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TECHNICAL MEMORANDUM

CH2MHILL

Final Field Sampling Plan Addendum for Screening Sites

TO: Tennessee Department of Environment and Conservation (TDEC)
EPA Region IV
Memphis Depot Caretaker
US Army Corps of Engineers, Huntsville

FROM: CH2M HILL

DATE: September 25, 1998

Introduction

As part of a continuing program of evaluating its hazardous waste management practices, the United States Army is performing Remedial Investigations/Feasibility Studies (RI/FS) at the Defense Distribution Depot Memphis Tennessee (DDMT). Previously completed site investigations at DDMT have confirmed the existence of contamination, and RI/FS investigations are underway to determine the extent of this contamination and appropriate remedial actions at the Main Installation, which consists of Operable Units 2, 3, and 4 (OU-2, 3 and 4). This Technical Memorandum presents a sampling plan for additional environmental characterization of surface soil, subsurface soil, surface water and sediment, and some site-specific groundwater locations. The environmental sampling proposed herein is based on a review of the initial Main Installation sampling. Additional groundwater characterization of the entire Main Installation Fluvial Aquifer was proposed to the BCT in a Technical Memorandum issued on May 8, 1998, and further discussed in the June, 1998, partnering meeting.

DDMT has initiated a series of environmental contamination investigations and remediation projects under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Base Realignment and Closure Act (BRAC). The sites investigated fall into three categories:

1. Screening Sites where environmental contamination was suspected but not confirmed. The objective of the environmental sampling was to determine if a release to the environment had occurred and therefore sample locations were biased to areas where releases would have been suspected. Screening Sites are located within each of the Main Installation Operable Units.

2. RI sites where existing environmental contamination was evaluated for nature and extent. The objective of the environmental sampling was to evaluate the type of contamination and its horizontal and vertical extent.

3. Base Relocation and Closure (BRAC) property parcels where environmental sampling was performed to determine if the property was suitable for transfer or lease. The objective of the BRAC sampling was to determine if chemicals existed in the surface soil and subsurface soil in concentrations that might present a concern for industrial and, in the case of Parcel 2, residential uses.

A Field Sampling Plan (FSP) was approved for Screening Sites in 1995, and the field investigation implementing this plan occurred in late 1996 and early 1997. Results of the field investigations were presented in a series of Letter Reports in 1997 and 1998. The data were also reviewed by the BRAC Cleanup Team (BCT) during a series of meetings in the summer and fall of 1997 wherein recommendations on additional characterization were made and documented in the meeting minutes.

During these meetings, the BCT determined that a comprehensive and conservative risk-based approach to evaluating the environmental data was needed. Following EPA Region IV guidance on performing a preliminary risk assessment, a Preliminary Risk Evaluation Report (CH2M HILL, 1998) was prepared on a BRAC parcel and CERCLA site basis. The risks calculated in the Preliminary Risk Evaluation (PRE) were also used as a basis for requiring additional sampling.

A series of sites was proposed for Early Removal (ER) action in the 1995 FSP, prior to inclusion of DDMT in the BRAC program. Most of these sites are in Dunn Field, only three were identified in the Main Installation. The requirements for early action have changed under BRAC, focusing on expedited removals for sites in parcels that are a priority for lease or transfer. Characterization of these sites is proposed prior to ER action.

Methodology

Data from the Screening Sites and RI Results of the field investigations, the BRAC Sampling Recommendations (Woodward Clyde, 1996) and the results of the Preliminary Risk Evaluation (CH2M HILL, 1998) were reviewed in preparation for updating the FSPs. CH2M HILL's risk assessment staff reviewed the updated risk-based screening levels and all the available data to ensure that enough were available to complete the risk assessment before preparing the revised FSPs for each site presented below.

In addition, CH2M HILL staff field-verified the proposed sampling locations, and staked and photographed each proposed sample location.

The collection of additional data is generically proposed to satisfy one of the following considerations.

Sufficient Number of Data Points. The number of usable data points was tabulated to assess whether a sufficient number existed to perform a risk assessment. Specific criteria used were if there was enough of data points to support a statistical estimate of the exposure concentration at each site and if the analytical methods were sufficient to characterize the site. If an insufficient data population existed for a site, additional data has been proposed.

Definition of the Extent of Contamination. Results of the field investigations indicated some samples at a site that exceeded the screening criteria for certain parameters. The

configuration of these samples was reviewed to assess whether additional samples were needed to adequately characterize the area exceeding health-based criteria.

Characterization of the Nature of Contamination. If earlier sampling at a site indicated the presence of a contaminant in some of the samples, sampling for additional types of contamination may need to occur.

Assurance of Absence of Contamination. A sufficiently broad spectrum of analyses is also necessary to fully understand the nature of contamination at each site. If a site is judged free of contamination, the number of samples and the suite of analyses should be reviewed for adequacy. The current knowledge of recent past use may not be an adequate indicator of the potential contaminants at a site.

Evaluation of Groundwater Contamination. At some sites, surface and subsurface soil concentrations exceed criteria that signify the potential for transfer from soil to groundwater via leaching. Additional subsurface soil sampling may be proposed or grab samples of groundwater may be obtained to directly determine if an impact to groundwater is occurring.

Sufficiency for Feasibility Studies. Feasibility samples are proposed at sites where remedial activities are likely and data are needed to evaluate the feasibility of different remedial technologies. If, for instance, surface soil at a particular site contains elevated concentrations of arsenic and subsurface soil does not, then samples would be collected from 0 to 6 inches, 6 to 12 inches and 12 to 18 inches to determine if removing the surface soil was a feasible remedial option. TCLP samples may be collected to determine if the surface soil could be covered without the risk of the contaminants leaching to the groundwater. Geotechnical samples may be collected to evaluate if other technologies such as soil vapor extraction, solidification or other engineering control may be applicable at the site. Geotechnical testing will include grain size distribution, moisture content, pH, alkalinity, cation exchange capacity, and total organic carbon.

Changes to Field or Laboratory Methods

EPA has promulgated a change in the methods for collection and analysis of VOC's in soil. The sampling proposed in this addendum to the FSP incorporates this methodology for VOC analysis of soils. Previous methods have demonstrated a significant low bias in the quantitation of VOC's in soil samples (EPA, 1997).

The samples collected as implementation of the 1995 FSPs were analyzed by the traditional "purge-and-trap" procedures outlined in Update II to SW-846 (Method 5030A,Revision 1, 1992). However, on June 13, 1997, Method 5030B and Method 5035 were promulgated in SW-846 (Update III). This update removed the option for analysis of soil / sediment by Method 5030 and replaced it with Method 5035, "Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Water Samples". Method 5035 has several options in sample collection: field preserving with methanol or sodium bisulfite or collecting in EnCore samplers and submitting to the laboratory for preservation within the specified 48 hours.

Revised Site Sampling and Analysis Plans

For each of the screening sites that require additional sampling, a synopsis of the revised sampling plan is presented below. A figure is presented for each site showing both the previous sampling locations (including sampling performed by other firms) and any new sampling proposed in this addendum. A table for each site itemizes each new proposed sample, and provides the rationale and proposed suite of analyses.

OU-2 Screening Sites (SS)

Sites 31, 32, & 33 (co-located sites in OU#2, Parcel 35)–Former Spray Paint Booth, Sand Blasting Waste Accumulation Area, and Sand Blasting Waste Drum Storage Area. The chemicals of potential concern (COPCs) detected at co-located Screening Sites 31 and 33 and RI Site 32 include antimony, arsenic, cadmium, chromium, lead, PAH compounds, dieldrin, PCBs, and DDT.

Nine additional surface soil samples (SS-33G through O) are needed to complete the horizontal delineation of metals contamination (Figure 1), differentiate between tri-valent and hex-valent chromium, and provide a consistent data set using uniform methodology and analytical technique. Four of the surface soil samples (SS-33G, I, K, and M) will be analyzed for Priority Pollutant Metals (PPM) and for Cr species differentiation; the other four samples will be analyzed for PPM. Additionally, sample SS-33J will be analyzed for Target Compound List / Target Analyte List (TCL/TAL) compounds and Sample SS-33O will be sampled for metals, PAHs, and pesticides. To complete the assessment of depth of surface soil contamination, three sample depths (i.e., 0.0 to 0.5, 0.5 to 1.0, and 1.0 to 1.5 ft.) will be sampled at six different locations and analyzed for PPM and geotechnical parameters (Table 1). The depth distributions will be used to evaluate soil quantities for remediation.

Site 82: Flammables Buildings 783 and 793. No additional environmental sampling is planned for this site. The only field activity needed at this site is a current photograph.

Site 84: Building 972. The lateral extent of polyaromatic hydrocarbons (PAHs) in surface soil is an issue at this site at SS-84C (Figure 2). Two surface soil samples (from 0.0 to 1.0 feet) will be taken 10 feet east and west of the railroad tracks, and analyzed for PAHs. One of the samples will also be analyzed for TAL/TCL (Table 3) to support the risk assessment.

Site 89: Building 1089.
At this site, PPM are the only analyses proposed for the additional sampling (Table 3). One groundwater grab sample (HY-05) will be collected by direct push methods to assess if groundwater is impacted by metals downgradient of the elevated chromium in the subsurface at SB-69J. Groundwater samples will only be analyzed if the turbidity in the samples can be maintained at less than or equal to 25 Nephelometric Turbidity Units (NTU). If metals in groundwater are above the criteria or the turbidity is not achieved, additional vertical delineation of subsurface soils will occur at SS-89J, the area of highest

surface concentration of lead and chromium, to a depth of 40 feet. Five surface soil samples will be collected at depth intervals of 0.0 to 1.0 feet to assess the lateral extent of metals in surface soil (Figure 3).

For the feasibility studies, PPM samples will be collected at 4 locations at 6-inch intervals from 0.0 to 1.5 feet to investigate the possible depth of soil removal. In addition, geotechnical parameters and TCLP metals and PAH will be analyzed from a 0.0 to 1.5- ft composite interval at two of the FS locations. At the other two locations, TCLP metals will be collected from the upper 6 inches at one location and from 0.0 to 1.0 ft at the second location.

Multiple Parcel, RR Tracks East of Building 970. To delineate the PAH contamination, additional samples are needed near the RR Tracks east of Building 970 (Table 4). Since this site is associated with BRAC sites, specific details on the samples needed are discussed in OU-2 under BRAC Parcels 30, 26, and 23. Sample locations for the additional figures are shown in Figure 4.

OU-3 Screening Sites

Site 51: Lake Danielson Outlet Drainage Ditch.

One surface soil sample (SS-51D) will be collected and analyzed for PPM and pesticides to confirm reports of elevated arsenic and dieldrin in the ditch soils (Table 5).

See Figure 5 for the new sample location.

Site 65: XXCC-3 Building 249.

The parameters detected at SS 65 include PAH compounds, cadmium, DDE and DDT.

Eight soil sampling sites (SS-65F through K, and FS-65A and B) will be sampled to evaluate the extent of PAHs in near-surface soils and provide data for assessing the extent of potential remediation (Figure 6). The two FS samples will be sampled at three depth intervals (i.e., 0.0 to 0.5, 0.5 to 1.0, and 1.0 to 1.5 ft). All soil samples will be analyzed for PAH. The six surface soil (SS prefix) samples will also be analyzed for pesticide/PCB concentrations, and two surface soil locations (i.e., SS-65H and I) will be analyzed for TCL/TAL compounds. The two FS sample sites will also be analyzed for geotechnical suite and TCLP PAH from a total depth composite sample (Table 6).

In response to EPA Region IV comments regarding asphalt and RR tracks as a source of PAH contamination, one sample of road asphalt and one sample of creosote oozing from the railroad tracks will be obtained at Site 65. These samples will be taken south of Building 249, in the area of previously elevated PAHs. Both samples will be analyzed for PAHs and PAH TCLP.

Site 66: POL Building 253. PAH compounds were detected at SS 66 at concentrations exceeding residential risk-based criteria. Four surface soil samples (SS-66B through E) will be collected from north of the asphalt to confirm elevated PAH concentrations reported historically. All samples will be analyzed for PPM, PAHs, and pesticide/PCB concentrations (Table 7).

See Figure 7 for the new sample locations.

Site 67: Installation Gas Station, Building 257. Parameters detected at SS 67 include arsenic and dieldrin in the surface soils and BTEX compounds in the subsurface soils.

One groundwater grab sample will be collected from beneath the site and analyzed for BTEX to evaluate whether this site has impacted groundwater quality. The sample will be taken from beneath the fuel transfer area (Figure 8). Soil samples will be collected at depths of 8 to 10 and 18 to 20 feet from the same push location as the groundwater sample and the soil samples (SB-67C) analyzed for VOC concentration and geotechnical parameters to allow for a Feasibility Study if contamination is confirmed (Table 8).

Site 68: POL Building 263. To further characterize the site and provide a consistent data set indicative of current conditions, an additional surface soil sample and subsurface soil sample (depth of 8 to 10 ft) will be collected at boring SB-68C just northeast of Building 263 (Table 9). Historical data from this site were collected under to wide a set of data quality objectives to be useful in assessing disposition of this site. The boring samples will be analyzed for TAL/TCL compounds. See Figure 9 for the new boring location.

Site 75: Unknown Wastes Near Building 689. PAH compounds were detected at SS 75 at concentrations exceeding the screening criteria. Four additional surface soil samples will be collected to delineate the lateral extent of PAH contamination in the surface soil. The samples will be collected 30 feet northwest, 30 ft northeast, 30 ft southeast and 30 ft southwest of Sample SS75A. The samples will be analyzed for PAH and TAL/TCL compounds (Table 10). See Figure 10 for the sample locations.

Site 77: Unknown Wastes Near Buildings 689 and 690
The parameters detected at SS 77 include antimony, arsenic, dieldrin and PAH compounds.

Four locations will be sampled for soil; two locations, SS-77E and SS-77F, will be from the 0.0 to 1.0 foot interval, and will be analyzed for PPM and PAH concentrations to provide data for a risk assessment (Figure 11). The other two locations, FS-77G and H, will be sampled at three depth intervals (i.e., 0.0 to 0.5, 0.5 to 1.0, and 1.0 to 1.5 ft) and analyzed for the same parameters as the SS locations samples. Geotechnical parameters and TCLP metals and PAH will be analyzed from a 0.0 to 1.5 ft composite interval at the FS locations (Table 11).

Site 78: Alcohol, Acetone, Toluene, & Hydrofluoric Acid Area Building 689. One groundwater grab sample (HY-03) will be collected and analyzed for VOCs to evaluate whether there has been transfer of VOCs from the site. Soil from the intervals of 8 to 10 and 18 to 20 feet will

be collected at the same location and analyzed for geotechnical parameters (Figure 12). To evaluate the lateral and vertical extent of TCE (if found in the groundwater grab sample) a second phase of sampling will collect soil northwest and southwest of SB-76B. Soil will be collected from 1 to 3, 4 to 6, 18 to 20, 28 to 30 and 38 to 40 feet below land surface at locations SB-78D and E, and analyzed for VOC concentrations (Table 12)

OU-4 Screening Sites

Site 35: Defense Reutilization Marketing Office Building T-308: Hazardous Waste Storage. COPCs for SS 35 include arsenic in the surface soils and total chromium and lead in the subsurface soils.

Four surface soil samples (i.e., SS-35A through D) will be collected to evaluate and analyze for PPM to confirm reports of elevated arsenic and provide data to support risk assessment of this site (Table 13). See Figure 13 for the new sample locations.

Sites 36 through 39 (Co-located sites in OU#4,): DRMO Drum Storage Area. The COPCs detected in the soil for Sites 36 through 39 include arsenic, chromium, antimony, lead, cadmium, copper, PAH compounds, DDT, 1,1,2,2-tetrachloroethane and trichloroethane (TCE).

One groundwater grab sample (HY-02) will be collected by direct push methods to evaluate the presence of VOC contamination in the area between the concrete pad and the road just north of the site (Figure 14). Three surface soil samples (SS-36A through C) will be collected to the east and south of SS-5. One will be analyzed for PPM and PAH to confirm the results from previous sample SS-5, and two will be analyzed for PPM and TAL/TCL compounds to evaluate lateral extent of metals in surface soils (Table 14).

