RECORD OF TECHNICAL CHANGE

Technical Change No. 1

Date 3/26/99

Project/Job Name Industrial Sites/Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada, Revision 1 (DOE/NV–514)

The following technical changes (including justification) are requested by:

Dustin Wilson	Industrial Sites Task Manager
(Name)	(Title)

The changes specified in this Record of Technical Change apply to Table 3-1 and Section 7.0 of the *Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada*, Revision 1, DOE/NV--514. U.S. Department of Energy, Nevada Operations Office, December 1998. The changes are required because of supplemental historical information. Process knowledge requires the addition of americium-241 as a contaminant of potential concern; therefore, a technical change to the Work Plan is necessary. Analytical methods for radioanalyses and associated references have also been added to accommodate the addition of americium-241 and methods used by laboratories other than Bechtel Nevada Analytical Services Laboratory.

Table 3-1

Replace Table 3-1, General Analytical Requirements for Leachfield CAUs, with the attached table. This table has been revised to reflect the addition of americium-241 and applicable references.

Section 7.0, References

Add the following references to Section 7.0:

- American Public Health Association. 1995. Standard Method 7500-Sr, "Standard Methods for the Examination of Water and Waste Water." Washington, DC.
- American Society for Testing and Materials. 1999. *Standard Test Method for the Radiochemical Determination of Am-241 in Soil by Alpha Spectrometry,* ASTM C1205-97. Philadelphia, PA.
- Briendler, J.E. 1962. *The Radiochemistry of Uranium*, NAS-NS-3050. Washington, DC: National Academy of Science.
- Coleman, G.H. 1965. *The Radiochemistry of Plutonium*, NAS-NS-3058, September. Washington, DC: National Academy of Science.
- Horwitz, E.P., M.L. Dietz, and D.E. Fisher. 1991. "Separation and Preconcentration of Strontium from Biological, Environmental, and Nuclear Waste Samples by Extraction Chromatography Using a Crown Ether." *In Analytical Chemistry*, 63:522-525. Washington, DC: American Chemical Society.
- Martin, D.B. 1979. "Determination of Strontium-89 and 90 in Soil with Total Sample Decomposition." In *Analytical Chemistry*, October. Washington, DC: American Chemical Society.
- U.S. Department of Energy. 1997. *Manual of the Environmental Measurements Laboratory Procedures*, HASL-300, 28th Edition, Vol. 1. New York, NY.
- U.S. Environmental Protection Agency. 1980. *Prescribed Procedures for Measurements of Radioactivity in Drinking Water*, EPA-600/4-80-032. Cincinnati, OH.

RECORD OF TECHNICAL CHANGE

Technical Change No. 1

Date 3/26/99

- Vajda, N., A. Ghods-Esphahani, E. Cooper, and P.R. Danesi. 1993. "Determination of Radiostrontium in Soil Samples using a Crown Ether." In the *Journal of Radioanalytical Nuclear Chemistry.*
- Yamato, A. 1982. "An Anion Exchange Method for the Determination of Am-241 and Plutonium in Environmental and Biological Samples." In the *Journal of Radioanalytical Chemistry*, Vol. 75, Nos. 1-2.

The project time will be (Increased) (Decreased) (**Unchanged**) by approximately 0 days

---

Applicable Project-Specific Document(s):

Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada, Revision 1, DOE/NV--514. U.S. Department of Energy, Nevada Operations Office, December 1998.

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cc:
Controlled Distribution

Approved By: for Janet Appenzeller-Wing, Project Manager
Industrial Sites Project
Date 3/30/99

Runore C. Wycoff, Division Director
Environmental Restoration Division
Date 3/30/99

RECORD OF TECHNICAL CHANGE

Technical Change No.: 2 | Page 1 of 1

Project/Job No.: 777521.27010200 | Date April 28, 1999

Project/Job Name: Industrial Sites Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada, Revision 1 (DOE/NV--514)

The following technical changes (including justification) are requested by:

Dustin Wilson — Task Manager

(Name) — (Title)

The technical change specified in this Record of Technical Change applies to Section 4.1.2 of the *Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada,* Revision 1, DOE/NV--514. The change is necessary because plastic sheeting used under staged spoils can tear and become mixed with soil when backfilling excavations. Plastic sheeting is investigation-derived waste and must be containerized and properly disposed of upon completion of investigation activities.

Section 4.1.2, third paragraph
Change paragraph to read as follows:

Collection system features (e.g., septic tanks, distribution structures, pipe disruptions) will be located using excavations. The dimensions of these excavations will be minimized to reduce spoils. Exploratory excavations conducted to locate features with unknown or poorly constrained locations will typically have larger dimensions than excavations required for sample collection from features with known locations. Spoils will be staged adjacent to the excavations. Excavated soil will be placed on plastic sheeting (i.e., Visqueen) if field screening results from the soil exceed field screening levels. Excavated soil will be returned to the excavation when access to the subsurface at a particular location is no longer required. If necessary, some excavated soil may be managed as waste according to Section 5.0. Plastic sheeting used under excavated material will be containerized and managed as investigation-derived waste (IDW). Samples required for the investigation will be collected as described in Section 4.1.4.

The project time will be (Increased) (Decreased) (Unchanged) X by approximately 0 days.

Applicable Project-Specific Document(s):

Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada, Revision 1, DOE/NV--514. U.S. Department of Energy, Nevada Operations Office, December 1998.

CC:
Controlled Distribution

Approved By: [signature] Date 4/28/99
Janet Appenzeller-Wing, Project Manager
Industrial Sites Project

for [signature] Date 4/28/99
Runore C. Wycoff, Division Director
Environmental Restoration Division

RECORD OF TECHNICAL CHANGE

Technical Change No. 3

Project/Job No. 799417.00040100 Date 8/30/2000

Project/Job Name Industrial Sites/Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada, Revision 1 (DOE/NV-514)

The following technical changes (including justification) are requested by:

Dustin Wilson — Task Manager

(Name) (Title)

The changes specified in this Record of Technical Change apply to Table 3-1 and Section 7.0 of the Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada, Revision 1, DOE/NV–514. U.S. Department of Energy, Nevada Operations Office, December 1998.

A) Technical Change

Globally add "or superseding document" to references for federal and state regulations, DOE Orders, Agreements, and Manuals.

Justification

The reference date for the most current version of federal and state regulations, DOE Orders, Agreements, and Manuals changes when the documents are revised or updated. The general regulations or requirements specified by the reference are current to the revision date of the work plan but imply the most current standards will be used. Deviations from the work plan are described in CAU-specific Corrective Action Investigation Plans.

B) Technical Change

Replace Table 3-1 (General Analytical Requirements for Leachfield CAUs) with the attached version.

Add the following reference to Section 7.0. U. S. Environmental Protection Agency. 1980. *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA - 6001/4-80-032. Washington, D.C.

Justification

The Bechtel Nevada Analytical Services Laboratory is no longer in use. The table has been modified to reflect the proper analytical method numbers and minimum reporting limits for the analytical laboratories currently under contract with IT Corporation, Las Vegas. Additionally, tritium has been added because supplemental historical information indicates that tritium is a contaminant of potential concern; therefore, a technical change to the Work Plan is necessary.

Technical Change No.: 3

Project/Job No.: 799417.00040100

Date 8/30/2000

Project/Job Name: Leachfield Work Plan

The project time will be (Increased)(Decreased)(Unchanged) by approximately 0 days.

Applicable Project-Specific Document(s): *Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada,* Rev. 1, December, 1998; DOE/NV--514

Approved by: [signature] Date 9/13/00
Janet Appenzeller-Wing, Project Manager
Industrial Sites Project

[signature] Date 9/18/00
Runore C. Wycoff, Division Director
Environmental Restoration Division

Client Notified Yes X No ____ Date 8/30/00
NDEP Concurrence Yes X No ___ Date 9/14/00
Contract Change Order Required Yes ____ No X
Contract Change Order No. ____________

RECORD OF TECHNICAL CHANGE

Technical Change No. 4

Page 1 of 1

Project/Job No. 831841-02040020

Date October 25, 2001

Project/Job Name Industrial Sites/Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada, Revision 1 (DOE/NV-- 514)

The following technical changes (including justification) are requested by:

Robert Sobocinski (Name) — Task Manager (Title)

Justification: The NDEP approved a new waste management strategy in June 2001 that affects all Industrial Sites projects. The subject Work Plan is often referenced in project-specific CAIPs and SAFER plans and requires revision to reflect the new waste management strategy.
The Table 3-1 'control limits' required revision to ensure compliance with the Industrial Sites Quality Assurance Program Plan (QAPP).

