United States
Environmental Protection
Agency

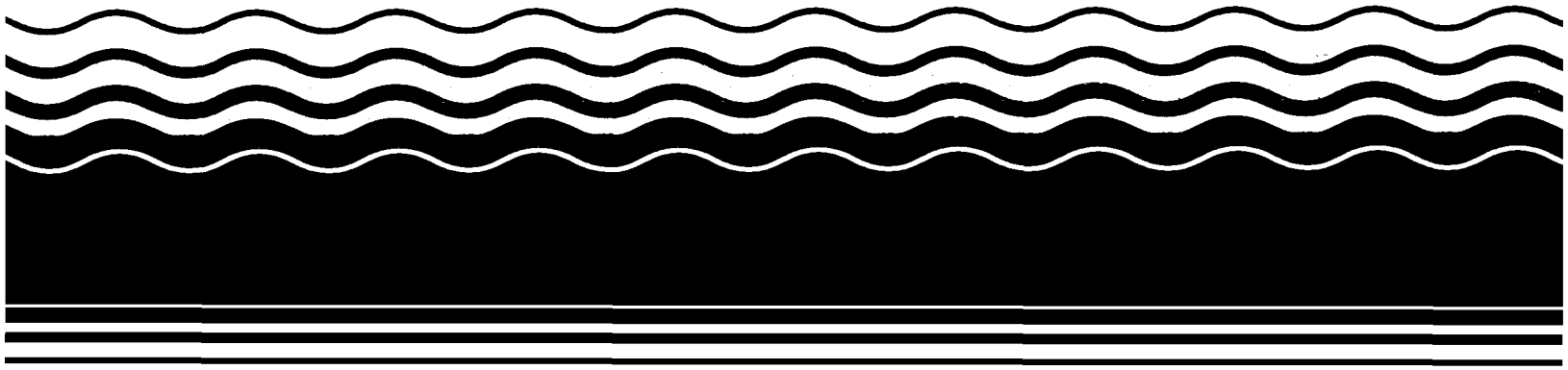
Office of
Emergency and
Remedial Response

EPA/ROD/R10-92/039
June 1992

EPA

# Superfund Record of Decision:

## Arrcom (Drexler Enterprise), ID



## NOTICE

The appendices listed in the index that are not found in this document have been removed at the request of the issuing agency. They contain material which supplement, but adds no further applicable information to the content of the document. All supplemental material is, however, contained in the administrative record for this site.

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First Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 1.2-acre Arrcom site is an abandoned waste oil recycling facility located 2.5 miles southwest of Rathdrum, Idaho. The facility is situated in a rural residential area, and there are an estimated eight residences within a one-half mile radius of the site. The site overlies the Spokane Valley-Rathdrum Prairie Aquifer, a sole source for public and private drinking water for approximately 350,000 people. From 1960 to 1982, Arrcom used the site for oil recycling operations, which included an oil/water separation process, a shaking process to facilitate sedimentation, and a heating process for demulsification. Waste oil and recycled oil were stored in 27 tanks and 4 tank trucks. Sludge and waste oils were discarded in three disposal pits on the property or used for dust suppression on the road. In 1982, the site was abandoned, and investigations by EPA later that year revealed soil and waste oils contaminated with high levels of solvents, lead, and PCBs. Emergency response activities were conducted under EPA's removal program between 1983 and 1990. In 1983, 9,700 gallons of waste oils from tanks and 137 cubic yards of contaminated soil were removed offsite. In 1987, 13,225 gallons of waste oils and sludge and 2,000 cubic yards of soil were removed from tanks and onsite disposal pits.

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - ARRCOM (Drexler Enterprise), ID
First Remedial Action - Final
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Key Contaminants: None

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First Remedial Action - Final

Abstract (Continued)

Also, in 1990, 1,653 tons of contaminated soil were excavated and sent offsite to hazardous waste incinerators or landfills. Residential ground water wells were sampled and ground water monitoring wells also were installed. This ROD addresses the final remedy for the Arrcom site. Previous removal actions have eliminated the need to conduct remedial action at the site. Therefore, there are no contaminants of concern affecting this site.

The selected remedial action for this site is no further action, which is based on the post-removal soil and ground water sampling, supplemental remedial soil and ground water sampling, and the risk assessment. Removal actions onsite have reduced concentrations of contaminants in the soil to levels that do not pose a risk to human health and the environment. There are no costs associated with this no action remedy.

PERFORMANCE STANDARDS OR GOALS: Not applicable.

# RECORD OF DECISION

# DECLARATION, DECISION SUMMARY, AND RESPONSIVENESS SUMMARY

FOR

ARRCOM
RATHDRUM, IDAHO

JUNE 1992

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON

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# DECLARATION

# ARRCOM
# SUPERFUND SITE

## SITE NAME AND LOCATION

Arrcom
Rathdrum, Idaho

## STATEMENT OF PURPOSE

This decision document presents the no further action decision by the U.S. Environmental Protection Agency (EPA) for the Arrcom Superfund Site in Rathdrum, Idaho. The no further action decision was developed in accordance with the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the Administrative Record for this site. The attached index identifies the documents that comprise the Administrative Record upon which the selection of the no further action decision is based.

The State of Idaho concurs with the no further action recommendation.

## DESCRIPTION OF THE SELECTED REMEDY

The no further action decision is based on the post-removal soil and groundwater sampling, the supplemental remedial soil and groundwater sampling and the Risk Assessment. Based on the information currently available, previous removal actions at the site have reduced concentrations of contaminants in soils to levels that do not pose a risk to human health and the environment and has eliminated the need to conduct additional remedial action at the site.

## DECLARATION STATEMENT

The no further action decision is protective of human health and the environment. Because the no further action decision does not result in hazardous substances, pollutants, or contaminants remaining at the site above health based levels that allow for unlimited use and unrestricted exposure, a five year review would not be necessary.

Signature sheet for the Arrcom Record of Decision by the U.S. Environmental Protection Agency.

Dana A Rasmussen

DANA A. RASMUSSEN
Regional Administrator, Region 10
U.S. Environmental Protection Agency

6-30-92
Date

# DECISION SUMMARY

## I. SITE DESCRIPTION

The Arrcom site is an abandoned waste oil recycling facility located 2.5 miles southwest of the City of Rathdrum, in Kootenai County, Idaho (See Figure 1). The property consists of approximately 1.2-acres in the central region of Section 10, Township 51 South, Range 5 West.

The Arrcom site is situated in a rural residential neighborhood with an estimated eight residences located within a one-half mile radius to the north, east, and west. One residential property is adjacent to the northern edge of the site. The site is bounded to the southeast by Highway 53, a Northern Pacific Railroad mainline, and agricultural lands used primarily for growing forage crops. The marshy drainage basin of Lost Creek is located 0.3 mile to the north/northeast. The site is not fenced.

The site is located over the Spokane Valley-Rathdrum Prairie Aquifer, the sole source for public and private drinking water for approximately 350,000 people in Idaho and Washington. Approximately 6,300 of these people live in the primarily rural residential area within three miles of the ARRCOM site.

## II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

### A. History of Site Activities

Oil recycling operations began at the facility in the early 1960s. During operation, waste oils were trucked to the site, underwent processing, and were sold. The oil recycling operation included an oil/water separation process, a shaking process to facilitate sedimentation, and a heating process to facilitate demulsification.

Waste oil and recycled oil were stored in 27 tanks and 4 truck tanks (Figure 2). Contamination of the environment occurred as a result of past oil spills from the operation and from leaking oil storage tanks. Sludge and waste oils were discarded in at least three disposal pits on the property and was spread on the on-site road.

### B. History of Federal Site Investigations and Removal Actions conducted Under CERCLA

The Arrcom site was abandoned in January 1982, and in August a site visit of the facility was conducted. During the site visit, a number of the oil storage tanks were found to be leaking and in general disrepair. Preliminary sampling of the site in June 1982

indicated the waste oils and soils at the facility were contaminated with high levels of solvents, lead and polychlorinated biphenyls (PCBs) and a potential for groundwater contamination existed.

A Site Inspection (SI) report was completed in August 1982 and a Hazard Ranking System score was developed. In December 1982, the Arrcom site was proposed for inclusion on the National Priorities List (NPL) and the site received a final NPL listing in September 1983.

With exceptionally high levels of contaminants and large volumes of waste oils and sludges, emergency response activities were initiated under EPA's removal program to stabilize the site . A three phased removal action was performed at the ARRCOM site in 1983, 1987 and in 1990. Contaminated soils and sludge disposal pits were excavated, and waste oils, tanks and buildings were removed from the site and shipped to off-site hazardous waste landfill and incinerator facilities. Surface soil and waste oils were sampled prior to the 1983 and before and after the 1987 and 1990 removal.

As part of the preliminary investigation and removal action residential groundwater wells in the immediate vicinity of the site were first sampled in August 1982 and then again in 1987. In addition, during the 1987 removal, groundwater monitoring wells were installed at the site. Groundwater samples were taken in 1987, 1989, 1990.

In 1991, EPA performed a comprehensive assessment of the site data generated during the removal actions and conducted a limited sampling effort to fill important data gaps in support of a risk assessment. This information was used to evaluate the current nature and extent of contamination at the site and conduct a risk assessment.

**C. Enforcement Activities**

Prior to initiating on-site response activities at the Arrcom Superfund Site, EPA notified the owners and operators of the Site of its intent to enter the property and conduct response activities. This Notice of Intent was sent in September of 1983. EPA then initiated and conducted a formal search for potentially responsible parties (PRP) at the Arrcom Superfund Site. This PRP search was followed up by a number of letters requesting information from identified PRPs. In July of 1989, a formal letter was sent to PRPs notifying them of potential liability, demanding the payment of response costs and providing an opportunity to conduct further response activities. Some of these PRPs entered into negotiations with EPA to conduct the work and/or pay for the response costs. In February of 1991, EPA filed a complaint against a number of the PRPS seeking to recover

its response costs. Following the negotiations and the filing of the complaint, a settlement was negotiated with Atlantic Richfield Company, Inc; Columbia Lighting, Inc; Kaiser Aluminum and Chemical Corporation; Warren Bingham; the United States Bonneville Power Administration and the United States Department of Interior. The settlement provides for the payment of $1,185, 500.00 to settle the PRP's liability for all costs incurred up to and including the date of the Record of Decision. The Consent Decree, which was made available for public comment, was entered on March 30, 1992.

## III. COMMUNITY RELATIONS HISTORY

CERCLA requirements, under Sections 113 (k)((2)(B)(i-v) and 117, 42 U.S.C. §§ 9613 and 9617 for public participation include releasing the Risk Assessment report and the proposed plan to the public and providing a public comment period to allow for public participation in the decision-making process. EPA met these requirements by releasing these documents to the public in May 1992. These documents were made available by placing them in an information repository in the Rathdrum Public Library and EPA office in Seattle. Notice of a 30 day public comment period on the documents was placed in the Statesman Review newspaper.

To date the following community relations activities have been conducted by EPA.

- March 1987 EPA released a fact sheet announcing the second phase of the removal.
- May 1987 EPA released a fact sheet announcing the completion of the second removal.
- March 1988 Community Relations Plan was completed and included in the site repository.
- April 1990 EPA released a fact sheet announcing the third phase of the removal action and briefly described the first two phases of the removal action.
- August 1991 EPA released a fact sheet announcing need for additional soil sampling.
- April 1992 EPA released a fact sheet announcing the public comment period on the Cost Recovery Consent Decree between the EPA and Potentially Responsible Parties (PRPs).
- May 20, 1992 EPA mailed the proposed plan fact sheet, which explained the results of the risk assessment and EPA's preferred decision for public comment.

- May 22, 1992 A public notice in the Spokesman Review announced the availability of the proposed plan and the risk assessment, and the dates of the public comment period.

- May 22 to June 20, 1992

  Public comment period for the proposed plan and risk assessment.

- June 1992 A responsiveness summary addressing comments received during the public comment period on the proposed plan and risk assessment was prepared and attached to this ROD.

## IV. SCOPE AND ROLE OF THE RESPONSE ACTION WITHIN THE SITE STRATEGY

EPA has conducted a three phased emergency removal action to stabilize conditions at the site, which posed a threat to public health and the environment. The removal action accomplished the following:

- 1983: 9,700 gallons of waste oils from tanks were removed. 137 cubic yards of contaminated soils removed.

- 1987: 13,255 gallons of waste oils and sludges were removed from tanks and disposal pits. 2,000 cubic yards of contaminated soils removed.

- 1990: 1,653 tons of contaminated soil were removed.

Contaminated soils and waste oils from the three removals were shipped to an offsite hazardous waste landfill and incinerator.

In 1991, EPA performed a comprehensive assessment of the site data generated during the removal action and conducted a limited sampling effort to fill in important data gaps. This information was used to evaluate the current nature and extent of contamination at the site and conduct a risk assessment.

