(CLASSIFICATION)

HW-34487

February 28, 1955

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HANFORD ATOMIC PRODUCTS OPERATION - RICHLAND, WASHINGTON

200

SCAVENGING OF STORED TBP WASTE

F. W. Poucher and W. P. Ingalls

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Page 1

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T. L. Burnside May 1973
BY *Helen Allen* DATE *1/3/94*
M. O. Gill 1-5-94

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SCAVENGING OF STORED TBP WASTE

Prepared By

F. W. Poucher and W. P. Ingalls

February 28, 1955

PROCESS ENGINEERING SUB-SECTION
DESIGN SECTION
ENGINEERING DEPARTMENT
GENERAL ELECTRIC COMPANY
HANFORD ATOMIC PRODUCTS OPERATION

This document has been reviewed and approved
by the appropriate members of the Process
Engineering Sub-Section as a scope basis for
the preparation of detailed designs for nickel
ferrocyanide scavenging of stored TBP wastes.

_____
Head, Separations Design and Development

_____
Manager, Process Engineering

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SCAVENGING OF STORED TBP WASTE

INTRODUCTION

The reactivation of B-Plant and the continued operation of T-Plant under the 4X Program have led to the problem of obtaining additional underground tankage in both 200 East Area and 200 West Area for the storage of B-Plant metal waste, second cycle waste sludge, 224-B Building waste sludge, B and T-Plant first cycle waste scavenged sludge, and perhaps additional TBP concentrated wastes.(1)(3)

As a result of this problem, a study has been made to determine the engineering feasibility of using a scavenging type process, similar to that used in the TBP Plant, for recovering the storage space in tanks currently filled with TBP wastes.(2) The results of this study are reported herein.

PURPOSE

The purpose of this document is to present the scope, justification, and engineering feasibility of a nickel ferrocyanide scavenging system for stored TBP wastes.

SUMMARY AND CONCLUSIONS

The reactivation of B-Plant and the continued operation of T-Plant require that additional tank space be made available prior to the time that new tanks could be constructed. Continuation of the program of evaporating the wastes to provide additional tank space is not practicable because of the difficulty in handling the resulting "bottoms" sludge for long distances. The tanks normally used for "bottoms" are all full. Thus, the best and quickest way to provide the required tank space is to install facilities for scavenging the TBP wastes now stored in the 200 East and 200 West tanks.

The total volume of underground tankage recoverable in 200 East Area, using a nickel ferrocyanide scavenging system, is approximately . . . . . 5,970,000 gallons.

The capital investment required to install "in-farm" nickel ferrocyanide facilities in 200 East Area is estimated to be . . . . . \$126,000.

The total volume of underground tankage recoverable in 200 West Area, using a nickel ferrocyanide scavenging system, is approximately . . . . . 3,402,000 gallons.

The capital investment required to install "in-farm" nickel ferrocyanide scavenging facilities in 200 West Area is estimated to be . . . . . \$130,000.

The scope of the installation of an "in-farm" nickel ferrocyanide scavenging system for 200 East Area is shown on the following drawings (attached):

- (1) HW-34052, "Waste Tank Scheduling for B and T Plants," by DE Peterson, 12-9-54.
- (2) HW-33536, "Nickel Ferrocyanide Scavenging Flowsheet for Neutralized Concentrated RAW," by RE Smith and EA Coppinger, 10-26-54.
- (3) HW-34635, "Justification For Additional Waste Storage Tanks," by DE Peterson, 1-12-55.

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1. SK-2-1818, "Engineer's Sketch, Stored TBP Waste Scavenging, 244-CR Process Vault."
2. SK-2-1817, "Chemical Addition, Stored TBP Waste Scavenging, Plot Plan, 244-CR Process Vault."
3. SK-2-1819, "New Chemical Make-up and Storage Building For Stored TBP Waste Scavenging, Equipment Arrangement."

The scope of the installation of an "in-farm" nickel ferrocyanide scavenging system for 200 West Area is shown on the following drawings (attached).

1. SK-2-1821, "Engineer's Sketch, Stored TBP Waste Scavenging, 200 West Area."
2. SK-2-1820, "Scavenging of Stored TBP Wastes, Waste Disposal, 200 West Area."
3. SK-2-1822, "Chemical Make-up and Storage Building For Stored TBP Waste Scavenging, Arrangement."

