START

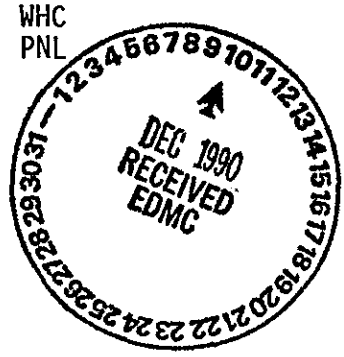
0012011

GROUT TREATMENT FACILITY DANGEROUS WASTE PERMIT APPLICATION UNIT MANAGERS MEETING - SPECIAL SESSION

DATE: August 1, 1990
LOCATION: Richland, Washington

ATTENDEES:

Steve Briggs	WHC	Joe Witczak	Ecology
Cliff Clark	DOE-RL	Sue Price	WHC
Hal Cooper	B&C	Hap Rantala	Ecology
Dan Duncan	EPA	Nick Speed	B&C
Dick Geiger	DOE-RL	Jeff Voogd	WHC
Ross Gordon	PNL	Joe Westsik	PNL
Stan Hill	WHC	Greg Whyatt	PNL
Ron Hollenbeck	KEH	George Williamson	WHC
Gary Koci	KEH	Joe Westsik	PNL
Art Lassila	DOE-RL		



B&C: Brown and Caldwell Consultants
DOE-RL: Department of Energy-Richland Operations Office
Ecology: Washington State Department of Ecology
EPA: Environmental Protection Agency
KEH: Kaiser Engineers Hanford
WHC: Westinghouse Hanford Company

A Grout Treatment Facility (GTF) meeting was held to discuss Ecology's Notice of Deficiency (NOD) dated June 19, 1990, comments 68 (thermocouple installation) and 326 (need for geotextile layer). These two comments were discussed at the last Unit Managers Meeting held July 26, 1990, in Lacey, Washington; however, based upon the discussion concerning comment 326, construction on GTF Vaults 102 and 103 would need to stop pending the installation of a geotextile membrane between the catch basin HDPE liner and the diffusion gravel.

DOE-RL/WHC started the meeting by giving a presentation on NOD comment 326 (Attachment 1). This presentation focused on the HDPE creep (gravel penetration into the HDPE liner) attributed to the maximum design static pressure on the HDPE (45.1 psi) at the maximum anticipated temperature of 90 degrees centigrade. DOE-RL/WHC discussed the testing that was being performed on the HDPE under these simulated conditions to measure the creep. The HDPE testing consists of positioning HDPE test specimens (60 mils, National Seal) in a chamber with gravel on it and placing a pressure of 45.1 psi on the specimen at a temperature of 90 degrees centigrade. The specimens were not exposed to radiation or chemical environments. Samples have been pulled at 30 days, 53 days and 230 days. The next sample will be pulled at the end of September 1990. Based on the results of the first two samples, PNL has estimated that the total creep would be 14.2 mils (extrapolated to assume a 30 year exposure). This would result in an equivalent liner thickness of 45.8 mils which is approximately 50% greater than the EPA minimum technical guidance (MTG) of 30 mils (EPA-530-SW-85-0).

Ecology had a concern with how these tests were performed since the creep measurements were taken approximately one hour after removing the sample from the chamber and allowing the sample to cool to room temperature.

Ecology's concern was attributed to the HDPE liner rebounding (returning to the original state); thus, resulting in the measured creep being less than what actually occurred. B&C, Ecology's consultant, mentioned that samples could rebound as much as 25%. DOE-RL/WHC mentioned that even if the samples rebounded 25%, the liner would still be greater than the EPA MTG of 30 mils (total creep of 18.9 mils instead of 14.2 mils, or an equivalent thickness of 41.1 mils).

Ecology asked DOE-RL/WHC why the decision was made to delete the geotextile from the design. DOE-RL/WHC informed Ecology that the regulations require leachate to be detected as soon as possible and the geotextile would initially absorb liquid; thus, the early detection of a small leak would be inhibited. Furthermore, initial tests with the geotextile did not appear to decrease the amount of creep into the HDPE. PNL informed Ecology that tests were initially done on HDPE with and without the geotextile. Based on a thirty day exposure under the test conditions described above (45.1 psi and 90 degrees centigrade), both specimens showed creep, extrapolated for a 30 year exposure, at 20 mils. PNL stated that they have refined their measurement techniques since these tests were initially run, and that scatter in the data resulted in both samples having the same amount of creep. In addition, Ecology was informed that testing on HDPE without the geotextile was being done to comply with the regulatory requirement to demonstrate that the current GTF Vault design is equivalent and/or better than the current accepted technology for landfills.