The results of the risk assessment indicate that conditions at the site do not pose a risk to human health or the environment. The removal action has eliminated the need to conduct additional remedial action and the no further action decision is the final response action for this site.

The no further action decision does not result in hazardous substances, pollutants, or contaminants remaining at the site above health based levels and thus allows for unlimited use and unrestricted exposure. Therefore, a five year review is not necessary.

## V. SUMMARY OF SITE CHARACTERISTICS

The following discussion presents a general overview of the site including a summary of the removal action, sampling and analysis that was performed as part of the removal action and the sampling and analysis performed in support of the risk assessment.

### A. Geology and Soils

The Arrcom facility is located on the northern edge of the Rathdrum Prairie. The Rathdrum Prairie valley trends generally north to south and is bounded on the east and west by bedrock highlands that rise over 1,000 feet above the valley floor.

The geologic setting at the ARRCOM site and its surroundings was greatly influenced by the Pleistocene glacial history of the area. Multiple glacial advances and recessions smoothed valley walls, and eroded most of the pre-existing deposits. The eroded material was then redeposited as till, undifferentiated drift, and lake sediments. Catastrophic floods generated by the periodic, sudden breaching of glacial Lake Missoula removed much of the previously deposited clays and silts, thereby forming the modern landscape. The deposits that remain are coarse textured, ranging from fine gravels to boulders persisting deep below the valley floor.

### B. Hydrogeology

The Arrcom site is situated over the Spokane Valley Rathdrum Prairie Aquifer. It is an unconfined sole-source aquifer that provides drinking water for approximately 350,000 people in Idaho and Washington. An estimated 6,300 people are served by both public and private drinking water wells located within a 3-mile radius of the Arrcom facility. The residence closest to the site, located immediately adjacent to the north side of the facility, relies on a private well for its drinking water supply, as do other residences in the immediate area. The aquifer is also heavily used for crop irrigation.

The Spokane Valley Rathdrum Prairie Aquifer exists within the highly permeable silt, sand, gravel, and boulder Pleistocene flood deposits. On average, the groundwater table is 135 feet below ground surface (bgs). The aquifer thickness is typically greater than 200 feet near the valley center. Irrigation and drinking water wells in the area are completed at depths greater than 100 feet bgs but generally less than 200 feet bgs.

Aquifer recharge is primarily from direct precipitation, streams, lakes, and irrigation. The aquifer gradient in many areas is very flat. Groundwater generally moves at a fast rate and flows regionally south-southwest toward the Spokane River (located about 5 miles from the site).

There are no surface water bodies on or in the near vicinity of the Arrcom site.

## C. Nature and Extent of Contamination

During the three phases of the removal action conducted between 1983 and 1990 soils were excavated down to depths, ranging from 1 to 20 feet bgs at different locations on the site. Soil samples were collected after two of the removals to verify the concentration of contaminants remaining in the soils. Contaminated soils and waste oils were shipped to an offsite hazardous waste landfill and incinerator.

A summary of the removal activities and environmental sampling that has been performed is provided below.

### • Summary of Sampling/Removal Activities: 1983

Soil and tank contents at the ARRCOM site were sampled in June and August 1983. The results of the analyses showed the presence of a variety of organic contaminants at significant concentrations in on-site soils and tanks.

In August 1983 EPA authorized an emergency removal action because the site posed an immediate threat to human health and the environment. Additional on-site tank and soil sampling was conducted through September 1983. Benzene was detected in the soils and the following contaminants (with the highest detected value in parentheses) were found in the on-site tanks: chloroform (1 ppm), benzene (100 ppm), toluene (11,000 ppm), total xylenes (103,000 ppm), acetone (460 ppm), methylene chloride (130 ppm), tetrachloroethylene (330 ppm), ethyl benzene (44,000 ppm), and PCBs (1,250 ppm).

Contaminated soils were excavated from seven areas which are shown in Figure 3. The two deep excavations were filled with on-site soils and the other excavated areas were leveled. Unpumpable sludges were left in the remaining tanks and trucks on-site.

### Summary of Sampling/Removal Activities: 1987

Between the 1983 removal action and 1987, illegal oil storage activities occurred at the Arrcom site. A site assessment conducted in March and April 1987 showed that two of the tanks pumped in 1983 (T-21 and T-22) had apparently been refilled. Additionally, a tar-like material had spilled from a 55-gallon drum on the north side of the boiler room and large areas of on-site soil contained visible oil contamination. An estimated 9,000 gallons of oil and other liquids and/or sludge-like materials were contained in tanks on the site in 1987.

Composite samples of oil and sludge were taken from 19 tanks and 3 trucks in 1987. Sampling results indicated elevated levels of organic and inorganic compounds.

In addition, sample analysis of on-site soils indicated the presence of high levels of organic and inorganic compounds associated with waste oils and solvents.

In April 1987, EPA authorized the second phase of the removal action at the Arrcom site with the goal of excavating contaminated soil and removing all waste oil and on-site structures. Generally, soils were removed if they were visibly contaminated or if concentrations measured by a mobile lab exceeded excavation screening criteria. The exception was in an area around underground storage tank T-14. This area was excavated to a depth of 20 feet, however soil removal ended prior to the complete removal of visible contaminated soil.

Soil removal activities were completed in July 1987. The areas excavated during the 1987 soil removal action are shown in Figure 5.

After the 1987 removal of oil, tanks, and soils, post removal soil sampling was conducted. Results of this sampling effort are shown in Tables 1 and 2 and the sample locations are shown in Figure 4. After the 1987 post-removal sampling was completed, the excavations were regraded and only the deep excavations were backfilled with off-site material.

- **Summary of Sampling/Removal Activities: 1990**

The results of the 1987 post-removal samples indicated that there were a few remaining areas on the site with elevated levels of PCBs, lead, and PCP. In 1990, EPA undertook a removal action focused on further excavating these areas. Pre-removal soil sampling was conducted. Lead concentrations were as high as 13,500 ppm, and PCBs were found at 5.7 ppm. No PCP was detected above the detection limit of 7 ppm. Other potential organic and inorganic compounds were thought to be co-located with lead and PCBs, therefore, PCBs and lead were used as indicator chemicals to determine the extent of soil excavation. The cleanup levels for lead and PCBs were 500 ppm and 1 ppm, respectively. The areas excavated during the 1990 removal are shown in Figure 6.

Because the removal was targeted at reducing the concentrations of lead, PCBs, and PCP, post-removal soil sampling for these compounds only was conducted before backfilling the 1990 excavations. The sample locations are shown in Figure 4. The results of this sampling effort are presented in Table 3. The excavated areas were then filled with off-site fill and gravel.

- **Summary of Sampling Activities: 1991**

A limited number of additional soil samples were collected in 1991 to support the risk assessment. Surface and subsurface soil samples were collected in the south area of the site which had not been investigated during the removal actions. Subsurface samples were collected below former waste oil pit locations to assess whether volatile organic compounds which are more mobile than Lead and PCBs, could have migrated to greater depths below the bottom of the waste oil excavations and potentially impact groundwater. In addition, a boring was drilled into the former T-14 pit location to identify the nature of the contamination remaining in the soils.

Surface and subsurface soil samples were analyzed for EPA's Target Compound List (TCL) organics, EPA's Target Analyte List (TAL) for inorganics, cyanide, and total petroleum hydrocarbons (TPHs). The sample locations are shown in Figures 7, 8 and 9. The concentrations of detected TAL organic and TCL inorganic analytes are shown in Tables 4 and 5, respectively. Table 6 shows the results of the TPH analysis.

The results suggest that no significant migration of chemicals has occurred below the formerly-excavated pits. Also, no additional site contamination was found in the south area of the site or in the surface soil fill. The samples obtained from soils below the former tank T-14 confirmed the existence of oily material and provided estimates of the concentrations of contaminants present in this material.

- **Summary of Contamination Remaining Onsite**

Data from the 1987 post-removal sampling, 1990 post-removal sampling (PCB, lead and PCP only) and 1991 sampling provide information on contaminant concentrations remaining onsite after the 1990 removal. The data suggest that concentrations of contaminants in soils were significantly reduced and that low levels of organic and inorganic contaminants remain in the soils below excavated areas at depths ranging from 1 foot to 25 feet bgs. The excavation depths and locations are shown in Figure 10.

The samples obtained from soils below the former tank T-14 indicate the existence of oily material and provided estimates of the concentrations of contaminants present in this material. These contaminants including trichloroethylene (TCE) and xylene are located 20 feet bgs under clean fill material.

The 1991 investigation suggests organic chemicals in waste oils had not significantly migrated vertically below the excavation pits and that contaminants were bound-up in the waste oil matrix rather than being leached prior to excavation.

• **Groundwater**

From 1982 to 1992, five groundwater sampling events occurred at or in the vicinity of the Arrcom site. The results of these sampling events are discussed below.

Groundwater samples were first collected from residential wells in the immediate vicinity of the ARRCOM site in August 1982. In July 1987, three on-site groundwater monitoring wells were installed at the Arrcom site. These three monitoring wells and five local residential wells were sampled in December 1987. The wells were sampled for volatiles, semi-volatiles, pesticides, herbicides, PCBs and metals.

The results of the 1983 & 1987 groundwater sampling effort, indicated that no site related organic or inorganic compounds were detected in any of the samples.

In March 1989, May 1990, and February 1992 the three on-site monitoring wells were sampled again for the same parameters, and no site related organic or inorganic compounds were detected.

## VI. SUMMARY OF SITE RISKS

A risk assessment was prepared to evaluate potential risks to human health and the environment resulting from contaminants remaining on-site after the final removal action. The remaining contaminants in soil that could potentially pose a risk were at depth and there was not a risk associated with the direct contact exposure pathway. Therefore, the quantitative risk assessment evaluated the risk associated with potential exposure to contaminants in groundwater only. The results of the risk assessment indicate that conditions at the site will not have an adverse effect on human health or the environment.

A conservative approach was used to evaluate quantitative health risks for chemicals of concern in soils as recommended in EPA's Risk Assessment Guidance for Superfund. Vol. I: Human Health Evaluation Manual (EPA 1989a), EPA Region 10 "Draft Supplemental Risk Assessment Guidance for Superfund" (EPA Region 10 1991), and other guidance documents. Reasonable conservative estimates and assumptions were made at every step in the analysis to enhance confidence in the conclusions of the risk assessment. The Risk Assessment followed a four step process which is summarized below.

### A. Human Health Risks

#### 1. Identification of Chemicals of Concern

The sampling results from soils that remain on-site after the 1987 and 1990 removal action and the additional data collected in

1991 were used to select chemicals of concern.

As a means of determining which chemicals and portions of the site pose a potential human health hazard, contaminant concentrations were compared to risk-based screening levels; allowable daily intake levels; naturally occurring background concentrations and the frequency of detection of the contaminants at the site.

Based on this screening the contaminants of concern that could pose significant risks are 1,1,2,2-tetrachloroethane a carcinogen, and xylenes which are noncarcinogens. These contaminants are located 20 feet bgs underneath clean fill at the former Tank T-14 location.

## 2. Exposure Assessment

Because the site is abandoned the most likely current scenario for exposure to the chemicals of concern is from a trespasser. The likely future exposure scenario would be to an on-site resident. The only contaminant source is assumed to be the chemicals of concern located in the zone of soil contamination under former Tank T-14, 20 feet bgs. Direct contact with subsurface soils at that depth by trespassers or future residents is highly unlikely. Inhalation of airborne soil particles or volatile organic compounds from contaminants at that depth is also highly unlikely.

The only reasonable potential exposure to contaminants is if the contaminants remaining in the soils migrate downward and come in contact with the groundwater. Note that the potential for verticle migration appears to be low based on the 1991 soil sampling event, which indicated that contaminants have not significantly migrated vertically. However, to be complete and conservative this pathway was evaluated further.

Since no groundwater contamination has been detected to date only a future exposure scenario was evaluated. A hypothetical future on-site residential scenario was chosen rather than a future worker or nearby resident because it is the most conservative in terms of the estimated daily intake. A conceptual site model is presented in Figure 2-11. The exposure pathways evaluated were ingestion and inhalation of contaminated groundwater.

### 2.1 Assessment of Potential for Future Groundwater Contamination and Associated Human Health Risks

A conservative groundwater infiltration model (MMSOILS Model) was performed to calculate the concentration of chemicals that could potentially reach groundwater with precipitation as the driving mechanism. The results of the modeling on the chemicals of concern indicated that only 1,1,2,2-tetrachloroethane could

potentially reach the groundwater at a concentration of concern. The concentration of xylene that could potentially reach the groundwater was below the risk based screening level and therefore not retained for further risk evaluation.