Technical change: Replace *Section 5.0 Waste Management* of the subject Work Plan with the attached revised Section 5.0 (8 pages). Replace Table 3-1 (4 pages), the Table of Contents (2 pages), the List of Figures (1 page), and the List of Tables (1 page) with those attached.

The project time will be (Increased)(Decreased)(Unchanged) by approximately -- days.

Applicable Project-Specific Document(s): *Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada*, Rev. 1, December, 1998; DOE/NV-- 514

Approved By: [signature] Date 10/25/01
Janet Appenzeller-Wing, Project Manager
Industrial Sites Project

[signature] Date 10/25/01
Runore C. Wycoff, Division Director
Environmental Restoration Division

Client Notified Yes X No ___ Date 10-03-01
NDEP Concurrence Yes ✓ No ___ Date 10/29/01
Contract Change Order Required Yes ___ No ___
Contract Change Order No. ___

w/revised pages 35-37 on 10/25/01
Ted [signature] for Paul [signature]

RECORD OF TECHNICAL CHANGE

Technical Change No. 4 | Page 1 of 1

Project/Job No. 831841-02040020 | Date October 25, 2001

Project/Job Name Industrial Sites/Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada, Revision 1 (DOE/NV - - 514)

The following technical changes (including justification) are requested by:

Robert Sobocinski | Task Manager
(Name) | (Title)

Justification: The NDEP approved a new waste management strategy in June 2001 that affects all Industrial Sites projects. The subject Work Plan is often referenced in project-specific CAIPs and SAFER plans and requires revision to reflect the new waste management strategy.
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The project time will be (Increased)(Decreased)(Unchanged) by approximately - - days.

Applicable Project-Specific Document(s): *Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada,* Rev. 1, December, 1998; DOE/NV- - 514

Approved By: [signature] Date 10/25/01
Janet Appenzeller-Wing, Project Manager
Industrial Sites Project

[signature] Date 10/25/01
Runore C. Wycoff, Division Director
Environmental Restoration Division

Client Notified Yes X No ___ Date 10-03-01
NDEP Concurrence Yes ___ No ___ Date ___
Contract Change Order Required Yes ___ No ___
Contract Change Order No. ___

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Table 3-1
General Analytical Requirements for Leachfield CAUs
(Page 1 of 4)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
ORGANICS						
Total Volatile Organic Compounds (VOCs)	Water	8260B[c]	Analyte-specific estimated quantitation limits[d]	Not Applicable (NA)	Lab-specific[f]	Lab-specific[f]
	Soil				Lab-specific[f]	Lab-specific[f]
Toxicity Characteristic Leaching Procedure (TCLP) VOCs						
Benzene	Aqueous	1311/8260B[c]	0.050 mg/L[d]	0.5 mg/L[d]	Lab-specific[f]	Lab-specific[f]
Carbon Tetrachloride			0.050 mg/L[d]	0.5 mg/L[d]		
Chlorobenzene			0.050 mg/L[d]	100 mg/L[d]		
Chloroform			0.050 mg/L[d]	6 mg/L[d]		
1,2-Dichloroethane			0.050 mg/L[d]	0.5 mg/L[d]		
1,1-Dichloroethene			0.050 mg/L[d]	0.7 mg/L[d]		
Methyl Ethyl Ketone			0.050 mg/L[d]	200 mg/L[d]		
Tetrachloroethene			0.050 mg/L[d]	0.7 mg/L[d]		
Trichloroethene			0.050 mg/L[d]	0.5 mg/L[d]		
Vinyl Chloride			0.050 mg/L[d]	0.2 mg/L[d]		
Total Semivolatile Organic Compounds (SVOCs)	Water	8270C[c]	Analyte-specific estimated quantitation limits[d]	NA	Lab-specific[f]	Lab-specific[f]
	Soil				Lab-specific[f]	Lab-specific[f]
TCLP SVOCs						
o-Cresol	Aqueous	1311/8270C[c]	0.10 mg/L[d]	200 mg/L[d]	Lab-specific[f]	Lab-specific[f]
m-Cresol			0.10 mg/L[d]	200 mg/L[d]		
p-Cresol			0.10 mg/L[d]	200 mg/L[d]		
Cresol (total)			0.30 mg/L[d]	200 mg/L[d]		
1,4-Dichloro-benzene			0.10 mg/L[d]	7.5 mg/L[d]		
2,4-Dinitrotoluene			0.10 mg/L[d]	0.13 mg/L[d]		
Hexachloro-benzene	Aqueous	1311/8270C[c]	0.10 mg/L[d]	0.13 mg/L[d]	Lab-specific[f]	Lab-specific[f]
Hexachloro-butadiene			0.10 mg/L[d]	0.5 mg/L[d]		
Hexachloro-ethane			0.10 mg/L[d]	3 mg/L[d]		
Nitrobenzene			0.10 mg/L[d]	2 mg/L[d]		
Pentachloro-phenol			0.50 mg/L[d]	100 mg/L[d]		
Pyridine			0.10 mg/L[d]	5 mg/L[d]		
2,4,5-Trichloro-phenol			0.10 mg/L[d]	400 mg/L[d]		
2,4,6-Trichloro-phenol			0.10 mg/L[d]	2 mg/L[d]		
Total Pesticides	Water	8081A[c]	Analyte-specific Contract Required Quantitation Limits (CRQL)[e]	NA	Lab-specific[f]	Lab-specific[f]
	Soil				Lab-specific[f]	Lab-specific[f]

Table 3-1
General Analytical Requirements for Leachfield CAUs
(Page 2 of 4)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limig	Regulatory Limit	Relative Percent Different (RPD)[a]	Percent Recovery (%R)[b]
TCLP Pesticides						
Chlordane	Aqueous	1311/8081A[c]	0.0005 mg/L[e]	0.03 mg/L[d]	Lab-specific[f]	Lab-specific[f]
Endrin			0.001 mg/L[e]	0.02 mg/L[d]		
Heptachlor			0.0005 mg/L[e]	0.008 mg/L[d]		
Heptachlor Epoxide			0.0005 mg/L[e]	0.008 mg/L[d]		
gamma-BHC (Lindane)			0.0005 mg/L[e]	0.4 mg/L[d]		
Methoxychlor			0.005 mg/L[e]	10 mg/L[d]		
Toxaphene			0.05 mg/L[e]	0.5 mg/L[d]		
Polychlorinated Biphenyls (PCBs)	Water	8082[c]	Analyte-specific (CRQL)[e]	NA	Lab-specific[f]	Lab-specific[f]
	Soil					
Total Herbicides	Water	8151A[c]	1.3 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		66 µg/kg[c]			
TCLP Herbicides						
2,4-D	Aqueous	1311/8151A[c]	0.002 mg/L[d]	10 mg/L[d]	Lab-specific[f]	Lab-specific[f]
2,4,5-TP			0.00075 mg/L[d]	1 mg/L[d]		
Total Petroleum Hydrocarbons (TPH)	Water Gasoline	8015B modified[c]	0.1 mg/L[g]	NA	Lab-specific[f]	Lab-specific[f]
	Soil Gasoline		0.5 mg/kg[g]			
	Water Diesel		0.5 mg/L[g]			
	Soil Diesel		25 mg/kg[g]			
Explosives	Water	8330[c]	14 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		2.2 mg/kg[c]			
Polychlorinated Dioxins and Furans	Water	8280A/8290[c]	0.05 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		5 µg/kg[c]			
INORGANICS						
Total Resource Conservation and Recovery Act (RCRA) Metals						
Arsenic	Water	6010B[c]	10 µg/L[g,h]	NA	Waters - 20[h] Soils - 35[i]	Matrix Spike 75-125[h] Laboratory Control Sample 80 - 120[h]
	Soil	6010B[c]	1 mg/kg[g,h]			
Barium	Water	6010B[c]	200 µg/L[g,h]			
	Soil	6010B[c]	20 mg/kg[g,h]			
Cadmium	Water	6010B[c]	5 µg/L[g,h]			
	Soil	6010B[c]	0.5 mg/kg[g,h]			
Chromium	Water	6010B[c]	10 µg/L[g,h]			
	Soil	6010B[c]	1 mg/kg[g,h]			
Lead	Water	6010B[c]	3 µg/L[g,h]			
	Soil	6010B[c]	0.3 mg/kg[g,h]			
Mercury	Water	7470A[c]	0.2 µg/L[g,h]			
	Soil	7471A[c]	0.1 mg/kg[g,h]			
Selenium	Water	6010B[c]	5 µg/L[g,h]			
	Soil	6010B[c]	0.5 mg/kg[g,h]			
Silver	Water	6010B[c]	10 µg/L[g,h]			
	Soil	6010B[c]	1 mg/kg[g,h]			