Site 42: Former PCP Dip Vat Area. The COPCs for Site 42 include dieldrin, PCP and dioxins/furans. Two additional surface soil samples (SS42F and SS42G) will be collected to characterize the extent of contamination at north half of the site (Table 15). The samples will be analyzed for PAH compounds, pesticides/PCB, and TAL/TCL compounds. See Figure 15 for the proposed sample locations.

Site 43: Former Underground PCP Tank Area. The COPCs for Site 43 include arsenic and dioxins in the surface soil. One additional surface soil sample (SS43F) will be collected to characterize the extent of surface soil contamination at the southern half of the site, near SS43B (Figure 16). The sample will be analyzed for pesticides, PCBs and PAH compounds (Table 16).

Site 46: Pallet Drying Area. One surface soil sample (SS-46F; see Table 17) will be collected from a depth of 0.0 to 1.0 foot, from a location near SS-46C to allow evaluation of PAH, pesticide, and PCB concentrations in this area (Figure 17).

Site 56: West Gate Water Storm Drainage Canal. The only field activity needed at this site is a current photograph. No additional environmental sampling is planned for this site.

Site 72: Waste Oil (PDO Yard). Two surface soil samples are needed to verify historical data and document the lateral extent of wastes (SS-72J and SS-72K, respectively) associated with releases from this site. Both samples will be collected from the 0.0 to 1.0 foot depth in the area north of the railroad spur (Figure 18) and analyzed for PPM (Table 18).

Site 79: Fuels, Miscellaneous Liquids, Wood, and Paper. PPM and PAHs are the environmental concerns at this site. One 20-foot boring will be drilled southeast of Building 702, downgradient of the arsenic contamination, to confirm the presence of chromium at SB-79C (Figure 19). In an attempt to define the source of contamination at SS-79A, two additional surface soil samples (from 0.0 to 1.0 feet) will be taken and analyzed for PPM and PAHs. One more surface soil sample will be taken 50 feet south of SS-79A to assess the extent of contamination south of the railroad tracks.

Three locations will be sampled at 6-inch intervals to 1.5 feet for the feasibility study, and analyzed for PPM. In addition, a geotechnical suite and metals TCLP will be analyzed from a 0.0 to 1.5-ft and 0.0 to 0.5-ft composite sample at two of the sites. A metals TCLP will be taken from 0.0 to 1.0 foot at the third sampling location (Table 19).

Site 80: Fuel and Cleaner Dispensing, Building 72. Surface soil contamination is a concern at this site, and six surface soil samples are proposed to obtain additional information about the lateral extent of metals, PAHs, and PCBs at Site 80 (Figure 20). Each sample will be taken from 0.0 to 1.0 feet in depth, and analyzed for either PPM, PAHs, PCBs, or some combination of these (Table 20).

Site 83: Dried Paint Disposal Area. One groundwater grab sample (HY-06) will be collected by direct push methods to assess if groundwater is impacted by metals downgradient of elevated chromium in SB-89B (Figure 21). Eleven surface soil samples (from 0.0 to 1.0 feet) will be collected and analyzed for PPM to assess the lateral extent of surface soil metal contamination.

Six locations will be sampled at 6-inch intervals to 1.5 feet for the feasibility study, and analyzed for PPM. In addition, a geotechnical suite and metals TCLP will be analyzed from a 0.0 to 0.5-ft composite sample at two of the sites (Table 21).

MISCELLANEOUS SCREENING SITE

Offsite Drainage Pathways Site No additional sampling is proposed for the offsite drainage pathways at DDMT, as sufficient information exists.

References

CH2M HILL. *Final Preliminary Risk Evaluation.* Prepared for United States Army Engineering Support Center, Huntsville, Alabama. April 1998.

"Determination of Volatiles in Soil–Directive for Change", Memorandum from Norman Niedergang, Director, Waste, Pesticides and Toxics Division, U.S. EPA Region 5, December 22, 1997.

Woodward-Clyde. *Sampling and Analysis Recommendations.* 1996.

Table 1
Site 31 - Former Spray Paint Booth
Site 32 - Sand Blasting Waste Accumulation Area
Site 33 - Sand Blasting Waste Drum Storage Area
Final Addendum to Field Sampling Plan
DOMT Delivery Order 11 - Main Installation
September, 1994

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	2	35	31, 32, 33	31 - Former Paint Spray Booth, 32 - Sand Blasting Waste Accumulation Area, 33 - Sand Blasting Waste Drum Storage Area	Determine lateral extent of metals in surface soils.	SS-33K	0-1	Confirm historical data for SS-17 for PCB, metals and PAHs		1 - Speciate Cr III and Cr VI		1	1			Fast turn around
						SS-33L	0-1	Extent sample west of SS-17		1		1	1			Fast turn around
						SS-33M	0-1	Extent sample Northeast of SS-19		1 - Speciate Cr III and Cr VI		1	1	1	1	Fast turn around
						SS-33N	0-1	Extent sample North of SS-19		1		1	1			Fast turn around
						SS-33O	0-1	Extent sample west of SS-48		1 - Speciate Cr III and Cr VI		1	1			Fast turn around
						SS-33H	0-1	Extent sample east-northeast of SS-19		1		1	1			Fast turn around
						SS-33I	0-1	Extent sample south of SS-19		1 - Speciate Cr III and Cr VI		1	1			Fast turn around
						SS-33J	0-1	Extent sample southeast of SS-15		1		1	1			Fast turn around
					Assess lateral extent of metals, pesticides, and PAHs in surface soils	SS-33G	0-1	Under TVA lines		1		1	1			
					Feasibility Study Information - Evaluate vertical extent of chromium in near-surface soil.	FS-33A	0-0.5, 0.5-1.0, 1.0-1.5	Near SS-33A to determine depth of potential soil remediation		3						Collect Metal TCLP and geotechnical suite from 0.0-1.5
						FS-33B	0-0.5, 0.5-1.0, 1.0-1.5	Near SS-33B to determine depth of potential soil remediation		3						Collect Metal TCLP and geotechnical suite from 0.0-0.5
						FS-33C	0-0.5, 0.5-1.0, 1.0-1.5	Near SS-33B to determine depth of potential soil remediation		3						Collect Metal TCLP and geotechnical suite from 0.0-1.0
						FS-33D	0-0.5, 0.5-1.0, 1.0-1.5	Near SS-19 to determine depth of potential soil remediation		3						Collect Metal TCLP and geotechnical suite from 0.0-1.5
						FS-33E	0-0.5, 0.5-1.0, 1.0-1.5	Near SS-33O to determine depth of potential soil remediation		3						Collect Metal TCLP and geotechnical suite from 0.0-0.5
						FS-33F	0-0.5, 0.5-1.0, 1.0-1.5	Near SS-33C to determine depth of potential soil remediation		3						Collect Metal TCLP and geotechnical suite from 0.0-1.0

Table 1
Site 84 - Building 972
Final Addendum to Field Sampling Plan
DOMT Delivery Order 11 - Main Installation
September, 1993

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	2	21	84	Building 972	Delineate lateral extent of PAHs in surface soil around sample SS-84C	SS-84G	0-1	10 ft west of RR tracks near SS-84C				1				Significantly elevated PAHs may be due to RR tracks
						SS-84H	0-1	10 ft east of RR tracks near SS-84C				1		1	1	

Table 3
Site 89 - Building 1089
Final Addendum to Field Sampling Plan
DOMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	2	28	89	Building 1089	Determine if groundwater is impacted by metals.	HY-05	N/A	Location south of SB-89B, downgradient of elevated chromium in subsurface in SB-89J.		1						Contingent on ability to sample metals using push. Turbidity must be below 25 NTU.
					If there is a groundwater impact, determine vertical extent of metals in areas of highest surface concentration.	SB-89E	3-5, 8-10, 18-20, 28-30, 38-40	Near elevated lead and chromium at SS-89J		5						Samples will be analyzed only if there is an observed impact on groundwater quality at HY-05. Samples deeper than 20 feet will not be analyzed unless overlying samples exceed groundwater transfer criteria.
					Evaluate lateral extent of metals in surface soil based on previous results	SS-89K	0-1	North of SS-89C		1						
						SS-89L		Adjacent to SB-89D on east side of the road		1						Surface soil sample not taken at SB-89D.
						SS-89M		SW of SS-89J on the east side of the road		1						
						SS-89N		Adjacent to SB-89C on the west side of the road		1						
						SS-89O		SW of SS-89J on the west side of the road		1						
					Feasibility Study Information - Evaluate vertical extent in near-surface soils.	FS-89P	0.0-0.5, 0.5-1.0, 1.0-1.5	At SS-89H to investigate possible depth of removal		3						Collect a geotechnical suite and TCLP Metals at 0-1.5 ft composite.
						FS-89Q		At SS-89J to investigate possible depth of removal		3						Collect a geotechnical suite and TCLP Metals at 0-1.5 ft composite.
						FS-89R		At SB-89D to investigate possible depth of removal		3						Collect TCLP Metals at 0-0.5 ft
						FS-89S		At SS-89C to investigate possible depth of removal		3						Collect TCLP Metals at 0.0-1.0 ft

Table 4
Parcel 26 - RR Tracks East of Building 970
Final Addendum to Field Sampling Plan
DDMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	2	26	70/71	RR tracks east of Building 970	Further delineate PAH contamination in surface soils based on previous sampling.	F(30.1)	0-1	North of B(26.2)				1				
						C(26.2)		South of B(26.2)				1				
						D(26.2)		North of A(26.2)				1				
						B(23.1)		South of A(26.2)				1				
					Feasibility Study Information - Evaluate vertical extent in near-surface soil.	FS-26.2A	0.0-0.5, 0.5-1.0, 1.0-1.5	At A(26.2) to determine possible depth of removal				3				Collect geotechnical suite and PAH TCLP from 0-1.5 ft composite.
						FS-26.2B		At B(26.2) to determine possible depth of removal				3				

Table 5
Site 51 - Lake Danielson Outlet Drainage Ditch
Final Addendum to Field Sampling Plan
DOMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/PCB	TAL	TCL	
SS	3	3	51	Lake Danielson Outlet Drainage Ditch	Confirm the results of elevated arsenic and dieldrin	SS-51D	0-1	Associated with elevated detections at SS-14.		1			1			Confirmation purposes.

Table 6
Site 65 - XXCC-3, Bldg 249
Final Addendum to Field Sampling Plan
DDMT Delivery Order 11 - Main Installation
September, 1993

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	3	7	65	XXCC-3, Bldg 249	Evaluate extent of PAHs in surface soil at Site 65	SS-65F	0-1	North of RR tracks west of Bldg 249 near ramp				1	1			Evaluate extent of PAHs and pesticides east of SS-65E.
						SS-65G		North of RR tracks east of Bldg 249 near ramp				1	1			Evaluate extent of PAHs in the southwest portion of Bldg 249.
						SS-65H		At RR tracks south of the east side of Bldg 249				1	1	1	1	Evaluate extent of PAHs in the southeast portion of Bldg 249.
						FS-65A	0.0-0.5, 0.5-1.0, 1.0-1	At RR tracks south of the east side of Bldg 249				3				collect geotechnical suite and PAH TCLP from 0-1.5 ft composite.
						SS-65I	0-1	North of the west side of Bldg 249				1	1	1	1	
						SS-65J		Northeast of Bldg 249				1	1			
						SS-65K		At RR tracks south of the west side of Bldg 249				1	1			
						FS-65B	0.0-0.5, 0.5-1.0, 1.0-1	At RR tracks south of the west side of Bldg 249				3				Collect geotechnical suite and PAH TCLP from 0-0.5 ft composite.
					Characterize asphalt	RD-65A	Surface					1				Also analyze for PAH TCLP
					Characterize RR tracks	RR-65A	Surface					1				Also analyze for PAH TCLP

Table 7
Site 66 - POL (Building 253)
Final Addendum to Field Sampling Plan
DOMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	3	4	66	POL (Building 253)	Provide a confirmation sample north of the asphalt	SS-66B	0-1	North of surface soil sample SS-66A to make sure the elevated PAHs were not from asphalt.		1		1	1			PAHs may be elevated above background due to the asphalt.
						SS-66C				1		1	1			
						SS-66D				1		1	1			
						SS-66E				1		1	1			

Table 8
Site 67 - Installation Gas Station, Bldg 257.
Final Addendum to Field Sampling Plan
DOMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses								Comments
									BTEX	PPM Metals	VOC	PAH	Pest/PCB	TCL	TAL	Geotech. Suite	
SS	3	4	67	Installation gas station, Bldg 257.	Determine if there has been an impact to groundwater from benzene in subsurface soil	HY-01	NA	Located near fuel transfer area	1								Direct Push Technology (DPT) Groundwater Grab Sample.
					Feasibility Study Information	SB-67C	8-10, 18-20	Located near fuel transfer area			2					2	Direct Push Technology (DPT) Soil Samples.

Table 9
Sites 68 - POL Building 263
Final Addendum to Field Sampling Plan
ODMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	3	4	68	POL Building 263	Site Characterization	SB-68C	0-1, 8-10	Northeast of Bldg 263						2	2	

Table 10
Site 75 - Unknown Wastes Near Building 689
Final Addendum to Field Sampling Plan
DDMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM Metals	VOC	PAH	Pest/PCB	TAL	Table	
SS	3	21	75	Unknown Wastes near Building 689	Delineate lateral extent of PAH contamination in surface soil	SS-75C	0-1	Approximately 30 feet northwest of SS-75A				1				
						SS-75D	0-1	Approximately 30 feet northeast of SS-75A				1		1	1	
						SS-75E	0-1	Approximately 30 feet southwest of SS-75A				1				
						SS-75F	0-1	Approximately 30 feet southeast of SS-75A				1				

Table 11
Site 77 - Unknown Wastes Near Building 689 and 690
Final Addendum to Field Sampling Plan
ODMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	3	22	77	Unknown Wastes Near Building 689 and 690	Evaluate risk of PAH in surface soil	SS-77E	0-1	East of existing samples on north side of corridor.		1		1				Corridor seems to be contaminated on north side near RR.
						SS-77F		West of existing samples on the north side of the corridor		1		1				
						FS-77G	0.0-0.5, 0.5-1.0, 1.0-1.5	Collected at SS-77C to help determine depth of potential soil removal		3		3				Collect geotechnical suite and PAH and Metals TCLP from 0-1.5 ft composite.
						FS-77H				3		3				

Table 12
Site 78 - Alcohol, Acetone, Toluene and Hydrofluoric Acid Area, Building 689.
Final Addendum to Field Sampling Plan
DOMT Delivery Order 11 - Main Installation
September, 1995

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	3	21	78	Alcohol, Acetone, Toluene and Hydrofluoric Acid Area, Building 689.	Determine if there has been transfer of VOCs to groundwater and evaluate water levels	HY-03	NA	Collect groundwater sample to determine if VOCs have migrated to groundwater			1					First phase of characterization. Use quick turnaround lab samples; also collect geotechnical Suite at 8-10 and 18 to 20 ft.
					Evaluate lateral and vertical extent of TCE if found in groundwater.	SB-78D	1-3, 4-8, 18-20, 28-30, 38-40	Evaluate vertical and horizontal extent northwest of SB-78B.			5					Second phase, contingent on presence of VOCs in groundwater from Site 78.
					Evaluate lateral and vertical extent of TCE if found in groundwater.	SB-78E	1-3, 4-8, 18-20, 28-30, 38-40	Evaluate vertical and horizontal extent southwest of SB-78B.			5					Second phase, contingent on presence of VOCs in groundwater from Site 78.