The concentration of 1,1,2,2-tetrachloroethane that could potentially reach the groundwater was combined with assumptions about the behavior of the populations at risk, in order to estimate the rate at which contaminants could be taken in by the exposed populations, via ingestion of drinking water or inhalation of vapors during household water use.

The scenario for future on-site residents was developed using reasonable maximum groundwater intake assumptions and an upperbound estimate of the concentration of the contaminant in groundwater.

Human exposure assumptions are shown in Table 7. Conservative assumptions associated with estimation of groundwater concentrations included that the well would draw water only from the contamination zone and that the concentration would be the average of the highest concentration potentially seen over a 30 year period.

**3. Toxicity Assessment**

Using the conservative assumptions for both the potentially exposed population and the potential groundwater concentrations, estimates of the chronic daily intakes (CDI) for 1,1,2,2-tetrachloroethane were calculated for a hypothetical exposed individual.

The CDIs for potential future site residents exposed to 1,1,2,2-tetrachloroethane in groundwater were calculated for the inhalation and ingestion exposure pathways. These CDIs are shown in Table 8. The CDI was then combined with toxicological information, as described below to determine whether the estimated intake level could pose a threat to human health.

The contaminant of concern at the Arrcom site, 1,1,2,2 - tetrachloroethane is classified as a Group C carcinogen or possible human carcinogen. The weight of evidence of carcinogenicity in animals is limited and inadequate or no data is available in humans. The cancer slope factor is presented in Table 9 for the exposure pathways of concern.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level or CDI by the chemical-specific cancer slope factor. Chemical-specific cancer potency (slope) factors have been developed by EPA from human epidemiological or animal studies. This information was obtained from EPA's Integrated Risk Information System (IRIS) and the

Health Effects Assessment Summary Tables (HEAST).

**4. Risk Characterization**

The cancer risks from ingestion and inhalation of the maximum potential concentrations of 1,1,2,2-tetrachloroethane predicted in groundwater at the Arrcom site and the total risk from adding risks associated with exposure to both drinking water and vapors are shown in Table 10. The risk estimates are expressed in scientific notation (i.e. 1 x $10^{-6}$ for one in one million; indicating that an individual is not likely to have greater than a one in one million chance of developing cancer over his/her lifetime as a result of site-related exposure). The risk at the Arrcom site falls within the EPA acceptable cancer risk range of $10^{-4}$ to $10^{-6}$ (NCP, USEPA, 1985e).

Risk estimates calculated from the potency factors reflect a conservative "upper bound" estimate of the risk posed by potentially carcinogenic compounds. That is, the true risk is very unlikely to be greater than the risk predicted and could be substantially lower.

**Uncertainties in the Risk Assessment for Human Health**

The accuracy of the risk characterization depends in a large part on the accuracy and representativeness of the sampling, exposure and toxicological data. Most assumptions are intentionally conservative, so the risk assessment will be more likely to overestimate risks than to underestimate risk. The procedures and inputs used to assess potential human health risks in this evaluation are subject to a number of uncertainties.

The uncertainties are discussed in greater detail in the risk assessment report.

**B. Ecological Risks**

The potential adverse impacts of soil contaminants on local plants and animals were qualitatively assessed. Potential ecological receptors could be exposed to soil contaminants through direct uptake, direct contact, or ingestion.

Potential receptors and exposure scenarios were evaluated and it was determined that because areas with contaminants remaining onsite are at significant depth in the subsurface, the Arrcom site does not pose a risk to ecological receptors or habitats.

**C. Human Health and Ecological Risk Summary**

The results of the risk assessment show that under a current use scenario and future hypothetical on-site residential scenario,

the site does not pose a risk to human health and the environment.

Under the current use scenario the risk to a trespasser through soil ingestion and inhalation is highly unlikely. The risk evaluation for the hypothetical future residential scenario showed that risks to human health through ingestion or inhalation of potential contaminants in groundwater were within EPA's acceptable risk range of $10^{-4}$ to $10^{-6}$ for carcinogens. Noncarcinogens are not expected to reach the groundwater in concentrations that result in adverse noncarcinogenic health effects.

Ecological receptors and habitats are not expected to be adversely impacted because the source of contamination in surface soils has been removed from the site.

## VII. THE SELECTED REMEDY

The no further action decision is based on the post-removal soil and groundwater sampling, the supplemental remedial soil and groundwater sampling and the Risk Assessment. Based on the information currently available, the removal actions at the site have reduced concentrations of contaminants in soils to levels that do not pose a risk to human health and the environment. Therefore, EPA has determined that no further remedial action is necessary at this site. The site now qualifies for inclusion in the "sites awaiting deletion" subcategory of the construction completion category of the National Priorities List.

## VIII. DOCUMENTATION OF SIGNIFICANT CHANGES

The proposed plan for the Arrcom site was released for public comment on May 22, 1992. The proposed plan identified the no further action decision at the Arrcom site. Public comments were evaluated at the end of the 30-day comment period and are addressed in the responsiveness summary. It was determined that no significant changes to the proposed plan were necessary.

# APPENDIX A

# FIGURES AND TABLES

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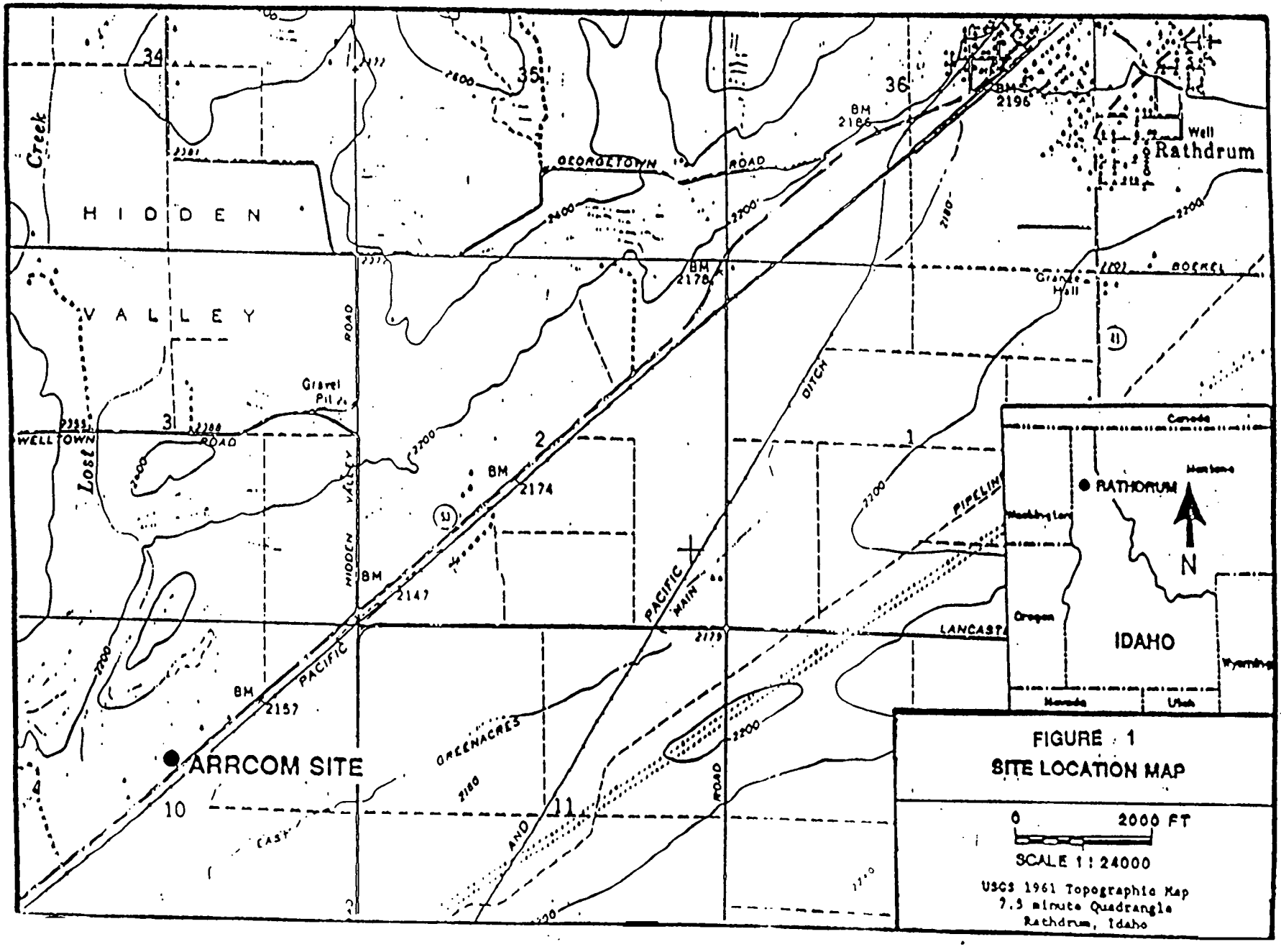



FIGURE 1
SITE LOCATION MAP

0 2000 FT

SCALE 1 : 24000

USGS 1961 Topographic Map
7.5 minute Quadrangle
Rathdrum, Idaho

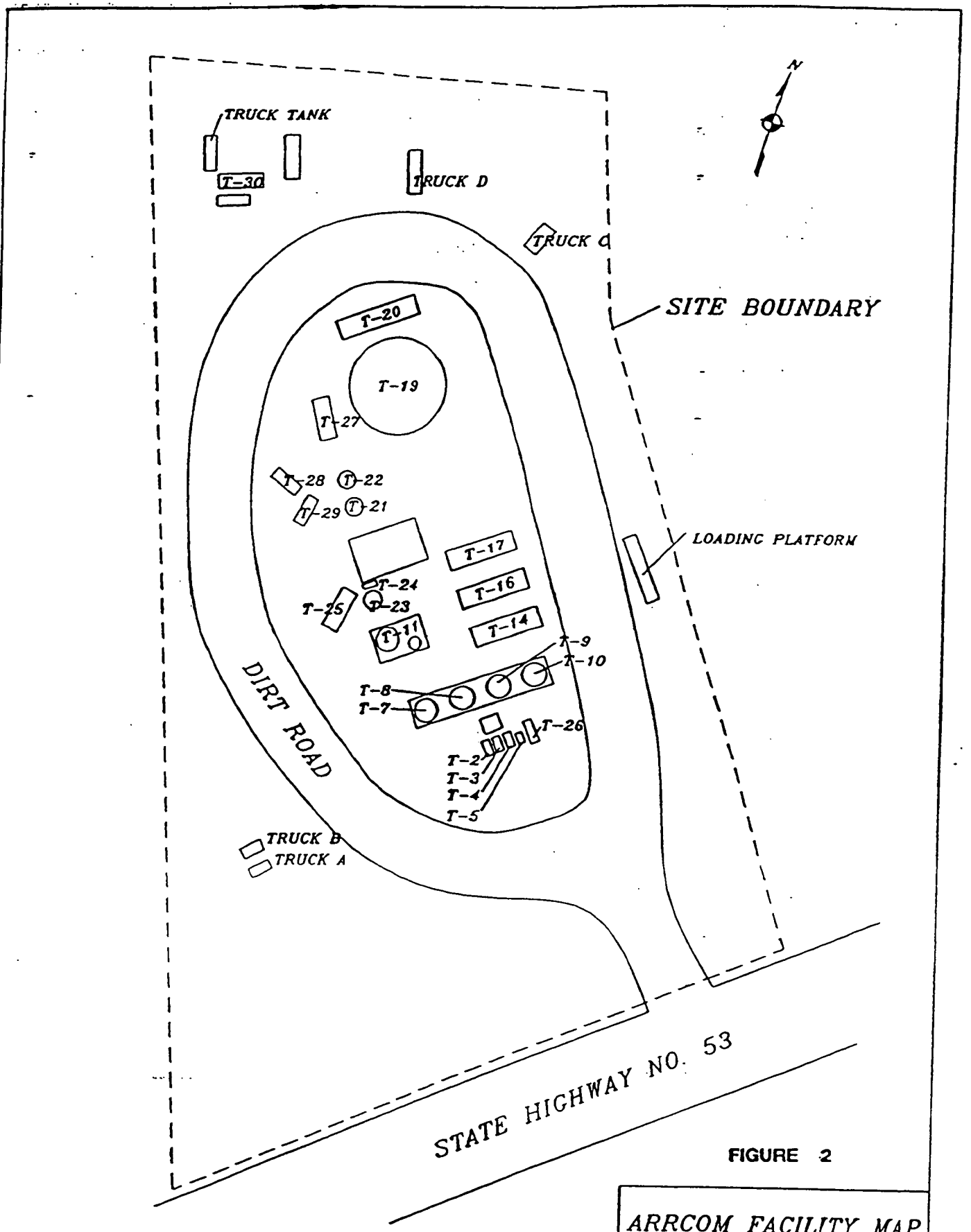



FIGURE 2

ARRCOM FACILITY MAP

ICF Technology Inc.