Table 3-1
General Analytical Requirements for Leachfield CAUs
(Page 3 of 4)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limig	Regulatory Limit	Relative Percent Different (RPD)[a]	Percent Recovery (%R)[b]
TCLP RCRA Metals						
Arsenic	Aqueous	1311/6010B[c] 1311/7470A[c]	0.10 mg/L[g,h]	5 mg/L[d]	20[h]	Matrix Spike 75-125[h] Laboratory Control Sample 80 - 120[h]
Barium			2 mg/L[g,h]	100 mg/L[d]		
Cadmium			0.05 mg/L[g,h]	1 mg/L[d]		
Chromium			0.10 mg/L[g,h]	5 mg/L[d]		
Lead			0.03 mg/L[g,h]	5 mg/L[d]		
Mercury			0.002 mg/L[g,h]	0.2 mg/L[d]		
Selenium			0.05 mg/L[g,h]	1 mg/L[d]		
Silver			0.10 mg/L[g,h]	5 mg/L[d]		
Cyanide	Water	9010B[c]	0.01 mg/L[h]	NA	Water - 20[h] Soil - 35[i]	Matrix Spike 75-125[h] Laboratory Control Sample 80 - 120[h]
	Soil		1.0 mg/kg[h]			
Sulfide	Water	9030B/9034[c]	0.4 mg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil or Sediment		10 mg/kg[g]			
pH/Corrosivity	Water	9040B[c]	NA	pH >2[j]	Lab-specific[f]	Lab-specific[f]
	Soil	9045C[c]		pH<12.5[j]		
Ignitability	Water	1010[c]	NA	Flash Point <140° F[d,j]	NA	NA
	Soil	1030[c]		Burn Rate[c,j] >2.2 mm/sec nonmetals; >0.17 mm/sec metals		
RADIOCHEMISTRY						
Gamma-emitting Radionuclides[k]	Water	EPA 901.1[l]	10 pCi/L (Cs-137)[n]	NA	20	Laboratory Control Sample Yield 80-120[q]
	Soil	HASL-300[m]	2.14 pCi/g (Cs-137)		35	
Isotopic Plutonium[k]	Water	ASTM D3865-97[o]	0.1 pCi/L	NA	20	Chemical Yield 30-105[q] Laboratory Control Sample 80 - 120[q]
	Soil	HASL-300[m]	0.05 pCi/g		35	
Isotopic Uranium[k]	Water	HASL-300[m] ASTM D3972-97[o]	0.1 pCi/L	NA	20	
	Soil	HASL-300[m] ASTM E1000-90[o]	0.05 pCi/g		35	
Strontium - 90[k]	Water	ASTM D5811-95[o]	1.0 pCi/L	NA	20	
	Soil	HASL-300[m]	0.5 pCi/g		35	
Americium - 241[k]	Water	ASTM-1205-97[o]	0.1 pCi/L	NA	20	
	Soil	HASL-300[m]	0.05 pCi/g[m]	NA	35	
Tritium[k]	Water	EPA 906.0[l]	400	NA	20	Laboratory Control Sample Yield 80-120[q]
	Soil (Sludge)	PAI 754[p]	5 pCi/g		20	

Table 3-1
General Analytical Requirements for Leachfield CAUs
(Page 4 of 4)

[a] RPD is used to Calculate Precision
Precision is estimated from the relative percent difference of the concentrations measured for the matrix spike and matrix spike duplicate analyses of unspiked field samples, or field duplicates of unspiked samples. It is calculated by: $RPD = 100 \times \{(|C_1-C_2|)/[(C_1+C_2)/2]\}$, where C_1 = Concentration of the analyte in the first sample aliquot, C_2 = Concentration of the analyte in the second sample aliquot.

[b] %R is used to Calculate Accuracy
Accuracy is assessed from the recovery of analytes spiked into a blank or sample matrix of interest, or from the recovery of surrogate compounds spiked into each sample. The recovery of each spiked analyte is calculated by: $\%R = 100 \times (C_s-C_u/C_n)$, where C_s = Concentration of the analyte in the spiked sample, C_u = Concentration of the analyte in the unspiked sample, C_n = Concentration increase that should result from spiking the sample

[c] U.S. Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste, 3rd Edition, Parts 1-4, SW-846 CD ROM Washington, DC (EPA, 1986; 1992; 1994d; and 1996)

[d] Estimated Quantitation Limit as given in SW-846 (EPA, 1996)

[e] EPA Contract Laboratory Program Statement of Work for Organic Analysis (EPA, 1988b; 1991; and 1994b)

[f] In-House Generated RPD and %R Performance Criteria
It is necessary for laboratories to develop in-house performance criteria and compare them to those in the methods. The laboratory begins by analyzing 15-20 samples of each matrix and calculating the mean %R for each analyte. The standard deviation (SD) of each %R is then calculated, and the warning and control limits for each analyte are established at ± 2 SD and ± 3 SD from the mean, respectively. If the warning limit is exceeded during the analysis of any sample delivery group (SDG), the laboratory institutes corrective action to bring the analytical system back into control. If the control limit is exceeded, the sample results for that SDG are considered unacceptable. These limits are reviewed after every 20-30 field samples of the same matrix and are updated at least semiannually. The laboratory tracks trends in both performance and control limits by the use of control charts. The laboratory's compliance with these requirements is confirmed as part of an annual laboratory audit. Similar procedures are followed in order to generate acceptance criteria for precision measurements

[g] *Industrial Sites Quality Assurance Project Plan* (DOE/NV, 1996)

[h] EPA Contract Laboratory Program Statement of Work for Inorganic Analysis (EPA, 1988a and 1994a)

[i] Sampling and Analysis Plan (Field Sampling and Quality Assurance Project Plan) with Guidance USEPA Region IX, March 1997.

[j] RCRA Regulations and Keyword Index, 1998 Edition

[k] Isotopic minimum detectable concentrations are defined during the DQO process and specified in the CAIP as applicable

[l] *Prescribed Procedures for Measurements of Radioactivity in Drinking Water*, EPA 901, 901.1, 906, and 908.0 (EPA, 1980)

[m] *Manual of Environmental Measurements Laboratory Procedures*, HASL-300 (DOE, 1997)

[n] Detection limit is based upon method and isotope. Isotope-specific minimum reporting limit to be specified in CAIP.

[o] American Society for Testing and Materials

[p] PAI - Paragon Analytics, Inc.

[q] Radioanalytical Data Verification and Validation, Bechtel Nevada OI-2154.457, (May, 2001)

Definitions:
μg/kg = Microgram(s) per kilogram
mg/kg = Milligram(s) per kilogram
pCi/L = Picocurie(s) per liter
mg/L = Milligram(s) per liter
pCi/g = Picocurie(s) per gram
μg/L = Microgram(s) per liter

5.0 Waste Management

All wastes generated in support of a field investigation (i.e., Investigation-Derived Wastes [IDW]) shall be managed in accordance with applicable U.S. Department of Energy (DOE) Orders, U.S. Department of Transportation (DOT) regulations, *Resource Conservation and Recovery Act* (RCRA) regulations, Nevada laws and regulations, the *Federal Facility Agreement and Consent Order* (FFACO, 1996), NDEP/DOE agreements, relevant permits, and site specific requirements. Other factors that may influence IDW management include field screening results, process knowledge, laboratory analysis results from investigation samples, and applicable state guidance.

The data generated as a result of the site investigation, historical knowledge of previous site activities, and process knowledge will be used whenever possible to assign the appropriate waste type (i.e., sanitary, hydrocarbon, hazardous, polychlorinated biphenyls [PCBs], low-level radioactive [LLW], or mixed) to the IDW. In some cases, direct sampling of a particular waste stream may be required in order to properly characterize a waste.

5.1 Waste Minimization

Investigation activities are planned to minimize IDW generation. This will be accomplished by incorporating the use of process knowledge, visual examination, and radiological survey and swipe results. When possible, disturbed media (such as soil removed during trenching) or debris will be returned to its original location. Media (e.g., soil managed as waste) as well as other IDW, will be segregated to the greatest extent possible to minimize generation of hazardous, radioactive, or mixed waste. Hazardous material use at the sites will be controlled in order to limit unnecessary generation of hazardous or mixed waste. Administrative controls, including decontamination procedures and waste characterization strategies, will minimize waste generated during investigations.

