485

REMOVAL SITE EVALUATION K-65 DECANT SUMP TANK WATER

8-17-90

WMCO/DOE
WMCO:EMT:90-539
8
RSE

485 [redacted]

REMOVAL SITE EVALUATION

on the

K-65 DECANT SUMP TANK WATER

Introduction

The K-65 silos are large concrete structures, built in 1951 and 1952, which contain the residues of pitchblende processing at FMPC and at St. Louis (Mallinckrodt Chemical Works). These residues contain radium, uranium, and thorium (230). Beneath each silo an underdrain system was constructed to collect any potential leakage through the floor of the silo. This underdrain system consisted of a series of pipes beneath the floor which was designed to discharge into a sump tank. The silos were designed to also have a decant system which discharged into this same tank. The decant system was designed to remove the liquid portion of the K-65 slurry after the solids had settled. Since this liquid was withdrawn in conjunction with the process of filling the silos, it was used on a daily basis during the years the silos were filled. As the primary purpose of this tank was to receive the decant liquid, it was called the decant sump tank. This tank has a 9,000 gallon capacity.

The earthen berms were placed around the silos in 1964 to provide structural support to the silos. At this time, the decant system was disconnected from this tank but the underdrain system remained intact. The purpose was to continue to have the capability of collecting any potential leakage from the underdrain system. Access was provided to this sump by attaching a 30" diameter corrugated galvanized steel pipe to the tank. This pipe extended upward 33′ to the top of the berm. Although this pipe provided access to the decant sump tank, no information exists which indicates the tank was used to monitor for potential leakage into the underdrain system. The tank had not been cleaned of residue from handling decant liquid when the decant system was removed and the silo berms constructed, so monitoring would have been of limited value if it had occurred. Two samples are known to have been taken of the decant sump tank water, both in 1980. Beyond this, routine sampling is not known to have occurred until it began in August 1989. Since that time, the decant sump tank has been sampled monthly (see Attachment 1).

The analysis of the samples taken in this monthly sampling indicates a level of uranium which would be of concern if it escaped from the decant sump tank into surrounding soil. There are also consistent levels of radium found in the water.

This Removal Site Evaluation (RSE) has been completed by the DOE under authorities delegated by Executive Order 12580 under Section 104 of CERCLA and is consistent with Section 300.410 of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). This RSE addresses water containing elevated levels of radionuclides contained in the K-65 decant sump tank. This RSE has been completed to support the determination of whether the pump out of this water in the decant sump tank warrants the initiation of a Removal Action.

Source Term

The subject area of concern is located beneath the berm surrounding the K-65 silos. The tank is positioned south of midpoint between Silos 1 and 2, and to the west of Silo 1 (see Attachments 2 and 3). The amount of water contained in the decant sump tank is calculated to be approximately 9,000 gallons, with about 200 gallons in the corrugated pipe. Since the extent of this water into the underdrain system (or beyond the underdrain system) is unknown, an estimate of 10,000 gallons for the total water involved is used here.

The tank is located over a geologically sensitive area. The aquifer beneath the FMPC has been designated a Sole Source Aquifer. The tank is located in the till, therefore, leakage could result in horizontal or vertical migration. Below this layer, there is potential for vertical migration.

Uranium, Radium 226, and Thorium 230 are the known contaminants of concern. Suspect contaminants, especially non-radiological contaminants, such as Lead 206, will be addressed once the contents of the decant sump tank are removed and stored for HSL analysis.

Evaluation of Magnitude of the Potential Threat

The potential threat posed by the levels of radionuclides found in the water of the decant sump tank is the release of this water from the tank into the surrounding soil. Since the condition of the point of attachment of the corrugated pipe to the decant sump tank is unknown, there is also a potential for release if the attachment has been compromised in the years since its installation in 1964. Observations of soil shifting (of the berm on the west side of the silos) would indicate the possibility this attachment may have been compromised. The underdrain system of the silos was installed almost 40 years ago and the integrity of this system may also be of question. Although there is no data to indicate any of the three components (underdrain system, decant sump tank, and corrugated pipe) of the decant sump tank drainage and collection system have been compromised, a break in any position could release water to the level of the break. This water, due to its radionuclide content, is a potential threat to the environment due to the possibility of release to the underlying soils. The average concentration of contaminants of concern from the monthly sampling may be compared to applicable limits for these substances (Attachment 4).