B&C went on to state that the major cause of failures in HDPE liners was attributed to construction. DOE-RL/WHC stated that construction is carefully controlled and work will be done with handtools as opposed to the bulldozers used at other landfill sites. Furthermore, Ecology was invited to oversee construction activities while placing the gravel on top of the HDPE to ensure that the liner was not damaged.

Ecology was informed by DOE-RL/WHC that the decision to remove the geotextile was made in early December 1989, and the engineering change notice (ECN) was issued in late December 1989 (ECN B-714-22). Ecology asked why they were not informed of this change. DOE-RL/WHC informed Ecology that the ECN was sent to them in March, 1990. It was later agreed to that the contents of all ECN's (cleared/uncleared and proposed ECN's) would be individually discussed with Ecology at future Unit Manager Meetings as opposed to just transmitting Ecology copies of the cleared ECN's.

In addition, DOE-RL/WHC informed Ecology that installation of the geotextile would result in a construction schedule slip of approximately 3 months due to procurement and certification of the material, and a cost impact of approximately $500,000 due to the costs associated with delaying the construction. Procurement and installation of the material would cost approximately $15,000. Ecology informed DOE/WHC that the decision to use or not use the geotextile would be based on a 'technical decision' with no consideration given to cost and scheduling.

Ecology consented to allow construction to continue on GTF Vaults 102 and 103 without the geotextile providing the following three conditions were met:

1. A report on the ongoing creep tests be sent to Ecology after completing the analysis for the September 1990, HDPE test specimen

2. If Ecology is not satisfied with current test results, a new creep test procedure will be developed that must be approved by Ecology
3. Demonstrate that the current GTF Vault design for an HDPE liner on concrete is equivalent to HDPE on clay from a regulatory point of view.

If DOE-RL/WHC failed to met any of these requirements, or the test results were not satisfactory, GTF vaults 102 and 103 would not be allowed to process dangerous waste. In addition, Ecology informed DOE-RL/WHC that construction is preceding at risk if they did not install the geotextile. If DOE-RL/WHC decided to install the geotextile for GTF vaults 102 and 103, DOE-RL/WHC would only have to comply with condition 3. Ecology went on to say that geotextile must be installed in GTF Vaults 104 and 105 regardless of the creep test results. When questioned by DOE-RL/WHC on the rationale for requiring the geotextile for vaults 104 and 105 if the test results were satisfactory, B&C and Ecology stated that this would be a test. Ecology committed to FAX a draft letter to DOE-RL/WHC on their requirements by Friday, August 3, 1990.

DOE/RL continued the meeting with a presentation (Attachment 2) on thermocouple placement in response to NOD comment 68. This presentation focused on locations for temperature measurements within the GTF vault, and temperature control within the GTF vaults associated with the heat of hydration and radiolytic decay. Temperature control within the vault is done by maintaining the waste feed temperature below 40 degrees centigrade, limiting the Cs^{137} concentration (~260 Ci/m^3 of grout or ~330 Ci/m^3 waste feed) and obtaining a grout formulation with a heat of hydration at approximately 5000 BTU/ft^3 grout.

In order to obtain actual temperature measurements of the grout vaults, thermocouple trees would be installed in the following locations:

- Center of the vault
- Mid-way along the longest length sidewall, both inside and outside of the wall
- Mid-way along the shortest length sidewall, both inside and outside of the wall
- In the corner of the vault, both inside and outside of the corner.

The presentation contained several graphs showing expected temperature profiles within the grout vaults after initial fill and three months after filling. This was done by using two dimensional numerical analysis techniques. A plot was made showing the predicted maximum temperatures within the vault comparing two dimensional with three dimensional analysis. The results showed that the two methods predicted nearly identical temperatures in the first year with the two dimensional analysis predicting higher temperatures after this time.

Ecology and B&C tentatively concurred with the recommendations by DOE-RL/WHC for monitoring the temperature profiles within the GTF Vaults.