5.2 Potential Waste Streams

Process/historical knowledge will be reviewed during the DQO process to identify COPCs that may have been released at a particular site and to identify waste types that may be generated during the investigation process. Depending on the anticipated COPCs at a particular site, the types of IDW that may be generated include low-level radioactive waste (LLW), mixed wastes (LLW and hazardous waste), radioactive/PCB waste, hydrocarbon waste, hazardous waste, PCB waste, and sanitary waste. Investigation derived wastes typically generated during investigation activities may include one or more of the following:

- Environmental media (e.g., soil)
- Personal Protective Equipment (PPE) and disposable sampling equipment (e.g., plastic, paper, sample containers, aluminum foil, spoons, bowls)
- Decontamination rinsate
- Field screening waste (e.g., soil, spent solvent, rinsate, disposable sampling equipment, and PPE contaminated by field screening activities)

Each waste stream generated will be segregated, and further segregation may occur within each waste stream.

5.3 Investigation-Derived Waste Management

The onsite management and ultimate disposition of IDW may be guided by several factors, including, but not limited to, the analytical results of samples either directly or indirectly associated with the waste, historical site knowledge, knowledge of the waste generation process, field observations, field monitoring/screening results, and/or radiological survey/swipe results. The following sections detail the on-site IDW management requirements by waste type. Deviations from the waste management methods discussed herein will be identified in individual CAIPs, as necessary.

5.3.1 Sanitary Waste

Sanitary waste will be contained in plastic bags, dumpsters, or drums and transported to an approved sanitary waste landfill for disposal.

5.3.2 Hydrocarbon Waste

Hydrocarbon waste is defined as waste containing more than 100 mg/kg of total petroleum hydrocarbon (TPH) contamination. Hydrocarbon waste will be managed on-site in a drum or other appropriate container until fully characterized. Hydrocarbon waste may be disposed of at a designated hydrocarbon landfill, appropriate hydrocarbon waste management facility (e.g., recycling facility), or other method in accordance with applicable regulations.

5.3.3 Hazardous Waste

All suspected hazardous wastes will be managed in accordance with RCRA and state of Nevada hazardous waste management regulations, policies, and approved guidance. Prior to the commencement of field work, the project will determine whether a particular site has the potential to generate RCRA "listed" waste and/or RCRA "characteristic" waste. Available historical site knowledge, previous sampling data, and/or knowledge of the waste generation process shall be used to make this determination. This distinction is important in the implementation of the waste management strategy for the PPE and decontamination rinsate waste streams as discussed in Sections 5.3.3.3 and 5.3.3.4.

Sites where hazardous constituents are COPCs (whether listed or characteristic) will have waste storage areas that are properly controlled for access and equipped with spill kits and appropriate spill containment. Suspected hazardous wastes will be placed in DOT-compliant containers (49 CFR 172 [CFR, 1997a, as amended]) compatible with the waste (40 CFR 265.172 [CFR, 1997d, as amended]). Containers shall be handled and inspected in accordance with the requirements of 40 CFR 265.173 and 174, respectively (CFR, 1997b, as amended). Based on process knowledge, incompatible wastes shall be managed in accordance with 40 CFR 265.177 (CFR, 1997d, as amended) (i.e., shall not be placed in the same container), and shall be separated so that in the event of a spill, leak, or release, incompatible wastes shall not contact one another. All containers (excluding those in Satellite Accumulation Areas [SAAs]) will be managed consistent with the requirements of 40 CFR 265 subpart I. SAAs will be managed according to the applicable requirements of 40 CFR 262.34(c)(1).

Waste storage areas will be inspected weekly and be covered under a Site Specific Emergency Response and Contingency Action Plan until such time that the waste is determined to be nonhazardous or all containers of hazardous waste have been removed from the storage area. Hazardous wastes will be characterized in accordance with the requirements of 40 CFR 261 (CFR, 1997b, as amended) and this Work Plan. Characterization will be based on laboratory results and/or process knowledge. Characterization is deemed complete once all data relating to the IDW has been validated, reviewed, and a waste characterization report finalized. Hazardous wastes will be transported for treatment and/or disposal by an approved hazardous waste transporter to an appropriate permitted treatment, storage, and disposal facility.

5.3.3.1 Field Screening Waste

The use of field test kits and/or instruments may result in the generation of small quantities of hazardous wastes. If hazardous waste is produced by field screening, it will be segregated from other IDW and managed as a separate waste stream.

5.3.3.2 Soil

Soil produced as a result of soil sampling, excavation, and/or drilling is considered to have the same COPCs as the material remaining in the ground. Regardless of the COPCs at the site (i.e., listed or characteristic), the preferred method for managing this waste stream is to place the material back into the borehole/excavation in the approximate location from which it originated. If this cannot be accomplished, the material will either be managed on site by berming and covering next to the excavation, or by placement in a container(s). Waste that is containerized at a site where hazardous constituents are COPCs will be labeled "Hazardous Waste Pending Analysis." The disposition of containerized material may be deferred until implementation of corrective action at the site.

5.3.3.3 Sites Where RCRA "Listed" Constituents are COPCs

Personal Protective Equipment. PPE and associated waste generated during sampling will only be contaminated by virtue of contact with potentially contaminated media (i.e., soil, sludge, etc.). PPE, disposable sampling equipment, and debris will be visually inspected for stains, discoloration, and gross contamination as it is generated. Staining or discoloration may be an indication of (1) a chemical reaction between the PPE/equipment and the contaminant(s) or (2) adsorption/absorption of the contaminant to the PPE/equipment. Staining and/or discoloration will be assumed to be the result of contact with potentially contaminated media such as soil, sludge, or liquid. Gross contamination is the visible contamination on an item (e.g., clumps of soil/sludge on a sampling scoop or free liquid smeared on a glove). While gross contamination can often be removed through decontamination methods, removal of gross contamination from small items, such as gloves or booties is not typically conducted. Waste with observable staining, discoloration, or gross contamination will be segregated and managed as suspect "listed" hazardous waste. This segregated population of waste will either be sampled directly or assigned the characterization of the media sampled. Waste without observable staining, discoloration, or gross contamination will be considered to not contain any "listed" constituents and will be managed in accordance with the appropriate section of this Work Plan. Waste that is determined to be hazardous will be entered into an approved waste management system within 45 days from receipt of the final CAU analytical data package from the laboratory.

Decontamination Rinsate. Decontamination rinsate is the result of the cleaning of potentially contaminated material. Nondisposable sampling equipment, PPE (e.g., rubber boots), heavy machinery, and other equipment used during site activities is washed with pressurized water and/or chemicals to allow reuse. This process can result in the rinsate becoming contaminated with dissolved and/or suspended contaminants from the item being cleaned. Decontamination rinsate generated at these sites will be managed as potentially "listed" hazardous waste. The rinsate will initially be evaluated using analytical results for samples associated with the rinsate (i.e., soil sample results from borehole or sampling activities associated with the generation of rinsate). If the associated samples do not indicate the presence of "listed" hazardous constituents, then the rinsate will be considered to not contain any "listed" constituents and will be managed in accordance with the appropriate section of this Work Plan.

If the associated samples indicate the presence of "listed" hazardous constituents, the rinsate will be sampled directly. If analytical results from direct sampling indicate the presence of "listed" hazardous constituents, the rinsate will be managed as "listed" hazardous waste and will be entered into an approved waste management system within 45 days from receipt of the final CAU analytical data package from the laboratory. If the results of direct sampling do not indicate the presence of "listed" constituents, then the rinsate will be considered to not contain any "listed" constituents and will be managed in accordance with the appropriate section of this Work Plan.

5.3.3.4 Sites Where RCRA "Listed" Constituents are not COPCs

Personal Protective Equipment. PPE and disposable sampling equipment will be visually inspected for stains, discoloration, and gross contamination as the waste is generated. Any materials that display these characteristics will be segregated and managed as potentially "characteristic" hazardous waste. This segregated population of waste will either be (1) assigned the characterization of the soil/sludge that was sampled, (2) sampled directly, or (3) undergo further evaluation using the soil/sludge sample results to determine how much soil/sludge would need to be present in the waste to exceed regulatory levels. Waste that is determined to be hazardous will be entered into an approved waste management system within 45 days from receipt of the final CAU analytical data package from the laboratory. The PPE/equipment that is not visibly stained, discolored, or grossly contaminated will be managed as nonhazardous waste in accordance with the appropriate section of this Work Plan.

