

**START**

**ENGINEERING CHANGE NOTICE**

Page 1 of 2

1. ECN **192502**

Proj.  
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. M.J. Brown, Liquid Effluent Engineering, R3-45, 2-2972		4. Date 2-1-93
	5. Project Title/No./Work Order No. Project C-018H Waste Water Engineering Alternatives Report - Supplementary Information on Engineered Disposal Structures.	6. Bldg./Sys./Fac. No.  ETF	7. Impact Level 3ESQ 4 MJB 2/1/93
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-C018H-ER-003, Rev.0-A	9. Related ECN No(s). 133337	10. Related PO No.
11a. Modification Work  <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No.  N/A	11c. Modification Work Complete  N/A <i>M.J. Brown</i> 2/1/93 Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only)  N/A Cog. Engineer Signature & Date

12. Description of Change

The preferred alternative has been selected from six candidate alternatives. The following alternatives were evaluated (see Section 5.0, Appendix E).

- Soil column disposal (crib disposal options)
- Soil column disposal (pond disposal option)
- Solar evaporation
- Mechanical evaporation
- Beneficial use options, including recycling and irrigation.

The highest total scores were assigned to the soil column (crib disposal) alternative.



13a. Justification (mark one)	Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const. <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details

14. Distribution (include name, MSIN, and no. of copies)

SEE ATTCH & Distr. Sheet

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**ENGINEERING CHANGE NOTICE**

**15. Design Verification Required**

Yes  
 No

**16. Cost Impact**

**ENGINEERING**

Additional  \$  
Savings  \$

**CONSTRUCTION**

Additional  \$  
Savings  \$

**17. Schedule Impact (days)**

Improvement   
Delay

**18. Change Impact Review:** Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
Vendor Information	<input type="checkbox"/>	Operating Procedure	<input type="checkbox"/>	Electric Circuit Schedule	<input type="checkbox"/>
OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>		<input type="checkbox"/>

**19. Other Affected Documents:** (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision                      Document Number/Revision                      Document Number Revision

**20. Approvals**

Signature	Date	Signature	Date
<b>OPERATIONS AND ENGINEERING</b>		<b>ARCHITECT-ENGINEER</b>	
Cog Engineer <i>M. J. Burn</i>	<u>2/2/93</u>	PE	_____
Cog. Mgr. <i>D. L. Flyck</i>	<u>2/1/93</u>	QA	_____
QA	_____	Safety	_____
Safety	_____	Design	_____
Security	_____	Environ.	_____
Environ.	_____	Other	_____
Projects/Programs	_____		_____
Tank Waste Remediation System	_____		_____
Facilities Operations	_____	<b>DEPARTMENT OF ENERGY</b>	
Restoration & Remediation	_____	Signature or Letter No.	
Operations & Support Services	_____		
IRM	_____	<b>ADDITIONAL</b>	
Other	_____		_____

0250-272716

SUPPORTING DOCUMENT

1. Total Pages 488

2. Title  
Project C-018H Waste Water Engineering Alternatives Report - Supplementary Information on Treated Effluent Disposal Site Engineered Structures

3. Number  
WHC-SD-C018H-ER-003

4. Rev No.  
0 A

5. Key Words  
Project C-018H, 200 Area Effluent Treatment Facility (ETF), Organic, Inorganic, and Radioactive Contaminants, Treated Effluent, Blowdown, Methods Evaluation, Siting Evaluation, Crib, Soil Column Disposal, State Approved Land Disposal Structure (SALDS), 216 Consent Order, 240 Engineering Report

6. Author  
Name: M.J. Brown  
*M J Brown*  
Signature  
Organization/Charge Code 86330/AC404

7. Abstract  
This document provides the evaluation that justifies for the selection of a crib (i.e. a covered structure with an open bottom to the ground) as the selected alternative for State Approved Land Disposal (SALDS) from a list of alternatives that includes pond, river, solar evaporation, mechanical evaporation, and recycling/irrigation. This document also provides the evaluation that justifies the identification for a site just north of the 200 West Area as the preferred location for the SALDS from a seven other alternative sites located in or around the 200 Areas of the Hanford Site. This information is provided in summary form in the main body of the document and in detailed form via engineering studies in the appendices. This effort supports the completion of Project C-018H, the 242-A Evaporator and the Plutonium-Uranium Extraction (PUREX) Plant Condensate Treatment Facility and satisfy WIC Milestone No. 216-14-3 of the Consent Order DE 91NM-177 (216 Consent Order).

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*Legends removed per work legal RMB 2/1/93*

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9. Impact Level 3ESQ

917273.002



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Northern Security Operations (PFP)	<u>[Signature]</u>	<u>26 Jan 93</u>
Patrol (POC)	<u>[Signature]</u>	<u>01/21/93</u>
Northern Security Operations (POC)	<u>[Signature]</u>	<u>21 Jan 93</u>

TEST RECORDER

Northern Security Operations (PFP)	<u>[Signature]</u>	<u>1/26/93</u>
Northern Security Operations (POC)	<u>[Signature]</u>	<u>1/26/93</u>

FINAL APPROVAL AND ACCEPTANCE

PATROL	<u>[Signature]</u>	<u>1-27/93</u>
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200 East Security Rep. (POC)	<u>[Signature]</u>	<u>1/21/93</u>
200 West Cognizant Engineer	<u>[Signature]</u>	<u>1/27/93</u>
200 East Cognizant Engineer	<u>[Signature]</u>	<u>1-27-93</u>

9473773.0923



### 3.0 DISPOSAL METHOD SUMMARY

A crib (i.e., a covered structure with a bottom open to the ground) has been selected as the method of disposal for Project C-018H. This section of the document summarizes the evaluation process that led to this selection. More detailed discussion can be found in Appendix E.