Assessment of the Need for Removal Actions

Section 300.415 of the NCP defines eight factors which should be considered in determining the appropriateness of a removal action. Two of these factors, which are listed below, are specifically applicable to the decant sump tank.

1. Actual or potential contamination of drinking water supplies or sensitive ecosystems.

2. Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.

These factors are considered appropriate as a result of the concentration of radionuclides in the water of the decant sump tank. Measurements to the level of the highest point of this water (which extends into the corrugated pipe) have remained constant over ten months of monitoring. Although the stability of this water level may indicate that the water of the tank is not migrating through leakage, the potential does exist for release of radionuclides. Beyond this, the slant borings underneath the K-65 silos, which are scheduled to be completed in the near future as a part of the Remedial Investigation, pose a potential threat to the integrity of the decant sump tank.

Appropriateness of a Response

If a planning period of less than six months exists prior to initiation of a response action, DOE will issue an Action Memorandum. The Action Memorandum will describe the selected response and supporting documentation for the decision.

If it is determined that there is a planning period greater than six months before a response is required, DOE will issue an Engineering Evaluation/Cost Analysis (EE/CA) Approval Memorandum. This memorandum is to be used to initiate the preparation of an EE/CA to document the threat of public health and the environment and to evaluate viable alternative response actions. The EE/CA Approval Memorandum will also serve as a decision document to be included in the Administrative Record.

If it is determined that a near term response is appropriate due to both the levels of contamination found in the water and the potential threat associated with the existing situation of the contaminants migrating then a removal action is recommended to be undertaken.

TABLE 1

Attachment 1

K-65 DECANT SUMP TANK

Monthly Sampling Results
(Expressed in pCi/L, exept where otherwise specified)

MONTH	U-234	WT. % U BASIS	U-235	WT. % U BASIS	U-236	WT. % U BASIS	U-238	WT. % U BASIS	TOTAL U	(ppm)	Ra-226	Th-230	TOTAL ACTIVITY
August, 1989	17150	0.006	723	0.73	29	0.001	15278	99.27	33000	(46)	260	1.1	
September, 1989	21000	0.0064	790	0.72	55	0.0017	17000	99.27	39000	(51.2)	190	<0.40	
October, 1989	16000	0.0064	620	0.73	33	0.0013	13000	99.26	30000	(39.4)	120	<0.40	
November, 1989	13795	0.006	565	0.71	24	0.001	12290	99.28	27000	(37)	98	<0.40	
December, 1989	12583	0.005	628	0.72	26	0.001	13453	99.28	27000	(40.5)	67	<0.30	
January, 1990	20133	0.006	837	0.72	34	0.001	17937	99.28	39000	(54)	1600		540
February, 1990	13360	0.005	657	0.71	27	0.001	14283	99.28	28000	(43)	100		640
March, 1990	14913	0.005	734	0.71	<31	<0.001	15944	99.28	<32000	(48)	194		130
April, 1990	10191	0.004	627	0.71	<26	<0.001	13619	99.28	<24000	(41)			135

ATTACHMENT 4

TABLE 2

	AVERAGE CONTAMINANT CONCENTRATION [1]	ARAR "APPLICABLE"	TO BE CONSIDERED (TBC) [1] DOE ORDER 5400.5 [2]
Total	3100	20 [3]	600
Thorium-230	< 0.5	N.A.	300
Radium-226	328	15[4], 5[5]	100

