0013574

ENGINEERING CHANGE NOTICE

Page 1 of 5

1. ECN XXXXXXX
Proj. ECN W-105-72

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.		4. Date
Supplemental ☒	T. AMBALAM, KEH, E6-25, 6-6259		02-13-91
Direct Revision ☐	5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Impact Level
Change ECN ☐	EVAP AND PUREX BASINS ER0156/W-105	~~424AL~~ 242AL	3
Temporary ☐	8. Document Number Affected (include rev. and sheet no.)	9. Related ECN No(s).	10. Related PO No.
Supersedure ☐	W-105-C1, Rev. 1	W-105-28,51	N/A
Discovery ☐			
Cancel/Void ☐			

11a. Modification Work	11b. Work Package Doc. No.	11c. Complete Installation Work	11d. Complete Restoration (Temp. ECN only)
☐ Yes (fill out Blk. 11b)	N/A	N/A	N/A
☒ No (NA Blks. 11b, 11c, 11d)	UNKNOWN	Cog. Engineer Signature & Date	Cog. Engineer Signature & Date

12. Description of Change

1) SECTION 02270
ADD a paragraph
1.1.1.3 Washington State Department of Transportation (WSDOT) Construction Manual
M41-01(CN)-87

1.3.1.1
MODIFY paragraph as follows:
Table 1, Line 3, under TEST FILL NO 1.
92 % standard proctor, compacted at moisture content, based on an average of all measurements of moisture content for each lift, between optimum and 4.5% over optimum.

3.1 REPLACE the entire ~~paragraph~~ ~~Section~~ Article 3/1/91 with the following:
INSTALLATION: Soil/bentonite liner mix

*** Description of change continued on page 3 ***

APR 1991 RECEIVED EDMC

RONALD G. HOLLENBECK STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER
3-7-91

13a. Justification (mark one)	13b. Justification Details
Criteria Change ☐	Based on test-fill data, requirements for bentonite, moisture content and compaction were selected. Construction specifications and procedures for testing and repair of the liner were modified to achieve desired permeability.
Design Improvement ☐	
Environmental ☒	
As-Found ☐	
Facilitate Const. ☐	
Const. Error/Omission ☐	
Design Error/Omission ☐	

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

KEH DISTRIBUTION
L. R. Tollbom R3-30(WHC)
Const Doc Cntl E2-50
Engrg Doc Cntl E6-52

WHC DISTRIBUTION
Project Files R1-28
W. A. Dupuis R3-28
J. K. Epperley S0-05
STATION 10 A3-87
LUPE GARZA A3-80

EDC
L. Hall S1-54
E. Hamm S4-65
M. W. Islam R3-08
K. J. Moss R3-12
D. R. Shreve R3-30
L. R. Tollbom (PE) R3-30
T. S. Vail R1-51
J. D. Williams H4-57
R. B. Wurz S5-15

DOE
A. G. Lassila A5-18

RELEASE STAMP

OFFICIAL RELEASE BY WHC
DATE MAR 11 1991
STATIONS 12

13

A-7900-013 (11/88)

188881	ENGINEERING CHANGE NOTICE	Page 2 of 5	1. ECN (use no. from pg. 1) W105-72

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)
	ENGINEERING		CONSTRUCTION		
☐ Yes	Additional ☒	$	Additional ☒	$	Improvement ☐
☒ No	Savings ☐	$	Savings ☐	$	Delay ☒ 6 WEEKS

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	☐		☐

N/A

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	[signature]	3/5/91	PE	[signature] 3-1-91	2/28/91
Cog./Project Engr. Mgr.			QA	[signature] 3/1/91	2/28/91 3-4-91
QA	[signature]	3-5-91	Safety	[signature] 3-1-91	2-27-91
Safety			Design	[signature]	2/26/91
Security			Other	N/A	
Proj.Prog./Dept. Mgr.			ENVR	[signature] 3/1/91	2/26/91
Def. React. Div.			SPECS	[signature] 3.1.91	2.27.91
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	[signature] U R SHREVE WHC/CE	3-5-91			

3.1.1 Prior to placing soil/bentonite mix, moisten existing subgrade as required and proof roll with 2 passes of vibratory smooth-surface, steel drum roller weighing at least 8 tons. Lay geotextile on proof rolled subgrade as shown on Drawings and as specified in Section 02758. Cover geotextile within 2 weeks of placement.