ATTACHMENT 1
(Notice of Deficiency Comment Number 326)

Notice of Deficiency Comment 326

Deficiency: HDPE liner protection

Concern raised by Ecology

-Loads on the liner are point loads

-Creep testing must consider chemical and radiation effects

Conclusions of 9090 Testing:

"The HDPE line was judged to be chemically compatible with DSSF at 90 C based on the extremely stable dimensional properties and the small observed changes in the mechanical properties over 120 days"

"The effect of radiation on liner compatability is expected to be neglibible for this application."

9090 Test report is included as Appendix 4H

Creep Testing

Two creep tests
- Short-term probe test
- Long-term gravel compressive load test

Testing at 90 C

Estimate of 30 year creep - 14.2 mils

Liner Design Criteria

Minimum Technology Guidance on Double Liner System for Landfills and Surface Impoundments" EPA-530-SW-85-014

Minimum liner thickness requirement - 30 mils

Catch basin liner thickness after 30 years,

45.8 mils (60 - 14.2 mils)

ATTACHMENT 2
(Notice of Deficiency Comment Number 68)

Notice of Deficiency Comment No. 68

Deficiency: System Compatibility

- Two concerns were raised by Ecology.
  - Use of simulated leachates for "actual" leachates.
  - Use of temperature estimate for vault and liner.
- Information was provided to Ecology regarding leachates during the July 1990 Unit Manager's Meeting. This discussion will discuss temperatures monitoring and control.

Ecology Requires

- "Temperature in the LDCRS and along one wall must be monitored by the installation of some temperature measuring device."
- "Data received must be reported and compared to the temperature models and heat transfer equations."

Temperature Control and Monitoring

- Temperature control is accomplished by using a formulation with a limited heat of hydration such that the adiabatic temperature rise and subsequent radiolytic heating does not cause the vault or liner to exceed 90°C. The key "controls" are as follows:

  - Characterization of waste batch and staging in the feed tank.

  - Calorimetry testing to assure limited temperature rise due to heat of hydration.

  - Limitations on starting temperature of waste feed.

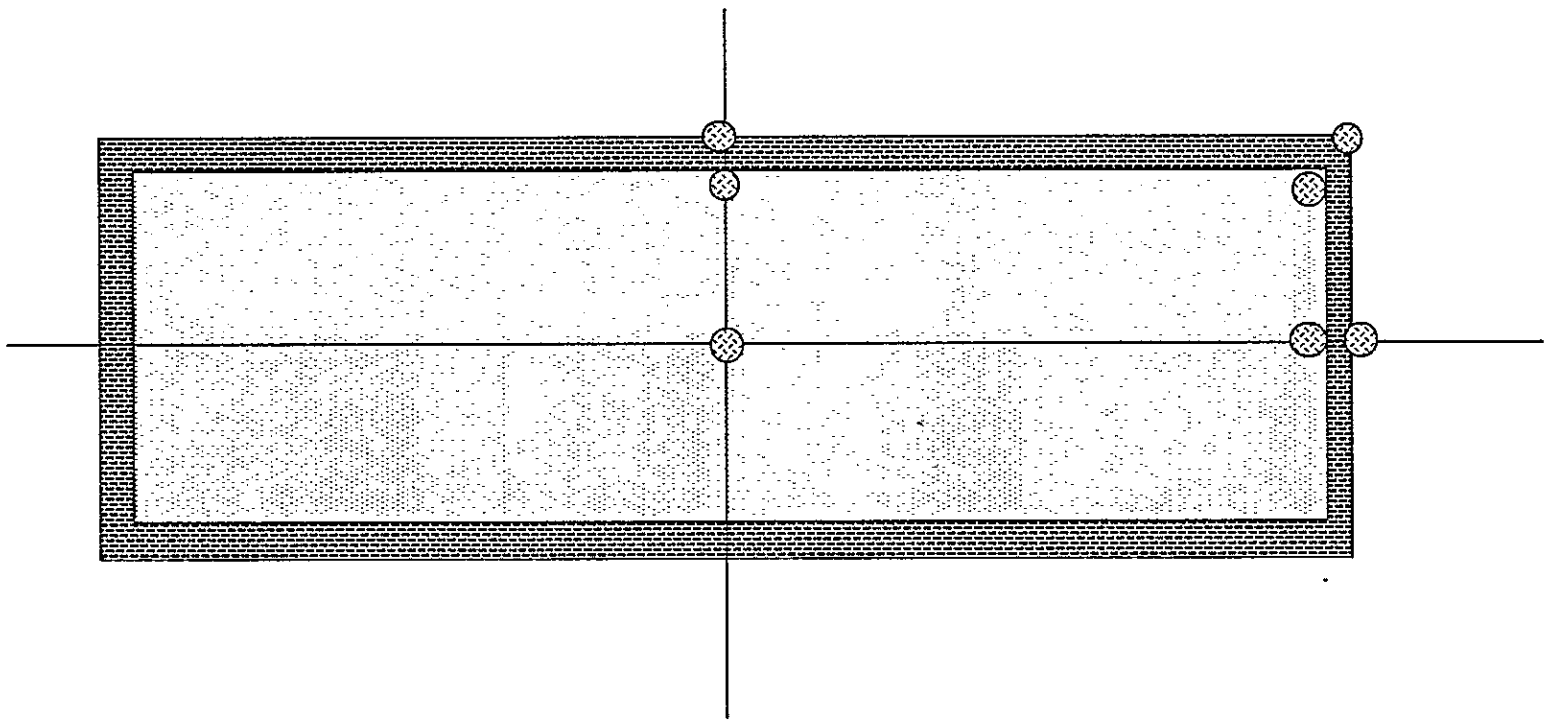
  - Limitation on amount of cesium 137 in waste feed.