Table 13
Site 35 - DRMO Bldg. T-308
Final Addendum to Field Sampling Plan
ODMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	4	15	35	Defense Reutilization Marketing Office (DRMO) Building T-308; Hazardous Waste Storage	Confirm presence of elevated arsenic reported in historical sample SS4.	SS-35A	0-1	Near SS-4 as a confirmation sample for arsenic		1						Arsenic only metal of concern. Lead does not exceed the background concentration of 24 ppm.
					Provide additional data for risk analysis	SS-35B		Northwest of building 308		1						
					Confirm presence of elevated arsenic reported in historical sample SS4 and evaluate extent.	SS-35C		Southeast of building 308		1						
					Confirm presence of elevated arsenic reported in historical sample SS4 and evaluate extent.	SS-35D		West of building 308		1						

Table 14
Sites 36-39 - DRMO Drum Storage
Final Addendum to Field Sampling Plan
DDMT Delivery Order 11 - Main Installation
September, 1995

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	4	15	36-39	DRMO Drum Storage	Evaluate presence of VOCs in groundwater due to elevated concentrations in soil.	HY-02	NA	Evaluate groundwater impact in area north of concrete pad between Perimeter Rd. and the pad.			1					Direct Push Technology (DPT) Groundwater Sample.
					Need confirmation of high levels of lead, chromium and SVOCs at SS-5.	SS-36A	0-1	At SS-5 to confirm historical results		1		1				Confirm results of SS-5
					Determine lateral extent of metals in surface soils.	SS-36B	0-1	South of SS-5		1				1	1	
						SS-36C	0-1	East of SS-5		1				1	1	

Table 15
Site 42 - Former PCP Dip Vat Area
Final Addendum to Field Sampling Plan
ODMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	4	33	42	Former PCP Dip Vat Area	Need to analyze for all related compounds for further site	SS-42F	0-1	In Open Storage Area X06 to characterize north half of site.						1	1	
						SS-42G	0-1	In Open Storage Area X05 to characterize north half of site.				1	1			

Table 16
Site 43 - Former underground PCP Tank Area
Final Addendum to Field Sampling Plan
DDMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM Metals	VOC	PAH	Pest/PCB	TAL		
SS	4	33	43	Former underground PCP Tank Area	Need to analyze all related compounds for further site characterization	SS-43F	0-1	Near SS-43B				1	1			Sample SS-43F will characterize the southern half of he site.

Table 17
Site 46 - Pallet Drying Area
Final Addendum to Field Sampling Plan
DDMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM Metals	VOC	PAH	Pest/PCB	TAL	TCL	
SS	4	33	46	Pallet Drying Area	Need to analyze for all related compounds for further site characterization	SS-46F	0-1	Near SS-46 C				1	1			

Table 18
Site 72 - Waste Oil (PDO Yard)
Final Addendum to Field Sampling Plan
DDMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM Metals	VOC	PAH	Pest/PCB	TAL	TCL	
SS	4	15	72	Waste oil (PDO Yard)	Confirm historical data for SS-41	SS-72J	0-1	Just north of the end of the RR spur near SS-41		1						
					Lateral delineation of lead and chromium concentrations	SS-72K	0-1	North of the end of the RR spur approximately 30 feet northwest of SS-41		1						

Table 19
Site 79 - Fuels, Miscellaneous Liquids, Wood, and Paper
Final Addendum to Field Sampling Plan
ODMT Delivery Order 11 - Main Installation
September, 1998

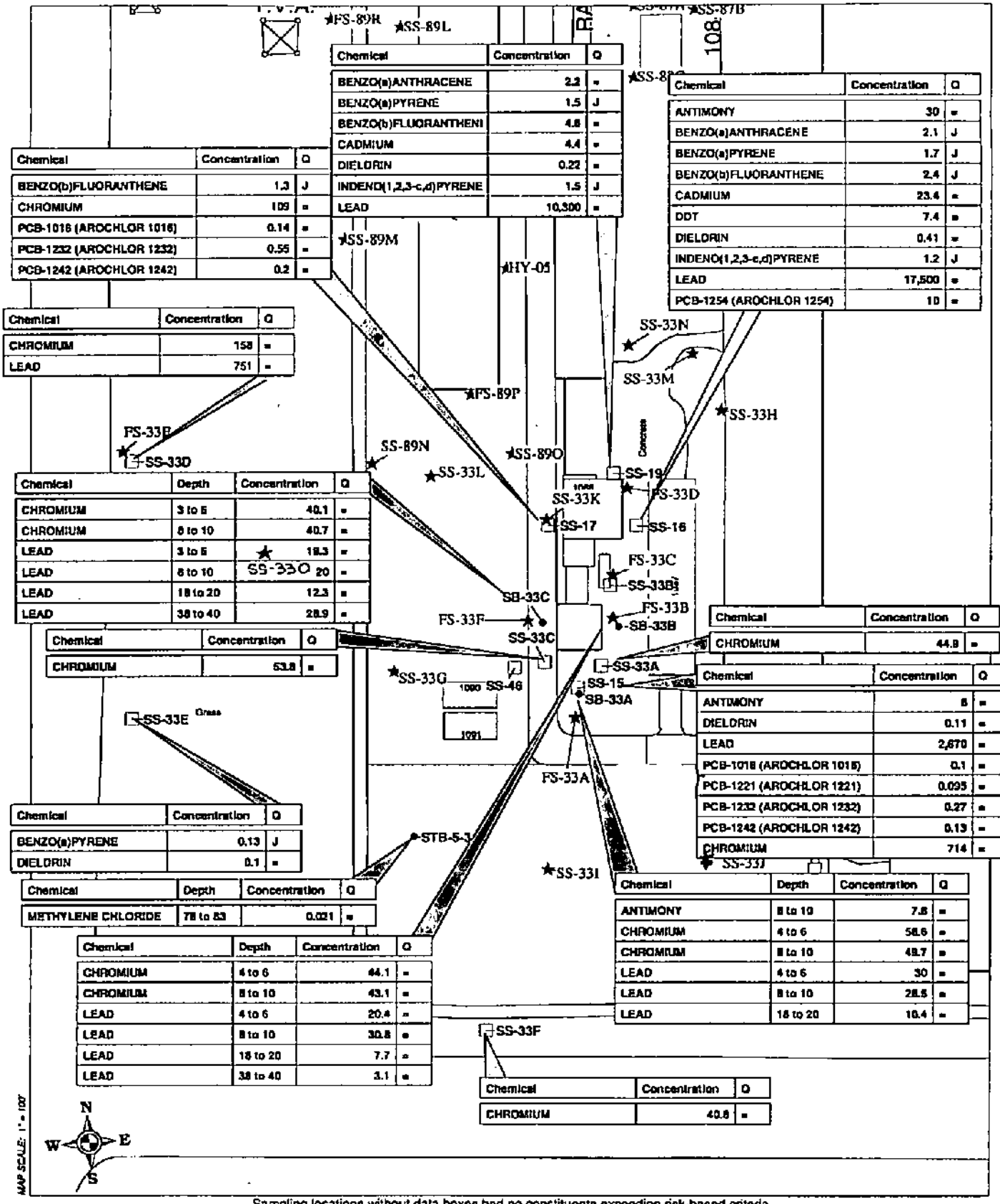
Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	4	15	79	Fuels, Miscellaneous Liquids, Wood, and Paper	Confirm the presence of chromium at SB-79C	SB-79D	4-6, 8-10 and 18-20	Southeast of Building 702 on the south side of the RR tracks which is downgradient of the arsenic contamination.		3						Metals of concern are lead, arsenic, chromium
					Determine if the contamination at SS-79A originated from the RR tracks or Building 702.	SS-79D	0-1	Just east of loading dock		1		1				
						SS-79E	0-1	Near RR tracks east of SS 79A		1		1				
					Determine the extent of metals and PAHs south of the RR tracks	SS-79F	0-1	50 feet south of SS-79A		1		1				
					Feasibility Study Information - Vertical extent of metals in near-surface soil.	FS-79A	0.0-0.5, 0.5-1.0, 1.0-1	Just east of loading dock		3						Geotechnical suite and Metals TCLP from 0-1.5 ft composite.
						FS-79B		Near RR tracks east of SS 79A		3						
						FS-79C		50 feet south of SS-79A		3						Collect Metals TCLP from 0.0-1.0

Table 20
Site 80 - Fuel and Cleaner Dispensing, Building 72
Final Addendum to Field Sampling Plan
ODMT Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	4	33	80	Fuel and Cleaner Dispensing, Building 72	Determine lateral extent of PCB and PAH in surface soil.	SS-80D	0-1	Northeast of SB-80A				1	1			
					Determine lateral extent of metals in surface soil.	SS-80E	0-1	Southwest of SB-80B		1						
					Determine lateral extent of Metals and PAH in surface soil.	SS-80F	0-1	Southeast of SS-80B		1		1				
					Determine lateral extent of Metals and PAH in surface soil.	SS-80G	0-1	Southeast of SS-80B		1		1				
					Confirm presence and potentially determine lateral extent of PCBs in surface soil.	SS-80H	0-1	Near SS-80A					1			
					Confirm presence and potentially determine lateral extent of PCBs in surface soil.	SS-80I	0-1	Near SS-80B					1			

Table 21
Site 83 - Dried Paint Disposal Area
Final Addendum to Field Sampling Plan
DO#7 Delivery Order 11 - Main Installation
September, 1998

Type of Site	OU No.	Parcel No.	Site No.	Description	Sampling Objective	Proposed Sample ID	Sample Interval (ft)	Sample Location/Basis	Analyses							Comments
									BTEX	PPM	VOC	PAH	Pest/ PCB	TAL	TCL	
SS	4	30	83	Dried Paint Disposal Area	Determine if groundwater is impacted by metals.	HY06	NA	Downgradient of elevated chromium in SB-83B.		1						Contingent on ability to sample metals using push and obtain turbidity of less than 25 NTUs.
					Determine lateral extent of surface soil contamination	SS-83D	0-1	East of 949		1						Confirm metals are the only parameter of concern
						SS-83E		East of RR tracks adjacent to SB83B		1						
						SS-83F		Southeast of concrete pad		1						
						SS-83G		Southwest of concrete pad		1						
						SS-83H		West of concrete pad across the Railroad		1						
						SS-83I		Northwest of the concrete pad across the road		1						
						SS-83J		West of building 949 next to the building		1						
						SS-83K		East of the RR tracks, 200 ft north of SB-83B		1						
						SS-83L		East of the RR tracks, 100 ft north of SB-83B		1						
						SS-83M		East of the RR tracks, 100 ft south of SB-83B		1						
						SS-83N		East of the RR tracks, 200 ft south of SB-83B		1						
					Feasibility Study Information - Evaluate vertical extent of metals in near-surface soil.	FS-83O	0.0-0.5, 0.5-1.0, 1.0-1.5	Adjacent to concrete pad to determine possible depth of removal		3						
						FS-83P	0.0-0.5, 0.5-1.0, 1.0-1.5			3						
						FS-83Q	0.0-0.5, 0.5-1.0, 1.0-1.5			3						Collect geotechnical suite and TCLP metals from a 0-0.5 composite.
						FS-83R	0.0-0.5, 0.5-1.0, 1.0-1.5			3						
						FS-83S	0.0-0.5, 0.5-1.0, 1.0-1.5			3						
						FS-83T	0.0-0.5, 0.5-1.0, 1.0-1.5			3						Collect geotechnical suite and TCLP metals from a 0-0.5 composite.



Chemical	Concentration	Q
BENZO(a)ANTHRACENE	2.2	=
BENZO(a)PYRENE	1.5	J
BENZO(b)FLUORANTHENE	4.8	=
CADMIUM	4.4	=
DIELDRIN	0.22	=
INDENO(1,2,3-c,d)PYRENE	1.5	J
LEAD	10,300	=

Chemical	Concentration	Q
ANTIMONY	30	=
BENZO(a)ANTHRACENE	2.1	J
BENZO(a)PYRENE	1.7	J
BENZO(b)FLUORANTHENE	2.4	J
CADMIUM	23.4	=
DDT	7.4	=
DIELDRIN	0.41	=
INDENO(1,2,3-c,d)PYRENE	1.2	J
LEAD	17,500	=
PCB-1254 (AROCHLOR 1254)	10	=

Chemical	Concentration	Q
BENZO(b)FLUORANTHENE	1.3	J
CHROMIUM	109	=
PCB-1016 (AROCHLOR 1016)	0.14	=
PCB-1232 (AROCHLOR 1232)	0.55	=
PCB-1242 (AROCHLOR 1242)	0.2	=

Chemical	Concentration	Q
CHROMIUM	158	=
LEAD	751	=

Chemical	Depth	Concentration	Q
CHROMIUM	3 to 5	40.1	=
CHROMIUM	8 to 10	40.7	=
LEAD	3 to 5	18.3	=
LEAD	8 to 10	20	=
LEAD	18 to 20	12.3	=
LEAD	38 to 40	28.9	=

Chemical	Concentration	Q
CHROMIUM	53.8	=

Chemical	Concentration	Q
CHROMIUM	44.8	=

Chemical	Concentration	Q
ANTIMONY	8	=
DIELDRIN	0.11	=
LEAD	2,670	=
PCB-1016 (AROCHLOR 1016)	0.1	=
PCB-1221 (AROCHLOR 1221)	0.095	=
PCB-1232 (AROCHLOR 1232)	0.27	=
PCB-1242 (AROCHLOR 1242)	0.13	=
CHROMIUM	714	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.13	J
DIELDRIN	0.1	=

Chemical	Depth	Concentration	Q
METHYLENE CHLORIDE	78 to 83	0.021	=

Chemical	Depth	Concentration	Q
ANTIMONY	8 to 10	7.8	=
CHROMIUM	4 to 6	58.6	=
CHROMIUM	8 to 10	48.7	=
LEAD	4 to 6	30	=
LEAD	8 to 10	28.5	=
LEAD	18 to 20	10.4	=

Chemical	Depth	Concentration	Q
CHROMIUM	4 to 6	44.1	=
CHROMIUM	8 to 10	43.1	=
LEAD	4 to 6	20.4	=
LEAD	8 to 10	30.8	=
LEAD	18 to 20	7.7	=
LEAD	38 to 40	3.1	=

Chemical	Concentration	Q
CHROMIUM	40.8	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- □ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifer Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 1
Site 33, Sandblasting Waste Drum Storage Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

WPSITE33.WO

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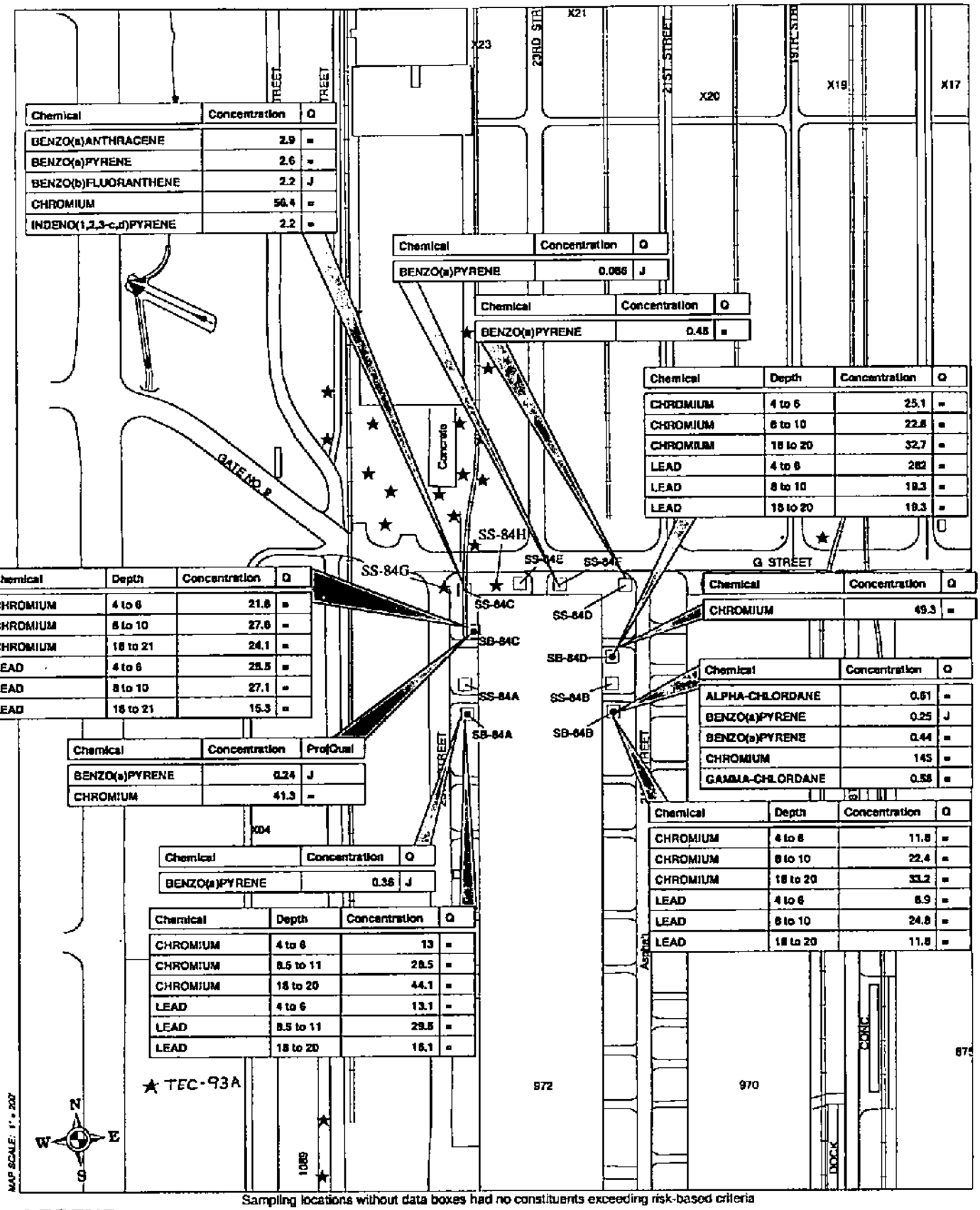