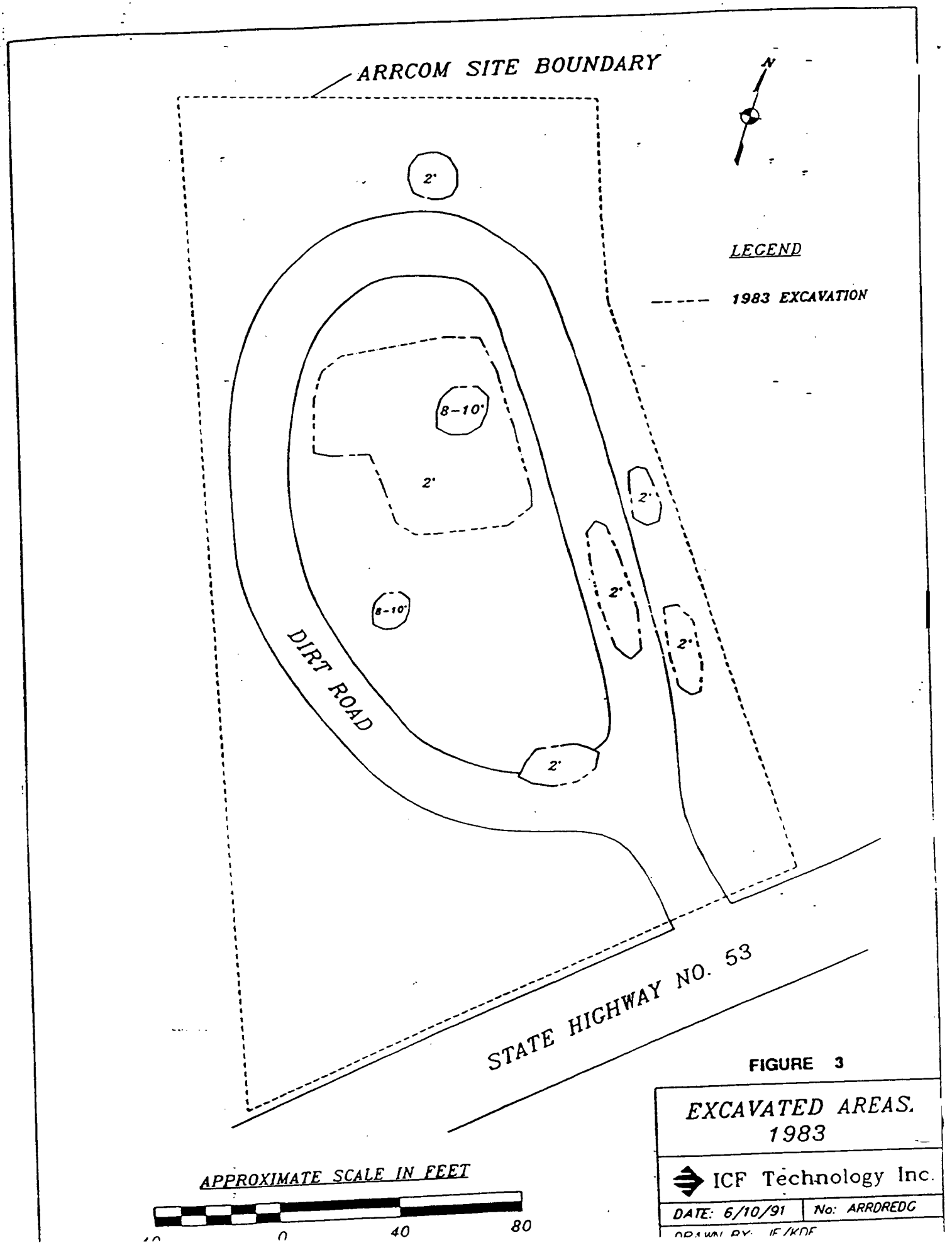
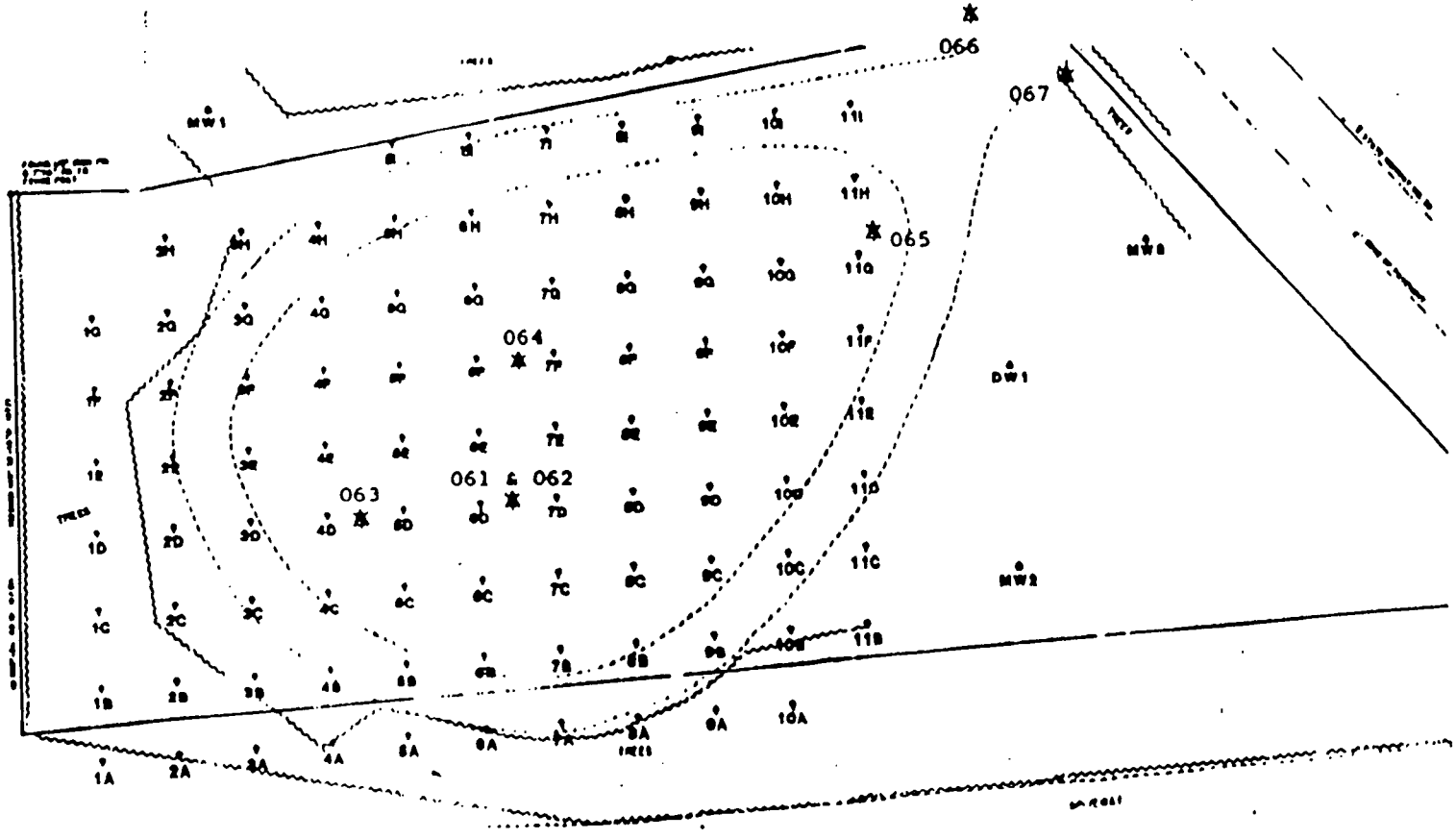



**FIGURE 3**

| EXCAVATED AREAS. 1983 | |
|---|---|
| ICF Technology Inc. | |
| DATE: 6/10/91 | No: ARRDREDG |
| DRAWN BY: JF/KDF | |

FIGURE 4

1987 & 1990 Removal Sample Locations




LEGEND

- Dirt Road
- Tree Line
- Post-Removal Soil Sample
- Monitoring Well (MW)
- Drinking Water Well (DW)
- Baseline Soil Sample

N

Source: E&E 1987a.

POOR QUALITY ORIGINAL

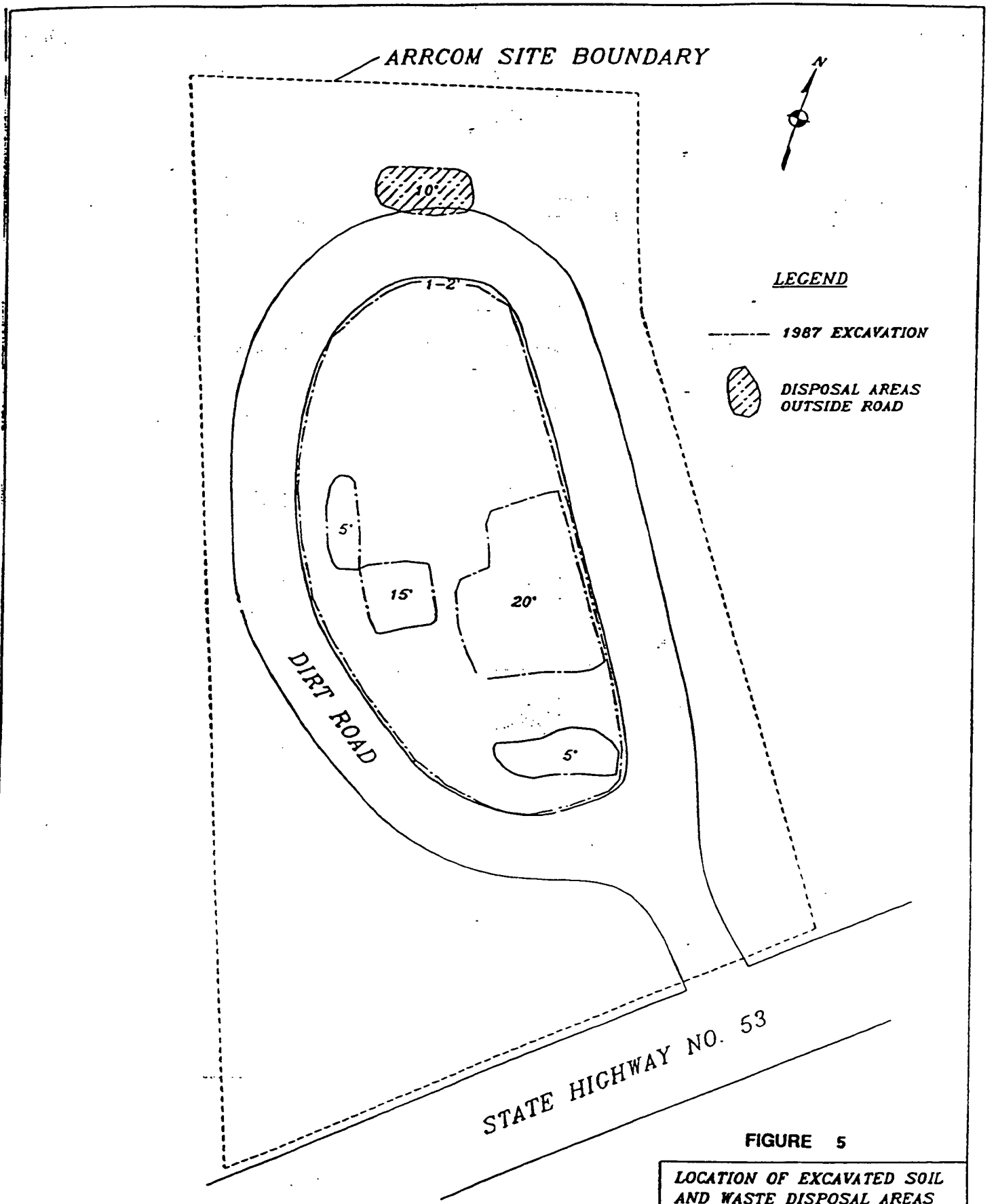



**FIGURE 5**

*LOCATION OF EXCAVATED SOIL AND WASTE DISPOSAL AREAS 1987*

ICF Technology Inc.