Temperature Control and Monitoring (Cont.)

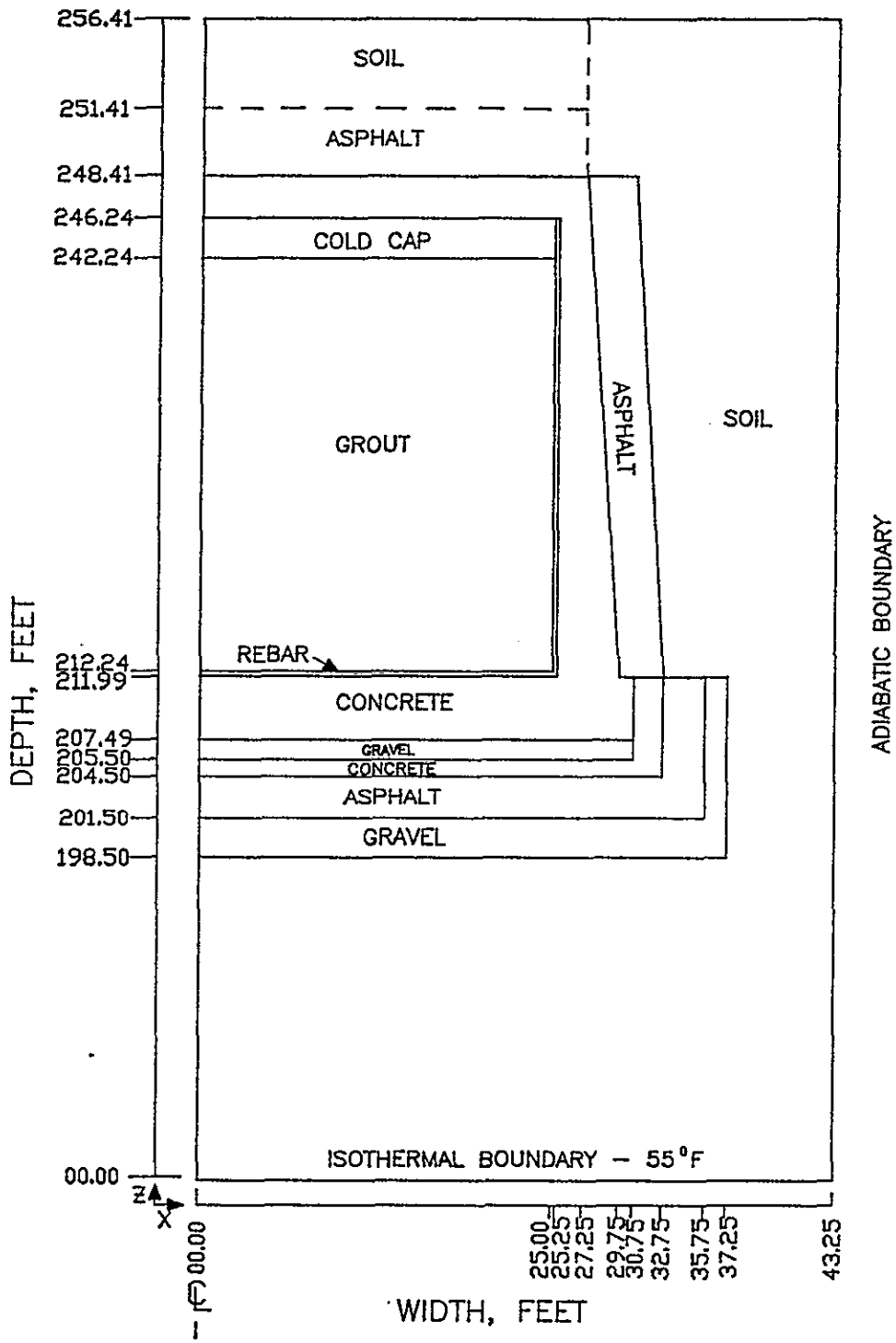
- These checks are made as a part of the start-up conditions for each grouted waste campaign (approximately one-million gallons of waste feed).