RECOMMENDATIONS

It is recommended that "in-farm" nickel ferrocyanide scavenging facilities be installed in both 200 East and 200 West Areas in accordance with the attached scope requirements.

DISCUSSION

I. Justification

The justification of "in-farm" scavenging facilities for both East and West Areas is based primarily on the critical need for additional waste tankage as pointed out in Document HW-34052 (1). Construction of new tankage is impractical due to the time involved (approximately eighteen months) and evaporation in the tank farm waste evaporators is also difficult at present due to the problem of disposing of the resulting evaporator bottoms (also pointed out in reference (1)).

A. 200 East Area

There is a need for underground storage space in 200 East, due to the startup of B-Plant in the latter part of 1955. This tankage will be necessary to store metal waste from 221-B Building, the waste sludge from the 224-B Building and second cycle, and 221-B Building first cycle waste scavenged sludge.

There are several underground storage tanks in 200 East that contain TBP wastes which could be used to relieve the storage problem if the TBP wastes were removed. These tanks include five C-Farm tanks, which are equipped with metal removal facilities (101 through 106 except Tank 104-C, which is empty and presently being used for blending but could be used for metal waste storage), six C-Farm tanks not equipped for metal removal (107 through 112) and two tanks in BX-Farm (108 and 109) and the 112-B Tank which do not contain metal removal facilities. In order to free these tanks for use, 6,637,000 gallons of stored TBP waste would be processed. A nickel ferrocyanide scavenging system would recover approximately 90 per cent of this volume or about 5,970,000 gallons in six to seven months' processing time.

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(1) HW-34052, "Waste Tank Scheduling for B and T Plants," by DE Peterson, 12-9-54.

The first tanks that will need to be processed are the 109-C and 112-C Tanks to be used for "in-farm" scavenged waste settling and decanting, the 109-BX Tank to be used for B-Plant coating waste, the 112-B Tank to be used for B-Plant 5-6, second cycle and 224-B Building wastes, and the 111-C Tank for B-Plant first cycle scavenged waste settling and decanting. These tanks are required for B-Plant start-up and assurance of continued operation.

B. 200 West Area

In addition to the tanks in 200 East, there are several storage tanks in 200 West which contain TBP waste. The removal of this waste would result in tankage available for T-Plant normal wastes and first cycle scavenged sludge resulting from continued operation of this plant under the 4X Program. Also, it would make tankage available for TBP scavenged sludge when this need arises. Due to insufficient data at this time, the date that this tankage will be needed for TBP is uncertain. Therefore, the installation of a scavenging facility in 200 West should be made as soon as possible as a safeguard against shut-down of the TBP Plant.

The tanks containing TBP waste are the 105 and 106-TX Tanks (to be used for T-Plant first cycle scavenged sludge), the 103, 110, and 111-TX Tanks and the 107-T Tank. In order to remove this waste, 3,780,000 gallons would be processed. A nickel ferrocyanide scavenging process would recover approximately 90 per cent of this volume or about 3,402,000 gallons in four or five months' processing time.

II. Scavenging Process Description

In the scavenging of stored TBP wastes, the bulk of the long-lived fission products in the stored waste is removed on a nickel ferrocyanide precipitate, which is allowed to settle and form a sludge that is stored in underground tanks. After settling, the supernatant from this sludge is decanted and cribbed.

A. 200 East Area

Addition of scavenging chemicals to the stored TBP waste will be made in the 244-CR Process Tank Vault. TBP waste from the underground storage tanks will be batch fed alternately to Blend Tanks 002 and 003, where it will be sampled and the pH adjusted to approximately nine. The two scavenging chemicals, sodium ferrocyanide and nickel sulphate, are then added batchwise in amounts which will make the waste 0.005 M in nickel ferrocyanide (the sodium ferrocyanide should be added first for process reasons). The waste will then be pumped, via the Process Pump Tank (TK-CR-011), to the 241-C Tank Farm for settling. After the scavenger is allowed to settle for about ten days, the supernatant, approximately 90 per cent of the original waste volume, will be pumped to cribs. The settling tanks and cribs to be used for this system are the same as the ones to be installed for B-Plant First Cycle Waste Scavenging. The use of these cribs, which will be located to the southwest of 200 East Area, may possibly cause a supernatant pumping problem due to crystallization of the supernatant in the long cross country line from C-Farm to this area. Data are available which indicate that stored TBP wastes in the pH range at which scavenging will take place (9 to 9.5) will tend to start crystallizing at temperatures between 10 to 20°C⁽⁺⁾. To safe-guard against this, a water connection will be provided

- (4) HW-27489, "Factors Affecting The Concentration of TBP Plant Wastes," by J. Soward, CW Pollack, WS Ferguson & DF Shepard, 3-25-53.

on the pump discharge to the cribs to allow dilution of the wastes should this prove necessary.