DATE: 6/10/91 | No: ARRDREDG

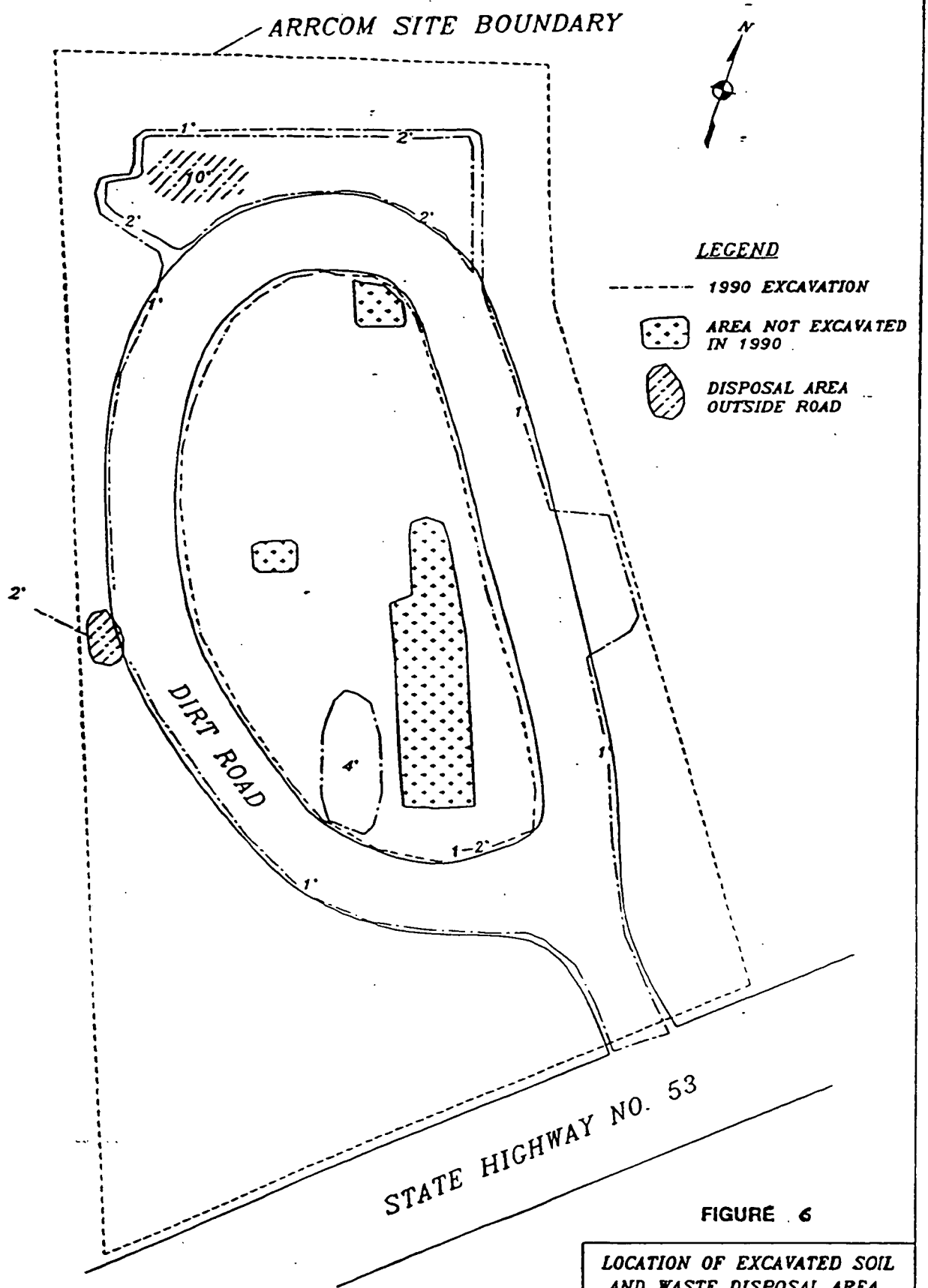



FIGURE 6

LOCATION OF EXCAVATED SOIL AND WASTE DISPOSAL AREA 1990

APPROXIMATE SCALE IN FEET

ICF Technology Inc.

DATE: 6/10/91 | No: ARRDREDG

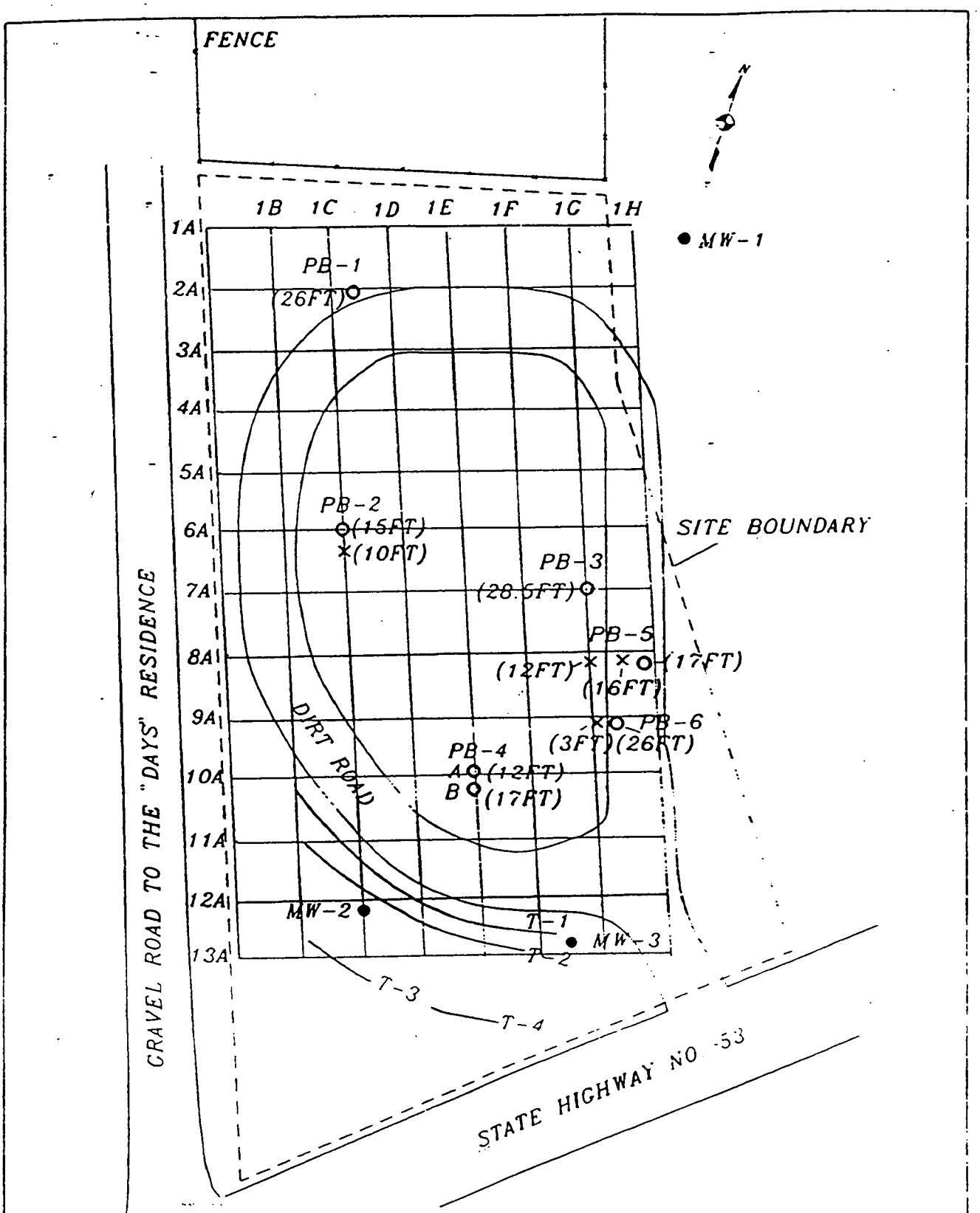



**FIGURE 7**

SUBSURFACE SOIL SAMPLE LOCATION MAP

ICF Technology Inc.

DATE 4/3/91 | No ARRCOM1

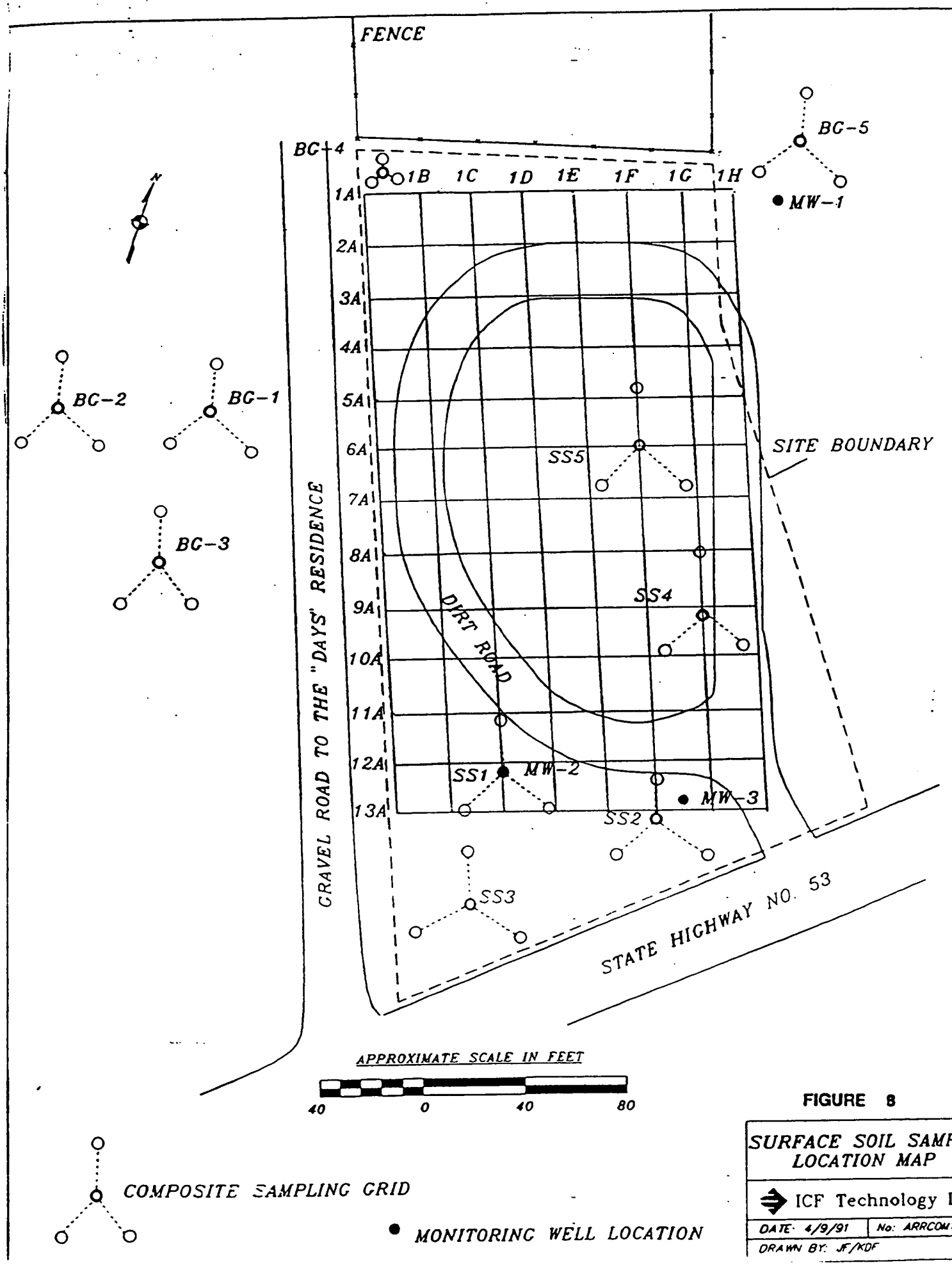



**FIGURE 8**

| SURFACE SOIL SAMPL LOCATION MAP | |
|---|---|
| ICF Technology In | |
| DATE: 4/9/91 | No: ARRCOM1 |
| DRAWN BY: JF/KDF | |