Decontamination Rinsate. Rinsate at these sites will not be considered hazardous waste unless there is evidence that the rinsate would display a RCRA characteristic. Evidence may include such things as the presence of a visible sheen, pH, or association with equipment/materials used to respond to a release/spill of a hazardous waste/substance. Decontamination rinsate that is determined to be potentially hazardous will be managed as potentially "characteristic" hazardous waste. The regulatory status of the rinsate will be determined through direct sampling. If determined to be hazardous, the rinsate will be entered into an approved waste management system within 45 days from receipt of the final CAU analytical data package from the laboratory.

The disposal of nonhazardous rinsate will be consistent with guidance established in current DOE/NV Fluid Management Plans for the NTS as follows:

Rinsate that is determined to be nonhazardous and contaminated to less than 5x Safe Drinking Water Standards (SDWS) is not restricted as to disposal. Nonhazardous rinsate which is contaminated at 5x to10x SDWS, will be disposed of in an established infiltration basin or solidified and disposed of as sanitary waste or LLW, in accordance with the respective sections of this Work Plan. Nonhazardous rinsate which is contaminated at greater than 10x SDWS will be disposed of in a lined basin or solidified and disposed of as sanitary waste or LLW, in accordance with the respective sections of this Work Plan.

5.3.4 Low-Level Radioactive Waste

If radiological COPCs are expected at a leachfield CAU addressed by this Work Plan, waste may be characterized incorporating the use of process knowledge, analytical results of direct or associated samples, visual examination, radiological surveys, and swipe results. Radiological swipe surveys and/or direct scan surveys may be conducted on reusable sampling equipment and the PPE and disposable sampling equipment waste streams exiting a radiologically controlled area. This allows for the immediate segregation of radioactive waste from waste that may be unrestricted regarding radiological release. Removable contamination limits, as defined in Table 4-2 of the current version of the *NV/YMP Radiological Control Manual,* may be used to determine if such waste may be declared unrestricted regarding radiological release versus being declared radioactive waste. Direct sampling of the waste may be conducted to aid in determining if a particular waste unit (e.g., drum of soil) contains low-level radioactive waste, as necessary. Waste that is determined to be below the values of Table 4-2 by either direct radiological survey/swipe results or through process knowledge will not be managed as potential radioactive waste, but will be managed in accordance with the appropriate section of this Work Plan. Wastes in excess of Table 4-2 values will be managed as potential radioactive waste and be managed in accordance with this section and any other applicable section of this Work Plan.

Low-level radioactive waste, if generated, will be managed in accordance with the contractor-specific waste certification program plan, DOE Orders, and the requirements of the Nevada Test Site Waste Acceptance Criteria (NTSWAC) (DOE/NV, 1997, as amended). Potential radioactive waste drums containing soil, PPE, disposable sampling equipment, and/or rinsate shall be staged at a designated Radioactive Materials Area (RMA) when full or at the end of an investigation phase. The waste drums will remain at the RMA pending certification and disposal under NTSWAC requirements (DOE/NV, 1997, as amended).

5.3.5 Mixed Waste

Mixed waste, if generated, shall be managed in accordance with RCRA (40 CFR 262) (CFR, 1997b, as amended) and State of Nevada regulations (NAC, 1990, as amended) as well as DOE requirements for radioactive waste, interpreted as follows. In general, mixed waste shall be managed in the same manner as hazardous waste, with additional mandatory radioactive waste management program requirements. Pending characterization and confirmation of its regulatory status, suspected mixed waste will be managed in accordance with applicable regulations and requirements and will be marked with the words "Hazardous Waste Pending Analysis." However, within 45 days from receipt of the final CAU ananlytical data package from the laboratory, the mixed waste shall be transported via an approved hazardous waste transporter to the NTS transuranic waste storage pad for storage pending treatment or disposal. Mixed waste with hazardous waste constituents below land disposal restrictions may be disposed of at the NTS Area 5 Radioactive Waste Management Site if the waste meets the requirements of the NTSWAC. Mixed waste not meeting land disposal restrictions will require development of a treatment plan under the requirements of the Mutual Consent Order between DOE and the State of Nevada (NDEP, 1995).

5.3.6 PCB and Radioactive PCB Wastes

The management of polychlorinated biphenyls (PCBs) is governed by the Toxic Substances Control Act (TSCA) and its implementing regulations at 40 CFR 761. PCB contamination may be found as a sole contaminant, or in combination with any of the types of waste discussed in this Work Plan. For example, PCBs may be a co-contaminant in soil that contains a RCRA "listed" chemical constituent, resulting in a PCB/hazardous waste. PCBs may also be a co-contaminant in radioactive wastes (PCB/radioactive waste), in sanitary or hydrocarbon waste (PCB waste), in RCRA "characteristic" waste (PCB/hazardous waste), or even in mixed waste (PCB/radioactive/hazardous waste). The IDW will initially be evaluated using analytical results for media samples from the investigation. If any type of PCB waste is generated, it will be managed according to 40 CFR 761, as well as state of Nevada requirements, guidance, and agreements with NNSA/NV.

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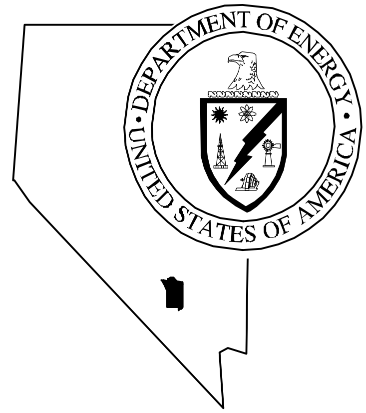

Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada

Controlled Copy No.:_____
Revision No.: 1

December 1998

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Division

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WORK PLAN FOR LEACHFIELD CORRECTIVE ACTION UNITS: NEVADA TEST SITE AND TONOPAH TEST RANGE, NEVADA

DOE Nevada Operations Office
Las Vegas, Nevada

Controlled Copy No.:____

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WORK PLAN FOR LEACHFIELD CORRECTIVE ACTION UNITS: NEVADA TEST SITE AND TONOPAH TEST RANGE, NEVADA

Approved by: Signature Approved Date: 12/17/98

Janet Appenzeller-Wing, Project Manager
Industrial Sites Project

Approved by: Signature Approved Date: 12/18/98

Runore C. Wycoff, Division Director
Environmental Restoration Division

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List of Acronyms and Abbreviations

ASTM	American Society for Testing and Materials
CADD	Corrective Action Decision Document
CAIP	Corrective Action Investigation Plan(s)
CAU	Corrective Action Unit(s)
CAS	Corrective Action Site(s)
CFR	*Code of Federal Regulations*
COPC	Contaminant(s) of Potential Concern
CRQL	Contract Required Quantitation Limit
CSA	Central Support Area
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy, Nevada Operations Office
DOT	U.S. Department of Transportation
DQO	Data Quality Objective(s)
E-MAD	Engine Maintenance, Assembly, and Disassembly Building
EPA	U.S. Environmental Protection Agency
ERD	Environmental Restoration Division
FFACO	*Federal Facility Agreement and Consent Order*
ft	Foot (feet)
gal	Gallon(s)
HASP	Health and Safety Plan
IDW	Investigation-derived waste
km	Kilometer(s)
L	Liter(s)
LLW	Low-level radioactive waste
m	Meter(s)
mg/kg	Milligram(s) per kilogram

List of Acronyms and Abbreviations *(Continued)*

mg/L	Milligram(s) per liter
mi	Mile(s)
MX	Missile Experimental
NAC	*Nevada Administrative Code*
NASA	National Aeronautics and Space Administration
NDEP	Nevada Division of Environmental Protection
NERVA	Nuclear Engine for Rocket Vehicle Application
NRDS	Nuclear Rocket Development Station
NTS	Nevada Test Site
NTSWAC	Nevada Test Site Waste Acceptance Criteria
PAL	Preliminary Action Level
PCB	Polychlorinated biphenyl(s)
pCi/g	Picocurie(s) per gram
pCi/L	Picocurie(s) per liter
PPE	Personal protective equipment
ppm	Part(s) per million
PRG	Preliminary Remediation Goals
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance and Quality Control
QC	Quality Control
RCP	Reactor Control Point
RCRA	*Resource Conservation and Recovery Act*
REECo	Reynolds Electrical & Engineering Co., Inc.
RMA	Radioactive Materials Area
R-MAD	Reactor Maintenance, Assembly and Disassembly Building

