0019190

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 168240

Proj. ECN

2. ECN Category (mark one)							
Supplemental	[]	Change ECN	[]	Supersedure	[]		
Cancel/Void	[]	Direct Revision	[X]	Temporary	[]	Discovery	[]

3. Originator's Name, Organization, MSIN, and Telephone No.	4. Date
J. D. Davis, 81224, H4-55, 6-8919	2/5/92

5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Impact Level
W049-H Effluent Disposal Alternatives B-91-10	NA	3

8. Document Number Affected (include rev. and sheet no.)	9. Related ECN No(s).	10. Related PO No.
WHC-SD-W049H-ES-003, Rev. 0 F8717	NA	NA

11a. Modification Work	11b. Work Package Doc. No.	11c. Complete Installation Work	11d. Complete Restoration (Temp. ECN only)
[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	NA	NA Cog. Engineer Signature & Date	NA Cog. Engineer Signature & Date

12. Description of Change

Wording changes on the following four pages:

iii Change 6.4, "Conclusions" to "Conclusions and Recommendations."

6-1 Section 6.1, Change sentence 1 to "...Case 1, the case with the least conservative assumptions, as shown..."

6-7 Section 6.2, ¶1, Change sentence 1 to: "The weighted scores of all alternatives for Case 2, the case with the most conservative assumptions are..."

6-15 Section 6.4, Change title to: "Conclusions and Recommendations." Changed as per the attached.

13a. Justification (mark one)							
Criteria Change	[]	Environmental	[]	Facilitate Const.	[]		
Design Error/Omission	[]	Design Improvement	[]	As-Found	[]	Const. Error/Omission	[]

13b. Justification Details

Change requested by DOE/RL to improve clarity of recommendation.

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

Same as distribution for Rev. 0 issued 1/23/92 (attached sheet)

RELEASE STAMP

OFFICIAL RELEASE BY WHC

DATE FEB 19 1992

Station 11

FEB 1992 RECEIVED EDMC

A-7900-013-2 (11/88) (EF) GEF095
Engineering Change Notice

A-7900-013-1 (11/88)

ENGINEERING CHANGE NOTICE	Page 2 of 2	1. ECN (use no. from pg. 1) 168240

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[] No	Savings	[] $	Savings	[] $	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	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

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
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog./Project Engineer	2/12/92	PE	
Cog./Project Engr. Mgr.	2/12/92	QA	
QA	2/12/92	Safety	
Safety		Design	
Security		Other	
Proj. Prog./Dept. Mgr.			
Def. React. Div.			
Chem. Proc. Div.			
Def. Wst. Mgmt. Div.		DEPARTMENT OF ENERGY	
Adv. React. Dev. Div.			
Proj. Dept.			
Environ. Div.		ADDITIONAL	
IRM Dept.			
Facility Rep. (Ops.)			
Other			

ECN 168240

INFORMATION RELEASE REQUEST

References: WHC-CM-3-4

COMPLETE FOR ALL TYPES OF RELEASE

Purpose

- [ ] Speech or Presentation (Check only one suffix)
  - [ ] Full Paper
  - [ ] Summary
  - [ ] Abstract
  - [ ] Visual Aid
- [ ] Speakers Bureau
- [ ] Poster Session
- [ ] Videotape
- [ ] Reference
- [X] Technical Report
- [ ] Thesis or Dissertation
- [ ] Manual
- [ ] Brochure/Flier
- [ ] Software/Database
- [ ] Controlled Database
- [ ] Other

New ID Number: WHC-SD-W049H-ES-003 Rev.0-A

Existing ID Number (include revision, volume, etc.): WHC-SD-W049H-ES-003 Rev. 0.

If previously cleared, list ID number: WHC-SD-W049H-ES-003 Rev. 0

Date Release Required: 2/2/92

Title: PROJECT W049-H TREATED EFFLUENT DISPOSAL ALTERNATIVES ENGINEERING STUDY

Unclassified Category: UC-

Impact Level: 3

COMPLETE FOR SPEECH OR PRESENTATION

Title of Journal: N.A.

Group or Society Sponsoring: N.A.

Date(s) of Conference or Meeting: N.A.

City/State: N.A.