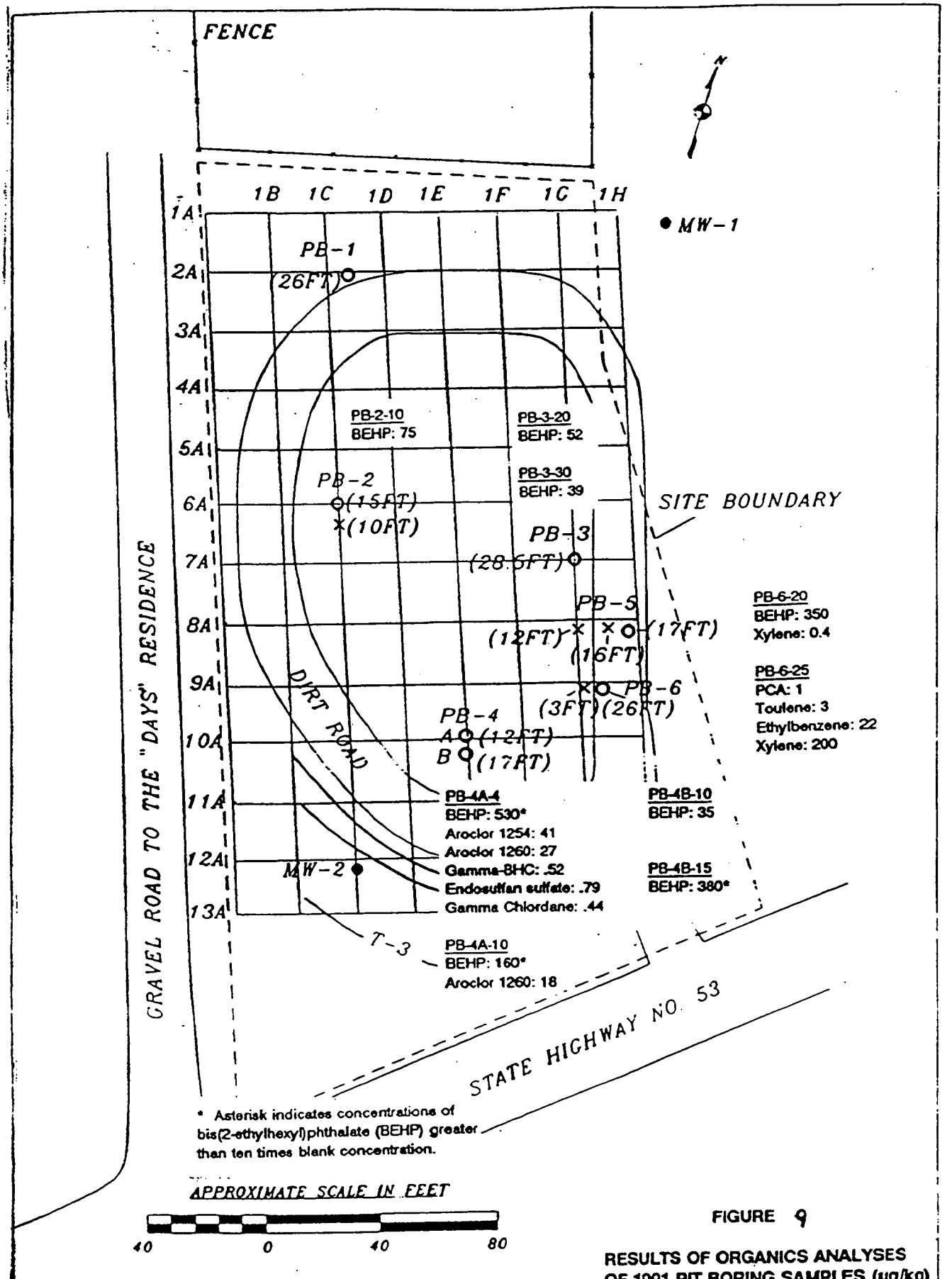



FIGURE 9

RESULTS OF ORGANICS ANALYSES OF 1991 PIT BORING SAMPLES (ug/kg)

ICF Technology Inc.

DATE 4/9/91 | NO ARRCOM:

DRAWN BY JF/KDF

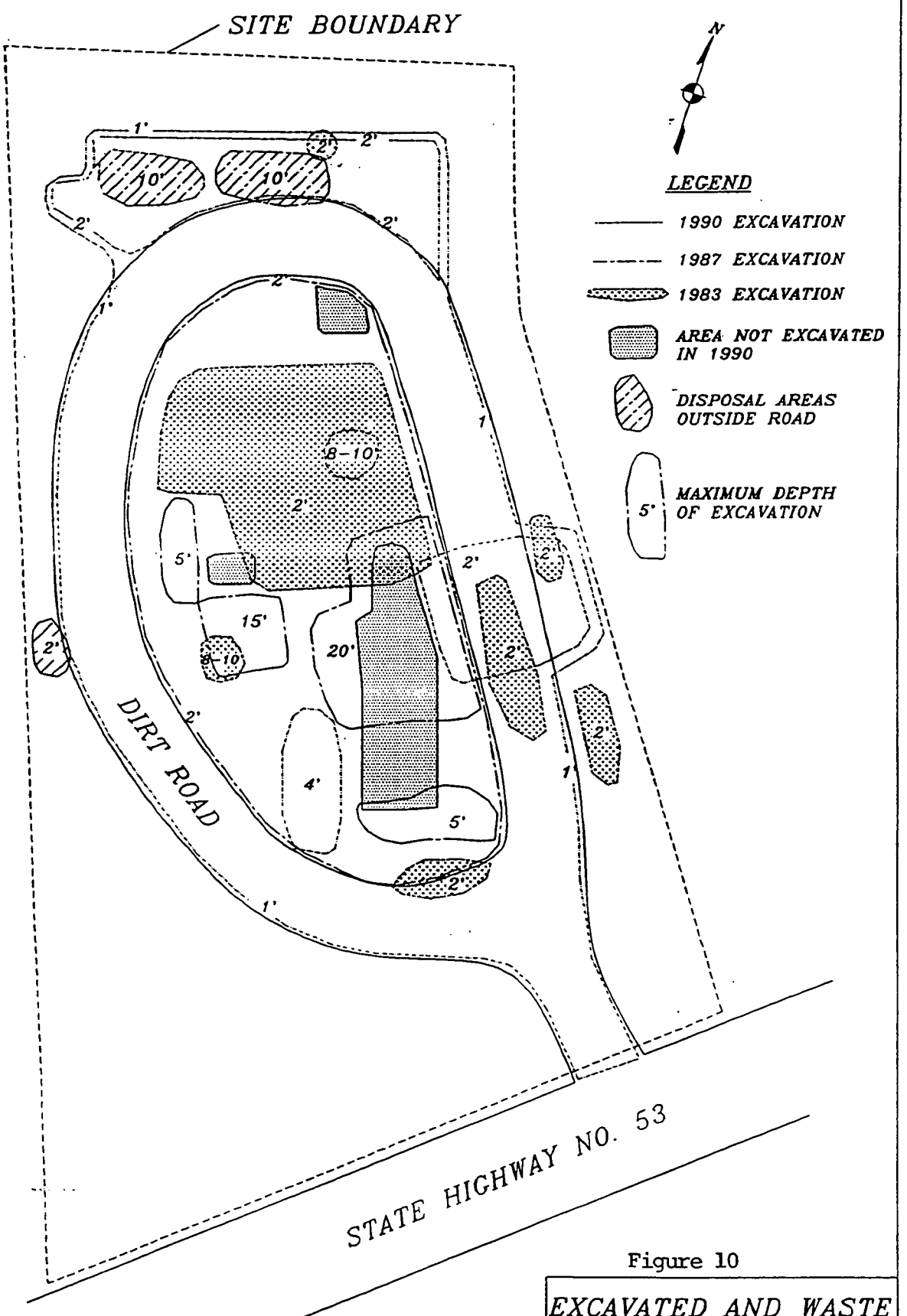



Figure 10

EXCAVATED AND WASTE DISPOSAL AREA MAP

ICF Technology Inc.

DATE: 5/15/92 | No: ARDREDC3

# ARRCOM SITE
# CONCEPTUAL SITE MODEL

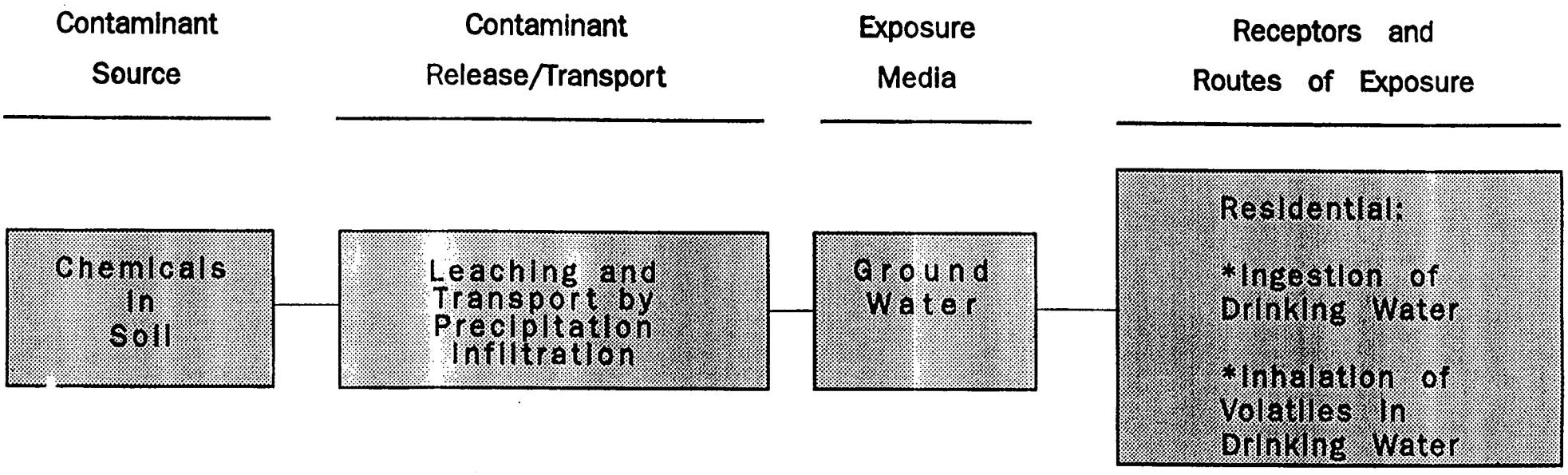



FIGURE 11

TABLE 1

SUMMARY OF 1987 POST-REMOVAL SOIL SAMPLING RESULTS
FOR ORGANIC CHEMICALS DETECTED AT THE ARRCOM SITE (ug/kg)[a]

| CHEMICAL | FREQUENCY OF DETECTION | RANGE OF DETECTIONS LOW (ug/kg) | RANGE OF DETECTIONS HIGH (ug/kg) | RANGE FOUND IN BACKGROUND SAMPLES (ug/kg) |
|---|---|---|---|---|
| **VOLATILES:** | | | | |
| Chloromethane | 11/108 | 10J | 1,000 | |
| Chloroethane | 4/108 | 10J | 10J | |
| Methylene chloride | 52/108 | 1J | 225J | 79-3623J |
| Acetone | 61/108 | 2 | 750J | 63-1831 |
| Carbon disulfide | 18/108 | 1J | 500J | 1J-4J |
| 2-Butanone | 30/108 | 8J | 1,100J | 9-4223 |
| 1,1,1-Trichloroethane | 7/108 | 1J | 18 | |
| Vinyl acetate | 9/108 | 10J | 50J | |
| Bromodichloromethane | 5/108 | 5J | 25J | |
| Trichloroethene | 12/108 | 2J | 21 | |
| Benzene | 16/108 | 1J | 7J | |
| 2-Chloroethylvinylether | 9/108 | 11R | 15R | |
| 2-Hexanone | 6/108 | 10J | 50J | |
| 4-Methyl-2-pentanone | 6/108 | 10J | 50J | |
| Tetrachloroethene | 22/108 | 1M | 64 | |
| Toluene | 63/108 | 2 | 2,500 | 10-986 |
| Chlorobenzene | 17/108 | 2J | 3,800 | 8-16 |
| Ethylbenzene | 4/108 | 4J | 1,600 | |
| Xylenes | 10/108 | 2J | 23,000J | |
| **SEMIVOLATILES:** | | | | |
| Phenol | 1/108 | | 2,783 | |
| Isophorone | 1/108 | | 12,000 | |
| Benzoic acid | 5/108 | 420J | 4200J | |
| 2-Methylnaphthalene | 4/108 | 87J | 5,700 | |
| Diethylphthalate | 1/108 | 106J | | |
| n-Nitrosodiphenylamine | 1/108 | | 120J | |
| Pentachlorophenol | 7/108 | 3,500J | 5,100J | |
| Phenanthrene | 1/108 | | 1,600J | |
| Di-n-butylphthalate | 4/108 | 100J | 1,077 | |
| Fluroanthene | 1/108 | | 99J | |
| Pyrene | 2/108 | 83J | 93J | |
| Butylbenzylphthalate | 1/108 | | 1,900J | |
| 3,3-Dichlorobenzidine | 9/108 | 1,460J | 2,100J | |
| Benzo(a)anthracene | 1/108 | | 49J | |
| Bis-2-ethylhexylphthalate | 27/108 | 96J | 12,000 | 101J-125J |

TABLE 1 (Continued)

SUMMARY OF 1987 POST-REMOVAL SOIL SAMPLING RESULTS
FOR ORGANIC CHEMICALS DETECTED AT THE ARRCOM SITE (ug/kg)[a]

| CHEMICAL | FREQUENCY OF DETECTION | RANGE OF DETECTIONS LOW (ug/kg) | RANGE OF DETECTIONS HIGH (ug/kg) | RANGE FOUND IN BACKGROUND SAMPLES (ug/kg) |
|---|---|---|---|---|
| Chrysene | 1/108 | | 90J | |
| Benzo(b)fluroanthene | 1/108 | | 63J | |
| Benzo(k)fluroanthene | 1/108 | | 56J | |
| **PESTICIDES AND PCBs** | | | | |
| Alpha BHC | 2/108 | 6J | 8J | 2J |
| Beta BHC | 3/108 | 17J | 31J | |
| Heptachlor | 1/108 | | 2 | |
| Aldrin | 1/108 | | 120 | |
| Endosulfan I | 2/108 | 4 | 23 | |
| Dieldrin | 1/108 | | 20 | |
| Endosulfan sulfate | 2/108 | 2 | 91 | |
| Arochlor 1016 | 14/108 | 96 | 5,200 | |
| Arochlor 1242 | 5/108 | 197 | 1,700 | |
| Arochlor 1248 | 6/108 | 120 | 8,200J | |
| Arochlor 1260 | 46/108 | 16J | 7,100J | 1J |

[a] Data qualifier "J" indicates the associated value is estimated; "R" indicates the associated value is rejected; "M" indicates mass spectral critical for positive identification were not met. In the opinion of the laboratory personnel, the identification is correct.

