1665

# ADDENDUM TO JUNE 1990 CLOSURE PLAN FOR TANKS T-5 AND T-6
# JULY 1990

XX/XX/XX

17
ENCLOSURE

[redacted]

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JULY 1990

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## 1.0 INTRODUCTION

The June 1990 revision of the RCRA closure plan for tanks T-5 and T-6 indicated that a record search would be performed to gain additional details on the tanks, their operating history and the characteristics of their contents. This information and modifications to the June 1990 plan made to accommodate this information are provided below.

## 2.0 DESCRIPTION OF TANKS T-5 AND T-6 AND ASSOCIATED EQUIPMENT

The location and general information on tanks T-5 and T-6 are provided in the revised closure plan (June 1990 revision). The information provided below is intended to supplement those data.

Attachment 1 to this addendum shows the locations of the two tanks relative to the Pilot Plant and the other tanks in the containment area. The drawing has been amended (relative to Figure 2 in the revised closure plan) to show the current configuration of the piping and pump associated with T-5 and T-6, the diameters of the tanks and the location of a shallow concrete sump and associated piping in the southeast corner of the containment pad.

The containment pad slopes gently toward the southeast, toward the sump shown on Attachment 1. The sump extends to approximately one foot below the surface of the pad and appears to have been cast in place with the containment pad. Centered in the sump is a three-inch diameter vertical standpipe that extends from near the sump bottom to approximately the top of the containment dike. The standpipe is open at the top and connected to a 90° elbow near the bottom of the sump. The elbow is connected to a three-inch diameter pipe that passes through the east dike and just below the ground to open to the brick-lined containment pad just to the southeast of tank T-2 (see Attachment 1). The height of the standpipe would prevent entry of fluid from the T-5/T-6 containment pad into the pipe. However, the piping permitted the additional containment capacity of the pad to the southeast to be used if necessary (due to catastrophic tank failure, for example) by removing the standpipe from the elbow. There is no documentation to suggest nor do historical accounts indicate that the standpipe was ever removed. Thus, the pad to the southeast is not considered to be part of the T-5 and T-6 hazardous waste management unit.

As can be noted on Attachment 1, the two bulk solvent storage tanks are connected by piping via an electrically operated pump to tank T-3. According to historical documentation, tank T-3 was emptied of thorium nitrate and the current piping installed to permit T-3 to serve as emergency containment in case of operating problems with or failure of tanks T-5 and T-6. The inspection plan for T-5 and T-6 (contained in the Pilot Plant Hazardous Waste Storage procedures and records document maintained at the Pilot Plant) specified that in case of leaks or other evidence of containment failure, the contents of the tank of concern would be transferred to T-3 if repairs could not be made with the contents in place.



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Available operating records and historical accounts do not suggest, however, that any of the contents of T-5 and T-6 were ever transferred to T-3 and that the valves that would permit such a flow path were kept closed. Attachment 2 is a photograph of the tanks taken from the west, looking east at the tanks. The approximate heights of the tanks are shown on the photograph.

Inspection of the containment pad reveals that the concrete pad and dikes are in good condition. The containment dike has an asphaltic coating on the entire inside vertical surface. The coating extends slightly onto the horizontal surface of the containment pad and forms a fillet at the dike/pad joint. The horizontal surface of the pad does not appear to be coated or sealed.

## 3.0 HISTORY OF TANKS T-5 AND T-6

As noted in the closure plan for bulk storage tanks T-5 and T-6 (June 1990 revision), the tanks were moved to the FMPC in 1969 from another DOE facility. Tanks T-5 and T-6 were used for storage of thorium nitrate solutions from the time of their installation at FMPC until about 1980. The tanks are believed to have been empty from about 1980 until April 1984. Tank T-3 was also used for storage of thorium nitrate and records indicate that it was empty in August 1984. Records available for the period August 1984 to present do not indicate that any material has been placed in T-3.

