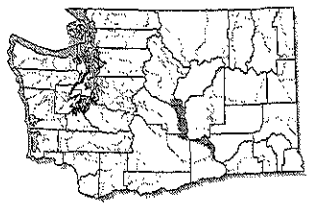
0700300
CC Recd: 01/25/2007

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99352 • (509) 372-7950

January 22, 2007



Your address is in the **Alkali-Squilchuck** watershed

Ms. Jennifer Nuzum
Director of Environmental Protection
Fluor Hanford, Inc.
PO Box 1000, MSIN: H8-12
Richland, Washington 99352

Re: Approval of *Hanford's Effluent Treatment Facility (ETF) Wastewater Solidification System Upgrade*

Dear Ms. Nuzum:

The Department of Ecology received the Technical Memorandum regarding the design for ETF's Wastewater Solidification System upgrade prepared by Fluor Hanford Inc. In accordance with the Revised Code of Washington (RCW) 90.48.110 and the Washington Administrative Code Chapter 173-240, and on behalf of Ecology, the above referenced document is hereby **APPROVED**.

Nothing in this approval shall be construed as satisfying other applicable federal, state or local statutes, ordinances or regulations.

You have the right to appeal this Technical Memorandum approval to the Pollution Control Hearings Board. Pursuant to Chapter 43.21B RCW, your appeal must be filed with the Pollution Control Hearings Board, and served on the Department of Ecology, within thirty (30) days of the date of your receipt of this document.

To appeal this action or decision, your Notice of Appeal must contain a copy of the Ecology order, action, or decision you are appealing.

Your appeal must be filed with:

Pollution Control Hearings Board
4224 - 6th Avenue SE, Rowe Six, Bldg. 2
P.O. Box 40903
Lacey, Washington 98504-0903

Your appeal must also be served on:

The Washington State Department of Ecology
Appeals Coordinator
P.O. Box 47608
Olympia, Washington 98504-7608

In addition, please send a copy of your appeal to:

Ron Skinnarland
Section Manager, Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

If you have any questions or need additional information, contact Michelle Mandis, reviewing engineer at 509-457-7970 or Kathy Conaway, permit manager, at 509-372-7890.

Sincerely,

Ron Skinnarland
Waste Management Section Manager
Nuclear Waste Program

mm/pll

Enclosures (2)

cc: Oscar Holgado, USDOE
Brian Dixon, FH
Kristi Lueck, FH
Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Todd Martin, HAB
Ken Niles, ODOE
Administrative Record: ETF
Environmental Portal

January 16, 2007

Recommendation for Approval

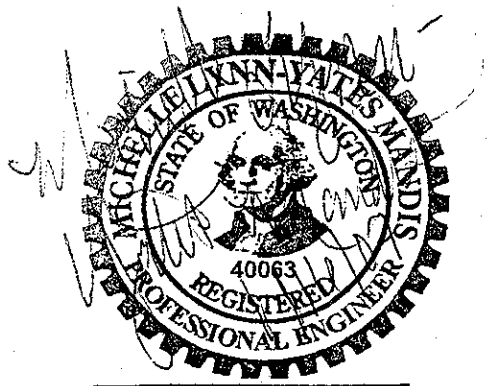
Hanford's Effluent Treatment Facility
(ETF) – Technical Memorandum for upgrades to ETF's Wastewater Solidification System
Submitted by Kristi Lueck, ETF Plant Engineer, Fluor Hanford, Inc.

Review Engineer - Michelle Mandis.

During the Ecology tour of the ETF (5/11/06), the addition of a new solidification treatment unit (STU) was discussed. Ecology noted that before the installation and operation of the STU and per WAC 173-240-110, submission and approval of an Engineering Report, submission and approval of Plans and Specifications, and submission of an Operation and Maintenance Manual were required for any modification of the industrial wastewater facility. The ETF has requested that Ecology waive the requirement of the three step submission of documents in lieu of conceptual plans per WAC Chapter 172-240-110 (5). Ecology has agreed to the waiver of the three step process and requested submission of a Technical Memorandum.