Chemical	Concentration	Q
BENZO(a)ANTHRACENE	2.9	=
BENZO(a)PYRENE	2.6	=
BENZO(b)FLUORANTHENE	2.2	J
CHROMIUM	56.4	=
INDENO(1,2,3-c,d)PYRENE	2.2	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.086	J

Chemical	Concentration	Q
BENZO(a)PYRENE	0.48	=

Chemical	Depth	Concentration	Q
CHROMIUM	4 to 6	25.1	=
CHROMIUM	6 to 10	22.8	=
CHROMIUM	18 to 20	32.7	=
LEAD	4 to 6	282	=
LEAD	6 to 10	19.3	=
LEAD	18 to 20	19.3	=

Chemical	Depth	Concentration	Q
CHROMIUM	4 to 6	21.8	=
CHROMIUM	6 to 10	27.6	=
CHROMIUM	18 to 21	24.1	=
LEAD	4 to 6	28.5	=
LEAD	6 to 10	27.1	=
LEAD	18 to 21	15.3	=

Chemical	Concentration	Q
CHROMIUM	49.3	=

Chemical	Concentration	ProjQual
BENZO(a)PYRENE	0.24	J
CHROMIUM	41.3	=

Chemical	Concentration	Q
ALPHA-CHLORDANE	0.61	=
BENZO(a)PYRENE	0.25	J
BENZO(a)PYRENE	0.44	=
CHROMIUM	145	=
GAMMA-CHLORDANE	0.58	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.36	J

Chemical	Depth	Concentration	Q
CHROMIUM	4 to 6	13	=
CHROMIUM	8.5 to 11	28.5	=
CHROMIUM	18 to 20	44.1	=
LEAD	4 to 6	13.1	=
LEAD	8.5 to 11	29.5	=
LEAD	18 to 20	16.1	=

Chemical	Depth	Concentration	Q
CHROMIUM	4 to 6	11.8	=
CHROMIUM	6 to 10	22.4	=
CHROMIUM	18 to 20	33.2	=
LEAD	4 to 6	8.9	=
LEAD	6 to 10	24.8	=
LEAD	18 to 20	11.8	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions

= - indicates unqualified detection

J - indicates estimated value above detection limit, but below reporting limit.

Figure 2
Site 84, Building 972
Constituents Exceeding "Screening" Criteria
Defense Distribution Depot Memphis, TN

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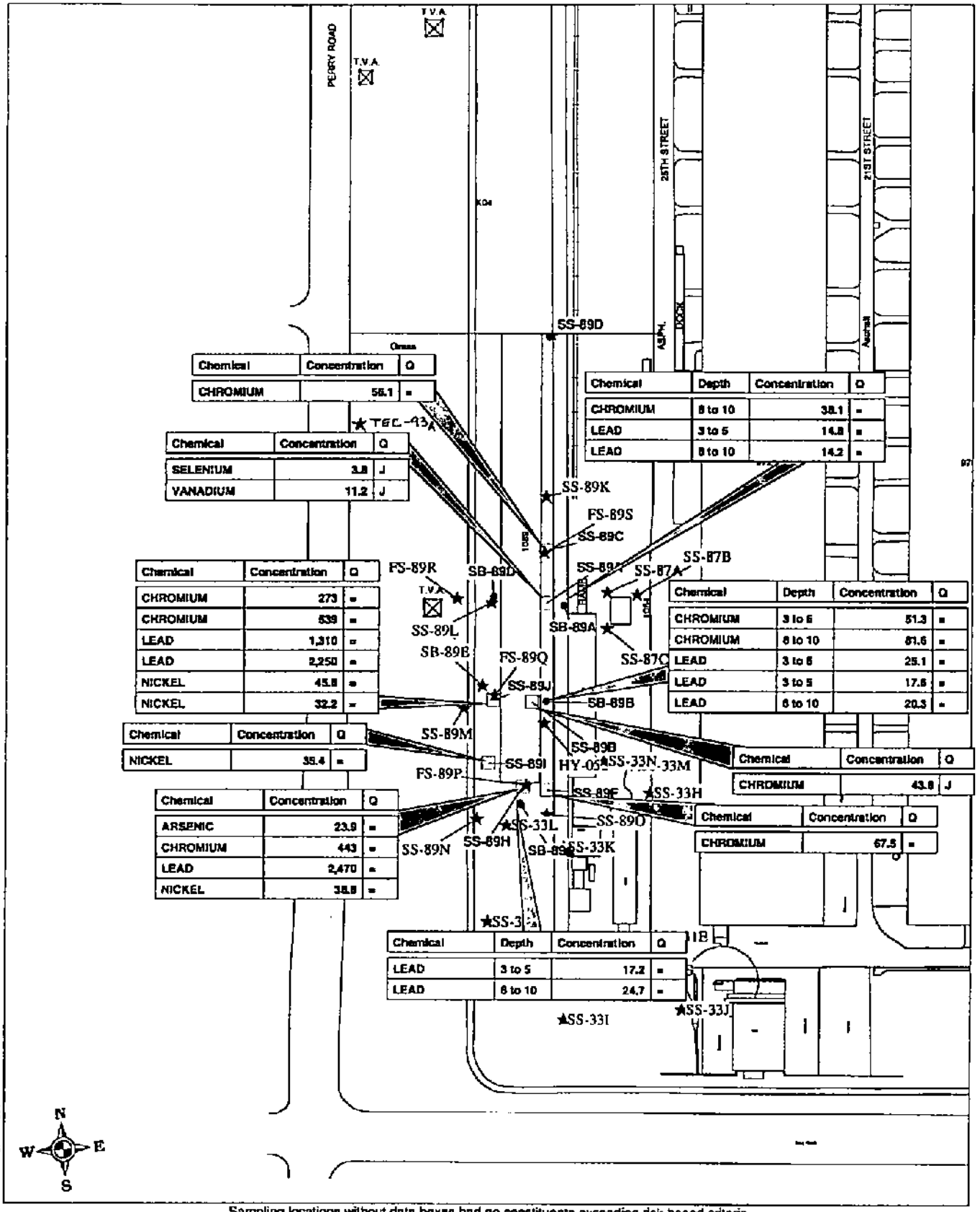
WP81TEM.WOR



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

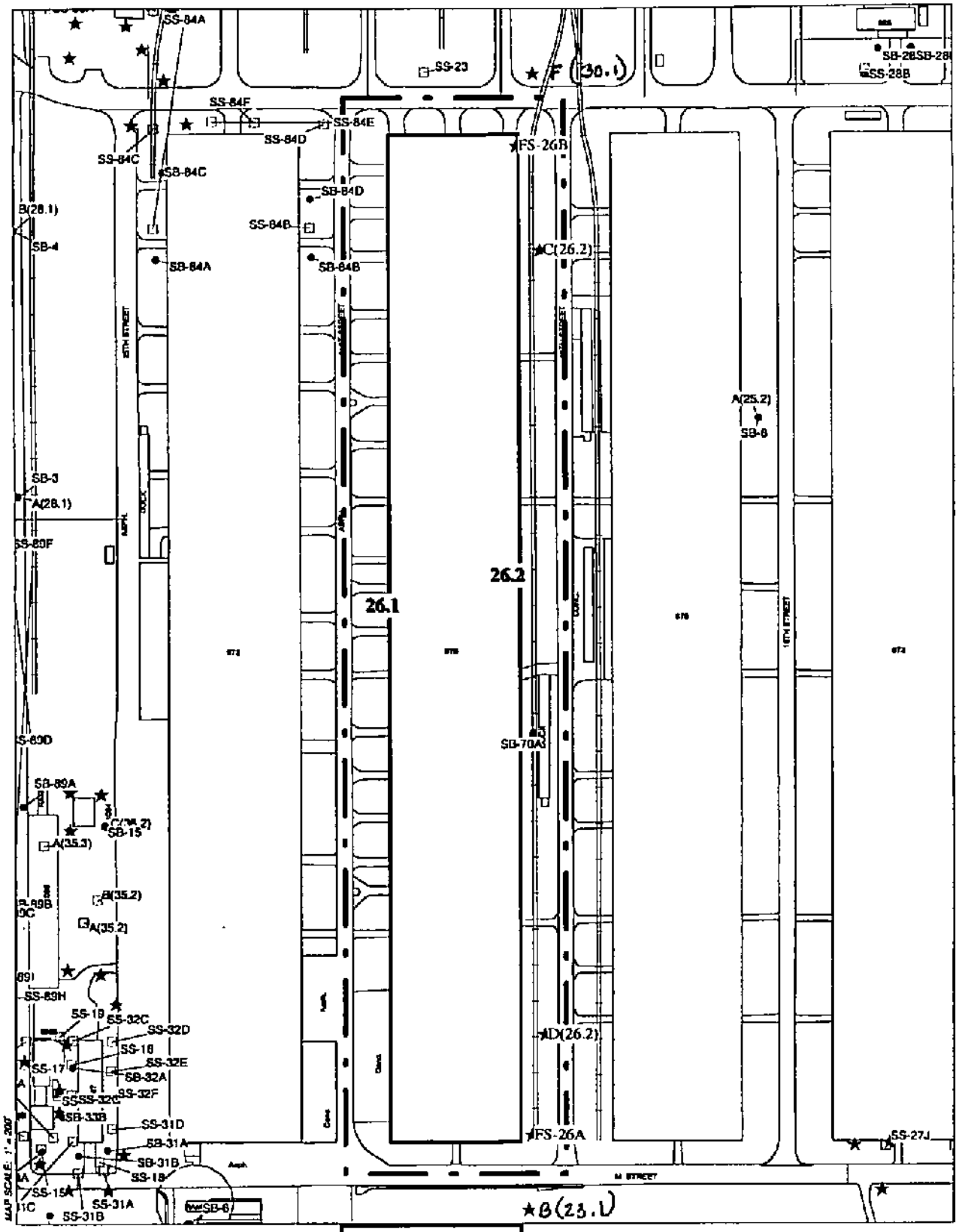
- ☐ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 3
Site 89, Building 1089
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

WPSITE89.WOR



LEGEND

- Surface Soil Sampling Locations
- Soil Boring Sampling Locations
- Surface Water Sampling Locations
- Sediment Sampling Locations
- ★ Proposed Sample Location

N
W E
S

KEY LOCATION MAP

Figure 4
PARCEL 26
Sampling Locations

Defense Distribution Depot Memphis, TN

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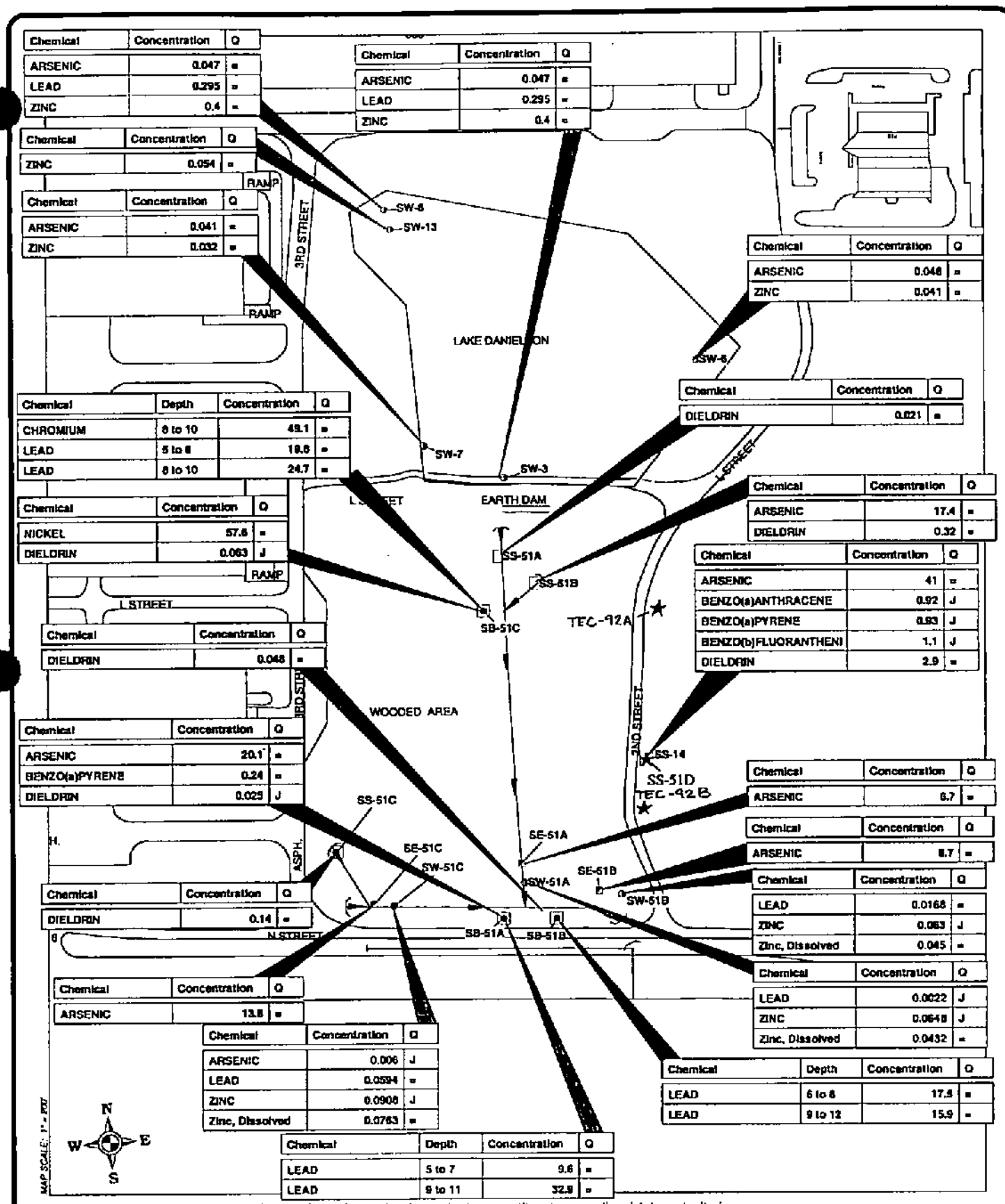

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Surface Water Sampling Location (mg/L)
- Sediment Sample Location (mg/kg)
- Proposed Soil Sample Location

(Q) Qualifer Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 5

Site 51, Lake Danielson Outlet Drainage Ditch
Constituents Exceeding Risk-Based Criteria