B. 200 West Area

The "in-farm" scavenging process in 200 West is the same as that in 200 East, except that the addition of scavenging chemicals will be made in 242-T Waste Evaporator, modified for this purpose. After the scavenging chemicals are added, the waste will be jetted to the 241-TX Tank Farm for settling and decanting. The cribs to be used for supernatant disposal are the ones to be installed for T-Plant First Cycle Waste Scavenging.

III. Scavenging Scope Description

A. 200 East Area

The scope of an "in-farm" scavenging process for 200 East is shown on drawings SK-2-1817, SK-2-1818, and SK-2-1819 (attached) and is described in the following paragraphs.

Drawing SK-2-1818, "Engineer's Sketch, Stored TBP Waste Scavenging, 244-CR Process Vault," shows the volumes of chemicals to be added, scavenged waste volume and the new equipment, jumpers and piping required to convert the 244-CR Process Tank Vault to an "in-farm" scavenging facility. The material balance on this drawing is based on figures obtained from reference (2).

A new 3000 gallon black iron tank (with coil and 10 HP agitator) is needed for NaOH storage. This tank will gravity feed into a new 200 gallon black iron weigh tank. Caustic from the weigh tank will then be pumped (new 10 gpm pump) to the Blend Tanks CR-002 and CR-003 in new piping which enters these tanks through an existing 6" riser in the instrument pit. A new 200 gallon stainless steel tank (with coil and 1.5 HP agitator) is required for nickel sulphate make-up. This tank will gravity feed a new 50 gallon stainless steel weigh tank. Solution from this tank is then jetted to the Blend Tanks via new piping inserted into the tanks through the same 6" instrument pit riser. A new 600 gallon stainless steel tank (with coil and 1.5 HP agitator) is needed for sodium ferrocyanide make-up. This tank will gravity feed into a new 200 gallon stainless steel weigh tank. Solution from this tank will be jetted to the Blend Tanks through a new line which ties into the existing HNO₃ addition lines. Nitric acid from Tank CR-004 will require a new line and 10 gpm pump to this same weigh tank. The scales for the weigh tanks are to be obtained from the 221-T Building. However, if scales are unavailable at the time of installation of the tanks, weight factor instruments will be satisfactory. Both the NaOH storage tank and the HNO₃ storage tank will require flanged inlet lines for filling from the tank trucks. The Process Pump Tank CR-011 will require a 25 HP agitator (to be obtained from spare parts), a new electrical jumper from U-8 to L-6, and a new lubrication jumper from U-7 to L-7.

Drawing SK-2-1817, "Chemical Addition, Stored TBP Waste Scavenging, Plot Plan, 244-CR Process Vault," shows the approximate locations of the chemical addition piping and the new chemical make-up and storage building.

-
- (2) HW-33536, "Nickel Ferrocyanide Scavenging Flowsheet for Neutralized Concentrated RAW," by RE Smith, and EA Coppinger, 10-26-54.
-

Drawing SK-2-1819, "New Chemical Make-up and Storage Building for Stored TBP Waste Scavenging, Equipment Arrangement," shows the approximate arrangement of the make-up tanks, weigh tanks and auxiliary equipment, and the approximate size necessary for the building.

The scope of the facilities for decanting and supernatant disposal are shown on drawings SK-2-1839 and SK-2-1850 (not attached) and are part of the scope of first cycle waste scavenging for B-Plant. Therefore, they will not be described in this document.

B. 200 West Area

The scope of an "in-farm" scavenging process for 200 West is shown on drawings SK-2-1820, SK-2-1821, and SK-2-1822 (attached) and is described in the following paragraphs.