In April 1984, waste solvents that had been stored in drums at FMPC, comprised primarily of distilled 1,1,1-trichloroethane and distillation still bottoms containing low concentrations of uranium, were placed in the tanks. Tank filling records indicate that approximately 165 drums and 143 drums of this material were placed in tanks T-5 and T-6, respectively. Also noted on the filling records are that all drums were not full and that the contents of drums transferred to tank T-5 contained more sludge (presumably the still bottoms) than those transferred to T-6. Total volumes after this initial fill of solvents were reported as about 7300 gallons in tank T-5 and 5300 gallons in T-6.

Available records indicate that limited volumes of spent solvents, paint, paint thinner and contaminated oil were pumped from drums into to the tanks until mid-1987. These wastes were generated by the paint shop, cleaning booth, garage and electric shops.

Drummed material was transferred to the tanks using a portable, air-driven diaphragm pump. According to the operating procedure for the tanks, the drums from which material was pumped were located adjacent to, but just outside, the diked area west of the tank farm containment pad. The pump was placed within the containment area in case of leakage due to pump failure. Flexible hose was used to suction material from the drums and pump it into the top manways of T-5 or T-6.

It was planned that the stored solutions would be processed for solvent recovery at the FMPC. Due to difficulties that caused suspension of solvent processing, the material continued to be stored in the tanks until 1989. There is no indication in the available records that any material was removed from the tanks before 1989. As a result of concerns about the integrity of the tanks (see

Section 4.0 below), adequacy of the secondary containment, etc., the fluid contents of the tanks were transferred to drums in June-July 1989. Sludge remaining in tank T-5 was transferred to drums in October 1989. The drums of waste were placed in a FMPC RCRA storage unit pending transport to and incineration at Oak Ridge.

The maximum volumes of material noted to have been present in tanks T-5 and T-6 are about 8100 gallons and 5400 gallons, respectively. These volumes should be considered estimates because they are based on measured "outages" (depth of liquid in tank), which are converted to volumes using outage vs. volume calibration tables.

Volume data were not generated when the tanks were drained in 1989. Rather, the weight of material drained from each tank was monitored as the waste was placed in drums. During the tank draining operations, each drum receiving waste was placed on a scale and filled until it contained 500 pounds of waste. One hundred-seventy-three (173) and 105 drums (each containing 500 pounds of material) were filled from the contents of T-5 and T-6, respectively.

## 4.0 TANK INSPECTION AND SPILL RECORDS

Available visual inspection logs, which cover the period from October 1984 until the tanks were drained, do not indicate the occurrence of spills or leaks from the tanks. Because inventory measurements were made only periodically and the measured volumes were estimates (for reasons noted above), inventory records are not believed to be accurate indicators of the lack of leakage of these two tanks.

In June 1989, an ultrasonic thickness inspection of tanks T-5 and T-6 was performed. The inspection revealed the presence of a pinhole in tank T-5 and an additional inspection identified another corroded area. The corroded areas, which were at the welds, measured approximately one-half inch in diameter and were wet. There was no evidence, however, of dripping or the release of tank contents into the containment area. A patch was placed over the pinhole to prevent any further release from the pinhole. It was estimated that less than one ounce of material was released to the environment.

Records which document the transfer of the contents of drums into tanks T-5 and T-6 do not indicate the occurrence of any spills or leaks during the transfer operations. In addition, historical accounts indicate that the transfer of the tank contents into drums in 1989 was performed entirely within the containment pad and did not result in any notable spills or leaks of material.

## 5.0 WASTE CHARACTERIZATION

Qualitative information on the composition of materials placed in tanks can be gained from tank filling (transfer) records described in Section 3.0 above. These records indicate that waste "dirty" solvents, contaminated oil, paint and paint thinner were placed in tank T-5. The "dirty" solvent also included sludge

(still bottoms from solvent distillation). Material placed in tank T-6 consisted of clean solvent and contaminated oil.

In 1988, the contents of the two tanks were analyzed for a wide variety of parameters including volatile organic compounds for tank T-5 contents. Copies of these laboratory analysis reports are provided as Attachment 3.

To obtain representative analyses of the tank contents, samples from T-5 were collected at different depths as noted in the International Technology Corporation laboratory analysis report in Attachment 3. As would be expected, the higher concentrations of the relatively high specific gravity 1,1,1-trichloroethane were found to be at greater depths in the tank. Presumably, oil and other solvents known to have been placed in the tank, as well as contaminants (including an aqueous phase) associated with the "dirty" solvent, were stratified above the fluids and sludge with higher 1,1,1-trichloroethane concentrations.