Defense Distribution Depot Memphis, TN

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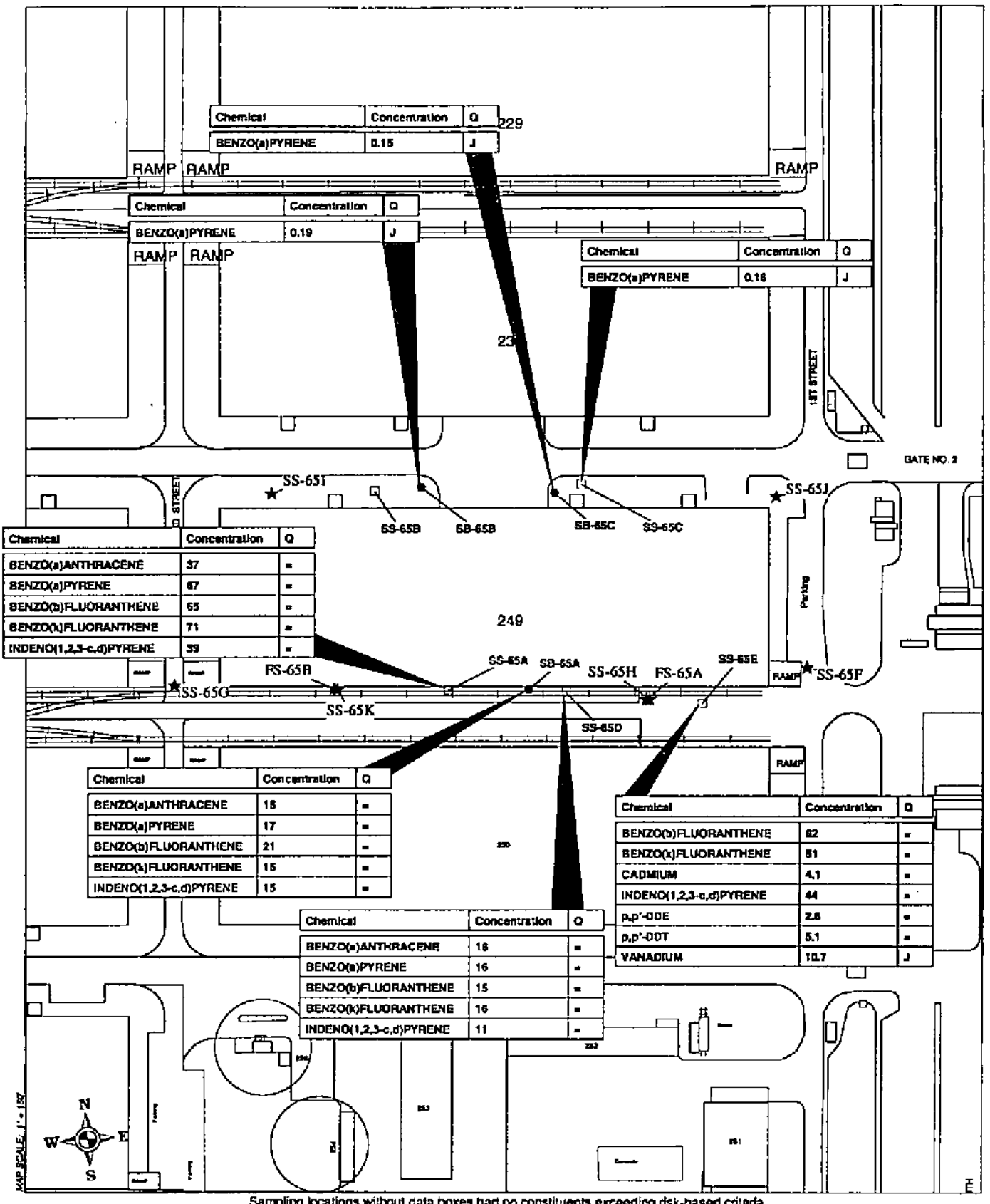

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- □ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 6
Site 65, XXCC-3, Building 249
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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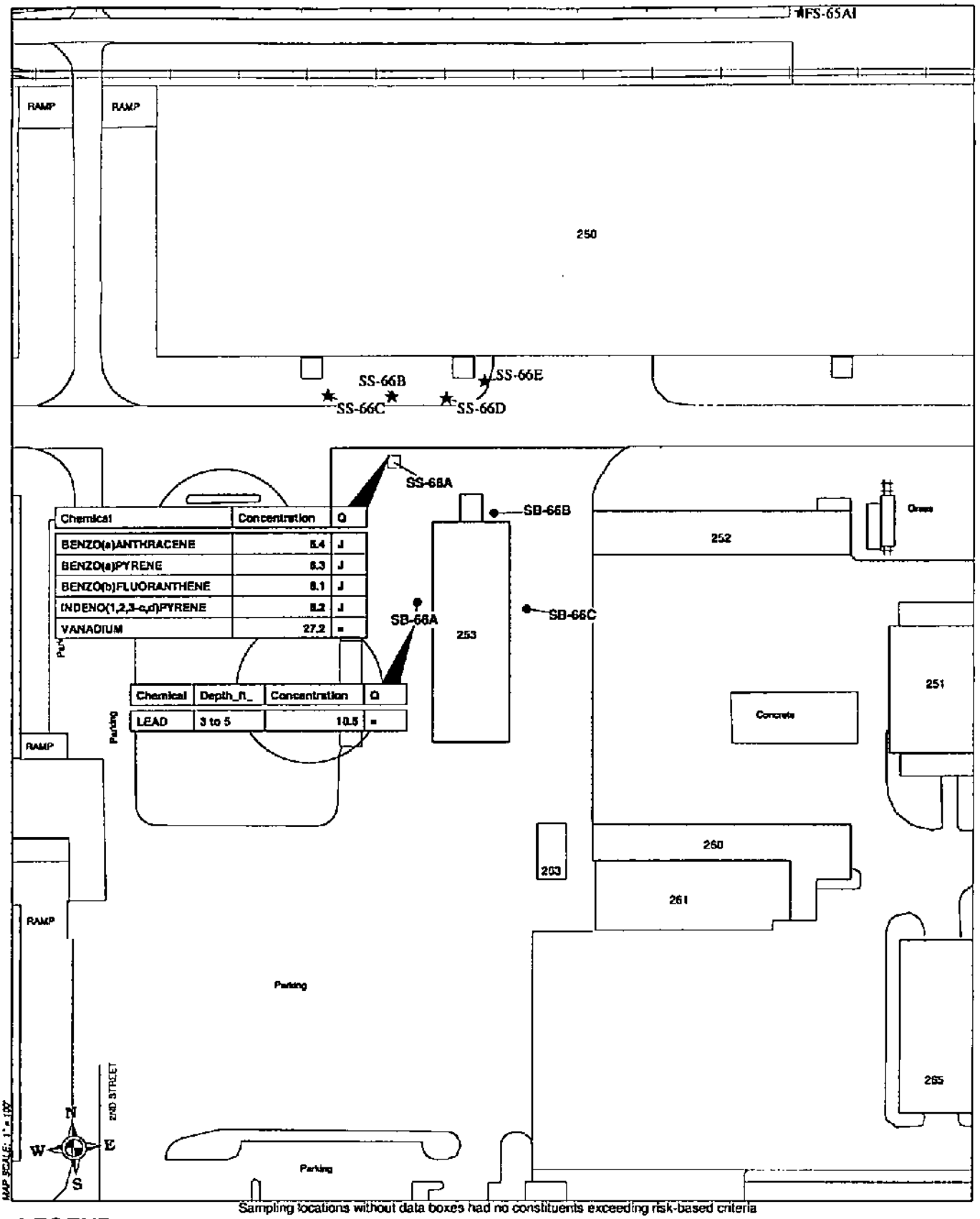
WPSITES.WOR



Sampling locations without data boxes had no constituents exceeding risk-based criteria

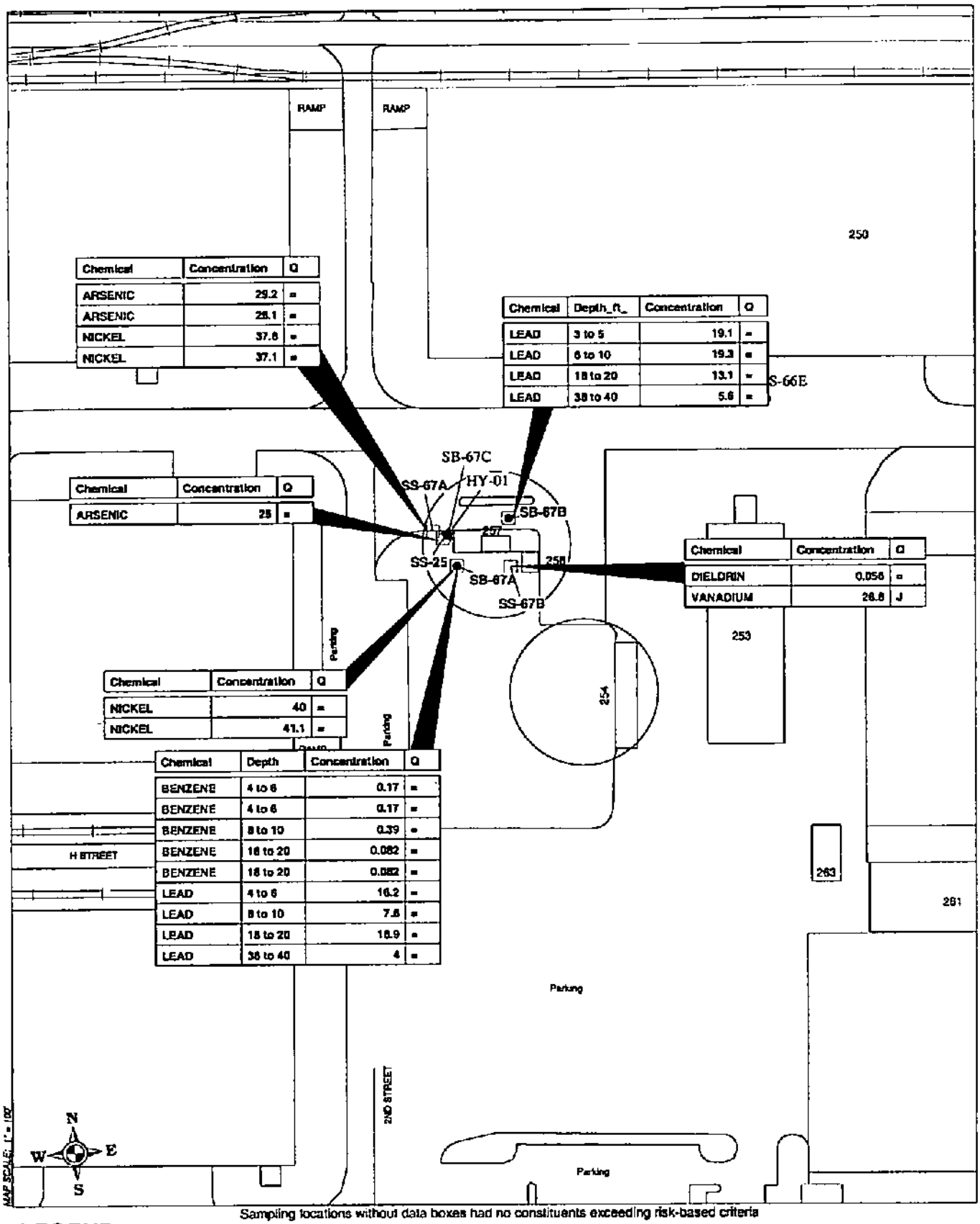
LEGEND

- ☐ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
= - Indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit

Figure 7
Site 66, Petroleum, Oil, & Lubricants (POL) Bldg 253
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

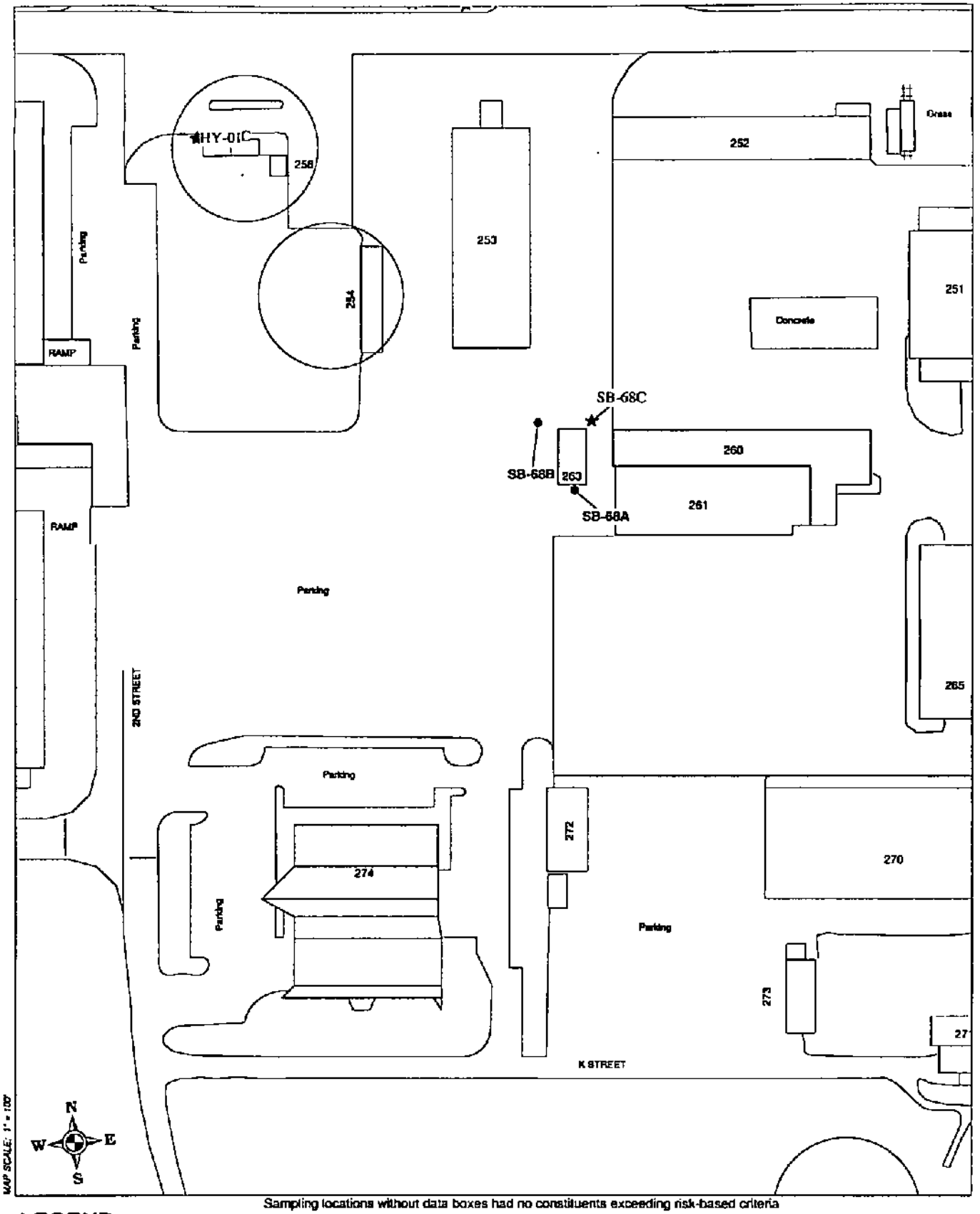
- ☐ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit

Figure 8
Site 67, Installation Gas Station, Bldg 257
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