TABLE 2

SUMMARY OF 1987 POST-REMOVAL SOIL SAMPLING RESULTS
FOR INORGANIC CHEMICALS DETECTED AT THE ARRCOM SITE (mg/kg)[a]

| CHEMICAL | FREQUENCY OF DETECTION | RANGE OF DETECTIONS LOW (mg/kg) | RANGE OF DETECTIONS HIGH (mg/kg) | RANGE FOUND IN BACKGROUND SAMPLES (mg/kg) |
|---|---|---|---|---|
| **INORGANICS:** | | | | |
| Aluminum | 108/108 | 4,990 | 36,100 | 15,600-29,000 |
| Antimony | 108/108 | 13J | 18J | 13-16 |
| Arsenic | 104/108 | 7 | 48J | 16-42 |
| Barium | 108/108 | 34 | 990 | 118-320 |
| Beryllium | 60/108 | 0.58 | 1.7 | 0.68-1.3 |
| Cadmium | 4/108 | 2.7 | 4.2 | 2.8 |
| Calcium | 108/108 | 1,790 | 33,900 | 2,680-4,170 |
| Chromium | 108/108 | 4.3 | 60 | 6.1-14 |
| Cobalt | 54/108 | 4.7 | 7.8 | 5.5-7.6 |
| Copper | 108/108 | 12 | 100 | 20-25 |
| Iron | 108/108 | 9,730 | 58,200 | 15,200-22,600 |
| Lead | 108/108 | 11 | 3,880 | 12-46 |
| Magnesium | 108/108 | 1,950 | 10,900 | 1,950-6,990 |
| Manganese | 108/108 | 211 | 1,010 | 512J-966J |
| Mercury | 47/108 | 0.1J | 2.4 | |
| Nickel | 108/108 | 6.7 | 28 | 10-17 |
| Potassium | 108/108 | 816 | 3,670 | 1,460-2,770 |
| Selenium | 58/108 | 2.6J | 3.7J | |
| Silver | 40/108 | 2.1J | 2.9J | |
| Sodium | 5/108 | 582 | 706 | 596 |
| Tin | 11/108 | 12 | 526 | |
| Vanadium | 108/108 | 8.1 | 59 | 22-36 |
| Zinc | 108/108 | 32 | 747 | 61J-181J |

[a] Data qualifier "J" indicates the associated value is estimated.

## TABLE 3

## SUMMARY OF 1990 POST-REMOVAL SOIL SAMPLING RESULTS (mg/kg)

| Sample Number | Lead | PCB | PCP | Grid Location/ Comments |
|---|---|---|---|---|
| T0040620 | 64 | 1.0 UJ | .001 U | 12G |
| T0040622 | 20 | 1.0 U | .0023 U | 7H |
| T0040623 | 330 | 4.5 | .020 U | 8H, since PCB action level was exceeded, sample T0040679 was collected following further excavating. |
| T0040624 | 14 | 1.0 U | .001 U | 8I |
| T0040625 | 109 | 1.0 U | .0072 U | 7I |
| T0040627 | 114 | 1.0 U | .021 U | 3H |
| T0040628 | 47 | 1.0 U | .0087 U | 11G |
| T0040629 | 90 | 1.0 UJ | .0072 U | 11F |
| T0040630 | 10 U | 1.0 U | .001 U | 2F |
| T0040631 | 57 | 1.0 UJ | .001 U | 2D |
| T0040632 | 60 | 1.0 UJ | .001 U | Duplicate of sample T0040631. |
| T0040633 | 18 | 1.0 UJ | .001 U | 2C |
| T0040634 | 20 | 1.0 UJ | .001 U | Duplicate of sample T0040633. |
| T0040635 | 240 | 1.0 UJ | .002 U | 3B |
| T0040636 | 68 | 1.0 UJ | .001 U | Duplicate of sample T0040635. |
| T0040637 | 247 | 1.0 U | .029 U | 7F |
| T0040638 | 144 | .8 J | .010 U | 7E |
| T0040639 | 62 | 1.0 UJ | .002 U | 7D |
| T0040640 | 28 | 1.0 U | .001 U | 5G |
| T0040641 | 87 | 1.3 | .001 U | 6F, since PCB action level was exceeded, sample T0040680 was collected following further excavation. |
| T0040642 | 173 | 1.0 U | .001 U | 6E |
| T0040643 | 268 | 1.0 UJ | .011 U | 4E |
| T0040644 | 44 | 1.0 UJ | .001 U | 4D |
| T0040648 | 10 U | 1.0 U | .001 U | 11H |
| T0040649 | 10 U | 1.0 U | .001 U | Duplicate of sample T0040648. |
| T0040650 | 81 | 1.0 U | .001 U | 10H |
| T0040651 | 10 U | 1.0 U | .001 U | 2H |
| T0040652 | 10 U | 1.0 U | .001 U | 2G |
| T0040653 | 10 U | 1.0 U | .0017 | 2E |
| T0040654 | 520 | 1.0 U | .0074 | 5E, since lead action level was exceeded, sample T0040689 collected followi further excavation. |
| T0040655 | 167 | 1.0 U | .012 | 5F |
| T0040658 | 10 U | 1.0 U | .001 U | 9H |
| T0040659 | 35 | 1.0 U | .001 U | 6H |
| T0040660 | 123 | 1.0 U | .001 U | 5H |
| T0040661 | 95 | 14 | .001 U | 4H, since PCB action level was exceeded, sample T0040683 was collected following further excavation. |
| T0040662 | 69 | 16 | .0081 | Duplicate of sample T0040661 |
| T0040663 | 18 | 1.0 U | .001 U | 3G |
| T0040664 | 68 | 1.0 U | .001 U | 3F |
| T0040665 | 327 | 1.0 U | .015 | 3E |
| T0040666 | 52 | 1.0 U | .001 U | 3D |
| T0040667 | 23 | 1.0 U | .001 U | 3C |
| T0040668 | 22 | 1.0 U | .001 U | 5B |
| T0040669 | 44 | 1.0 U | .0013 | 4B/4C, grab sample collected between the two grid locations. |
| T0040670 | 10 U | 1.0 U | .001 U | 6A/6B, grab sample collected between the two grid locations. |
| T0040671 | 54 | 1.0 U | .001 U | 7A/7B, grab sample collected between the two grid locations. |
| T0040672 | 16 | 1.0 U | .001 U | 8A/8B, grab sample collected between the two grid locations. |
| T0040673 | 14 | 1.0 UJ | .001 U | 9B |
| T0040674 | 10 U | 1.0 U | .001 U | 10C |
| T0040675 | 10 U | 1.0 U | .001 U | 11D |
| T0040676 | 10 U | 1.0 U | .001 U | 12F |
| T0040677 | 24 | 1.0 UJ | .001 U | 12H |
| T0040678 | 10 U | 1.0 UJ | .001 U | 12I |

## TABLE 3 (Continued)

## SUMMARY OF 1990 POST-REMOVAL SOIL SAMPLING RESULTS (mg/kg)

| Sample Number | Lead | PCB | PCP | Grid Location/ Comments |
|---|---|---|---|---|
| T0040679 | 10 U | 1.0 U | .0029 | 8H |
| T0040680 | 10 U | 1.0 UJ | .001 U | 6F |
| T0040681 | 13 | 1.0 U | .001 U | 4F |
| T0040682 | 10 U | 1.0 U | .001 U | Duplicate of sample T0040678 |
| T0040683 | NA | 1.0 U | .001 U | 4H, original sample at this grid location met action level for lead, but not for PCB. |
| T0040684 | 315 | 1.0 U | * | 5C |
| T0040685 | 51 | 1.0 U | * | 5D |
| T0040686 | 10 U | 1.0 U | * | 11E |
| T0040687 | 10 U | 1.0 U | * | Duplicate of sample T0040686 |
| T0040688 | 10 U | 1.0 U | * | 4C |
| T0040689 | 10 U | NA | * | 5E, original sample at this grid location met action level for PCB, but not for lead. |
| T0040690 | 10 | 1.0 U | * | 6C |
| T0040691 | 12 | 1.0 U | * | 13J |
| T0040697 | 166 | 1.0 U | * | 10D |
| T0040698 | 190 | 1.0 U | * | 10E |
| T0040699 | 15 | 1.0 U | * | 7C |
| T0050201 | 235 | 1.0 U | * | 9E |
| T0050202 | 14 | 1.0 U | * | 8E |
| T0050203 | 26 | 1.0 U | * | 8D |
| T0050204 | 36 | 1.6 | * | 9D, since PCB action level was exceeded, sample T0050212 collected following further excavation. |
| T0050205 | 12 | 1.0 U | * | Duplicate of sample T0040691. |
| T0050210 | 57 | 1.0 UJ | * | 8C |
| T0050211 | 10 U | 1.0 U | * | 9C |
| T0050212 | 10 U | 1.0 U | * | 9D |
| T0040656 | 10 U | 1.0 UJ | .001 U | Clean fill |
| T0040657 | 10 U | 1.0 U | .001 U | Clean gravel |

* - No PCP sample collected due to EPA/TAT decision that PCP values were at acceptable limits following excavation.

U - The material was analyzed for but was not detected. The associated numerical value is the sample detection limit or the adjusted sample detection limit.

J - The associated numerical value is an estimated quantity because the reported concentrations were less than the contract required detection limits or quality control criteria were not met.

NA - Not analyzed

TABLE 4

## SUMMARY OF ORGANIC CHEMICALS DETECTED IN SOIL - 1991[a]

| Location | Chemical | Detection Limits (DL) For Nondetects (mg/kg) | Frequency of Detection | Range of Detection (mg/kg) |
|---|---|---|---|---|
| Background Surface Soil | Bis(2-ethylhexyl)Phthalate | 0.34-0.36 | 3/5 | 0.035-0.1 (a) |
| | 4,4'-DDE | 0.0034-0.0037 | 2/5 | 0.0005J-0.00075J |
| | 4,4'-DDT | 0.0034-0.0037 | 2/5 | 0.00019J-0.0034J |
| | Alpha-BHC | 0.0017-0.0019 | 1/5 | 0.00083J |
| On-Site Surface Soil | Bis(2-ethylhexyl)Phthalate | 0.33-0.42 | 3/5 | 0.044-0.11 (a) |
| | Di-n-Butylphthalate | 0.33-0.42 | 1/5 | 0.034J |
| | PCP | 0.8-1.0 | 1/5 | 0.039J |
| | 4,4'-DDE | 0.0033-0.0042 | 1/5 | 0.0004J |
| | 4,4'-DDT | 0.0033-0.0042 | 2/5 | 0.0022J-0.0051J |
| | Aroclor 1260 | 0.033-0.042 | 1/5 | 0.075 |
| Trenches | Bis(2-ethylhexyl)Phthalate | 0.35-0.42 | 1/4 | 0.042J |
| | 1,2-dichlorobenzene | 0.35-0.42 | 1/4 | 0.038J |
| | 1,2,4-Trichlorobenzene | 0.35-0.42 | 1/4 | 0.064J |
| | Methoxychlor | 0.001-0.022 | 1/4 | 0.00048J |
| Pit Borings | Bis(2-ethylhexyl)Phthalate | 0.350-3.6 | 9/12 | 0.035-0.53 (a) |
| | gamma-BHC (Lindane) | 0.0018 | 1/12 | 0.00052J |
| | Endosulfan sulfate | 0.0034-0.0036 | 1/12 | 0.00079J |
| | gamma-Chlordane | 0.0018 | 1/12 | 0.00044J |
| | Aroclor 1254 | 0.034-0.036 | 1/12 | 0.041 |
| | Aroclor 1260 | 0.034-0.036 | 2/12 | 0.018-0.027J |
| | 1,1,2,2-Tetrachloroethane | 0.01 | 1/12 | 0.001J |
| | Toluene | 0.01 | 1/12 | 0.003J |
| | Ethylbenzene | 0.01 | 1/12 | 0.022 |
| | Xylene (total) | 0.01 | 2/12 | 0.004-0.2 |

Footnotes: (a) All detected value(s) qualified with J.