As shown by the analysis reports, the tanks contained wastes with high concentrations of 1,1,1-trichloroethane and lesser concentrations of metals and other constituents for which analyses were performed. Uranium is present at concentrations of 0.002 to 0.004 percent by weight, causing the material to be a radioactive mixed waste.

## 6.0 AMENDMENT OF CLOSURE PLAN

Based on the information provided above, changes in the analytical program proposed in the June 1990 closure plan do not appear to be warranted. However, other changes are needed to ensure that the closure plan addresses the entire hazardous waste management unit and specifies collection of soil samples from locations with the greatest potential to have been affected by operation of the unit. These changes are listed below:

- The interiors of Tanks T-3, T-5 and T-6 will be visually inspected (without personnel entry) to determine the presence of any residues by removing manway covers and lighting the tank interiors.

- Deionized, organic-free water will be flushed through tank T-3 and a sample collected and analyzed for parameters noted in Tables 1 and 2 of the closure plan. If visual inspection reveals that a sampleable volume of material is present in the tank, a sample of the material will be obtained in lieu of a rinseate sample. Sample collection and analytical procedures will be those specified in the body of the closure plan.

- Deionized, organic-free water will be flushed through the piping and valves connecting T-3, T-5 and T-6 to the pump and a sample of the water will be collected from each of the pipe runs and analyzed as above.

- Deionized, organic-free water will be flushed through the pump and sampled and analyzed as above.

- Deionized, organic-free water will be flushed through the three-inch diameter pipe between the containment pad and the containment pad to the southeast and sampled and analyzed as above.

- Because the pad slopes to the east and any spills would have pooled against the east dike, the soil sample locations south and north of the pad as shown on Figure A-1 in the closure plan will be moved to the east of the pad at the locations shown on Attachment 4.

- A soil sample will be taken from just beneath the concrete base of the containment pad sump and analyzed in accordance with the procedures described in Appendix A of the closure plan.

- The results of analysis of the water and soil samples described above will be evaluated based on the criteria noted in I-d(2) and Table 3 in the June 1990 closure plan. If material is determined to be contaminated with RCRA constituents, it will be handled as described for other material/equipment identified as part of the hazardous waste management unit in the closure plan.