List of Acronyms and Abbreviations (Continued)

SSHASP	Site-Specific Health and Safety Plan
SVOC	Semivolatile Organic Compound(s)
TPH	Total petroleum hydrocarbon(s)
TTR	Tonopah Test Range
USACE	U.S. Army Corps of Engineers
UTM	Universal Transverse Mercator
VMRD	Vehicle-Mounted Radiometric Detector
μg/L	Microgram(s) per liter
VOC	Volatile Organic Compound(s)

Executive Summary

The Leachfield Corrective Action Units Work Plan has been developed in accordance with the *Federal Facility Agreement and Consent Order* that was agreed to by the U.S. Department of Energy, Nevada Operations Office; the State of Nevada Division of Environmental Protection; and the U.S. Department of Defense (FFACO, 1996). Under the consent order, a work plan is an optional planning document that provides information for a Corrective Action Unit or group of Corrective Action Units where significant commonality exists to eliminate redundant documentation. This Work Plan contains management, technical, quality assurance, health and safety, public involvement, field sampling, and waste management information applicable to a set of Corrective Action Units with similar site histories and characteristics, namely the leachfield systems at the Nevada Test Site and the Tonopah Test Range. For each Corrective Action Unit, a Corrective Action Investigation Plan will be prepared to present detailed, site-specific information regarding contaminants of potential concern, sampling locations, and investigation methods particular to the individual Corrective Action Unit.

In general, the source of potential contamination at each leachfield and associated collection system is wastewater effluent that was channeled from building drains through underground lines, into septic tanks, and released into leachfields. The physical setting, operational history, waste inventory, release information, and investigative background of the individual leachfield Corrective Action Units are site-specific and will be discussed in the Corrective Action Investigation Plans.

A general leachfield model has been developed in the Leachfield Work Plan as a basis for the Corrective Action Investigation Plans. Available data for each leachfield Corrective Action Unit will be reviewed to determine if the work plan is applicable (i.e., similar site elements, similar site characteristics, similar investigation strategy). If the Corrective Action Unit fits the model, then a site-specific Data Quality Objectives meeting will be conducted for the unit, and a Corrective Action Investigation Plan will be prepared covering those site-specific elements not addressed in the Leachfield Work Plan.

The Leachfield Work Plan presents the basic technical approach for conducting investigation activities at the leachfield Corrective Action Units. Specific technical approaches tailored to site

conditions and parameters are reflected in the Corrective Action Investigation Plans. The following activities may be used to investigate the leachfield Corrective Action Units:

- Radiological walkover surveys and mapping
- Video surveys of piping with optional radiation detector
- Soil sampling in the vicinity of the collection system and at identified breaches along the system
- Soil sampling within the leachfield
- Soil sampling from borings or exploratory trenches
- Soil sampling at the distribution box and in the immediate vicinity of both ends of the septic tanks
- Liquid/sludge sampling from septic tanks
- Field screening of soils to guide sampling activities and assist with waste management decisions
- Sample analysis to identify the concentrations and lateral and vertical extent of contaminants of potential concern
- Sample analysis for geotechnical and hydrological parameters from native soils underlying the distribution system

Details of the waste management strategy for the leachfield Corrective Action Units are included in Section 5.0 of the Leachfield Work Plan.

Under the *Federal Facility Agreement and Consent Order*, the Corrective Action Investigation Plans will be submitted to the Nevada Division of Environmental Protection for approval. Field work will be conducted following approval of the Corrective Action Unit-specific investigation plan. The results of the field investigation will support a defensible evaluation of corrective action alternatives in the Corrective Action Decision Document for each Corrective Action Unit.

1.0 Introduction

This Leachfield Corrective Action Units (CAUs) Work Plan has been developed in accordance with the *Federal Facility Agreement and Consent Order* (FFACO) that was agreed to by the U.S. Department of Energy, Nevada Operations Office (DOE/NV); the State of Nevada Division of Environmental Protection (NDEP); and the U.S. Department of Defense (FFACO, 1996). Under the FFACO, a work plan is an optional planning document that provides information for a CAU or group of CAUs where significant commonality exists. A work plan may be developed that can be referenced by leachfield Corrective Action Investigation Plans (CAIPs) to eliminate redundant CAU documentation. This Work Plan includes FFACO-required management, technical, quality assurance (QA), health and safety, public involvement, field sampling, and waste management documentation common to several CAUs with similar site histories and characteristics, namely the leachfield systems at the Nevada Test Site (NTS) and the Tonopah Test Range (TTR) (Figure 1-1). For each CAU, a CAIP will be prepared to present detailed, site-specific information regarding contaminants of potential concern (COPCs), sampling locations, and investigation methods.

1.1 Purpose

This document presents a general plan to investigate the nature and extent of COPCs at CAUs composed of collection systems and distribution systems (i.e., leachfields) used to dispose of various effluents. All of the features related to the effluent disposal are collectively referred to as "leachfield systems" in this Work Plan. The purpose of the corrective action investigation(s) is to:

- Identify the presence, distribution, and nature of COPCs at leachfield systems including septic tanks, leachfields, and associated wastewater collection systems.
- Provide sufficient information and data to develop and evaluate appropriate corrective actions for leachfield CAUs.

This Work Plan was developed using the U.S. Environmental Protection Agency (EPA) Data Quality Objectives (DQOs) (EPA, 1994c) process to clearly define the goals for collecting and using environmental data and to design a data collection program that will satisfy these goals. General DQOs applicable to the leachfield CAUs were identified in a scoping meeting between the DOE/NV

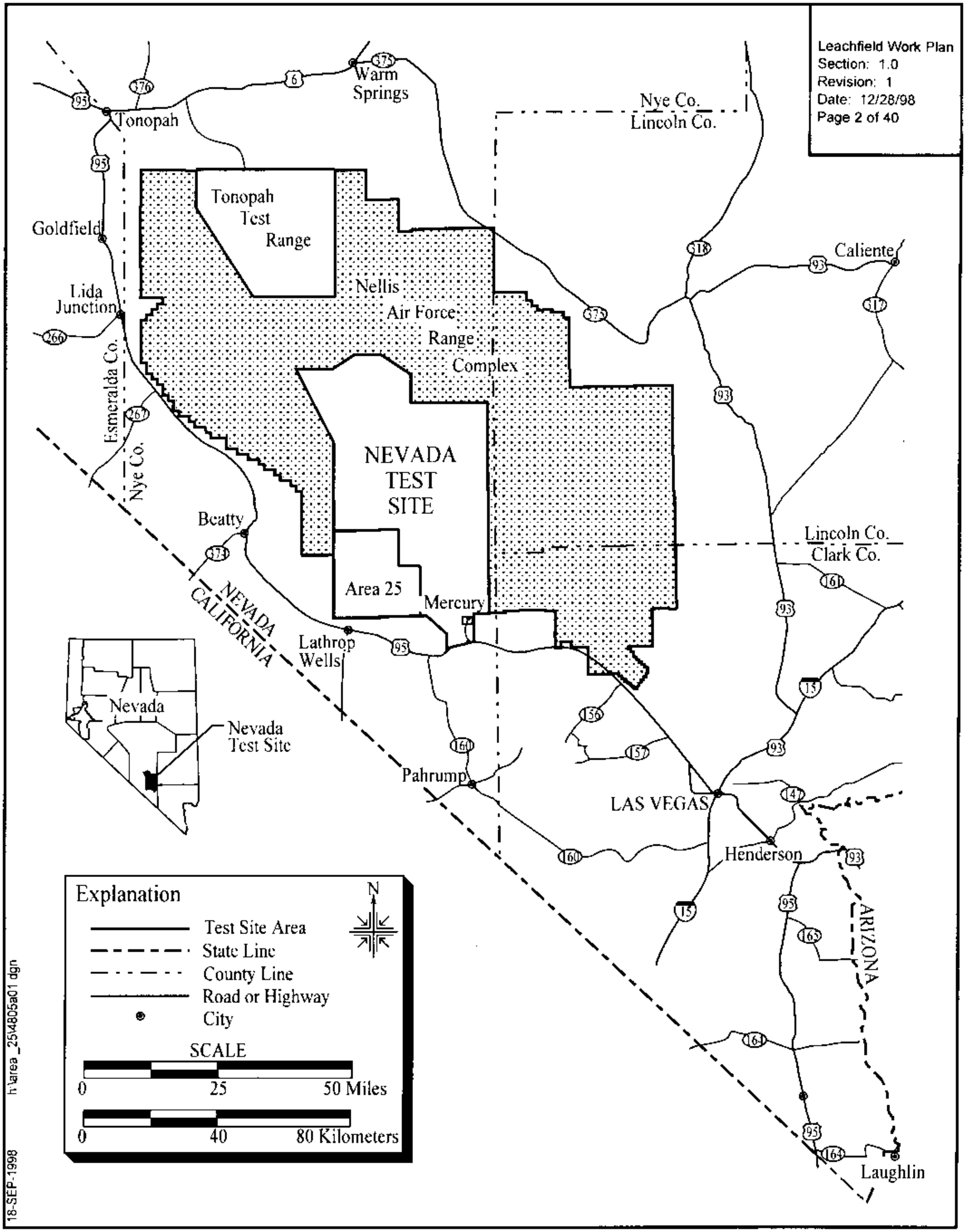

Figure 1-1
Nevada Test Site and Tonopah Test Range

and the NDEP as described in Section 3.0. Corrective Action Unit-specific DQO scoping meetings will be held prior to the preparation of the CAIPs.