WPSITE67.WOR

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

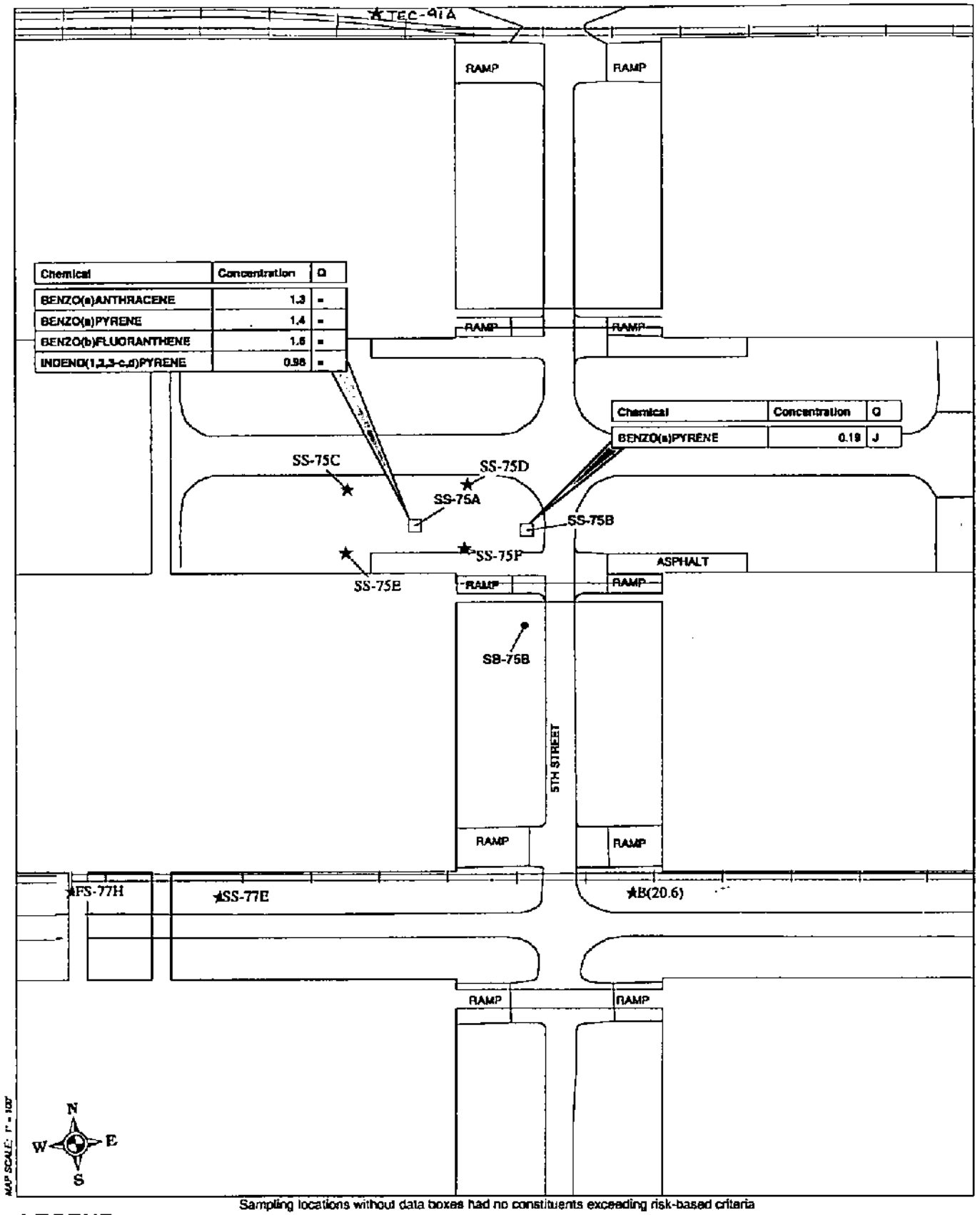
LEGEND

- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

Figure 9
Site 68, POL Building 263
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

WP\SITE68.WOR

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

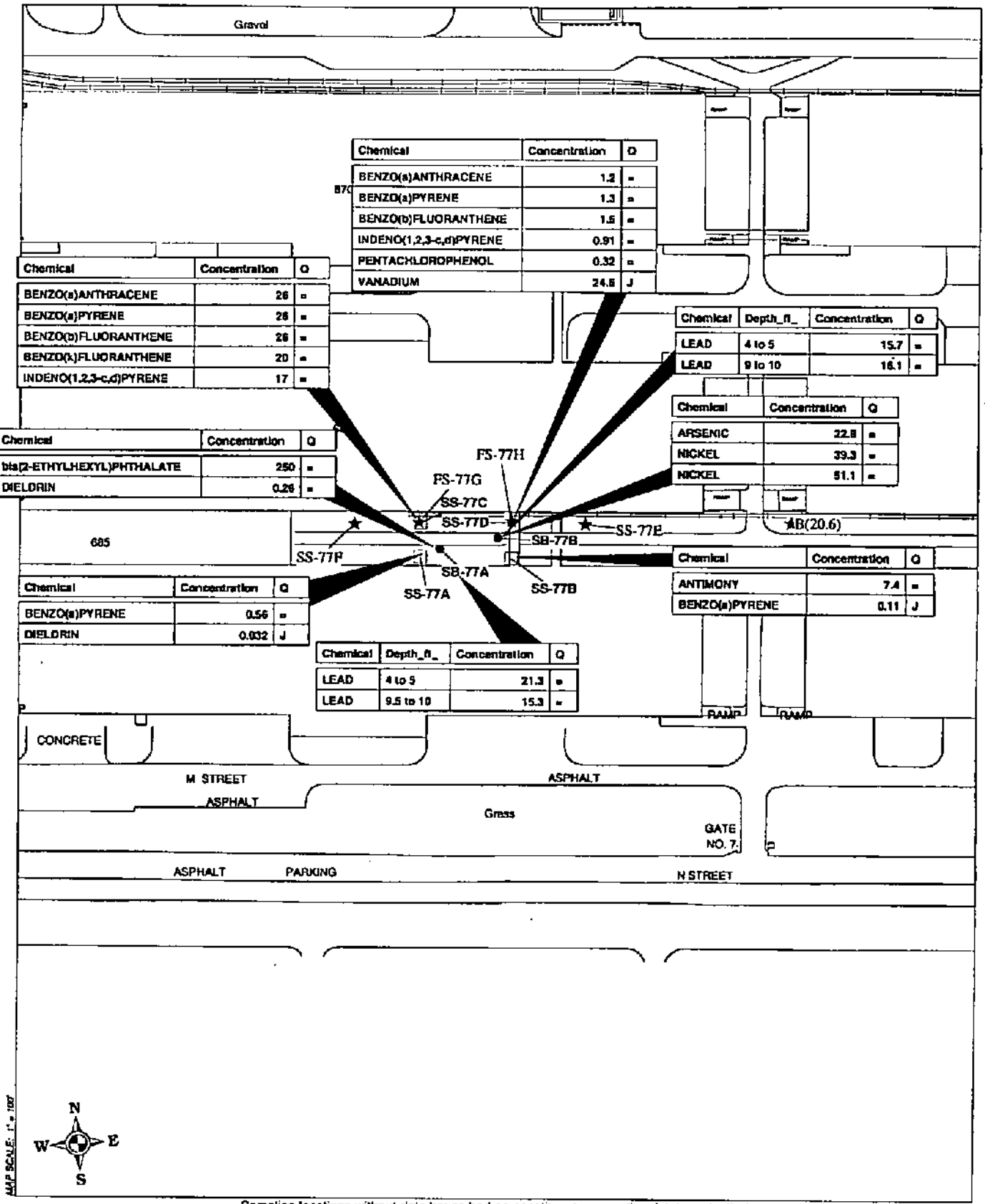
- □ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
- = - indicates unqualified detection
- J - indicates estimated value above detection limit, but below reporting limit.

Figure 10
Site 75, Unknown Wastes near Building 689
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

WPSITE75.WOR

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

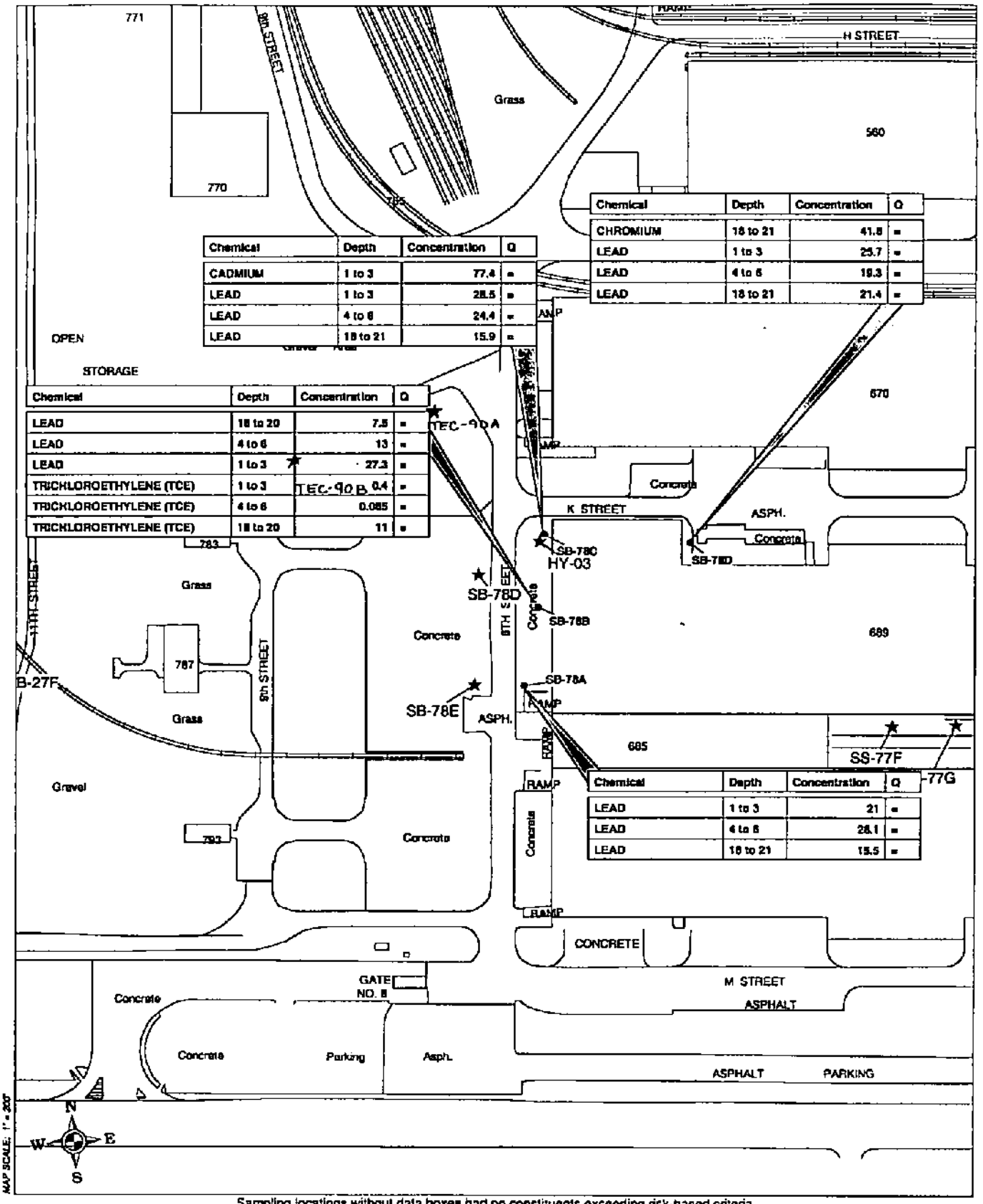
LEGEND

- ☐ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 11
Site 77, Unknown Waste near Bldgs 689 & 690
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL



Chemical	Depth	Concentration	Q
CADMIUM	1 to 3	77.4	=
LEAD	1 to 3	28.5	=
LEAD	4 to 6	24.4	=
LEAD	18 to 21	15.9	=

Chemical	Depth	Concentration	Q
CHROMIUM	18 to 21	41.8	=
LEAD	1 to 3	25.7	=
LEAD	4 to 6	19.3	=
LEAD	18 to 21	21.4	=

Chemical	Depth	Concentration	Q
LEAD	18 to 20	7.5	=
LEAD	4 to 6	13	=
LEAD	1 to 3	27.3	=
TRICHLOROETHYLENE (TCE)	1 to 3	0.4	=
TRICHLOROETHYLENE (TCE)	4 to 6	0.085	=
TRICHLOROETHYLENE (TCE)	18 to 20	11	=

TEC-90A
TEC-90B

Chemical	Depth	Concentration	Q
LEAD	1 to 3	21	=
LEAD	4 to 6	28.1	=
LEAD	18 to 21	15.5	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

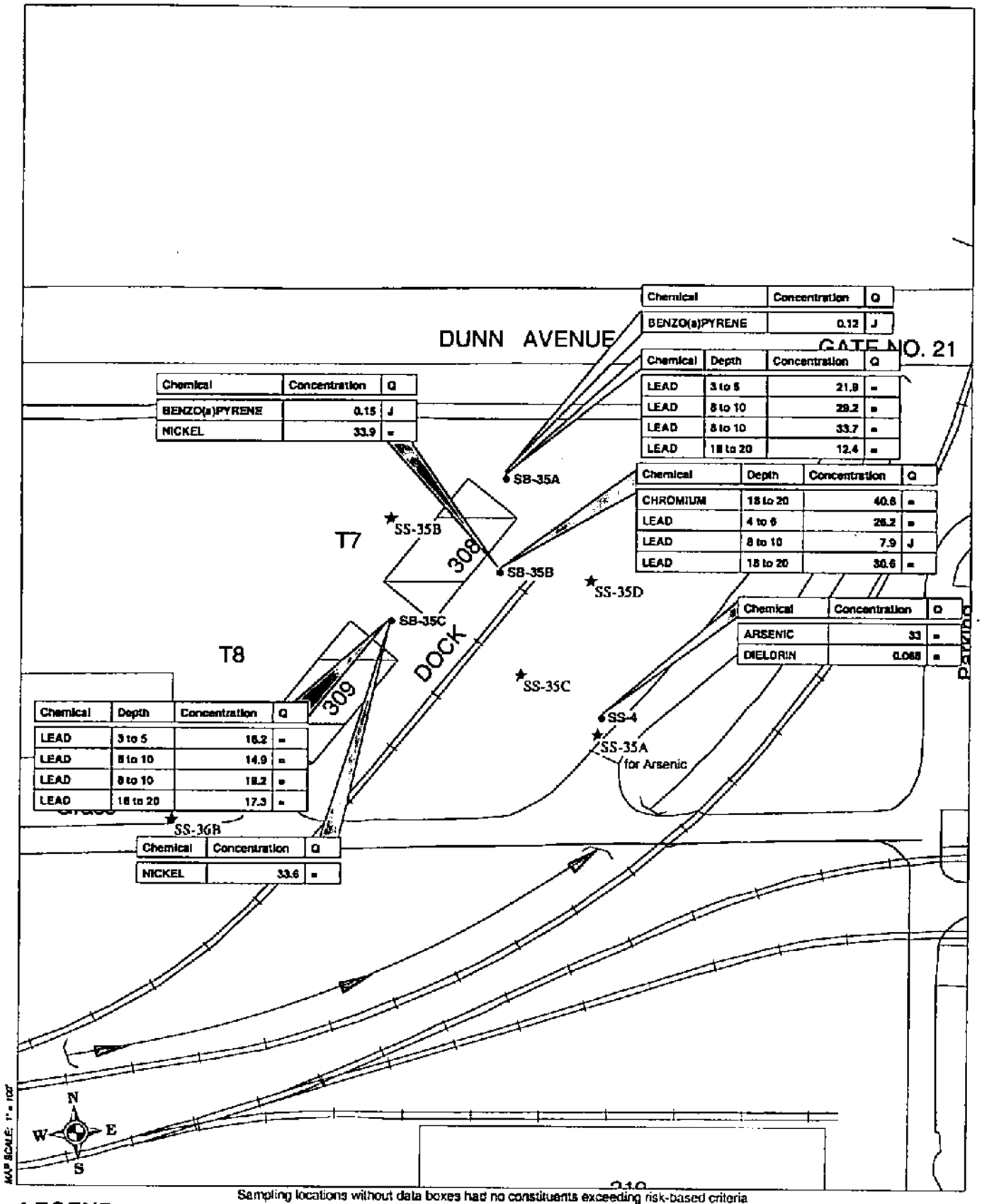
- □ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 12
Site 78, Building 689
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

WP9/TETLWOR



Chemical	Concentration	Q
BENZO(a)PYRENE	0.12	J

Chemical	Depth	Concentration	Q
LEAD	3 to 5	21.9	=
LEAD	8 to 10	29.2	=
LEAD	8 to 10	33.7	=
LEAD	18 to 20	12.4	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.15	J
NICKEL	33.9	=