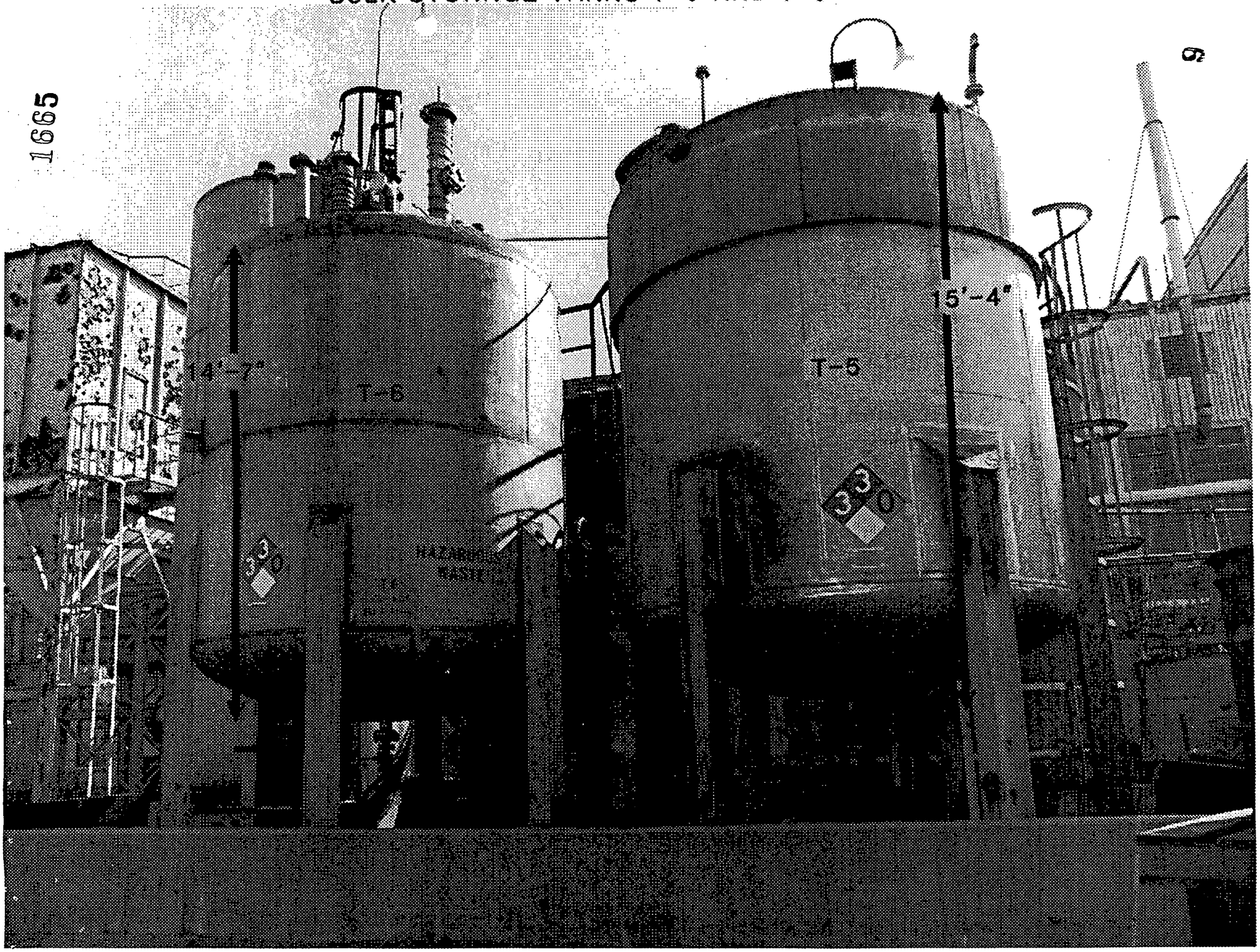
ATTACHMENT 1

PILOT PLANT OUTSIDE TANK AREA

ATTACHMENT 2

PHOTOGRAPH OF TANKS T-5 AND T-6
(LOOKING EAST)

BULK STORAGE TANKS T-5 AND T-6

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ATTACHMENT 3

1988 LABORATORY ANALYSIS REPORTS -- TANKS T-5 AND T-6

| | | TANK T5 | TANK T6 |
|---|---|---|---|
| 1. | Waste Category | Non-PCB solvents and chemicals | Non-PCB solvents and chemical |
| 2. | Name of Waste | solvent still bottoms (1,1,1-Trichloroethane) | solvent (1,1,1-Trichloroethane) |
| 3. | Water, wt. % | 24.8 | 0.06 |
| 4. | Suspended Solids, wt. % | 0.57 | <0.01 |
| 5. | Phase Separation | Two phases present | No phase separation |
| 6. | Ash, wt. % | 0.30 | <0.01 |
| 7. | Kinematic Viscosity, cST @ 25°c ① | (A) 740 (B) 3.7 | 3.0 |
| 8. | Flash Point, °F | N.D. [No flash point detected; sample b.p. @ 155° F] | N.D. [No flash point detected; sample b.p. @ 155° F] |
| 9. | Heat of Combustion, BTU/16 | 5300 | 3200 |
| 10. | Density, g/ml @ 25°c | 1.140 | 1.309 |
| 11. | idity, N | 0.003 | 0.002 |
| 12. | Alkalinity, g/KOH/g | NA | NA |
| 13. | pH, Standard Units | 7.5 | 3.7 |
| 14. | wt. % Retained (1/32") | 0.02 | <0.01 |
| 15. | C, % | 15. | 6.0 |
| 16. | H, % | 2.9 | 0.94 |
| 17. | O, % | Could not analyze | Could not analyze |
| 18. | Cl, % | 43.1 | 48.3 |
| 19. | F, % | 36 ppm | 35 ppm |
| 0. | S, % | 0.02 | 0.08 |
| 1. | P, % | 0.24 | 0.13 |
| 2. | PCB, µg/g | <5 | <5 |
| 3. | Specific Gravity | 1.140 | 1.309 |
| 4. | dioactive Contamination | Total Alpha = 43<br>Total Beta = 56<br>Total Gamma = 27 | Total Alpha = 22<br>Total Beta = 23<br>Total Gamma = 4.4 |