The ETF Technical Memorandum was received during the December 2006 Project Managers Meeting. The design proposes an upgrade of the ETF's existing Wastewater Solidification System. Currently, evaporate brine is routed to the thin film dryer which is heated by steam. As the brine flows down the dryer, it is dried into a powder that is scraped into a 55-gallon drum. The drums require additional processing such as wetting (to suppress air-borne emissions), crushing, and drying prior to disposal at the Environmental Restoration Disposal Facility.

The STU will limit personnel exposure and provide improved contamination control. Rather than routing the evaporate brine to the thin film dryer, the brine will be cooled and neutralized in an existing concentrate tank. The brine will be metered into the mixer as grout (e.g. Portland cement, fly ash, blast furnace slag, and/or lime) is added. When the mixture is homogenous, it is fed to waste containment bags, allowed to cure, sealed, and sent for disposal. The STU will require an additional HVAC system, but tie into the other existing ETF utilities. The STU rinse water will be routed to the head-end for reprocessing and is anticipated not to impact the ETF wastewater treatment capacity. Operation of the STU will supplement the thin film dryer. Construction is slated to start in May 2007 and be completed January 2008.



EXPIRES: 06-20-08

ETF
STU500

May start construction

1.0 INTRODUCTION

1.1 Objective of the New Unit

The STU will treat and solidify concentrate from the existing ETF evaporator by mixing the concentrate with dry, cementitious raw materials (e.g., Portland cement, fly ash, blast furnace slag, and/or lime).

The waste concentrate will be cooled, using a concentrate cooler for optimal processing. The cooled concentrate would be stored and pH adjusted in the existing concentrate tanks before being processed. The waste concentrate will be metered as it is fed to the grout mixer using concentrate circulation pumps. The aforementioned raw materials would be stored in separate silos located outside of, but adjacent to, the ETF. The raw materials will be individually weighed in weigh hoppers underneath the silos, then sequentially vacuum-transferred into a feed hopper (vacuum filter/receiver) located above the grout mixer, using a vacuum conveyance system. The feed hopper separates the air from the solids. After all ingredients are transferred into the feed hopper, they would be gravity-fed into the grout mixer through a rotary feeder.

The ingredients will be thoroughly mixed in the mixer until the mixture becomes homogenous. Once mixing is completed, the grouted waste would be emptied from the mixer by gravity into a waste containment bag supported in a loading cart located directly below the grout mixer. Once the mixer is empty, the loading cart containing the solidified waste containment bag would be removed from the loading area and staged to allow the grouted waste to set. Once the grouted waste has set, the solidification waste containment bag will be sealed and removed from the loading cart, then cleaned surveyed, and weighed before it is transported on pallets, using a forklift, to an outside waste storage area for curing, awaiting shipment to final disposal on the Hanford Site. The loading carts will be reused.

1.2 Description of Current Plant Operation (Thin Film Dryer)

The Evaporator brine is pumped to the thin film dryer that is heated by steam. As the evaporator brine flows down the length of the dryer, the waste is dried. The dried film, or powder, is scraped off the dryer cylinder by blades attached to a rotating shaft. The powder is funneled through a cone shaped powder hopper at the bottom of the dryer and into the container handling system.

A 55-gallon drum is raised underneath the dryer funnel. The container is sealed to the dryer and a rotary valve begins the transfer of powder to the empty drum. The drum is filled to a predetermined level, capped, and moved along a conveyor to the station air lock. The container is moved onto the conveyer by remote control. The drums are labeled, placed on pallets, and moved by forklift to the drum handling room where they are storage until final disposal on the Hanford Site.

Overhead vapor released by the drying of the evaporator brine is condensed in the distillate condenser. Excess heat is removed from the distillate by a water cooled heat exchanger. Part of the distillate is circulated back to the condenser spray nozzles. The remaining distillate is pumped to the head end of the main treatment train for processing.

1.3 Current Solid Waste Requirements

Solid waste generated at he ETF must meet the disposal site acceptance criteria. This criteria is documented in HNF-EP-0063, Rev. 12, *Hanford Site Solid Waste Acceptance Criteria*, and BHI-00139, Rev. 4, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*.