3.1.2
Mix soil and bentonite within the specified moisture content using pug mill and approved procedure. Lay geotextile over sub-grade before placing first lift. First lift shall be 12 inches maximum loose thickness and other lifts shall be 6 inches maximum loose thickness. Do not allow lifts to dry before covering.

3.1.3
KEH will perform following tests.
a) Laboratory tests.

Property	Test Method	Frequency	Values
Particle size analysis	ASTM D 422, ASTM D 1140	Per 1500 yd^3	N/A
Plasticity index	ASTM D 4318	Per 1500 yd^3	10 to 40
Bentonite content (%). Minimum 3 tests per sample with at least 2 test results meeting specified limits and 3rd test result falling within 1/2% of specified limits	Methylene blue test	Per 1500 yd^3	11.5 to 14.5

b) Field tests.

Property	Test Method	Frequency	Values
Density	ASTM D 2922	20 per lift	No less than 92 % of maximum density, as determined by WSDOT M41-01 Test method 609, based on the average of bentonite percentage calculated, for each lift or a day's production run.
Moisture content (%). Eighty percent of test results shall be within the range of 19.5 to 24.5%. Remaining twenty percent of the results shall be within the range of 19 to 25.5%. No two tests from adjacent test spots shall be outside the specified range.	ASTM D 3017	20 per lift	19.5 to 24.5

3.1.4 Obtain approval from KEH before placing each lift.
3.1.5 Remove debris and organic matter from area to receive mix.
3.1.6 Do not place on frozen ground.
3.1.7 Remove debris and organic matter from mix before compacting.
3.1.8 Mix, spread, and prevent drying in accordance with approved submittal. Allow material to set 24 hours minimum before placement.
3.1.9 Compaction equipments and methods.
3.1.9.1 A nominal 40 ton deep pad footed roller shall be used to compact lifts. Length of the pad foot shall be 6 inches minimum, ~~or equal to the depth of loose lift.~~ 3/1/91

3.1.9.2 Except for the top lift, all other lifts shall be compacted with a minimum of 6 passes of pad foot rollers.

3.1.9.3 The top most lift shall be compacted with two passes using pad foot roller and a minimum of four passes using smooth-surface, steel drum roller weighing at least eight tons.

3.1.9.4 After compaction is achieved, small rollers or compactors, less than 8 tons in capacity, may be used to obtain smoothness.
3.1.9.5 Topmost lift shall have a smoothness tolerance with no abrupt change in elevation, except locations shown in the plans, greater than 1 inch within a foot.
3.1.10 Remix or replace lift areas that fail to meet compaction or moisture content test requirements. Re-compact, and retest until requirements are met.

3.1.11 Areas to be replaced or remixed include locations where tests have failed and extend to edge of lift or to locations where tests have passed whichever is closest.
3.1.12 Desiccation cracking
Limits of areas where desiccation cracks are larger than 1.25 inches deep or 0.25 inches wide will be identified by KEH.
Replace or rework identified areas as follows:

- Remove dried or cracked soil-bentonite materials
- Scarify surface and spray with water
- Place additional soil-bentonite materials and add moisture if required
- Compact all lifts except the top most lift in accordance with 3.1.9.2
- Compact the top lift in accordance with Para. 3.1.9.3
- Trim surface to design grades and tolerances

3.1.13
Restrictions on substitutions: Any substitution of the following from that used for construction of test fill is not allowed.

a. Pug mill
b. Spreading or compaction equipment.
c. Material from a different borrow area.
d. Compaction procedure
e. Bentonite from Black Hills Bentonite Company

3.1.14 Protection after construction
3.1.14.1 Place 6-mil white polyethylene sheeting over finished liner with 12 inches of overlap.
3.1.14.2 Secure polyethylene sheeting with sand bags or other approved methods.