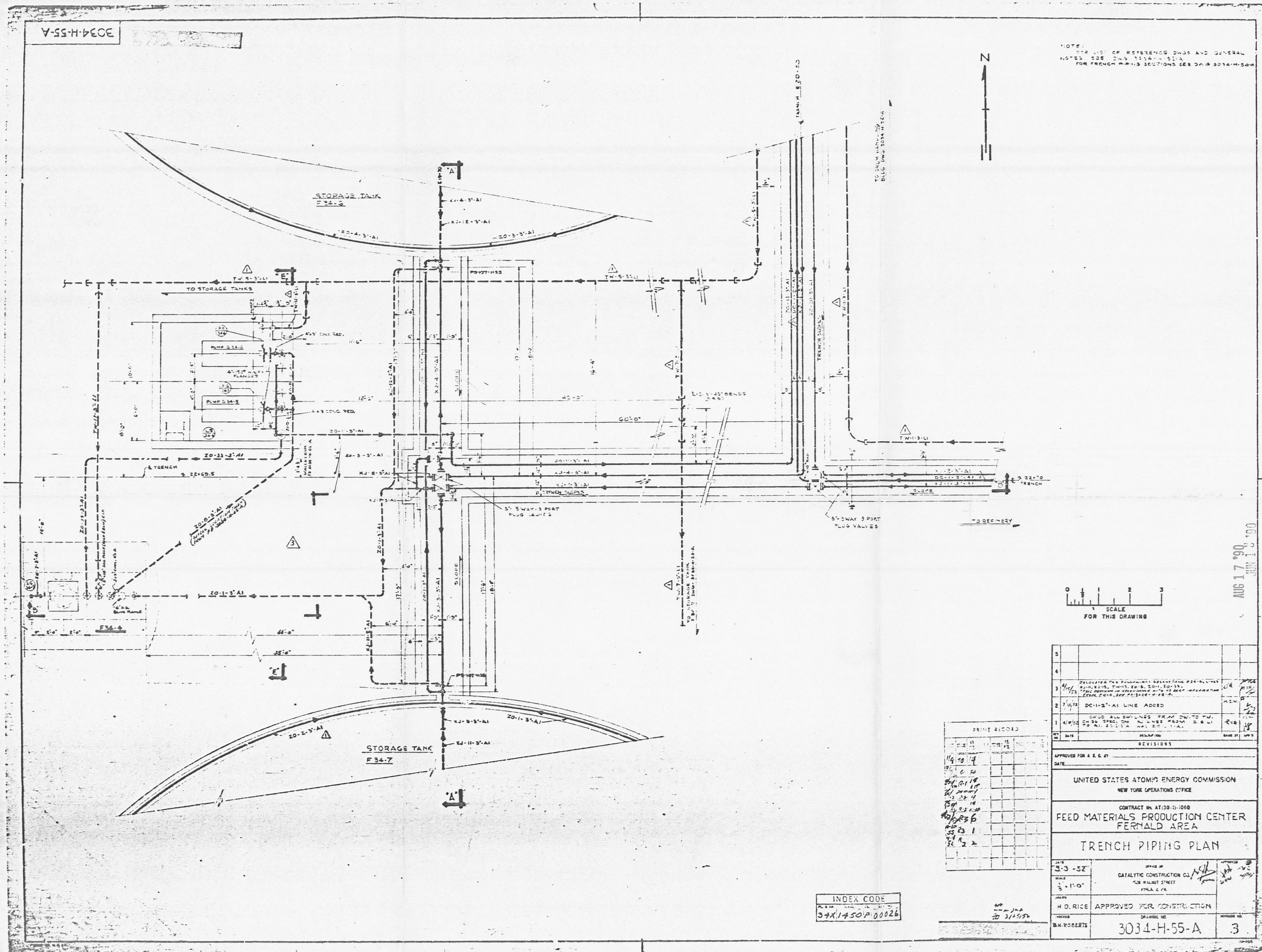
(1) All concentrations are in pCi/Liter

(2) DOE derived conc. guide (DCG) = 100 mrem/yr

(3) USEPA-Region 5 has required 30 ppb concentration level for total uranium (4 mrem/yr natural ratio) or approximately 20 pCi/L for drinking water (ARAR implementation for the RI/FS). This is less than 4 mrem/yr; DOE DCG or 24 pCi/L.

(4) Ohio Administrative Code for Ohio Receiving Waters [OAC 3745-1-32 (c) (9)]

(5) 40 CFR 141.15 maximum contaminant level in 5 pCi/L of combined radium 226 and radium 228.