1.2 Scope

The scope of this Work Plan is to provide general information concerning the investigation of the leachfield CAUs, thereby eliminating redundant documentation and streamlining the corrective action investigation process. The scope of the CAIPs is the resolution of problem statement(s) identified in the DQO process. The general problem identified for the leachfield CAUs is that various potentially hazardous or radioactive effluents may have been released at the CAUs and that existing data are insufficient to support the development and evaluation of potential corrective actions and selection of a preferred corrective action for the CAUs.

1.3 Work Plan Contents

Section 1.0 of this Work Plan provides an introduction to the associated projects, including document purpose for this Work Plan and scope for the associated corrective action investigations. The FFACO (FFACO, 1996) requires that CAIPs address the following elements:

- Management
- Technical aspects
- Quality assurance
- Health and safety
- Public involvement
- Field sampling
- Waste management

These elements are discussed in this Work Plan. Additional documentation of these elements will include CAU-specific information in the individual CAIPs.

The managerial aspects of the projects addressed by this Work Plan are discussed in the DOE/NV *Project Management Plan*, (DOE/NV, 1994) and site-specific Field Management Plans that will be developed prior to field activities at the CAUs. A general facility description is presented in Section 2.0. The technical aspects of this Work Plan are contained in Sections 3.0 and 4.0 of this document. Investigation strategies generically applicable to leachfield CAUs are also discussed in Section 4.0. General field and laboratory quality assurance and quality control (QA/QC) issues, including collection of quality control (QC) samples, are presented in the *Industrial Sites Quality Assurance Project Plan* (QAPP) (DOE/NV, 1996c). The generic health and safety aspects of the projects addressed by this Work Plan are discussed in the Environmental Restoration Project Health and Safety Plan (HASP) (DOE/NV, 1998a) and will be supplemented with a site-specific HASP (SSHASP) written prior to the start of field work. No CAU-specific public involvement activities are planned for the projects addressed by this Work Plan at this time; however, an overview of public involvement is documented in the "Public Involvement Plan" in Appendix V of the FFACO (1996). General waste management strategies are discussed in Section 5.0 of this Work Plan. Project schedules and records availability information for the projects addressed by this Work Plan are discussed in Section 6.0, and Section 7.0 provides a list of Work Plan references.

1.4 Work Plan Implementation

This Work Plan will be used in conjunction with CAIPs for each leachfield CAU located at the NTS and TTR that fits the conceptual model discussed in Section 3.0. Available data for each leachfield CAU will be reviewed to determine if this Work Plan is applicable (i.e., similar site elements, site characteristics, and potential investigation strategies). If the site fits the model, then a DQO meeting will be conducted for the CAU and a CAIP will be prepared to address the elements not discussed in the Work Plan. If a leachfield CAU does not adequately fit the model, the CAIP will not necessarily reference this Work Plan.

Several leachfield CAUs in the NTS Area 25 are suitable for the combination of this Work Plan and a CAIP. Additional qualified CAUs located at both the NTS and TTR will be identified in the future. A facility description applicable to specific CAUs at Area 25 of the NTS is provided in Appendix A.

2.0 Facility Description

The source of potential contamination at each leachfield and associated collection system is wastewater effluent channeled from building drains through underground collection system lines and septic tanks and released into leachfields. In some cases, the collection system lines released effluent to the ground surface via outfalls or to the subsurface via leaching pits or disposal wells. In some cases, these systems were modified by extending drain lines to leachfields. The leachfields were designed to disperse effluent within the base of installed leachfield materials (the leachfield base) and allow liquid to percolate down into the underlying native soil. The driving force for potential downward migration of the contamination was effluent discharge to the leachfields via septic tanks. All of the leachfield systems considered under this Work Plan are inactive.

The physical setting, operational history, waste inventory, release information, and investigative background particular leachfield CAUs are site-specific and will be discussed in the CAIPs. Information for leachfield CAUs located in NTS Area 25 is included as Appendix A of this Work Plan.

Site investigation activities associated with leachfield CAUs have been identified and documented in the *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada* (DOE/NV, 1996b).

3.0 Objectives

General objectives for leachfield CAUs addressed by this Work Plan were determined using the DQO process outlined in the EPA's *Guidance for the Data Quality Objectives Process* (EPA, 1994c). The DQOs are qualitative and quantitative statements that specify the quality of the data required to support potential corrective action at the CAUs. The DQOs were developed to clearly define the uses for the environmental data and to design a data collection program appropriate to these uses. The formulation of a conceptual site model is an aid to facilitate the DQO process and help with the decision making concerning data quality.

3.1 Conceptual Site Models for Leachfield CAUs

A general conceptual site model has been developed as a basis for the leachfield CAUs and is discussed in this Work Plan. The leachfields and associated collection systems are divided into areas based on the function of the system elements and the varying potential for contamination. Components of the general conceptual site model include leachfield piping, leachfields, and other disposal features associated with designed effluent release; and collection system features associated with potential accidental release including drains, discharge lines, septic tanks, outfall lines, and distribution structures. This model is depicted graphically in Figure 3-1. Additional components of the model include the estimated vertical and horizontal extent of potential contamination related to possible leaks and designed effluent discharge.

Designed releases of effluent may have introduced COPCs into leachfields and underlying soils. The extent of underlying soil impact is highly variable, and dependent on the volume of effluent released, the leachfield system design, geologic conditions, the nature of the COPCs, and other factors. In some cases, effluent may have been released to other disposal features (shown in red) including seepage pits, disposal wells, ditches, or drainage channels prior to or coincident with discharge to leachfields (shown in yellow).

Designed releases are distinguished from accidental releases associated with a loss of integrity within the collection system. Accidental releases are typically restricted to a small area adjacent to a system breach. Accidental releases could be produced by rupture of a septic tank or diversion structure or