- Temperature monitoring is accomplished using thermocouples and comparing predicted values with actual values.

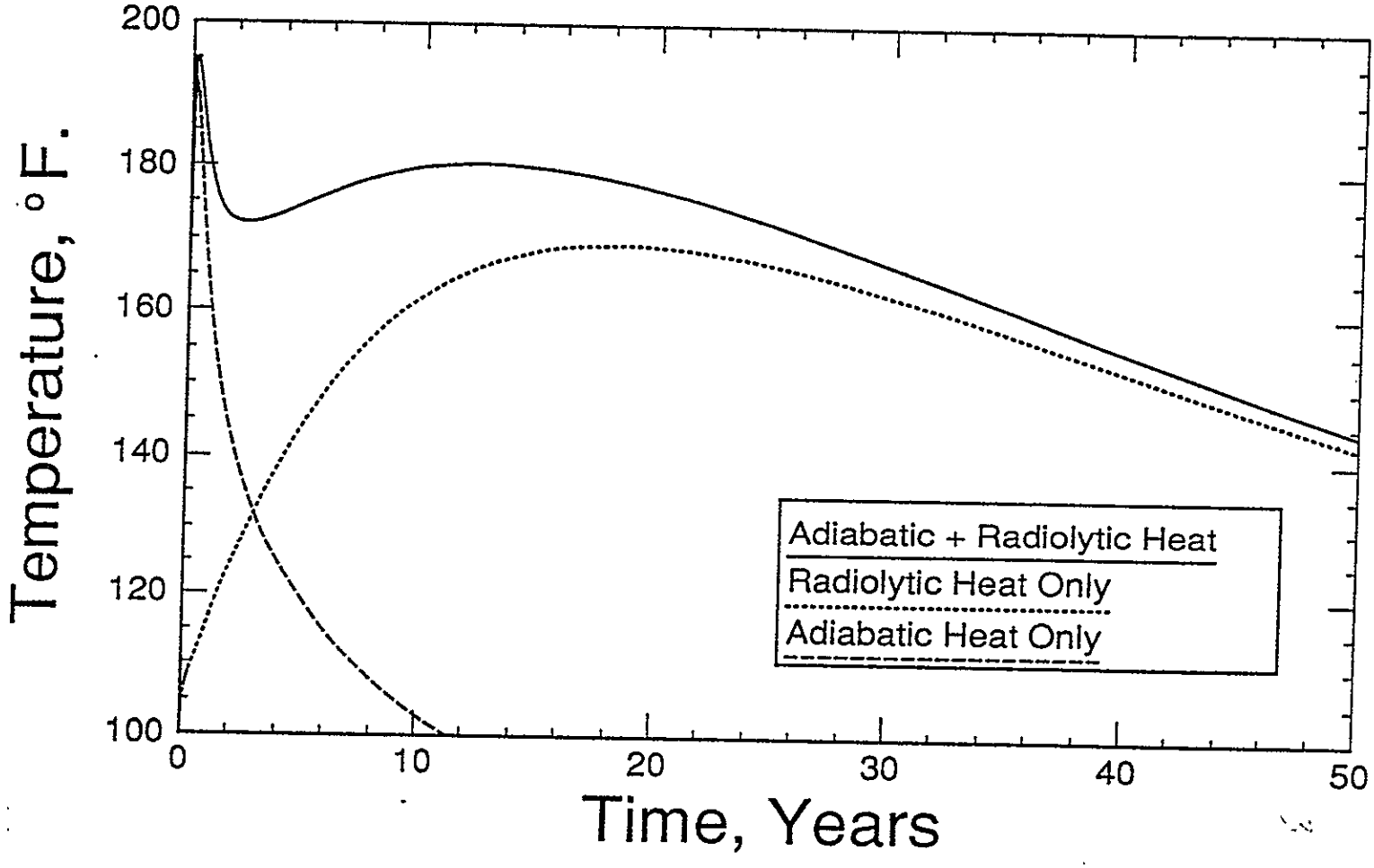