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| | TANK T5 | TANK T6 |
|---|---|---|
| 25. Uranium %U | 0.002 | 0.004 |
| 26. Uranium +-Daughters | $^{235}U$ = 0.775 wt. % | $^{235}U$ = 0.998 wt. % |
| 27. Other Radionuclides, % (A) = top portion (B) = bottom | NA | NA |
| 28. Spectrochemical Analyses: (ppm unless indicated) | | |
| Ag | <0.7 | <0.01 |
| Al | 23 | 0.02 |
| As | <25 | <0.2 |
| B | 1.8 | <0.01 |
| Ba | <2 | <0.01 |
| Be | 0.2 | <0.01 |
| Bi | 0.4 | NR [uranium interference] |
| Ca | 180 | 0.10 |
| Cd | <3 | <0.02 |
| Co | <2 | <0.01 |
| Cr | 3 | <0.2 |
| Cu | 27 | 0.4 |
| Fe | 8.82% | 2 |
| Ga | <0.7 | <0.01 |
| Ge | <0.7 | <0.01 |
| In | <2 | <0.01 |
| K | 4.14% | 5.82% |
| Li | <100 | <100 |
| Mg | 18 | 0.8 |
| Mn | 0.4 | <0.01 |
| Mo | 0.5 | <0.01 |
| Na | 0.08% | <0.2 |

| | TANK T5 | TANK T6 |
|---|---|---|
| Spectrochemical Analyses: (continued) | | |
| Nb | <2 | <0.01 |
| Ni | 5 | NR [uranium interference] |
| Pb | 9 | <0.01 |
| Pd | <2 | <0.01 |
| Pt | <2 | <0.01 |
| Ru | <25 | <0.4 |
| Sb | <5 | <0.05 |
| Si | 72 | 0.5 |
| Sm | 3 | 0.03 |
| Sr | <11 | <0.10 |
| Ta | <25 | <0.2 |
| Te | <25 | <0.2 |
| Ti | 4 | <0.01 |
| Tl | <25 | <0.2 |
| V | <0.2 | <0.01 |
| W | <45 | <0.4 |
| Zm | 54 | <0.2 |
| Zr | <3 | 0.10 |

TANK 5

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INTERNATIONAL TECHNOLOGY CORPORATION

# ANALYTICAL SERVICES

1550 Bear Creek Road • P O Box 549 • Oak Ridge Tennessee 37831 • 615-482-9707

## CERTIFICATE OF ANALYSIS

TO ASI-Fernald Office
ATTN: L. T. Murphy
10845 Hamilton Cleves Road
Ross, OH 45061

DATE REPORTED February 22, 1988
PROJECT CODE ITEP 35080
ORDER NUMBER 602.09.02
PAGE 1 OF 2
Job No.: 303317

Sample Description: Four (4) TCLP extract samples and one (1) TCLP blank received December 17, 1987

| | Blank (µg/liter) | Percent by Weight | | | |
|---|---|---|---|---|---|
| | | 1 Foot | 3 Foot | 6 Foot | 9 Foot |
| Methylene Chloride | <5 | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | 7 | 9 | 66 | 61 | 98 |
| Tetrachloroethene | ND | ND | ND | ND | ND |

ND = Not detected.

Analyzed by EPA Method 624.