1.4 Current Solid Waste Characterization

The secondary treatment train typically processes the following by-products generated from the main treatment train: dissolved solids (inorganic metals/salts) removed from the reverse osmosis unit operation, suspended solids from filter backwash, and regeneration waste from the ion exchange system. These contaminates are dried to a powder. The primary constituents in the powder depend on the wastewater being treated. Typically the powder is made up of one or more of the compounds, sodium sulfate, calcium sulfate, sodium nitrate, sodium chloride, ammonium sulfate, and trace amounts of heavy metals.

2.0 DESCRIPTION OF PROPOSED MODIFICATIONS (STU)

2.1 Reason for Modification

Operation of the ETF thin-film dryer has been problematic in the past. Groundwater and other feed streams that differ significantly in composition from that identified in the dryer design specification have caused problems. Feed streams outside the design specification coupled with variation in feed density resulted in hard material buildup on the internals of the dryer. The material buildup eventually caused failure of the rotor blades, and frequent maintenance has been required. Design of the thin-film dryer operation has provided less than adequate contamination control and increased personnel exposure.

Disposal of solid waste in powder form has also become problematic. In the past, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) powder drums were wetted prior to disposal at the Environmental Restoration Disposal Facility (ERDF) to prevent the powder from going airborne when the drums are disposed of by crushing. Because of the variability in the amount of water needed to wet the drums adequately, this practice became unacceptable. Not enough water added to the drums caused airborne concerns, and too much water caused free liquid that is unacceptable for disposal.

One option to address the airborne concern is to dispose of the drums within structural vaults that will be constructed in the ERDF disposal cells, whereby there would no longer be a requirement to add water to the drums. However, this method is expensive. A second

alternative is for ERDF to run a grouting mixer and grout the powder. The powder drums would again be wetted prior to shipment to ERDF to avoid airborne issues when emptying the drums in the grout mixer, but excess water would be acceptable. This alternative is only an interim measure until the ETF has the ability to grout secondary waste, since grouting powder drums at ERDF is labor intensive and exposes workers to additional hazards.

Criteria for disposal of RCRA powder drums at the Mixed Waste Trench have also changed over the past year. In the past, the only reasons for monolithing containers were for RCRA macroencapsulation or Category III RAD stabilization. The Mixed Waste Trench recently instituted a pound-per-square-inch (psi) requirement for wastes disposed in the Mixed Waste Trench. The purpose of the psi requirement is to ensure safe use of the crane when it is operating on a waste layer. Monolithing, which is an expensive process, will likely be required for significantly more powder drums than in the past because of problems passing void space verification tests as the powder settles in the drums.

For these reasons an alternative technology is needed to process the evaporator brine concentrate to a waste form suitable for disposal. The STU project provides a cement-based stabilization method that meets progressively stringent disposal criteria. Cement-based stabilization converts the hazardous waste into their least soluble, mobile, or toxic forms.