THERMOCOUPLE TREE LOCATIONS FOR GROUT DISPOSAL VAULTS



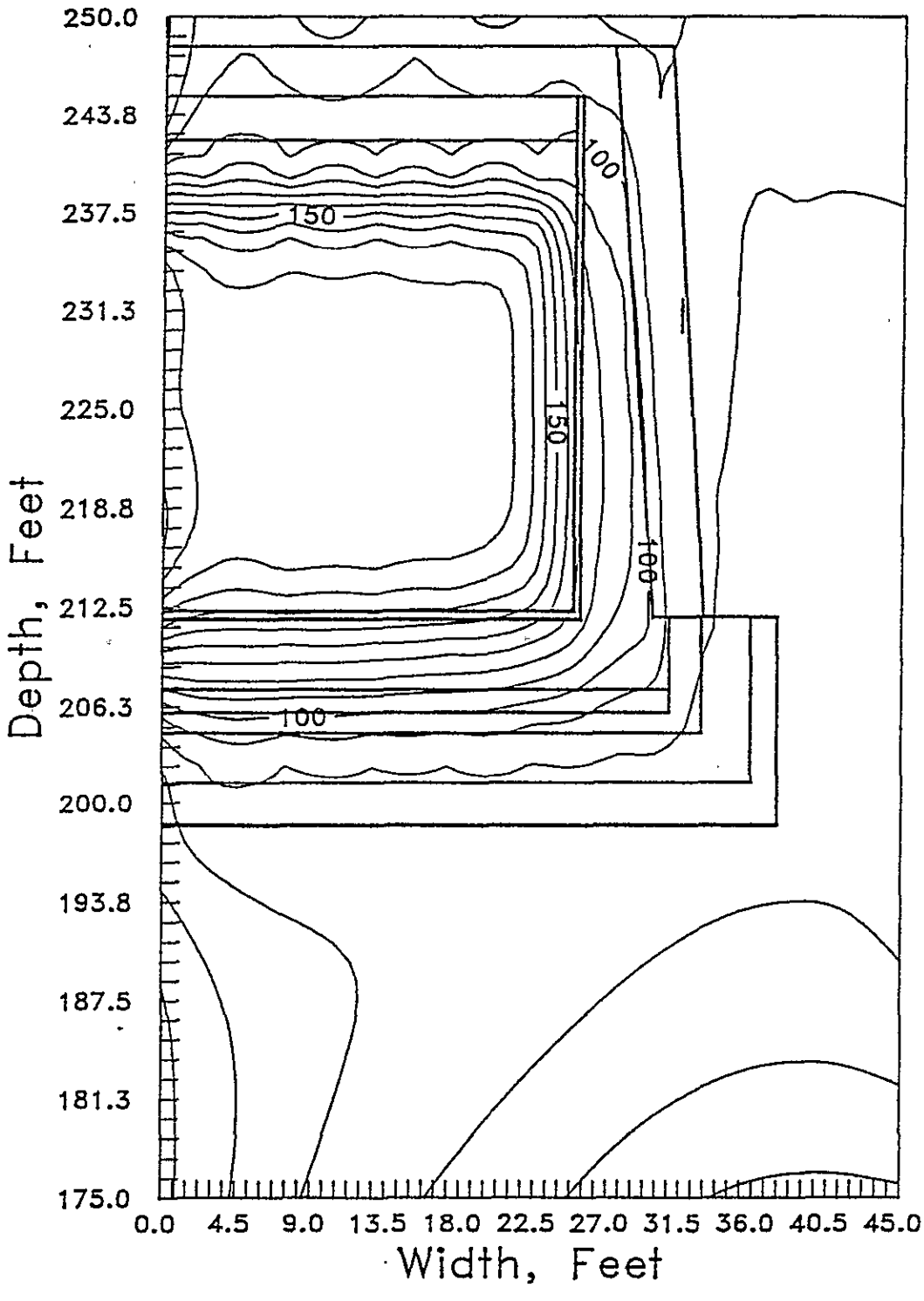
⊗ thermocouple trees



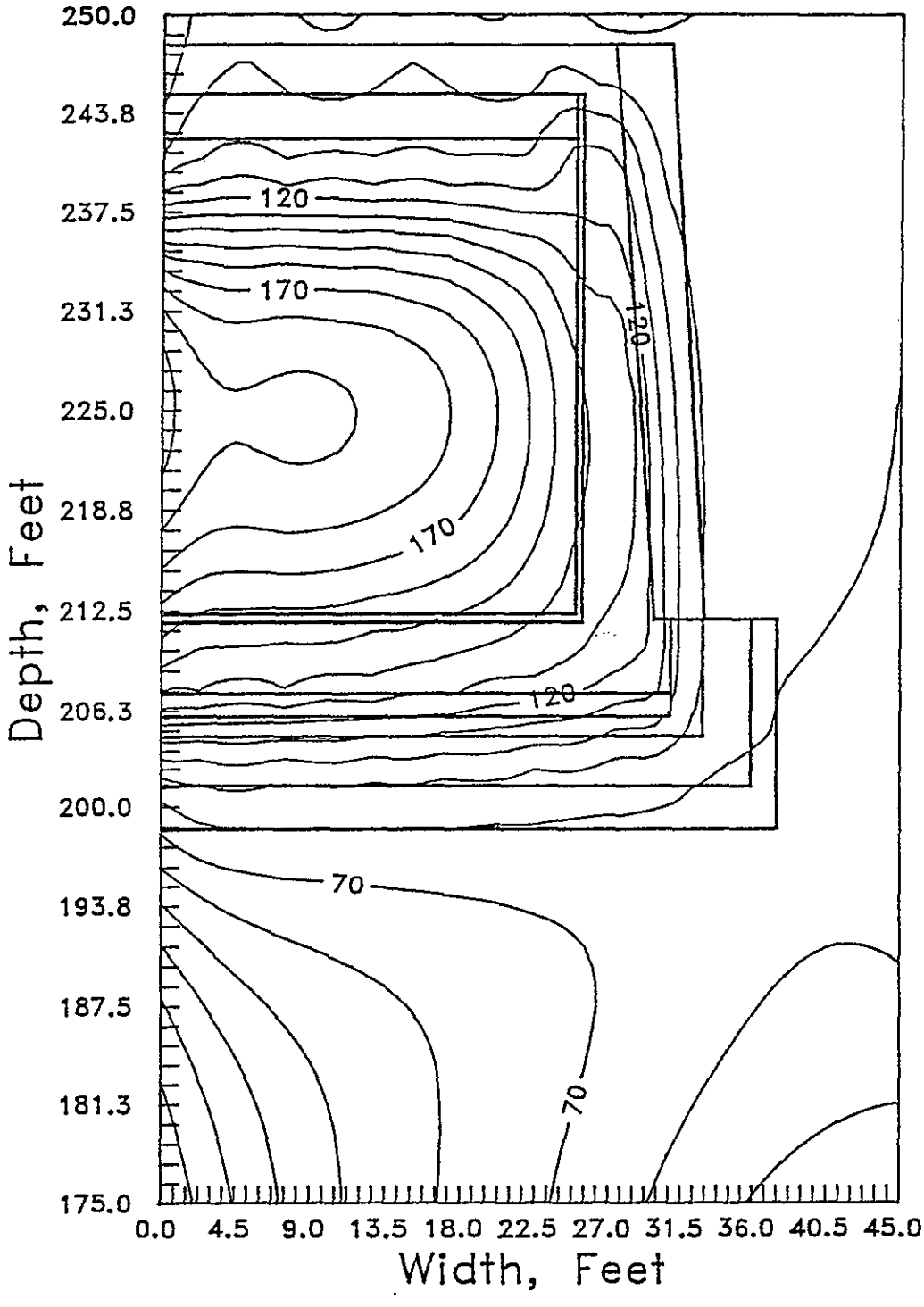
Asphalt Barrier Grout Vault