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Approved by Laboratory Manager

Title

Accredited by the American Association for Laboratory Accreditation in the chemical field of testing, as listed in the current AALA Directory of Accredited Laboratories

Tank 5

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INTERNATIONAL TECHNOLOGY CORPORATION

# ANALYTICAL SERVICES

1550 Bear Creek Road • P O Box 549 • Oak Ridge Tennessee 37831 • 615-482-9707

## CERTIFICATE OF ANALYSIS

TO ASI-Fernald Office
ATTN: L. T. Murphy
10845 Hamilton Cleves Road
Ross, OH 45061

DATE REPORTED February 22, 1988
PROJECT CODE ITEP 35080
ORDER NUMBER 602.09.02
PAGE 2 OF 2
Job No.: 303317

Sample Description: Four (4) TCLP extract samples and one (1) TCLP blank received December 17, 1987

Concentration units are mg/liter (ppm)

ICAP METALS SCAN

| | 1 Foot* | 3 Foot | 6 Foot | 9 Foot | Blank |
|---|---|---|---|---|---|
| Aluminum | 3.58 | 0.08 | <0.05 | <0.05 | <0.05 |
| Antimony | <0.05 | 0.29 | 0.11 | <0.05 | <0.05 |
| Arsenic | 0.46 | 0.34 | 0.24 | <0.2 | <0.2 |
| Barium | 0.20 | 0.765 | 0.612 | 0.789 | <0.002 |
| Beryllium | 0.002 | 0.0029 | 0.009 | 0.008 | <0.001 |
| Cadmium | 0.425 | 0.002 | <0.002 | <0.002 | <0.002 |
| Chromium | 0.18 | <0.02 | <0.02 | <0.02 | <0.02 |
| Copper | 19.0 | 0.51 | 0.22 | 0.31 | <0.01 |
| Iron | 15.8 | 0.32 | 0.29 | 0.29 | <0.005 |
| Lead | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Lithium | 0.40 | <0.03 | 0.36 | 0.20 | <0.03 |
| Magnesium | 49.7 | 0.07 | 0.05 | 0.01 | <0.005 |
| Manganese | 19.1 | 0.03 | <0.001 | <0.001 | <0.001 |
| Nickel | 2.31 | <0.02 | <0.02 | <0.02 | <0.02 |
| Selenium | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Silver | 0.02 | <0.01 | <0.01 | <0.01 | <0.01 |
| Sodium | 5,900 | 1,410 | 1,340 | 1,350 | 1.10 |
| Thallium | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 |
| Titanium | 0.069 | <0.003 | <0.003 | <0.003 | <0.003 |
| Zinc | 54.4 | 0.90 | 0.30 | 0.37 | <0.01 |
| Mercury | 0.001 | <0.0002 | <0.0002 | <0.0002 | <0.0002 |

*Sample at 1 Foot analyzed as total metals.