#### 3.1 CRITERIA

The ranking process incorporated weighting factors that have been assigned to demonstrate the relative importance of minimizing radiation exposure as low as reasonably achievable (ALARA) considerations, environmental impact, permitting requirements, capital and operating costs, and implementation.

These criteria were chosen because they represent the key issues that need to be considered. The criteria were assigned the following weighting factors (see Section 5.0, Appendix E).

- ALARA (10)
- Environmental impact (8)
- Permitting requirements (5)
- Capital and operations costs (3)
- Implementation (2).

#### 3.2 EVALUATION

The preferred alternative has been selected from six candidate alternatives. The following alternatives were evaluated (see Section 5.0, Appendix E).

- Soil column disposal (crib disposal options)
- Soil column disposal (pond disposal options)
- Discharge to the Columbia River
- Solar evaporation
- Mechanical evaporation
- Beneficial use options, including recycling and irrigation.

The highest total scores were assigned to the soil column (crib disposal) alternative. A bar graph of the scores is provided in Figure 3-1. Crib and pond disposal scores for ALARA were higher than for all the other alternatives because the potential for radiation exposure (dose) is significantly lower for

soil column disposal systems. Crib disposal ranked higher than pond disposal because the pond would provide a surface area with a potential for exposure to birds and animals (environmental impact criteria), and more effluent would evaporate from a pond (ALARA criteria). Because of extensive characterization requirements and the complexities associated with permitting, crib disposal was ranked lower than some other alternatives for permitting and implementation criteria.

The third highest ranked alternative was mechanical evaporation. This disposal alternative would cost considerably more than other disposal alternatives, and would result in comparatively higher offsite exposure levels. Nonetheless, it was given comparatively high scores for environmental impact, permitting, and ease/feasibility of implementation criteria.

### 3.3 SELECTED METHOD

The selected disposal system alternative is a crib (Figure 3-2). Crib disposal has been practiced at the Hanford Site for many years and has been successful in retarding the movement of contaminants through the vadose zone to the Columbia River via the groundwater. This structure will be designated as the State Approved Land Disposal Structure (SALDS) upon Ecology's issuance of the waste water discharge permit.

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**Complete for all Types of Release**

<b>Purpose</b> <input type="checkbox"/> Speech or Presentation <input type="checkbox"/> Full Paper (Check only one suffix) <input type="checkbox"/> Summary <input type="checkbox"/> Abstract <input type="checkbox"/> Visual Aid <input type="checkbox"/> Speakers Bureau <input type="checkbox"/> Poster Session <input type="checkbox"/> Videotape		<input type="checkbox"/> Reference <input checked="" type="checkbox"/> Technical Report <input type="checkbox"/> Thesis or Dissertation <input type="checkbox"/> Manual <input type="checkbox"/> Brochure/Flier <input type="checkbox"/> Software/Database <input type="checkbox"/> Controlled Document <input type="checkbox"/> Other <u>Disposal Structures</u>	ID Number (include revision, volume, etc.) <u>WHC-SD-C0184-ER-003 Rev 0-A</u> List attachments. Date Release Required <u>02/01/93</u>
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Title Project C-0184 Waste Water Engineering Alternatives Report - Supplementary Information on Engineered **Unclassified Category** UC- **Impact Level**

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)

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References Available to Intended Audience	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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D.L. Flycke 2/1/93

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February 1, 1993

## Project Title/Work Order:

Project C-018H Waste Water Engineering Alternatives Report - Supplementary Information on Treated Effluent Disposal Site Engineered Structures (WHC-SD-C018H-ER-003 REV 0-A)/AC404

EDT No.:

ECN No.: 192502

Name	MSIN	With Attachment	EDT/ECN & Comment	EDT/ECN Only
D.L. Flyckt	R3-45			X
M.J. Brown	R3-45	X (5)		
A.F. Crane	R3-45			X
F.N. McDonald	R3-45	X		
J.P. Benton	R3-45	X		
W.R. Owen	R1-48	X		
S.T. Smith	H4-25			X
T.L. Bennington	H4-16			X
J.R. McCallum	H4-16	X		
N. Islam	R3-08			X
M. Jaka	R3-08	X		
C.J. Geier	H6-21			X
W.R. Brown	H6-21			X
W.R. Oldham	H6-25			X
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S.P. Skurla	H6-25	X		
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J.G. Wollard	H6-05			X
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K.J. Koegler	H6-05	X		
K.R. Fecht	H6-06			X
M. Marratt	H6-06			X
K.A. Lindsey	H6-06			X
B.G. Erlandson	H6-21			X
L.P. Diediker	H6-30	X		
M.E. Juguilon	L4-76	X		
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S.P. Reidel	H6-06	X		
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IRA	R1-08	X		