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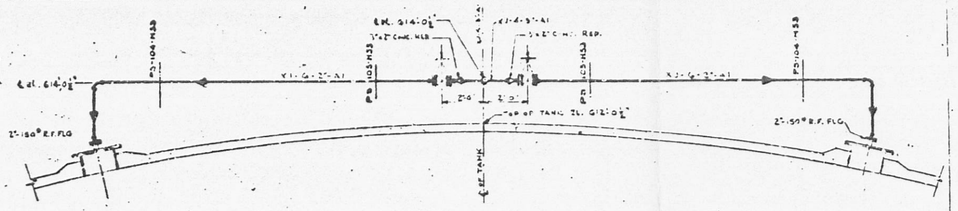
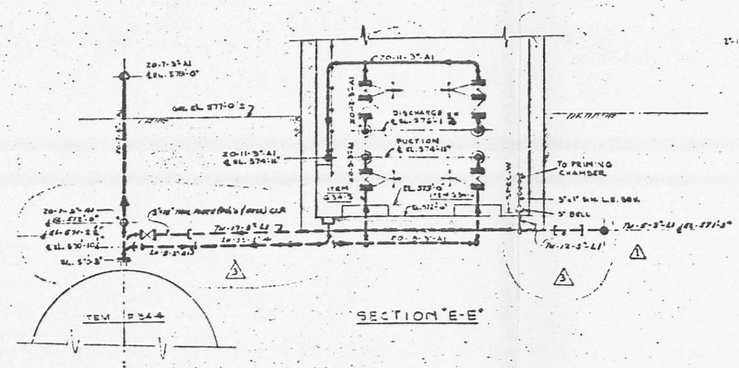
ATTACHMENT 2

3034-H-56-A



SECTION "F-F"

NOTE:
FOR LIST OF REFERENCE DWGS. AND GENERAL NOTES, SEE DWG. 3034-H-52-A
FOR TRENCH PIPING PLANS SEE DWG 3034-H-55-A



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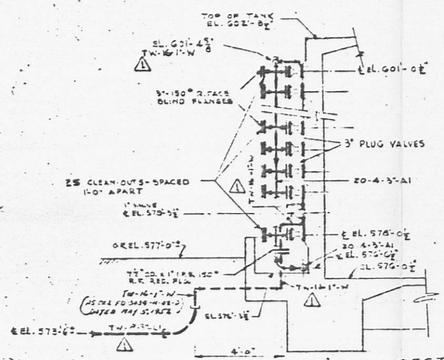

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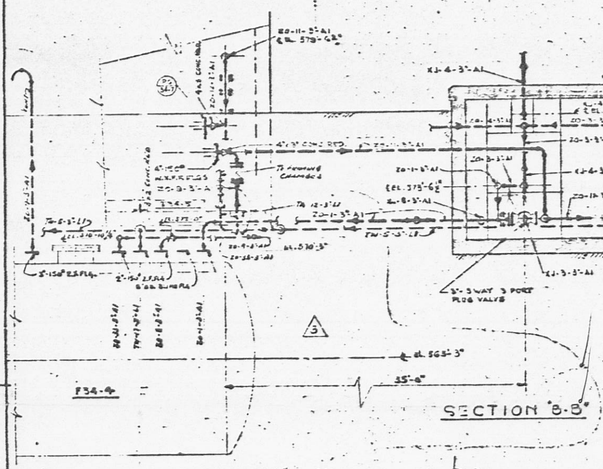