Chemical	Depth	Concentration	Q
CHROMIUM	18 to 20	40.6	=
LEAD	4 to 6	28.2	=
LEAD	8 to 10	7.9	J
LEAD	18 to 20	30.6	=

Chemical	Concentration	Q
ARSENIC	33	=
DIELDRIN	0.068	=

Chemical	Depth	Concentration	Q
LEAD	3 to 5	16.2	=
LEAD	8 to 10	14.9	=
LEAD	8 to 10	18.2	=
LEAD	18 to 20	17.3	=

Chemical	Concentration	Q
NICKEL	33.6	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

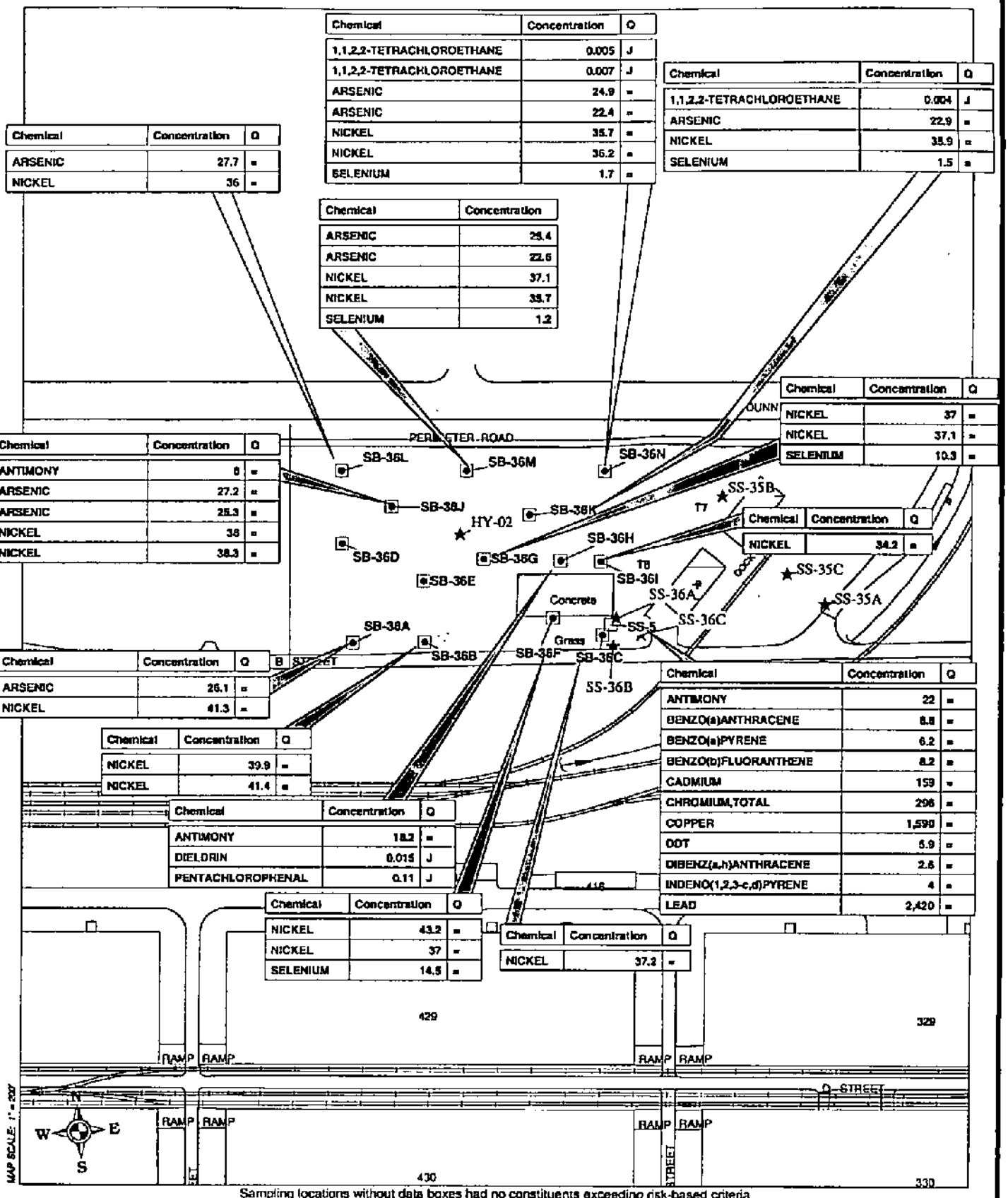
- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 13
Site 35, DRMO Building T-308
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

WP3\TES\WOA



Sampling locations without data boxes had no constituents exceeding risk-based criteria

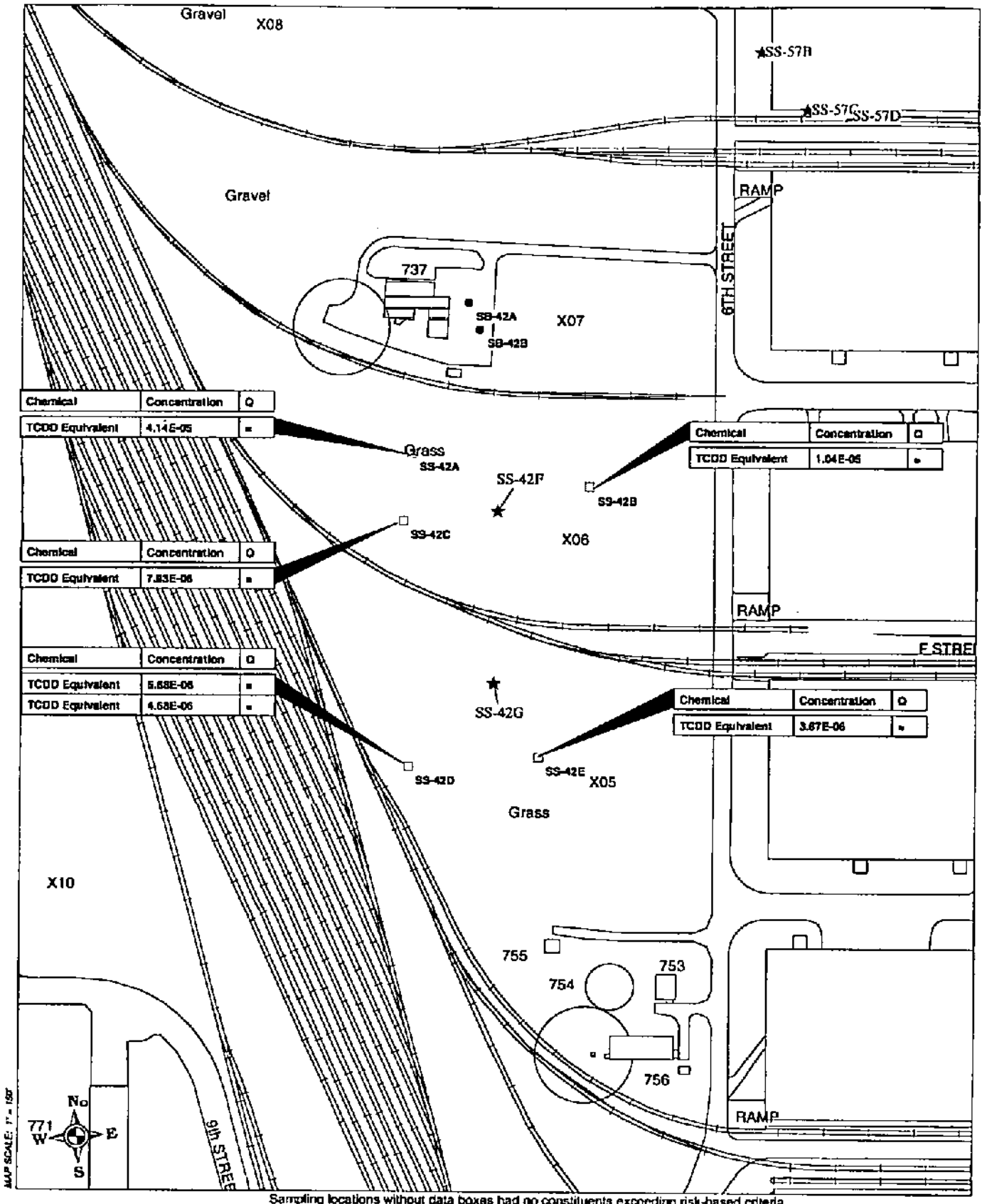
LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Proposed Soil Sample Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 14
Sites 36-39, DRMO Drum Storage Area
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

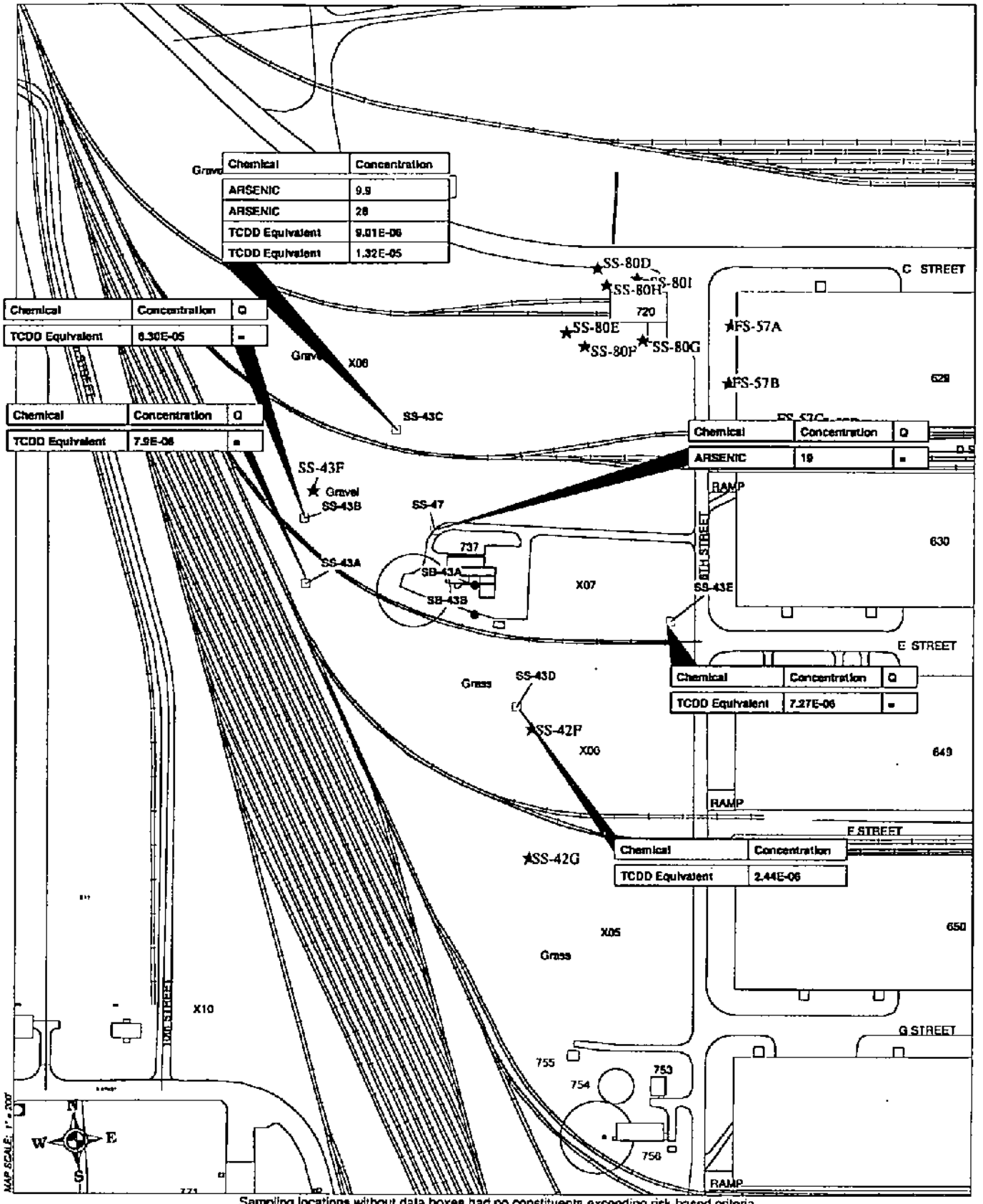
- □ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 15
Site 42, Former PCP Dip Vat Area
Constituents Exceeding Risk Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

WPSITE42.WOR



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

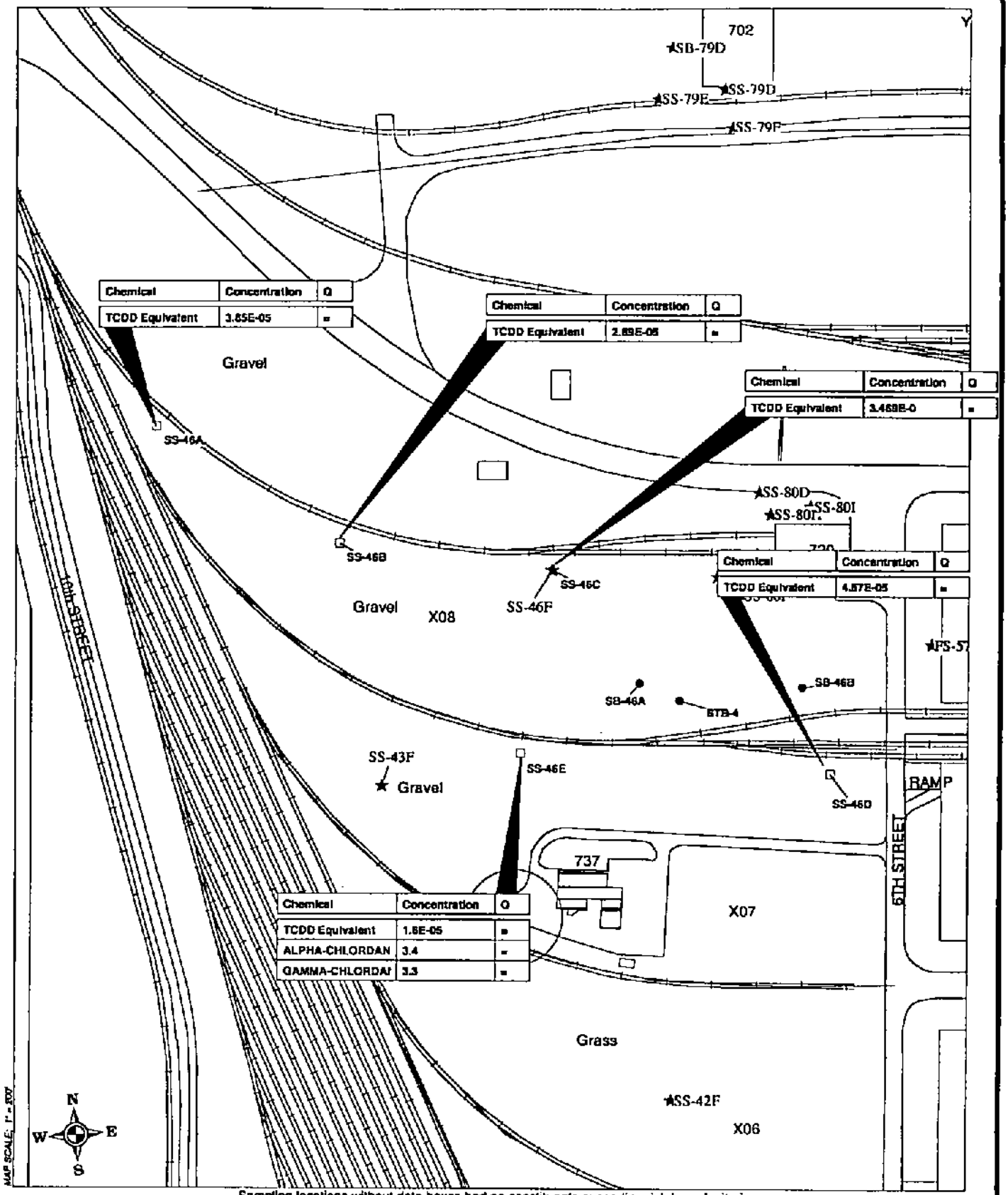
- ☐ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 16
Site 43, Former Underground PCP Tank Area
Constituents Exceeding Risk Based Criteria
Defense Distribution Depot Memphis, TN