## TABLE 5

## SUMMARY OF INORGANIC CHEMICALS DETECTED IN SOIL - 1991[a]

| Location | Chemical | Detection Limits (DL) For Nondetects (mg/kg) | Frequency of Detection | Range of Detection (a) (mg/kg) |
|---|---|---|---|---|
| Background Soil | Aluminum | NA (b) | 5/5 | 26,700-30,300 |
| | Antimony | 3 | 2/5 | 3.8-4.8 |
| | Arsenic | NA | 5/5 | 4.46-5.04 |
| | Barium | NA | 5/5 | 267-306 |
| | Beryllium | NA | 5/5 | .979-1.17 |
| | Cadmium | NA | 5/5 | 0.8-1.2 |
| | Calcium | NA | 5/5 | 3,500-4,300 |
| | Chromium | NA | 5/5 | 7.14-9.06 |
| | Cobalt | NA | 5/5 | 7.44-9.26 |
| | Copper | NA | 5/5 | 16.3-18.4 |
| | Iron | NA | 5/5 | 16,400-18,600 |
| | Lead | NA | 5/5 | 12.4-27.2 |
| | Magnesium | NA | 5/5 | 3,100-4,010 |
| | Manganese | NA | 5/5 | 774-961 |
| | Mercury | NA | 5/5 | 0.03-0.047 |
| | Nickel | NA | 5/5 | 9.05-9.64 |
| | Potassium | NA | 5/5 | 1,210-1,850 |
| | Silver | 0.3 | 4/5 | 0.36-0.48 |
| | Sodium | NA | 5/5 | 40.6-102 |
| | Vanadium | NA | 5/5 | 21-26.2 |
| | Zinc | NA | 5/5 | 75.8-95.9 |
| Surface Soil Area Samples | Aluminum | NA | 5/5 | 8,740-25,700 |
| | Antimony | 3 | 3/5 | 3.9 |
| | Arsenic | NA | 5/5 | 2.83-19.3 |
| | Barium | NA | 5/5 | 47.4-257 |
| | Beryllium | NA | 5/5 | 0.44-0.829 |
| | Cadmium | NA | 5/5 | 0.29-0.99 |
| | Calcium | NA | 5/5 | 2,650-29,700 |
| | Chromium | NA | 5/5 | 5.48-13 |
| | Cobalt | NA | 5/5 | 5.55-10 |
| | Copper | NA | 5/5 | 12.7-25.1 |
| | Iron | NA | 5/5 | 13,300-18,300 |
| | Lead | NA | 5/5 | 12.6-192 |
| | Magnesium | NA | 5/5 | 1,930-8,720 |
| | Manganese | NA | 5/5 | 309-610 |
| | Mercury | 0.015 | 3/5 | 0.03-0.297 |
| | Nickel | NA | 5/5 | 6.5-13.3 |
| | Potassium | NA | 5/5 | 1,250-2,280 |
| | Silver | 0.3 | 2/5 | 0.37-0.41 |
| | Sodium | NA | 5/5 | 172-322 |
| | Vanadium | NA | 5/5 | 9.16-19.8 |
| | Zinc | NA | 5/5 | 45.2-92.2 |
| Trenches | Aluminum | NA | 4/4 | 18,000-28,000 |
| | Arsenic | NA | 4/4 | 1.66-3.78 |
| | Barium | NA | 4/4 | 190-237 |
| | Beryllium | NA | 4/4 | 0.49-0.93 |
| | Cadmium | NA | 4/4 | 0.45-0.76 |
| | Calcium | NA | 4/4 | 1,550-2,530 |
| | Chromium | NA | 4/4 | 1.97-9.59 |
| | Cobalt | NA | 4/4 | 2.95-7.05 |
| | Copper | NA | 4/4 | 10.7-17.1 |
| | Iron | NA | 4/4 | 7,710-18,100 |
| | Lead | NA | 4/4 | 5.33-14 |
| | Magnesium | NA | 4/4 | 1,240-5,320 |
| | Manganese | NA | 4/4 | 183-546 |
| | Mercury | 0.015 | 1/4 | 0.019 |

TABLE 5 (Continued)

## SUMMARY OF INORGANIC CHEMICALS DETECTED IN SOIL - 1991[a]

| Location | Chemical | Detection Limits (DL) For Nondetects (mg/kg) | Frequency of Detection | Range of Detection (a) (mg/kg) |
|---|---|---|---|---|
| | Nickel | 3.8-6.8 | 2/4 | 2.5-9.21 |
| | Potassium | NA | 4/4 | 792-1,500 |
| | Silver | 0.3 | 2/4 | 0.37 |
| | Sodium | NA | 4/4 | 168-384 |
| | Thallium | 0.25 | 1/4 | 0.26 |
| | Vanadium | NA | 4/4 | 7.87-21.8 |
| | Zinc | NA | 4/4 | 18.8-51.7 |
| Pit Borings | Aluminum | NA | 11/12 | 7,330-14,900 |
| | Antimony | 3 | 1/12 | 20 |
| | Arsenic | NA | 11/12 | 4.52-12 |
| | Barium | NA | 11/12 | 41.8-136 |
| | Beryllium | NA | 11/12 | 0.37-0.668 |
| | Cadmium | 0.2 | 9/12 | 0.21-0.75 |
| | Calcium | NA | 11/12 | 4,060-23,900 |
| | Chromium | NA | 11/12 | 7.51-23.1 |
| | Cobalt | NA | 11/12 | 5.25-9 |
| | Copper | NA | 11/12 | 13.5-29.3 |
| | Iron | NA | 11/12 | 10,600-18,100 |
| | Lead | NA | 11/12 | 9.69-150 |
| | Magnesium | NA | 11/12 | 4,000-11,700 |
| | Manganese | NA | 11/12 | 292-523 |
| | Mercury | 0.015 | 2/12 | 0.138 |
| | Nickel | 7.12-8.99 | 8/12 | 7.98-10.7 |
| | Potassium | NA | 11/12 | 1,010-5,170 |
| | Silver | 0.15-0.3 | 2/12 | 0.38-0.8 |
| | Sodium | NA | 11/12 | 122-471 |
| | Thallium | 0.25 | 1/12 | 0.32 |
| | Vanadium | NA | 11/12 | 8.31-22.2 |
| | Zinc | NA | 11/12 | 35.1-96.3 |

Footnotes: (a) See Appendix A, Table 5 for list of data qualifiers for inorganic samples.
(b) NA = Not applicable

TABLE 6

TOTAL PETROLEUM HYDROCARBONS IN SOIL SAMPLES AT THE ARRCOM SITE - 1991 (mg/kg)

| SAMPLE ID | TPH CONCENTRATION | |
|---|---|---|
| | Laboratory Analysis (mg/kg) | Field Analysis (mg/kg) |
| PB-1-5 | < 26 | > 500 |
| PB-4-4 | 1250 J | > 500 |
| PB-6-25 | < 26 | > 500 |
| PB-6-50 | 2690 J | > 500 |
| T-1-A | 146 J | 77 |

TABLE 7

**ASSUMPTIONS USED TO ESTIMATE EXPOSURE OF ON-SITE RESIDENTS VIA INGESTION AND INHALATION OF CONTAMINANTS IN WELL WATER - FUTURE USE SCENARIO**

| Parameter | Exposure Factors |
|---|---|
| Intake Rate | |
| Water Ingestion | 2 L/day |
| Vapor Inhalation | 15 $m^3$/day |
| Exposure Frequency | 350 days/year |
| Exposure Duration | |
| Water Ingestion | 30 years |
| Vapor Inhalation | 30 years |
| Body Weight | 70 kg |
| Averaging Time | 70 years |
| Contaminant Concentration | |
| Water Ingestion | |
| 0.003 gradient, $K_d$ 0.317 | 0.029 ug/L |
| 0.003 gradient, $K_d$ 0.0412 | 0.033 ug/L |
| 0.0006 gradient, $K_d$ 0.317 | 0.14 ug/L |
| 0.0006 gradient, $K_d$ 0.0412 | 0.15 ug/L |
| Vapor Inhalation | |
| 0.003 gradient, $K_d$ 0.317 | 0.029 ug/L * 0.5 L/$m^3$ |
| 0.003 gradient, $K_d$ 0.0412 | 0.033 ug/L * 0.5 L/$m^3$ |
| 0.0006 gradient, $K_d$ 0.317 | 0.14 ug/L * 0.5 L/$m^3$ |
| 0.0006 gradient, $K_d$ 0.0412 | 0.15 ug/L * 0.5 L/$m^3$ |

TABLE 8

## CHRONIC DAILY INTAKE RATES OF 1,1,2,2- TETRACHLOROETHANE CALCULATED FOR EXPOSURES TO GROUNDWATER VIA THE INGESTION AND INHALATION PATHWAYS

| Parameter | Exposure Point Concentration | CDI (mg/kg/day) |
|---|---|---|
| Water Ingestion | | |
| 0.003 gradient, $K_d$ 0.317 | 0.029 ug/L | $3.4 \times 10^{-7}$ |
| 0.003 gradient, $K_d$ 0.0412 | 0.033 ug/L | $3.9 \times 10^{-7}$ |
| 0.0006 gradient, $K_d$ 0.317 | 0.14 ug/L | $1.6 \times 10^{-6}$ |
| 0.0006 gradient, $K_d$ 0.0412 | 0.15 ug/L | $1.8 \times 10^{-6}$ |
| Vapor Inhalation | | |
| 0.003 gradient, $K_d$ 0.317 | 0.029 ug/L * 0.5 L/$m^3$ | $1.3 \times 10^{-6}$ |
| 0.003 gradient, $K_d$ 0.0412 | 0.033 ug/L * 0.5 L/$m^3$ | $1.5 \times 10^{-6}$ |
| 0.0006 gradient, $K_d$ 0.317 | 0.14 ug/L * 0.5 L/$m^3$ | $6.2 \times 10^{-6}$ |
| 0.0006 gradient, $K_d$ 0.0412 | 0.15 ug/L * 0.5 L/$m^3$ | $6.6 \times 10^{-6}$ |

TABLE 9

TOXICITY VALUES AND POTENTIAL CARCINOGENIC EFFECTS FOR CHEMICALS OF CONCERN AT ARRCOM

| Chemical | Slope Factor/ Unit Risk | Weight-of-Evidence Classification | Type of Cancer | SF Basis/ SF Source |
|---|---|---|---|---|
| 1,1,2,2-Tetrachloroethane | Oral: 2.00E-1 $(mg/kg\text{-}day)^{-1}$ | C | Liver | Gavage/IRIS |
| | Inhalation: 5.80E-5 $(ug/m^3)^{-1}$ | C | Liver | Gavage/IRIS |

TABLE 10

**RISKS OF ON-SITE RESIDENTS FROM INGESTION AND INHALATION OF WELL WATER – FUTURE USE SCENARIO**

| Parameter | Risk |
|---|---|
| Water Ingestion | |
| 0.003 gradient, $K_d$ 0.317 | $7 \times 10^{-8}$ |
| 0.003 gradient, $K_d$ 0.0412 | $8 \times 10^{-8}$ |
| 0.0006 gradient, $K_d$ 0.317 | $3 \times 10^{-7}$ |
| 0.0006 gradient, $K_d$ 0.0412 | $4 \times 10^{-7}$ |
| Vapor Inhalation | |
| 0.003 gradient, $K_d$ 0.317 | $3 \times 10^{-7}$ |
| 0.003 gradient, $K_d$ 0.0412 | $3 \times 10^{-7}$ |
| 0.0006 gradient, $K_d$ 0.317 | $1 \times 10^{-6}$ |
| 0.0006 gradient, $K_d$ 0.0412 | $1 \times 10^{-6}$ |
| Total Excess Cancer Risk (Ingestion and Inhalation)[a] | |
| 0.003 gradient, $K_d$ 0.317 | $3 \times 10^{-7}$ |
| 0.003 gradient, $K_d$ 0.0412 | $4 \times 10^{-7}$ |
| 0.0006 gradient, $K_d$ 0.317 | $2 \times 10^{-6}$ |
| 0.0006 gradient, $K_d$ 0.0412 | $2 \times 10^{-6}$ |

[a] Total excess cancer risks were calculated by adding ingestion and inhalation risks using two significant figures and then rounding the total risk to one significant figure. Therefore, ingestion and inhalation risks in table may not add exactly to give total excess cancer risks.