2.1 Overall Effects of the Unit on the Facility and Other Units it Impacts

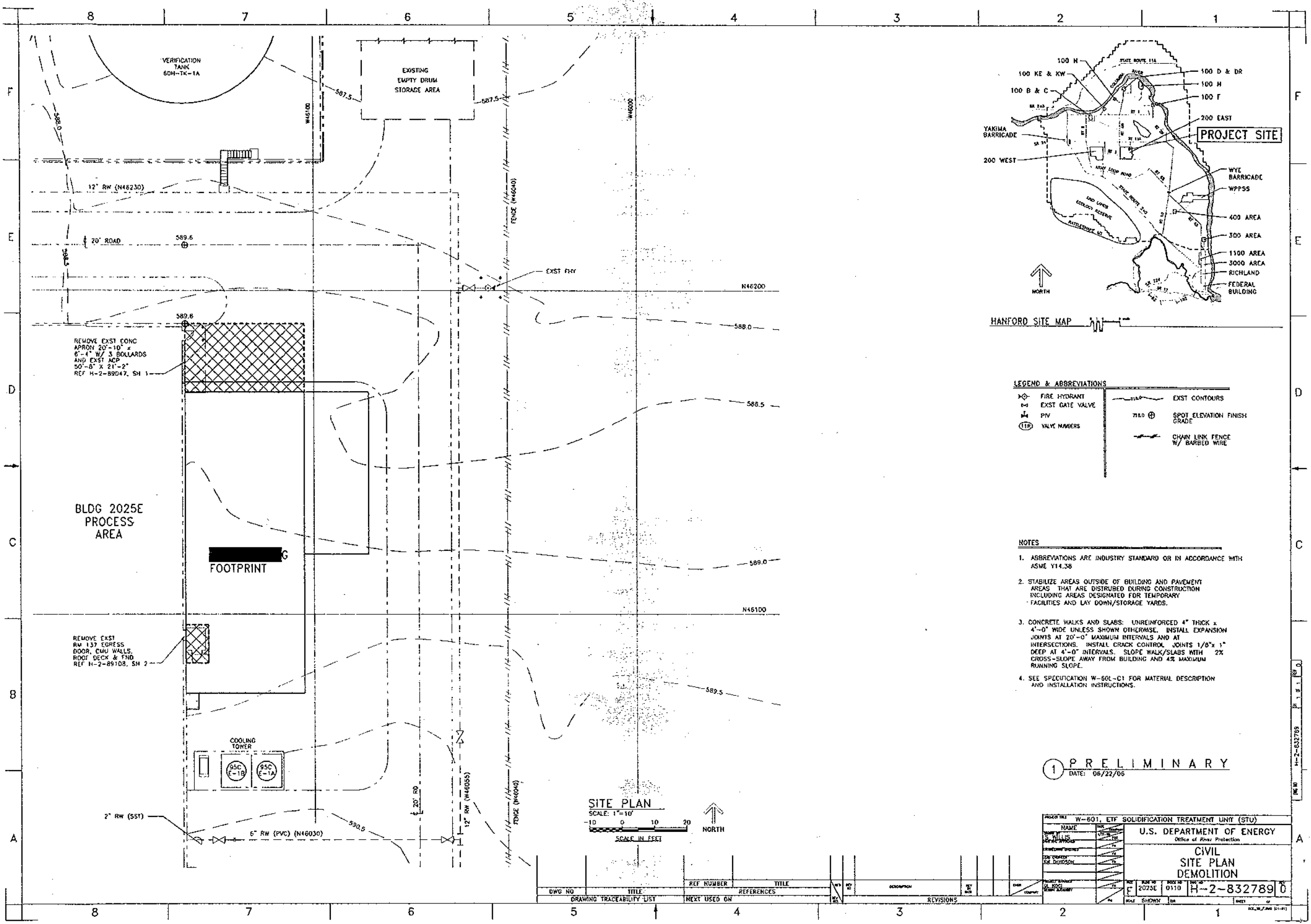
The STU will be the last unit operation of the ETF secondary treatment train and will supplement the existing thin film dryer. The STU will not impact other ETF unit operations. STU will tie-in to existing ETF utilities (e.g., instrument air, chilled water) that have spare capacity. STU will have its own HVAC system, separate from the ETF HVAC system. Verification water from the ETF will be used as rinse water in the STU and sent back to the head end of the ETF for treatment. The rinse water will be a small volume and will not effect the overall capacity of the ETF to treat other wastewaters.

2.2 Changes/Modifications Required in the Facility to Support the STU

No changes/modifications to the existing ETF are necessary other than tie-ins to utilities and process piping tie-ins to STU. STU will be an annex to the existing ETF building.

2.3 Timetable for Final Design and Construction

Final design of STU is schedule to be completed by 2/2/2007 with construction to start in May of 2007. Construction is scheduled to be completed in January of 2008.