WP\SITE43.WC

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

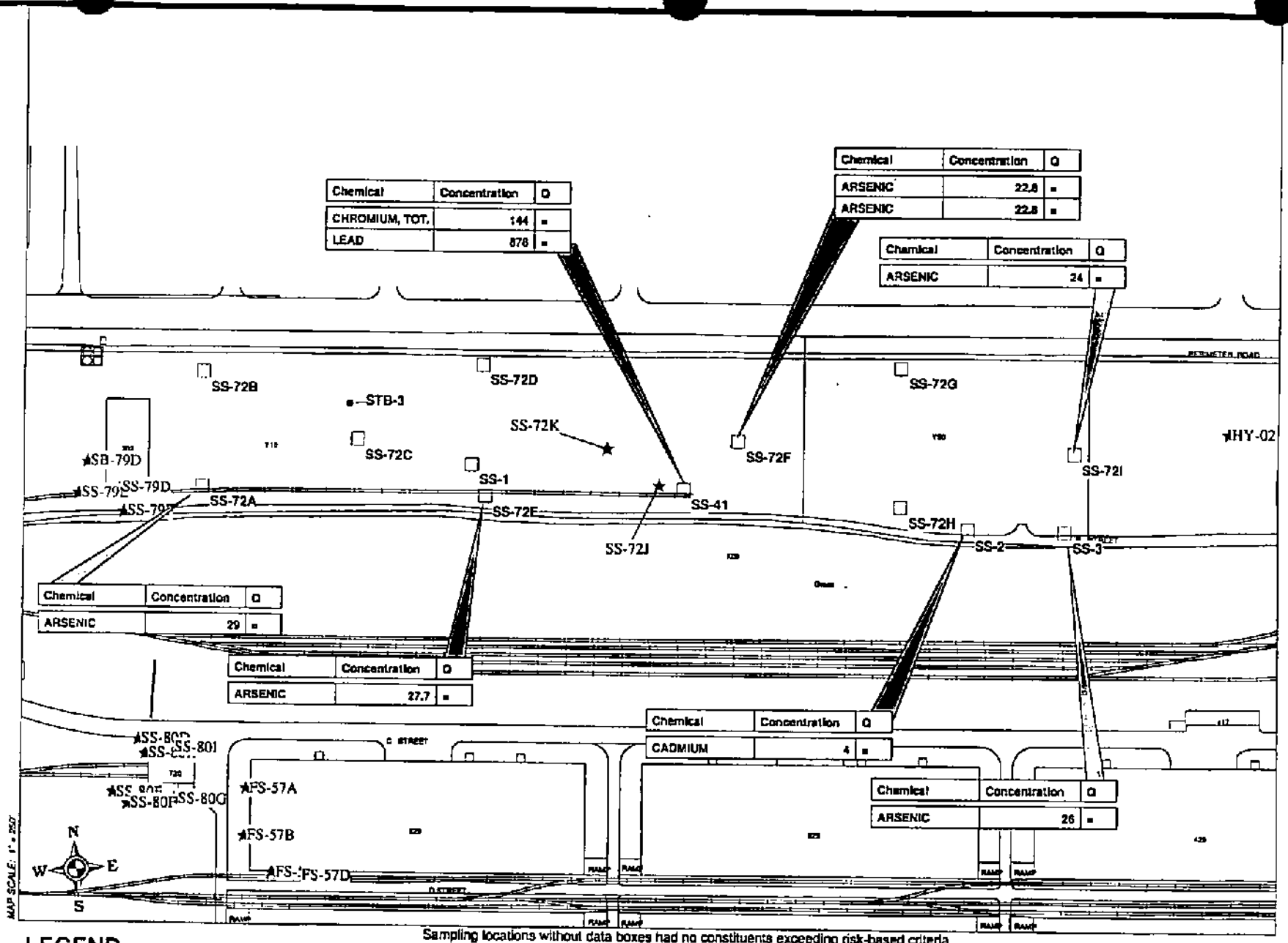
LEGEND

- □ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifer Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 17
Site 46, Pallet Drying Area
Constituents Exceeding Risk Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

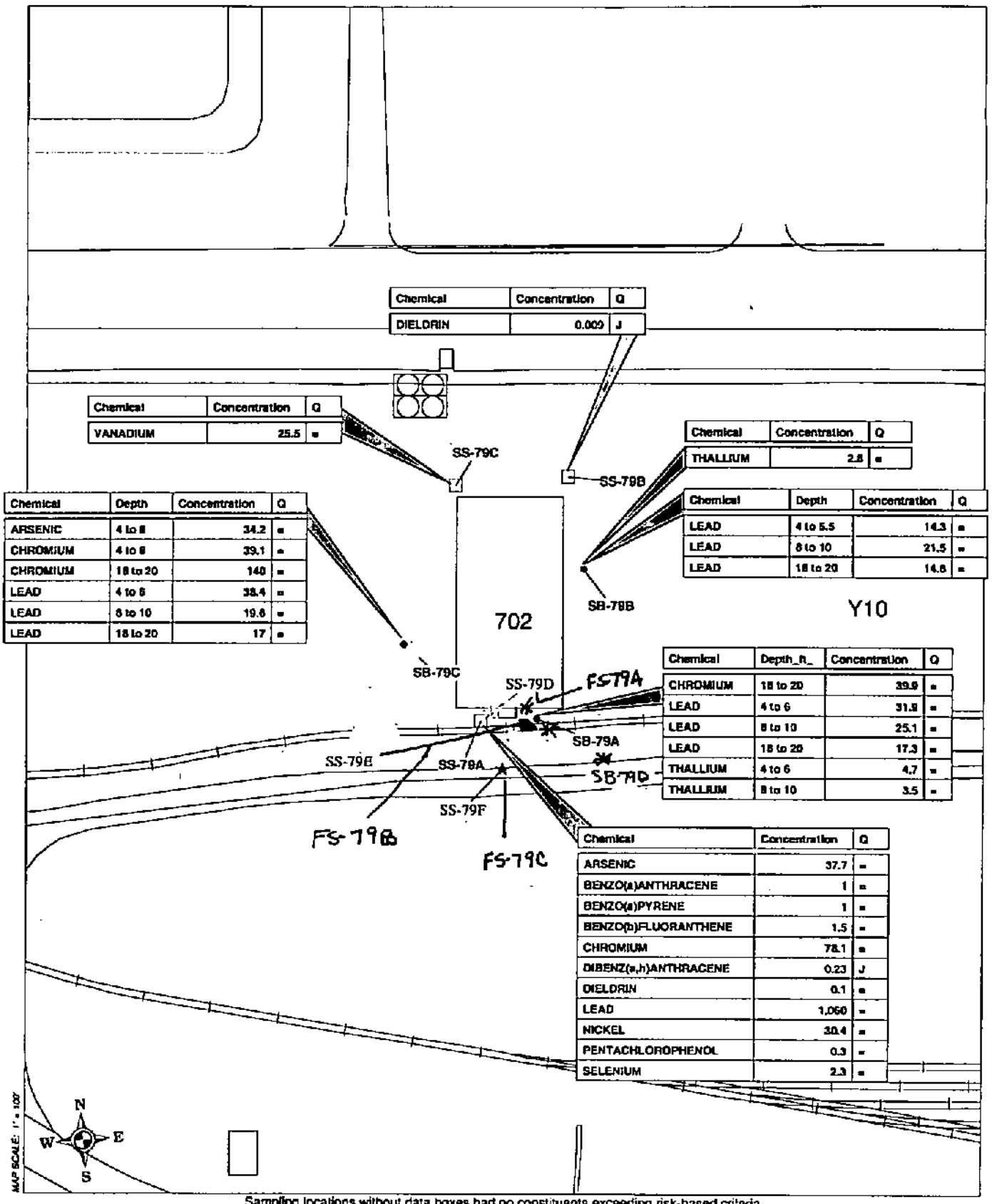
- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifer Definitions
= - Indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit.

Figure 18
Site 72, Waste Oil (PDO Yard)
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

WPSITE72.WOR



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

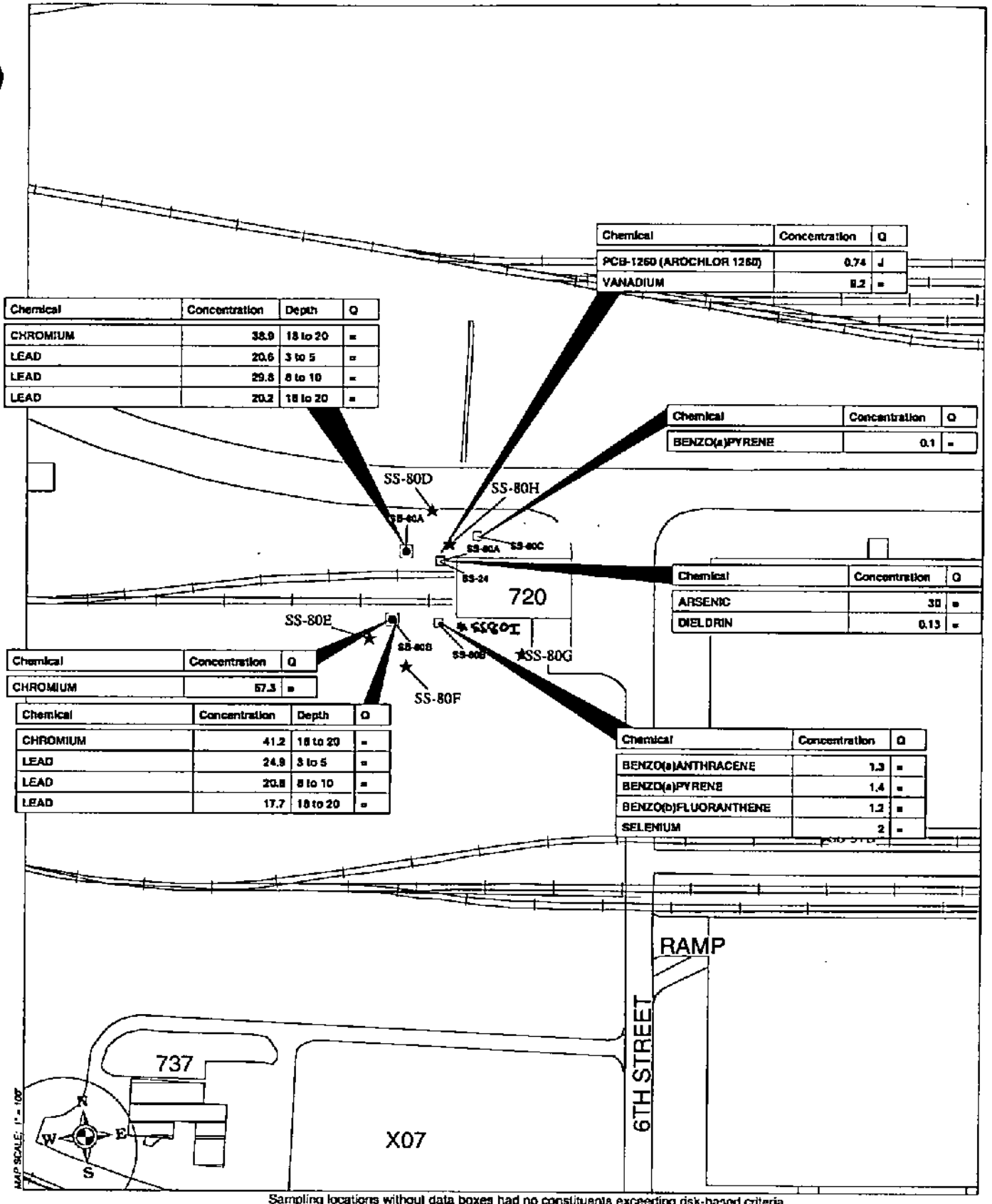
- ☐ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)
- ★ Proposed Sampling Location

(Q) Qualifer Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 19
Site 79, Fuels, Misc. Liquids, Wood & Paper Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

WP\SITE79.WOR

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

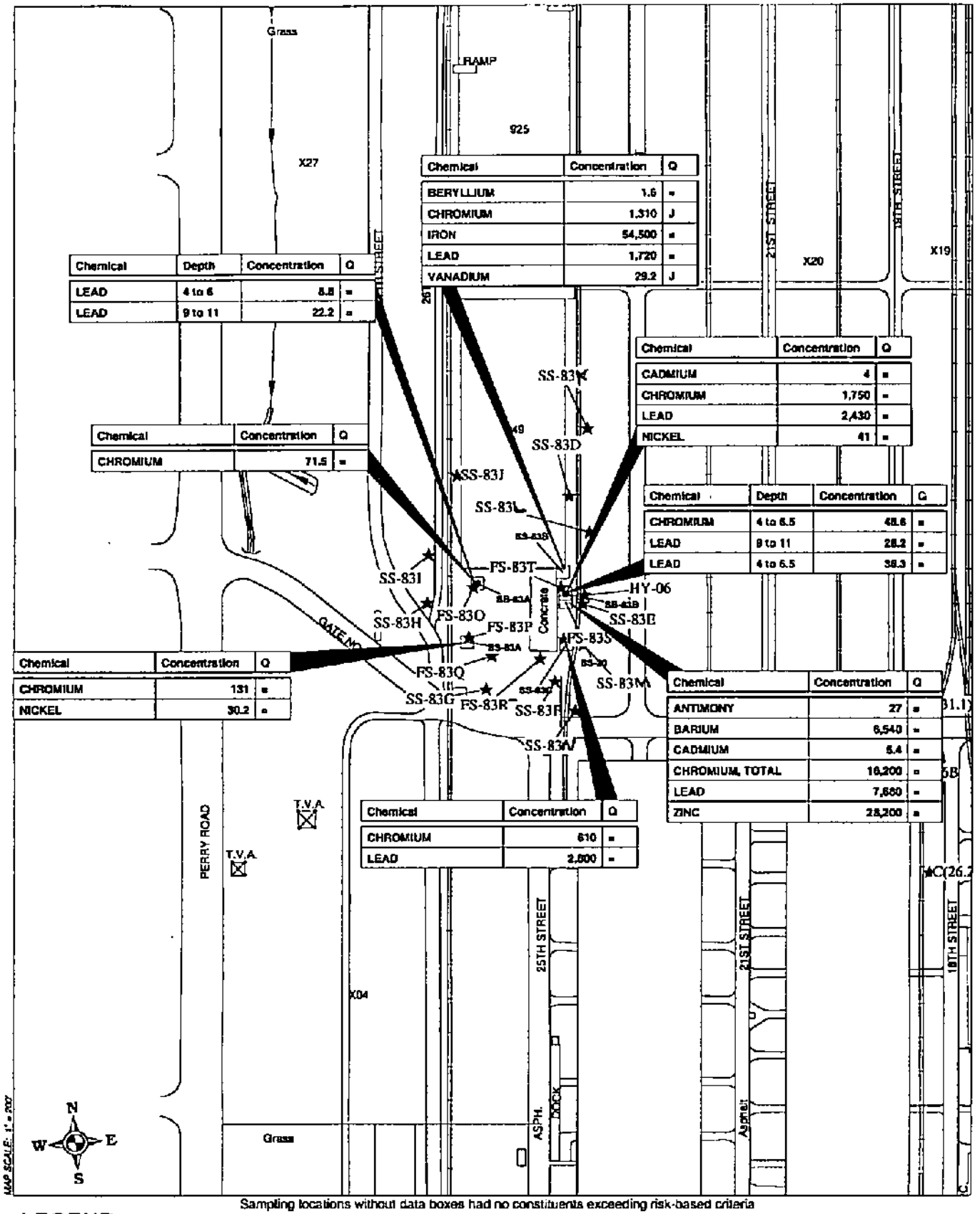
- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 2.0
Site 80, Fuel & Cleaner Dispensing, Bldg 720
Constituents Exceeding Risk Based Criteria
Defense Distribution Depot Memphis, TN

WPSITE80.WOR

CH2MHILL



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Proposed Sampling Location

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 21
Site 83, Dried Paint Disposal Area
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE

FINAL PAGE

ADMINISTRATIVE RECORD

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