Drawing SK-2-1821, "Engineer's Sketch, Stored TBP Waste Scavenging, 200 West Area," shows the volume of chemicals to be added, scavenged waste volume, equipment and new piping necessary to convert the 242-T Waste Evaporator into an "in-farm" scavenging facility. The figures for the material balance on this drawing were obtained from reference (2).

The make-up tanks, NaOH storage tank, weigh tanks, scales and their piping are similar to those needed in 200 East Area and described in Section III-A. In addition, a new 3,000 gallon stainless steel tank equipped with a flanged line for tank truck filling will be needed for nitric acid storage. New fill lines to the waste evaporator will be required from the three weigh tanks. The waste evaporator will also require a sampler and a new jet-out line to be connected to a new underground line to the 242-T-151 Diversion Box. A piping change will also be necessary in the feed line to the waste evaporator. This will require a new section of pipe to by-pass the feed tank and connect into the pre-heaters by-pass line that feeds the waste evaporator. Blanks will then have to be inserted in the lines to the feed tank, from the feed tank, from the pre-heaters, to the gravity drain and to the sludge drain.

Drawing SK-2-1822, "Chemical Make-up and Storage Building For Stored TBP Waste Scavenging, Arrangement," shows the approximate location of the make-up building and the approximate location of the new nitric acid storage tank.

Drawing SK-2-1820, "Scavenging of Stored TBP wastes, Waste Disposal, 200 West Area," shows the new underground line from the 242-T Building to the 241-T-151 Diversion Box, the tank to be used for settling, decanting, and sludge storage (PK-241-TX-117) and the manifolding of the 100 gpm floating suction pump to the T-Plant first cycle waste scavenging supernatant discharge header.

IV. Capital Cost For Scavenging

A. 200 East Area

The capital investment required to install an "in-farm" scavenging facility in 200 East is estimated to be \$115,000, as shown on Table I, Parts A and B.

- (2) HW-33539, "Nickel Ferrocyanide Scavenging Process for Neutralized Concentrated RAW," by GE Smith and RA Crappinger, 10-20-64.

This includes all the items shown on drawings SK-2-1817, SK-2-1818, and SK-2-1819.

B. 200 West Area

The capital investment required for the installation of an "in-farm" scavenging facility in 200 West is estimated to be \$130,000, as shown on Table II, Parts A and B. This includes all the items shown on drawings SK-2-1820, SK-2-1821, and SK-2-1822.

F. W. Poucher, Jr.
Separations Design & Development
Design Section
ENGINEERING DEPARTMENT

W. P. Ingalls
Separations Design & Development
Design Section
ENGINEERING DEPARTMENT

FW Poucher/WP Ingalls:pk

REFERENCES

1. HW-34052, "Waste Tank Scheduling For B and T Plants," by DE Peterson, 12-9-54.
2. HW-33536, "Nickel Ferrocyanide Scavenging Flowsheet For Neutralized Concentrated RAW," by RE Smith and EA Coppinger, 10-26-54.
3. HW-34635, "Justification For Additional Waste Storage Tanks," by DE Peterson, 1-26-55.
4. HW-27489, "Factors Affecting The Concentration of TBP Plant Wastes," by JW Soward, CW Pollack, WS Ferguson & DF Shepard, 3-25-53.

PRELIMINARY ESTIMATE

HW-34487

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Job No. CG-603

TABLE I - Part A
SCAVENGING OF STORED TBP
WASTES - 200 EAST AREA

Work Performed By: Minor Construction

	<u>LABOR</u>	<u>MATERIAL</u>	<u>TOTAL</u>
Site Decontamination	\$ 200	\$	\$ 200
Clearing and Grading	500		500
Contamination Clean-up (Building & Equipment)			—
Temporary Facilities	2,000	1,500	3,500
Structure & Equipment	30,000	28,000	58,000
Heavy Equipment Charges			5,000
Construction Overheads			26,600
Construction Engineering			5,000
Escalation			
Sub Total Direct Constr. Cost	\$ 32,700	\$ 29,500	\$ 98,800
Contingencies 15%			<u>14,800</u>
Total Direct Construction Cost			\$ 113,600
Administrative Expense			3,400
Design Engineering			<u>9,000</u>
			\$ 126,000