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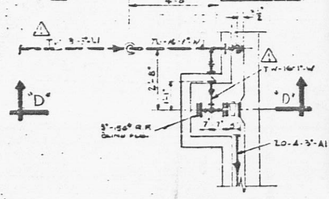
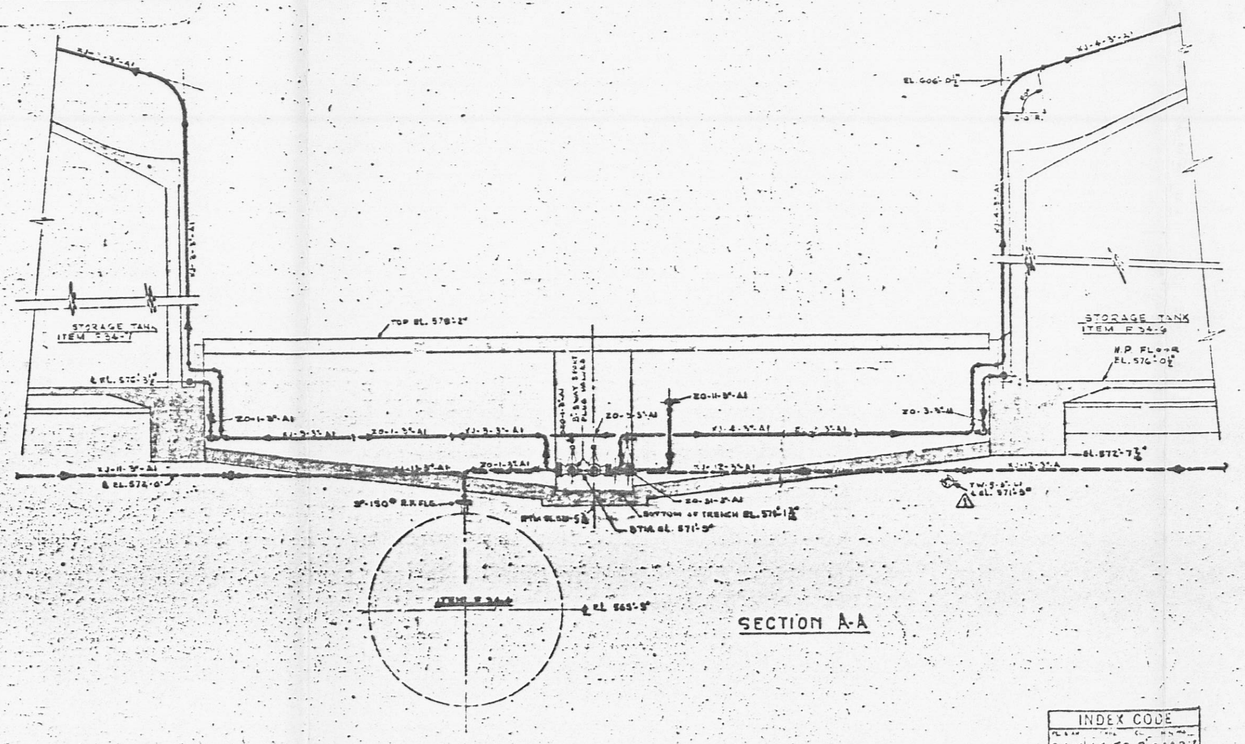


DETAIL "C"



SECTION A-A

SCALE FOR THIS DRAWING

PRINT RECORD									
SHEET	STREET	NO. PCS.	DATE	SHEET	STREET	NO. PCS.	DATE	SHEET	NO. PCS.
1/6	10	14							
2	3								
3	11								
4	3								
5	3								
P3	3	6							
P3	1								
P3	2								
P3	1								

INDEX CODE
34X1450P00021

REVISIONS				
NO.	DATE	DESCRIPTION	BASE BY	APP'D
5				
4				
3	7/11/52	DELETION OF PIPE & FITTING CHANGES AS SHOWN ON DWG. H-34-A REVISION 2. DELETION OF 3-4" EX. ELBOW FROM PIPING LINE 3-W-3. ADDITION OF 3-4" EX. ELBOW IN PIPING LINE 3-W-3. ALL REVISIONS AS NOTED ON DWG. H-34-A REVISION 2.	[illegible]	[illegible]
2	7/11/52	DC-1-2"AI-LINA ADDED.	[illegible]	[illegible]
1	6/16/52	WERE DW LINES, NOW TW.	[illegible]	[illegible]

APPROVED FOR A.E.C. BY _____
DATE _____

UNITED STATES ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

CONTRACT No. AT(30-1)-1060

FEED MATERIALS PRODUCTION CENTER
FERNALD AREA

TRENCH PIPING SECTIONS

DATE 3-3-52	OFFICE OF CATALYTIC CONSTRUCTION CO. 1528 WALNUT STREET PHILA. 2, PA.	APPROVED
SCALE 3/8"=1'-0"		
DRAWN H.D. RICE	APPROVED FOR CONSTRUCTION	
CHECKED E.N. ROBERTS	DRAWING NO. 3034-H-56-A	REVISION NO. 3

AUG 17 '00

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ATTACHMENT 3