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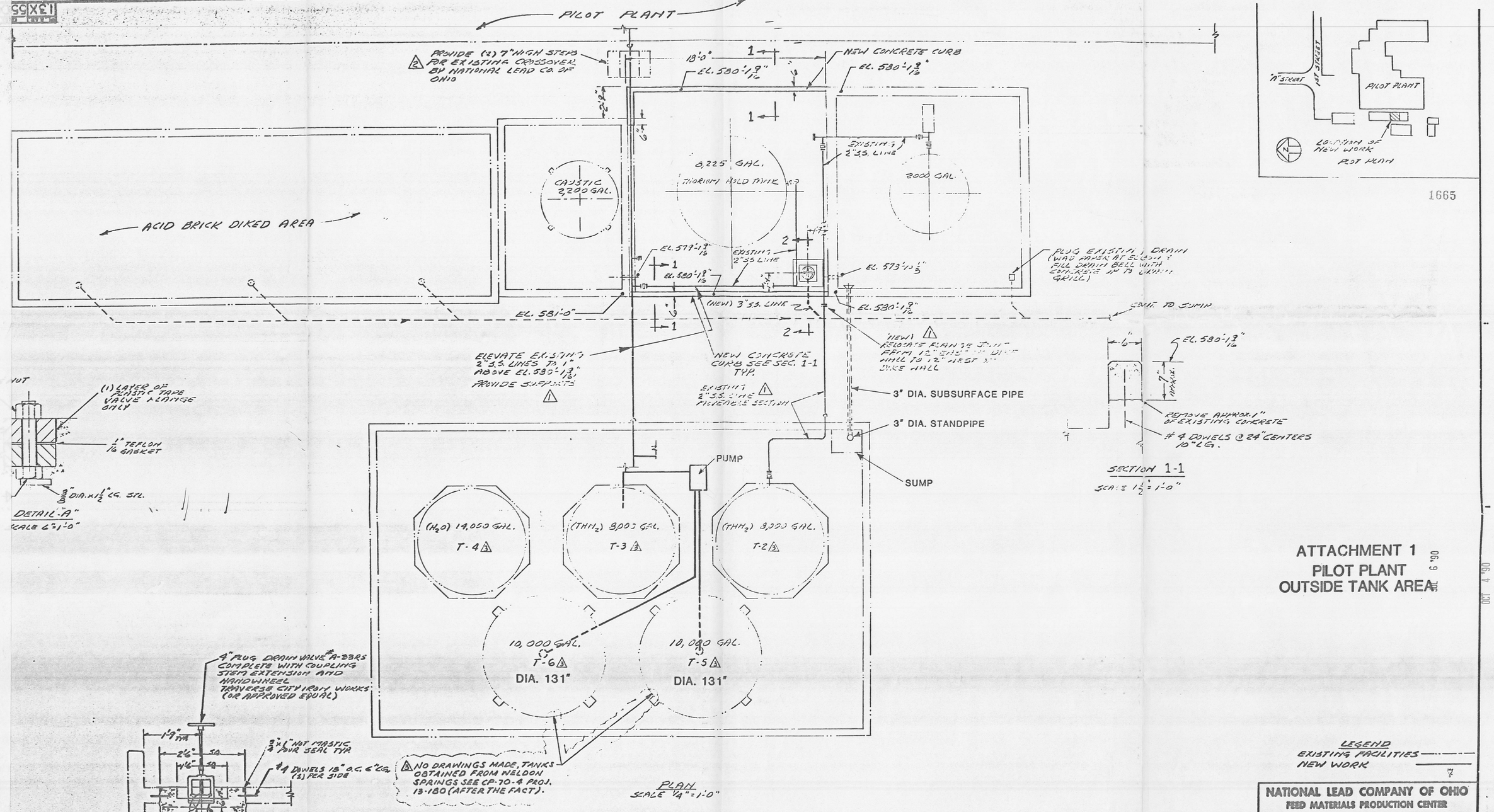
Approved by Laboratory Manager
Title

Accredited by the American Association for Laboratory Accreditation in the chemical field of testing, as listed in the current AALA Directory of Accredited Laboratories

ATTACHMENT 4

PROPOSED SOIL SAMPLING LOCATIONS

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## ATTACHMENT 1
## PILOT PLANT
## OUTSIDE TANK AREA

LEGEND
EXISTING FACILITIES
NEW WORK

DO NOT SCALE REDUCED DRAWING

| REF. DWG. NO. | REF. DWG. TITLE | NO. | REVISIONS | DATE | BY |
|---|---|---|---|---|---|
| | | 3 | ADDED NOTE & TANK NOS. | 6-5-89 | |
| | | 2 | STEPS BY NLO | 4-4-77 | |
| | | 1 | ADDED PIPING CHANGES TO DRAWING | 4-1-77 | |