Will proceedings be published? N.A. [ ] Yes [ ] No

Will material be handed out? [ ] Yes [ ] No

Title of Conference or Meeting: N.A.

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	[ ]	[X]			
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Publication Services	[X]	[ ]	D. SMITH	D Smith	2/4/92
Other Program	[X]	[ ]	J. D. DAVIS	J. D. Davis	2/5/92
References Available to Intended Audience	[X]	[ ]	J. D. DAVIS	J. D. Davis	2/5/92
Transmit to DOE-HQ/Office of Scientific and Technical Information	[ ]	[X]			

Information conforms to all applicable requirements. The above information is certified to be correct.

Author/Requestor (Printed/Signature) Date

J. D. Davis 2/5/92

J. D. DAVIS

Responsible Manager (Printed/Signature) Date

M A Adams for 2/6/92

J. G. WOOLARD

Intended Audience

[ ] Internal [ ] Sponsor [X] External

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.

[illegible] 2/11/92

Date Received 2/11/92 VB

BD-7600-062 (4/90) (EF) WEF074
Information Release Request

Part 1

SUPPORTING DOCUMENT

1. Total Pages 163

2. Title: Project W049-H Treated Effluent Disposal Alternatives Engineering Study

3. Number: WHC-SD-W049H-ES-003

4. Rev No.: 0-A

5. Key Words:
Effluent Disposal Alternatives
Project W049-H

APPROVED FOR PUBLIC RELEASE
V. Birkland 2/11/92

6. Author: Bovay Northwest, Inc.
Name: Originator: J. D. Davis
J. D. Davis
Signature
81224
Env. Engr. Support Sect./A2C2B
Organization/Charge Code

7. Abstract: This study provides the basis for selecting the preferred disposal alternative for Project W049-H effluents. For the treated effluents likely to be disposed of, disposal to the soil column is clearly preferred over the other alternatives.

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

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9. Impact Level 2

10. RELEASE STAMP

OFFICIAL RELEASE (11)
BY WHC
DATE FEB 19 1992
Station #11

RECORD OF REVISION	(1) Document Number WHC-SD-W049H-ES-003 Page 1

(2) Title PROJECT W049-H TREATED EFFLUENT DISPOSAL ALTERNATIVES ENGINEERING STUDY

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
O-A	(7) Replace page iii with new page iii	J. D. Davis	M A Beam 2/6
O-A	Replace page 6-1 with new page 6-1	J. D. Davis	M A Beam 2/6
O-A	Replace page 6-7 with new page 6-7	J. D. Davis	M A Beam 2/6
O-A	Replace page 6-15 with new page 6-15	J. D. Davis	M A Beam 2/6

CONTENTS

6.0 CONCLUSIONS AND PREFERRED ALTERNATIVES

The purpose of this section is to present the preferred disposal alternatives for Case 1 and 2 treated effluent and further explain their ranking. This discussion also includes the impacts of changing evaluation criterion weights, deleting public perception as an evaluation criterion, and adding "benefit" to the irrigation alternative. The purpose of evaluating these changes was to determine the sensitivity of the alternative rankings to changes in the evaluation parameters.

The evaluation and scoring system utilized for this study was developed to provide a rational, consistent, and objective approach to avoid the influence of personal preferences and/or biases. A comparison of the disposal alternatives, weighted scores, and relative ranking by case is shown in Table 6-1.

Table 6-1. Disposal Alternatives Ranking.

Alternative	Case 1		Case 2	
	Weighted score	Rank	Weighted score	Rank
Crib	70	3	116	1
Pond	75	2	103	2
River discharge	76	1	77	3
Irrigation	45	4	57	4

6.1 CASE 1 SCORES

The weighted scores for crib, pond, and river discharge alternatives did not differ significantly for Case 1, the case with the least conservative assumptions, as shown in Figure 6-1. Virtually any of these three alternatives could be selected for use as a disposal alternative for Case 1 effluents.

The irrigation alternative scored significantly lower for Case 1 than the other three concepts. The low score was the result of a variety of factors, including potential environmental impact (in particular, large use of land), a more extensive regulatory process, high life cycle costs, and difficulty in implementation. This is presented graphically in Figures 6-2, 6-3, 6-4, and 6-5. Also evident in the figure is the similarity of the first three alternatives in the environmental impact criterion.