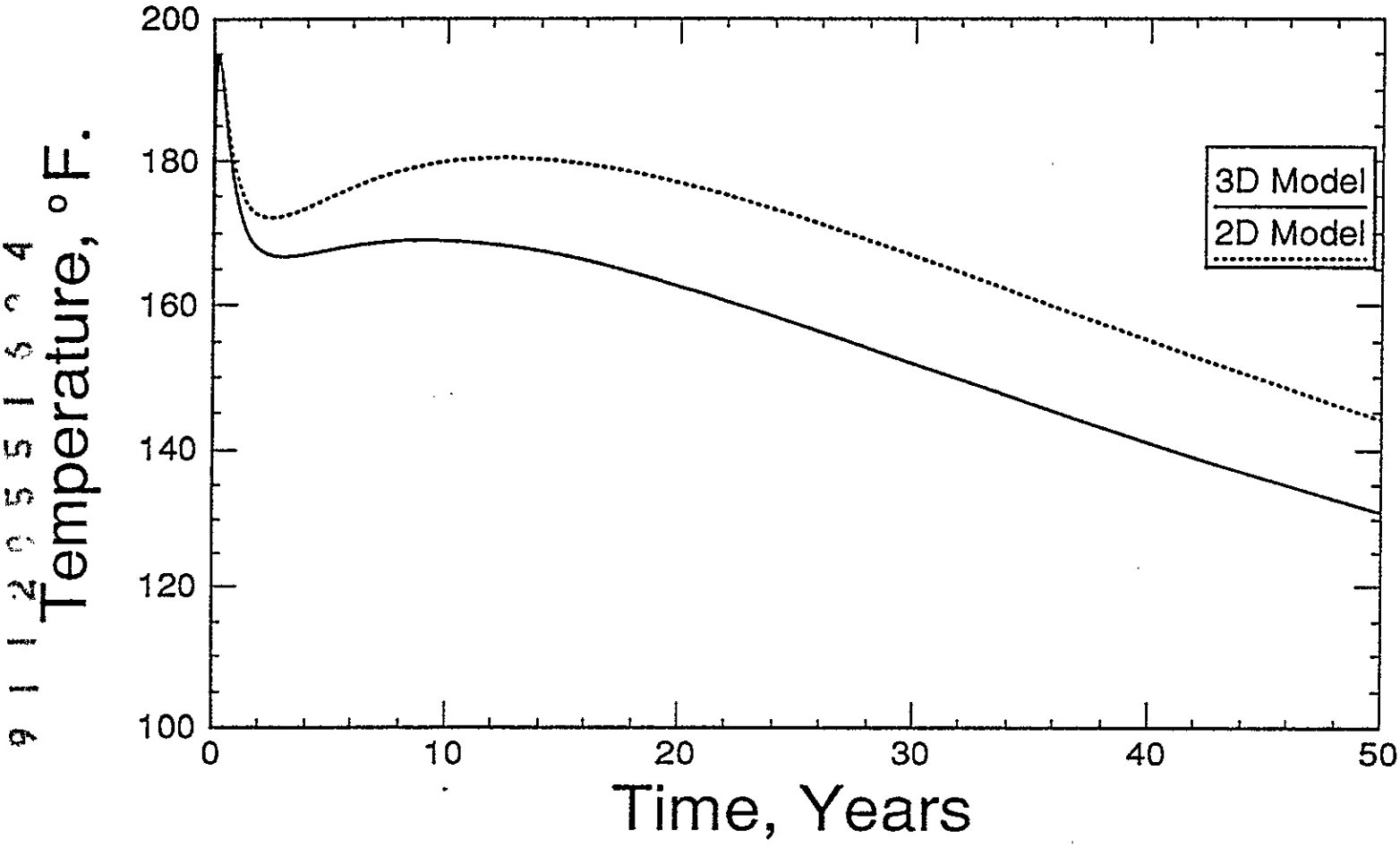
Maximum Grout Temperatures, 2-Dimensional Model



Full Grout Vault



Three Months After Full



2-D Versus 3-D Maximum Temperatures

CONCURRENCES

Clifford E Clark
Cliff Clark, DOE-RL — 9/18/90 DATE

Daniel L Duncan
Dan Duncan, EPA — 11/1/90 DATE

J A Voogd
Jeff Voogd, WHC — 8-30-90 DATE

J. W.
Joe Witczak, Ecology — 8/30/90 DATE