**NATIONAL LEAD COMPANY OF OHIO**
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

**U. S. ATOMIC ENERGY COMMISSION**

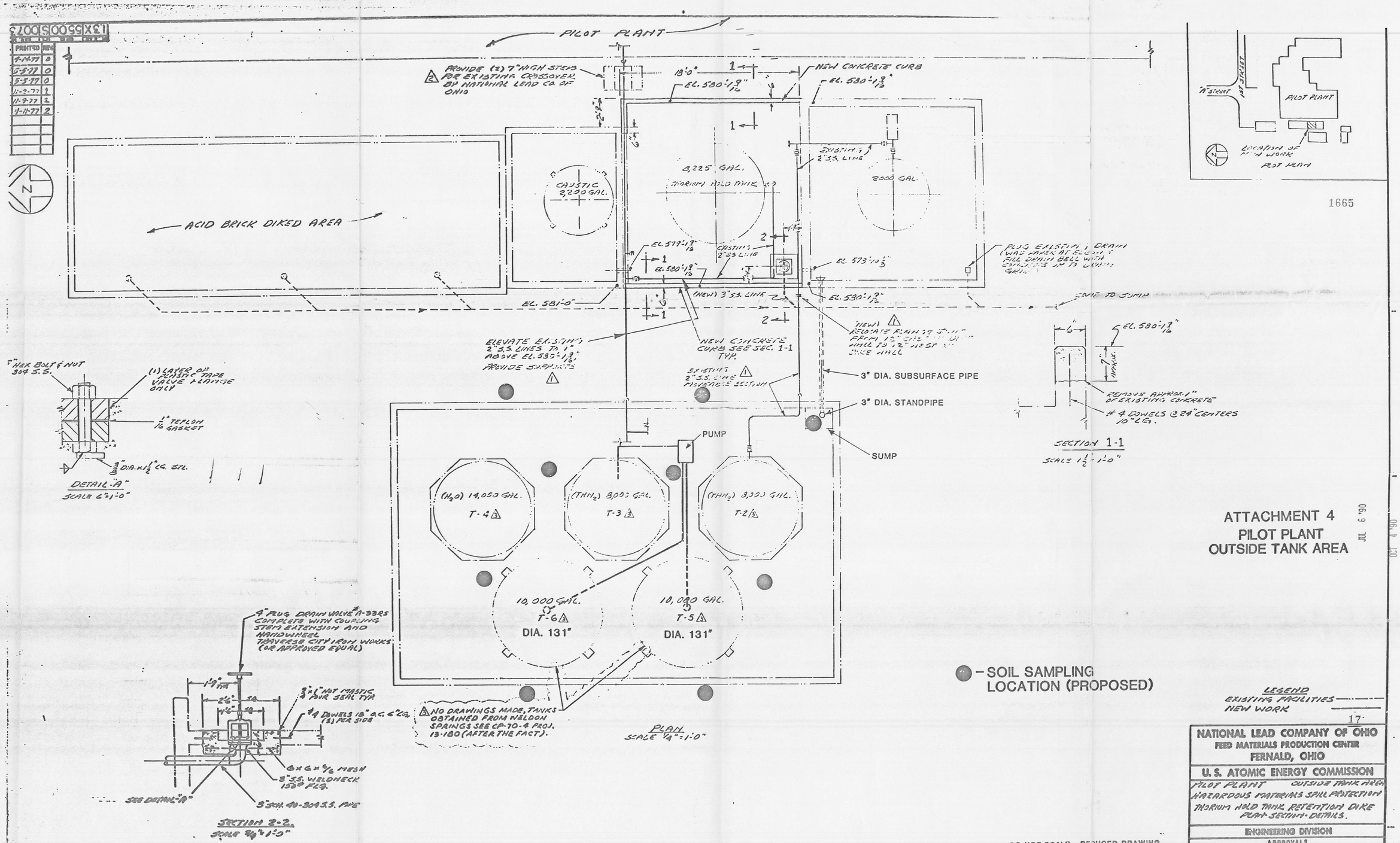
PILOT PLANT OUTSIDE TANK AREA
HAZARDOUS MATERIALS SPILL PROTECTION
THORIUM HOLD TANK RETENTION DIKE
PLAN-SECTION-DETAILS.

ENGINEERING DIVISION

APPROVALS

| | | | | | |
|---|---|---|---|---|---|
| ARCH. & STR. | | | H. & S. | | 4/13/77 |
| MECHANICAL | | | PROD. | | |
| ELECTRICAL | | | TECH. | | |
| CHEMICAL | | | MAINT. | | 4/13/77 |
| ENGINEER | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| PROJ. NO. 6-657 | CP. 74-4 | DATE 9-11-77 | SCALE 1/4" = 1'-0" | | |
| DRAWN R. SCHLATER | PL. & ARC. | CRITA. | CL. | SER. NO. | REV. |
| CHECKED | 13X | 5500 | S | 00738 | 3 |
| APPROVED EL 4-4-77 | | | | | |

107432 1

| PRINTED | REV |
|---|---|
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| 5-5-77 | 0 |
| 5-5-77 | 0 |
| 11-2-77 | 1 |
| 11-9-77 | 2 |
| 1-11-77 | 2 |