6.2 CASE 2 SCORES

The weighted scores of all alternatives for Case 2, the case with the most conservative assumptions, are shown in Figure 6-6. Weighted scores for river discharge were significantly lower than those for pond or crib disposal, and the irrigation alternative scored lowest.

The weighted score for crib disposal was approximately 15% higher than that of any other alternatives for Case 2. The high score for this alternative resulted primarily from high scores for the ALARA and environmental impact criteria, as shown in Figures 6-7 and 6-8. Both crib and pond disposal take advantage of the increased travel time to the river which allows for contaminant decay. However, the pond disposal alternative has the potential for exposure to both humans and animals via the air pathway. From an ALARA perspective, it is logical that crib disposal ranked higher than pond disposal because disposal of contaminated liquids in a subsurface environment prevents migration and deposition of wind-blown contamination.

River discharge ranked low due mostly to ALARA considerations. A dose of 0.04 mrem/yr to the maximum exposed individual was calculated based upon ^{238}Pu and ^{239}Pu levels (Appendix G). In addition, the implementation of the river discharge and incremental cost difference tended to decrease its weighted scores. The river discharge alternative also ranked low for the public opinion component of environmental impact. The survey indicates that the public wishes to avoid the discharge of any contaminants from the Hanford Site to the Columbia River. In contrast, from a regulatory and permit application perspective, river discharge ranked the highest of all alternatives for Case 2.

The irrigation alternative ranked the lowest for Case 2, for all evaluation criteria. As with Case 1, Case 2 scores were low for irrigation primarily due to environmental impact and the additional requirements for the regulatory process, life cycle cost, and implementation, as shown in Figures 6-9, 6-10, and 6-11.

Evaluation Criteria	Original Weight	Variation 3 Weight
ALARA	10	2
Environmental Impact	8	3
Regulatory Process	5	8
Life Cycle Cost	3	10
Implementability	2	5

With this variation, Case 1 rankings are altered such that the river alternative moved from first to third (Pond-113, Crib-100, River-99, Irrigation-54). Case 2 relative rankings are altered such that the crib and pond alternatives are reversed and river discharge and irrigation are third and fourth (Pond-113, Crib-117, River-92, Irrigation-53).

6.4 CONCLUSIONS AND RECOMMENDATIONS

The TEDF will dispose of treated effluents to which BAT/AKART have been applied in a manner that complies with regulatory requirements.

Three options are available for disposal of the BAT/AKART-treated effluents: discharge to the Columbia River, discharge to the soil column via a pond or crib, and irrigation. A method of objectively scoring and then ranking the alternatives was utilized. The evaluation criteria included a broad array of considerations that were weighted according to their perceived relative importance. The evaluation included ALARA, environmental impact, regulatory process and permitting requirements, rough-order-of magnitude life cycle costs, and implementability. The potential economic and environmental benefits of the disposal alternatives were not considered by this study. The irrigation alternative, for both Case 1 and Case 2, was determined to currently be the least desirable alternative for disposal of the effluents.

Discharge to the Columbia River requires compliance with an NPDES permit and applicable surface water quality criteria and standards. Discharging the effluent to the soil column requires compliance with the terms and conditions of a WAC 173-216 wastewater discharge permit.

Discharging the effluent to either the Columbia River or to the soil column was determined to be feasible and viable; discharging to the soil column is preferred for both Case 1 and Case 2. Discharge to the river and soil column are ranked essentially the same for Case 1; reasons for preferring disposal to the soil column include the environmentally less sensitive nature of the unsaturated zone and reduced implementation cost. For Case 2, the case with the most conservative assumptions, disposal to the soil column via crib or pond was the preferred disposal option. Consequently, disposal of the Project W049-H treated effluents to the soil column is recommended.

Discharge of the treated effluent to the soil column requires a State Waste Water Discharge Permit (WAC-173-216-110). Compliance with the terms and conditions of this permit will provide for the preservation and protection of groundwater quality, including compliance with the Ground Water Quality Criteria of WAC-173-040.

DISTRIBUTION SHEET

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Date: Feb. 19, 1992

Project Title/Work Order:

WHC-SD-W049H-ES-003, Rev. 0-A

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