VERIFICATION TANK 60H-TK-1A
EXISTING EMPTY DRUM STORAGE AREA
587.5
588.0
W46100
W46000
12" RW (N46230)
FENCE (W46040)
20' ROAD
589.6
588.5
EXST FHY
N46200
REMOVE EXST CONC APRON 20'-10" x 6'-4" W/ 3 BOLLARDS AND EXST ACP 50'-8" X 21'-2" REF H-2-89047, SH 1
588.0
588.5
BLDG 2025E PROCESS AREA
[redacted]G FOOTPRINT
589.0
N46100
REMOVE EXST RM 137 EGRESS DOOR, CMU WALLS, ROOF DECK & FND REF H-2-89108, SH 2
589.5
COOLING TOWER
95C E-1B
95C E-1A
2" RW (SST)
6" RW (PVC) (N46030)
590.5
20' RD
12" RW (W46055)
FENCE (W46040)
SITE PLAN
SCALE: 1"=10'
SCALE IN FEET
NORTH
HANFORD SITE MAP
100 N
100 KE & KW
100 B & C
YAKIMA BARRICADE
200 WEST
100 D & DR
100 H
100 F
200 EAST
PROJECT SITE
WYE BARRICADE
WPPSS
400 AREA
300 AREA
1100 AREA
3000 AREA
RICHLAND
FEDERAL BUILDING
NORTH
LEGEND & ABBREVIATIONS
FIRE HYDRANT
EXST GATE VALVE
PIV
VALVE NUMBERS
EXST CONTOURS
SPOT ELEVATION FINISH GRADE
CHAIN LINK FENCE W/ BARBED WIRE
NOTES
1. ABBREVIATIONS ARE INDUSTRY STANDARD OR IN ACCORDANCE WITH ASME Y14.38
2. STABILIZE AREAS OUTSIDE OF BUILDING AND PAVEMENT AREAS THAT ARE DISTRUBED DURING CONSTRUCTION INCLUDING AREAS DESIGNATED FOR TEMPORARY FACILITIES AND LAY DOWN/STORAGE YARDS.
3. CONCRETE WALKS AND SLABS: UNREINFORCED 4" THICK x 4'-0" WIDE UNLESS SHOWN OTHERWISE. INSTALL EXPANSION JOINTS AT 20'-0" MAXIMUM INTERVALS AND AT INTERSECTIONS. INSTALL CRACK CONTROL JOINTS 1/8"x 1" DEEP AT 4'-0" INTERVALS. SLOPE WALK/SLABS WITH 2% CROSS-SLOPE AWAY FROM BUILDING AND 4% MAXIMUM RUNNING SLOPE.
4. SEE SPECIFICATION W-601-C1 FOR MATERIAL DESCRIPTION AND INSTALLATION INSTRUCTIONS.
PRELIMINARY
DATE: 06/22/06
W-601, ETF SOLIDIFICATION TREATMENT UNIT (STU)
NAME
S WILLIS
GL KOCI
U.S. DEPARTMENT OF ENERGY
Office of River Protection
CIVIL
SITE PLAN
DEMOLITION
F
2025E
0110
H-2-832789
0
SHOWN
DWG NO
TITLE
DRAWING TRACEABILITY LIST
REF NUMBER
TITLE
REFERENCES
NEXT USED ON
REVISIONS