Approved: J. A. Hall

(Estimating) 2/15/55

Approved: W. P. Ingalls

(Engineering) 2/28/55

PROJECT DESIGN ESTIMATE

GENERAL ELECTRIC COMPANY
HANFORD ATOMIC PRODUCTS OPERATION

PROJECT		TYPE OF ESTIMATE	
Scavenging of Stored TBP Wastes - 200-East		(A) ☐ STUDY STAGE	
DATE PREPARED	ESTIMATED BY	(B) ☒ DESIGN SCOPE	100 % COMPLETE
2/15/55	D. O. Webb	(C) ☐ FINAL DESIGN	% COMPLETE

ENGINEERING, INCLUDING SCOPING,
DETAILED DESIGN, AND DESIGN
SERVICES IN THE FIELD

ENGINEERING DESIGN

3,600

DRAFTING

3,000

PROJECT MANAGEMENT

800

Sub-Total

7,400

ARCHITECT ENGINEERSENGINEERING ASSISTANCE TO HANFORD,
INCLUDING CONSULTANTS, ENGINEERING
ASSISTANCE CONTRACTORS, KAPL, GEL, ETC.ENGINEERING SERVICES (HANFORD)

TRAVEL AND LIVING

(blank)

REPRODUCTION

200

ESTIMATING

200

LAYOUT AND SURVEY

300

OTHER

(blank)

SUB-TOTAL

700

TEST MATERIALS AND EXPERIMENTAL TESTSCONTINGENCIES

TOTAL

900

2,000

DISTRIBUTION BY DESIGN STAGE

DESIGN SCOPE

2,300

DETAILED DESIGN

4,800

DESIGN SERVICES IN THE FIELD

1,000

CONTINGENCIES

900

TOTAL

9,000

PRELIMINARY ESTIMATE
TABLE II - Part A
SCAVENGING OF STORED TBP
WASTES - 200 WEST AREA

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Page 12
Job No. CG-603

Work Performed By: Minor Construction

	<u>LABOR</u>	<u>MATERIAL</u>	<u>TOTAL</u>
Site Decontamination	\$ 200	\$	\$ 200
Clearing & Grading	500		500
Contamination Clean-up (Building & Equipment)			—
Temporary Facilities	2,000	1,500	3,500
Structure & Equipment	30,000	31,000	61,000
Heavy Equipment Charges			5,000
Construction Overheads			26,600
Construction Engineering			5,000
Escalation			
Sub Total Direct Construction Cost	\$ 32,700	\$ 32,500	\$ 101,800
Contingencies 15%			<u>15,500</u>
Total Direct Construction Cost			\$ 117,300
Administrative Expense			3,700
Design Engineering Cost			<u>9,000</u>
Total Project Cost			\$ 130,000

Approved: J. T. Hall

(Estimating)

2/15/55

Approved: W. R. Ingalls

(Engineering)

2/26/55

PROJECT DESIGN ESTIMATE
GENERAL ELECTRIC COMPANY
HANFORD ATOMIC PRODUCTS OPERATION

PROJECT		TYPE OF ESTIMATE	
Scavenging of Stored TBF Wastes - 200 West		(A) ☐ STUDY STAGE	
DATE PREPARED	ESTIMATED BY	(B) ☒ DESIGN SCOPE	100 % COMPLETE
2/15/55	D. O. Webb	(C) ☐ FINAL DESIGN	% COMPLETE

<u>ENGINEERING, INCLUDING SCOPING, DETAILED DESIGN, AND DESIGN SERVICES IN THE FIELD</u>		
ENGINEERING DESIGN	3,600	
DRAFTING	3,000	
PROJECT MANAGEMENT	800	
Sub-Total		7,400
<u>ARCHITECT ENGINEERS</u>		
<u>ENGINEERING ASSISTANCE TO HANFORD, INCLUDING CONSULTANTS, ENGINEERING ASSISTANCE CONTRACTORS, KAPL, GEL, ETC.</u>		
<u>ENGINEERING SERVICES (HANFORD)</u>		
TRAVEL AND LIVING		
REPRODUCTION	200	
ESTIMATING	200	
LAYOUT AND SURVEY	300	
OTHER		
SUB-TOTAL		700
<u>TEST MATERIALS AND EXPERIMENTAL TESTS</u>		
<u>CONTINGENCIES</u>		900
TOTAL		9,000
<u>DISTRIBUTION BY DESIGN STAGE</u>		
DESIGN SCOPE		2,500
DETAILED DESIGN		4,800
DESIGN SERVICES IN THE FIELD		1,000
CONTINGENCIES		900
TOTAL		9,000

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NOTE

1. HEAVY LINES & SHADED EQUIPMENT FOR DESIGN
2. STREAMS MARKED WITH AN * TO BE USED ALTERNATELY
3. PROCESS AND AUXILIARY PIPING FROM SPECIFICATION HW-5500
4. FIGURES FOR MATERIAL BALANCE FROM DOCUMENT HW-33536
5. SCALES FOR WEIGH TANKS TO BE OBTAINED FROM BENT BROS. (IF NOT AVAILABLE AT TIME OF INSTALLATION, WEIGHT INSTRUMENTS WILL BE SATISFACTORY)

APPROVED
FOR DESIGN
NOT FOR CONSTRUCTION

REVISIONS		DATE	BY	REASON
NO. 1		10-10-75	SK-2-1818	0
SCALE: NONE		APPROVALS		
DESIGNED BY	SK-2-1818	CHECKED BY	DATE	BY
CONSTRUCTED BY	DATE	DATE	DATE	DATE
NO. 1	10-10-75	10-10-75	10-10-75	10-10-75
PROJECT NO. 3182		U. S. ARMY CORP. ENGINEERING		
PROJECT NO. 00-101075		GENERAL ELECTRIC		
ENGINEERS SKETCH STORED TBP WASTE SCAVENGING 244-CR PROCESS VAULT				
NO. 244-CR		NO. SK-2-1818		

UNCLASSIFIED

ROAD

VENTILATION
STACK & FAN

FENCE

-EXISTING STEAM LINE

APPROVED
FOR DESIGN
NOT FOR CONSTRUCTION

240-1019	NEW CHEM. MAKE-UP & STORAGE BLOS FOR STORED TSP WASTE SCAVENGING-EQUIP ARMST
SK-2-1810	ENG'S SKETCH STORED TSP WASTE SCAVENGING 244-CK
WORK IN PROGRESS	
REFERENCE DRAWINGS	
NEXT MEETING ON	

NOTE

1. HEAVY LINES & SHADED AREA NEW.
2. SEE DRAWING NO. SK-2-1810 FOR PIPE LINE SIZES
3. FOR PIPING OF WASTE DISPOSAL FACILITIES SEE DRAWINGS SK-2-1839 & SK-2-1850
4. COORDINATE LOCATION OF PIPE LINES SUBJECT TO CHANGE DURING DETAIL DESIGN

[illegible]

PLAN

ELEVATION

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TIC UNLOADING

NOTE

1. MONORAIL TO BE USED FOR UNLOADING DRUMS FROM TRUCK & EMPTYING DRUMS INTO FERROCYANIDE & NI₂SO₄ TANKS.
2. SOME TYPE OF HOPPER ARRANGEMENT TO BE PROVIDED FOR ADDITION OF CHEMICALS INTO MAKE-UP TANKS.
3. BUILDING TO BE OF SIMPLEST CONSTRUCTION.

REVISIONS		DATE	BY	CHKD	APP'D
0					

DESK NO. **SK-2-1819**
 SCALE: 1/4" = 1'-0"
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 DESK NO. 3182
 PROJECT NO. DO-181079
 U. S. ARMY CORP. OF ENGINEERS
 HANFORD ARMY RESERVE CENTER
 GENERAL ELECTRIC
 NEW CHEMICAL MAKE-UP AND STORAGE BLDG. FOR STORED TBP WASTE SCAVENGING EQUIPMENT ARRANGEMENT

NO. 1819	CHEMICAL ADDITION SYSTEM TBP WASTE SCAVENGING PLANT PLAN
NO. 18	PROCESS VAULT
NO. 18	PROCESS VAULT
NO. 18	PROCESS VAULT
NO. 18	PROCESS VAULT

DESK NO. **SK-2-1819**
 PROJECT NO. 200-2

NO.	DATE	TIME
113,076	95.76	
681	0.87	
101	0.03	
42	4.034	3.45
68	0.06	
53	0.05	
118,679		
~ 1.35		
10,500		

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PAGE 17

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NOTE

1. HEAVY LINES & SHARED EQUIPMENT NEW.
2. PROCESS AND AUXILIARY PIPING FROM SPECIFICATION NWS-5506
3. REQUIREMENTS FOR MATERIAL BALANCE FROM DOCUMENT HW 33576
4. SCALES FOR WHICH TANKS TO BE OBTAINED FROM 221-T BLDG. (IF NOT AVAILABLE AT TIME OF INSTALLATION, WEIGHT FACTOR INSTRUMENT WILL BE SATISFACTORY)