60L-FL-4A/B
INLET AIR FILTER

60L-BN-1
CEMENT STORAGE SILO

60L-BN-2
SLAG STORAGE SILO

60L-BN-3
LIME STORAGE SILO

60L-H-5
FEED HOPPER

60L-FL-5
VACUUM FILTER

60L-H-1
CEMENT WEIGH HOPPER

60L-H-2
SLAG WEIGH HOPPER

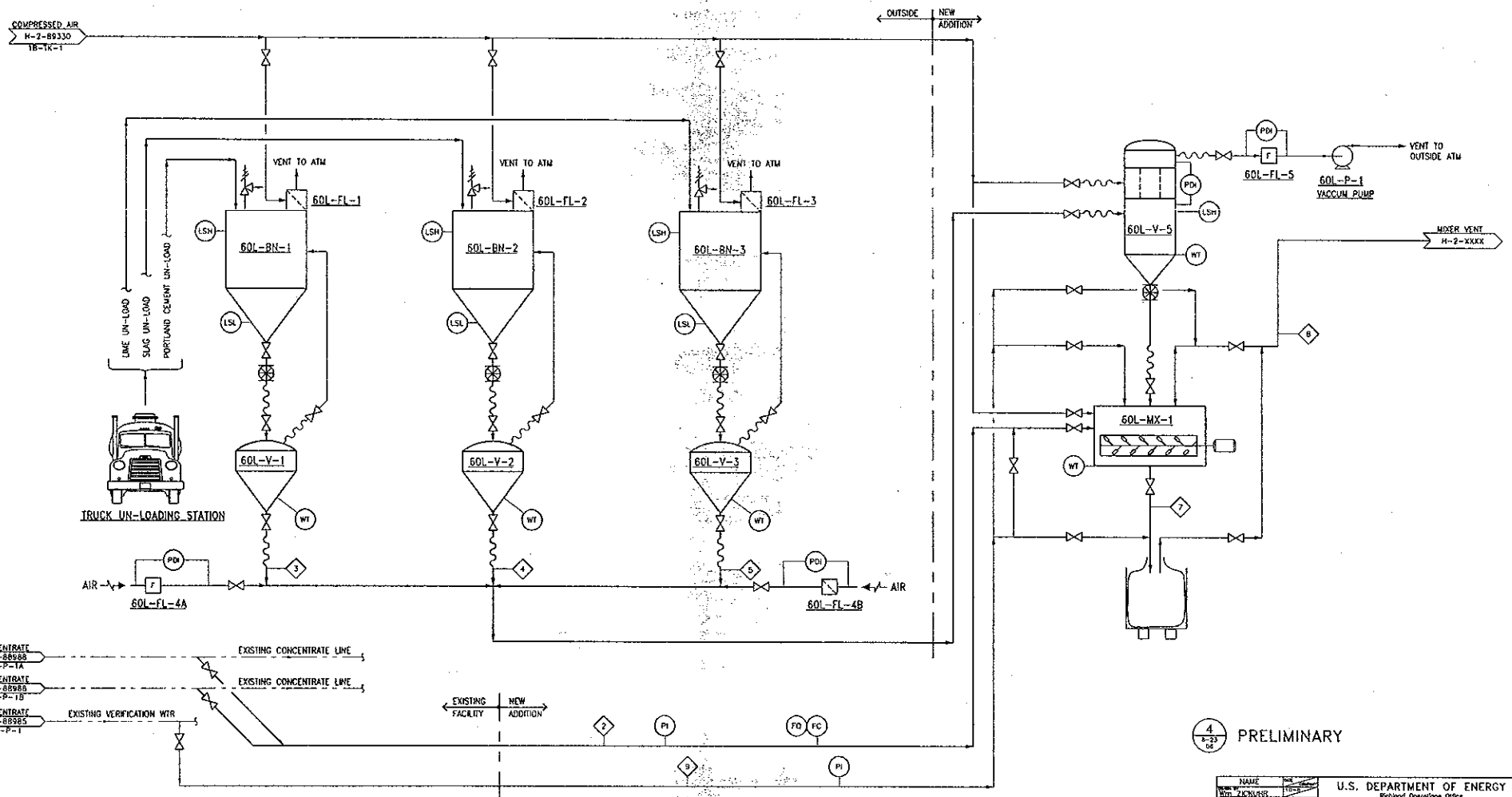
60L-H-3
LIME WEIGH HOPPER

60L-MX-1
GROUT MIXER

60L-FL-1
CEMENT SILO AIR FILTER

60L-FL-2
SLAG SILO AIR FILTER

60L-FL-3
LIME SILO AIR FILTER



4 PRELIMINARY

DWG NO	TITLE	REF NUMBER	TITLE
DRAWING TRACEABILITY LIST		NEXT USED ON	REFERENCES

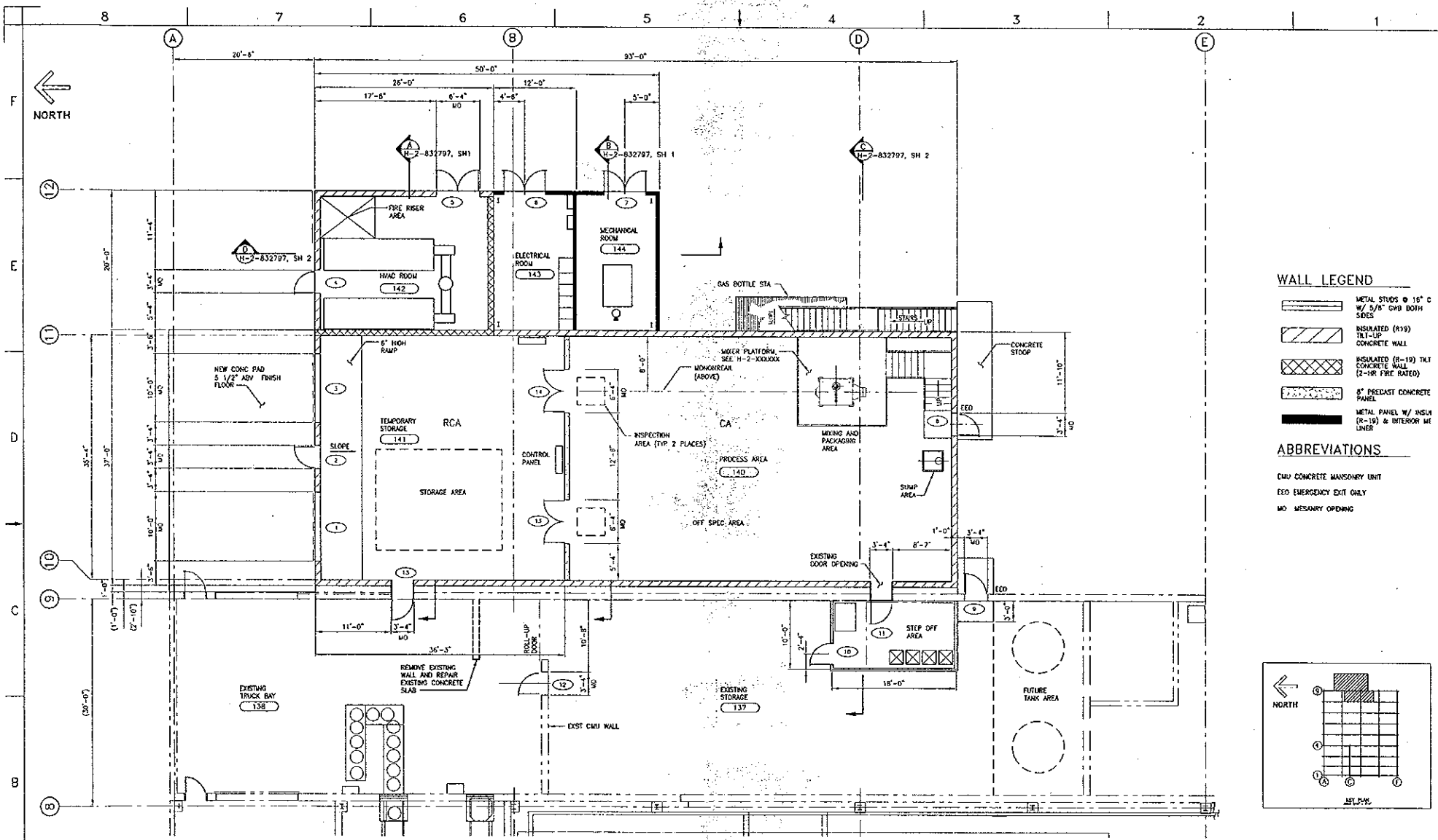
REVISIONS					

U.S. DEPARTMENT OF ENERGY
Richland Operations Office

EFFLUENT TREAT FACILITY
SOLID TREAT UNIT
PROCESS FLOW DIAGRAM

SIZE	DWG NO	REV
F	H-2-832777	0

SCALE NONE
SHEET 1 OF 1



FIRST FLOOR PLAN

SCALE: 3/16"=1'-0"
FINISHED FLOOR EL = 0'-0" (UNO)

5 PRELIMINARY
DATE: 7/31/06

W-601, ETF SOLIDIFICATION TREATMENT UNIT (STU)

U.S. DEPARTMENT OF ENERGY
Richland Operations Office

ARCHITECTURAL
FIRST FLOOR PLAN

F | 2025E | 0600 | H-2-832795 | 0

DRAWING TRACEABILITY LIST

DWG NO	TITLE	REF NUMBER	TITLE
		REFERENCES	
		NEXT USED ON	

REVISIONS

FMP-8 (Facility Modification Package - Continuation Page)

FMP Section Title: DWG-1 | DATE X/X/06 | PAGE 1 OF 1

H-2-88991 SH 1 REV 18
REVISE DRAWING ZONE F2, ADD NOTE 3