APPROVED
FOR DESIGN
NOT FOR CONSTRUCTION

SK-2-1820	CHEMICAL MAKE-UP & STORAGE IN 2
SK-2-1821	NEW TANKS FOR WASTE SCAVENGING
SK-2-1822	NEW TANKS FOR WASTE SCAVENGING
SK-2-1823	NEW TANKS FOR WASTE SCAVENGING
SK-2-1824	NEW TANKS FOR WASTE SCAVENGING
SK-2-1825	NEW TANKS FOR WASTE SCAVENGING
SK-2-1826	NEW TANKS FOR WASTE SCAVENGING
SK-2-1827	NEW TANKS FOR WASTE SCAVENGING
SK-2-1828	NEW TANKS FOR WASTE SCAVENGING
SK-2-1829	NEW TANKS FOR WASTE SCAVENGING
SK-2-1830	NEW TANKS FOR WASTE SCAVENGING

REVISIONS		DATE	BY	CHKD	APP'D
SK-2-1821					
SCALE: NONE		APPROVALS			
DESIGNED BY: [Signature]		DATE: 11-10-57	BY: [Signature]	CHKD: [Signature]	APP'D: [Signature]
DRAWN BY: [Signature]		DATE: 11-10-57	BY: [Signature]	CHKD: [Signature]	APP'D: [Signature]
NO. 3182					
PROJECT NO. DO-181073					
U. S. ATOMIC ENERGY COMMISSION HANFORD ATOMIC PRODUCTS OPERATION GENERAL ELECTRIC					
ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING 200-W AREA					
NO. 242-T		NO. SK-2-1821			

CITY NO.

DESCRIPTION

HW 34487
PAGE 18

PUMP DETAIL

UNCLASSIFIED

NOTE

1. NEW PIPING SHOWN BY HEAVY LINES. NEW EQUIPMENT SHADED. PUMP TO BE USED AS SHADED & CROSSHATCHED.
2. DISCHARGE LINE TO CONTAIN TWO SECTIONS.
3. COORDINATE LOCATION OF PIPE LINES SUBJECT TO CHANGE DURING DETAIL DESIGN.

APPROVED
FOR DESIGN
NOT FOR CONSTRUCTION

SK-1822	CHEMICAL MAKE-UP & STORAGE ALDS FOR STORED TBP WASTE SCAVENGING
SK-1821	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1820	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1819	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1818	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1817	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1816	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1815	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1814	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1813	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1812	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1811	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1810	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1809	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1808	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1807	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1806	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1805	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1804	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1803	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1802	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING
SK-1801	ENGINEER'S SKETCH STORED TBP WASTE SCAVENGING

DESCRIPTION		REV.	BY	DATE
REVISIONS				
DWS. NO. 3K-2-1820		REV.	BY	DATE
SCALE: 1"=100'-0"		APPROVALS		
DESIGNED BY: [Signature]		BY	DATE	
CHECKED BY: [Signature]		BY	DATE	
DRAWN BY: [Signature]		BY	DATE	
APP. NO. 3182				
PROJECT NO. DO-101075				
U. S. ATOMIC ENERGY COMMISSION HAMFORD ATOMIC PRODUCTS OPERATIC GENERAL ELECTRIC				
SCAVENGING OF STORED TBP WASTES WASTE DISPOSAL 200-W AREA				
DWS. NO. 242-T		DWS. NO. 3K-2-1820		

PLAN

ELEVATION

11-2" APPROX.

0 DWG. N

APPROVED
FOR DESIGN
NOT FOR CONSTRUCTION

NOTE

1. NEW BUILDING & EQUIPMENT SHAPED
2. BUILDING & ACID TANK LOCATION TENTATIVE
3. SUBJECT TO CHANGE DURING DETAIL DESIGN.
4. BUILDING TO BE OF STEEL-REINFORCED CONSTRUCTION.

END

DATE

FILMED

5/16/94