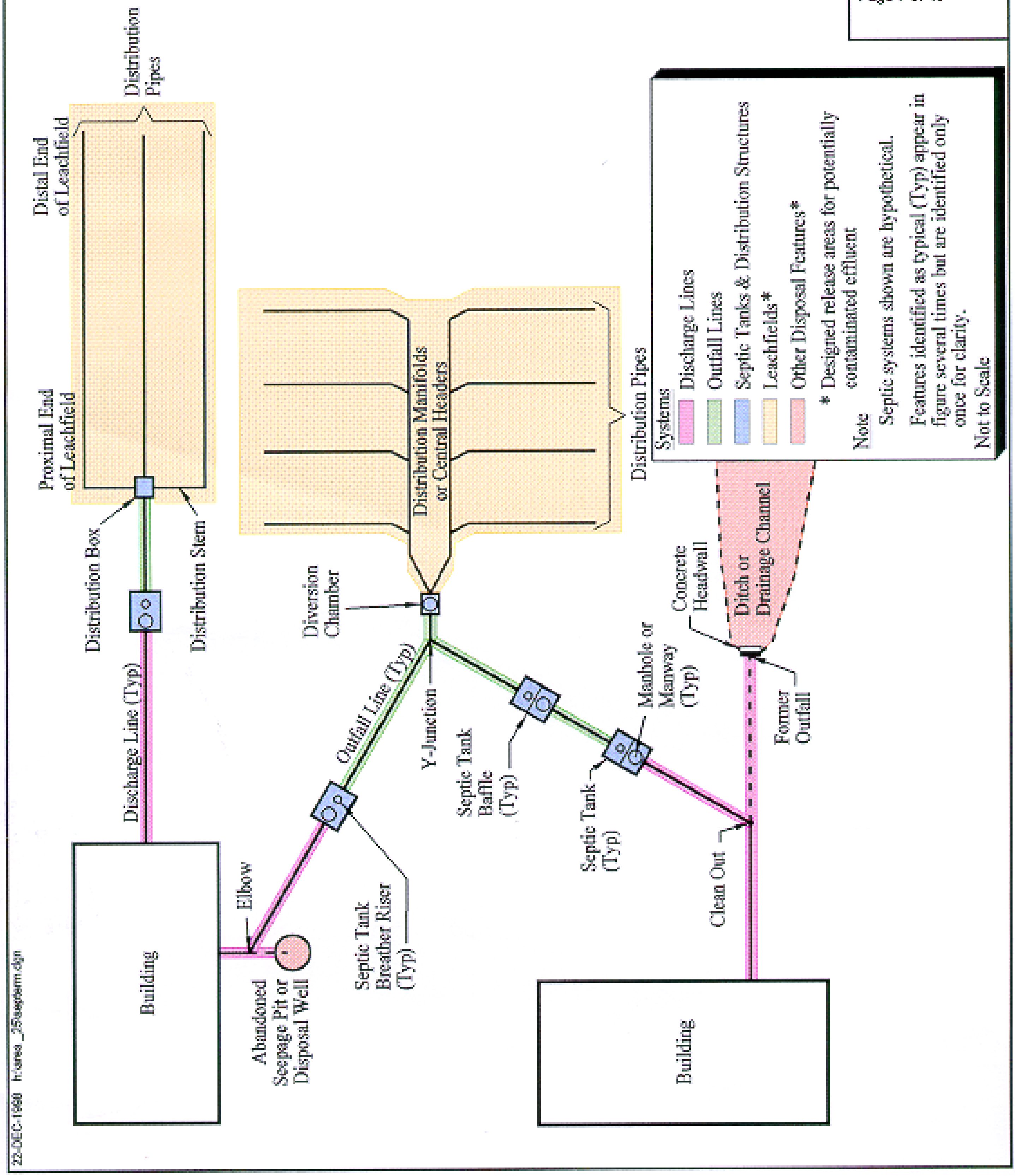

Figure 3-1
Leachfield System General Conceptual Site Model and Terminology

through pipe damage to discharge or outfall lines. Accidental releases may be identified by inspection of leachfield system components, video surveys of discharge and outfall lines, or other techniques.

Conceptual site models based on actual site configurations and historical information will be developed for the CAU-specific Data Quality Objectives process and provided as part of Appendix A to CAIPs that reference the Leachfield Work Plan. Site-specific elements of the conceptual model reflect unique conditions and parameters, and will be provided in the CAIPs. The CAU-specific model will be based on assumptions and premises discussed during CAU-specific DQO scoping meetings. The following summarizes the assumptions that were considered in formulating the general conceptual site model:

- The presence of COPCs within soils is the result of releases from the following known or potential contaminant sources:
  - Potential effluent flow through drains within source buildings, through collection system lines, and into possible outfalls or disposal wells. This typically occurred during early periods of operation at locations where lines did not terminate in leachfields. Subsequently upgraded collection systems allowed the effluent to reach inline septic tanks and be dispersed through the leachfield(s).
  - Possible leakage from the collection system lines leading to the leachfield distribution system
  - Possible leakage from the leachfield distribution structure(s)
  - Possible leakage from the septic tank(s)
  - Potential for contaminants dispersed by the leachfield itself
- Groundwater is not thought to have been impacted because of its significant depth and because the environmental conditions at both the NTS and the TTR (i.e., arid climate, relatively low permeability soils) are not conducive to downward migration.
- Land use of the CAUs is likely to remain similar to current uses. Land use at sites addressed by this work plan is typically industrial with continued access controls. Land use is defined in the *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada* (DOE/NV, 1996b).
- Excavation of contaminated material by site workers causing ingestion, inhalation, or dermal contact with COPCs is the most likely potential exposure pathway.

This document uses the following terminology to address leachfield CAU components: Each entire system is collectively referred to as the leachfield system; all features prior to and including the distribution box or other diversion structures are considered part of the collection system, and all features subsequent to these structures are considered part of the distribution system. Individual leachfield system components are referenced according to the terminology provided in Figure 3-1.

To facilitate the evaluation of the conceptual model, the leachfield systems are divided into study areas based on the function of the system elements and the varying potential for contamination. Descriptions and estimated contamination concentrations are provided for the following six general study areas:

- Soil directly below and immediately surrounding discharge lines leading from the contributing building/structure to the initial septic tank
  - Relatively low contamination concentrations expected
- Soil potentially impacted by discharge features other than leachfields including outfalls used for surface disposal or seepage pits or disposal wells used for subsurface disposal
  - Highly variable contamination concentrations dependent on discharge type
- Soil directly below and immediately surrounding outfall lines connecting septic tanks or outfall lines connecting septic tanks to distribution structures (e.g., distribution boxes or diversion chambers)
  - Relatively low contamination concentrations expected
- Soil immediately surrounding septic tank inlets and outlets and the contents of septic tanks
  - Highest contamination concentrations expected (especially septic tank contents)
- Soil immediately surrounding distribution structure outlets
  - Relatively low contamination concentrations expected
- Soil directly below and immediately surrounding the leachfield distribution pipes with potential contamination associated with designed effluent releases
  - Moderate contamination concentrations expected

Sampling objectives designed to investigate these study areas to confirm, evaluate, and potentially modify or refute site-specific conceptual site models will be incorporated into the CAIPs. Data-collection activities will be designed to provide data that are meaningful, valid, and defensible and that support development and evaluation of potential corrective actions and selection of preferred corrective actions for the CAUs. A basic technical approach for field investigations is presented in Section 4.1. This approach identifies areas of concern early in the process and then targets those areas for additional investigation, as needed.

The collection system and distribution system sampling strategy is designed to investigate geologic, hydrologic, and contamination conditions at each site. Sampling activities are designed to assess the nature and extent of vadose-zone soil contamination. The most likely affected area is located immediately beneath the distribution lines within the leachfields (see Figure 3-1). Samples from these locations and from soil at several collection system features will be analyzed for COPCs identified in CAIPs. Representative samples will be collected from these locations and analyzed for geotechnical and hydrologic properties to assess the potential for lateral and vertical migration of COPCs.

Investigation strategies are designed to determine the lateral and vertical extent of COPCs, but additional investigation (e.g., stepout borings or trenches) may be required to adequately define the contamination extent. If contamination exists beyond the boundaries defined in an alternate model, members of the scoping team will be notified and the project re-evaluated. Alternate models are formulated to allow the investigation to extend beyond the anticipated contamination boundaries. Adoption of an alternate model typically requires sampling at greater depths or additional step-outs. Rescoping may be necessary should the alternate model fail.

3.2 Contaminants of Potential Concern

Table 3-1 provides a generic list of COPCs that may have been disposed of at leachfield CAUs considered under this Work Plan. Analytical requirements for COPCs not provided in this table but established during individual DQO meetings will be provided in the individual CAIPs. Actual, CAU-specific COPCs will be determined during individual DQO meetings, and will be addressed in the individual CAIPs. The analytical requirements provided will be used for specified COPCs unless otherwise stated in the individual CAIPs.

Table 3-1
General Analytical Requirements for Leachfield CAUs
(Page 1 of 4)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
ORGANICS						
Total Volatile Organic Compounds (VOCs)	Water	8260B[c]	Analyte-specific estimated quantitation limits[d]	Not Applicable (NA)	14[e]	61-145[e]
	Soil				24[e]	59-172[e]
Toxicity Characteristic Leaching Procedure (TCLP) VOCs						
Benzene	Aqueous	1311/8260B[c]	0.050 mg/L[d]	0.5 mg/L[d]	14[e]	61-145[e]
Carbon Tetrachloride			0.050 mg/L[d]	0.5 mg/L[d]		
Chlorobenzene			0.050 mg/L[d]	100 mg/L[d]		
Chloroform			0.050 mg/L[d]	6 mg/L[d]		
1,2-Dichloroethane			0.050 mg/L[d]	0.5 mg/L[d]		
1,1-Dichloroethene			0.050 mg/L[d]	0.7 mg/L[d]		
Methyl Ethyl Ketone			0.050 mg/L[d]	200 mg/L[d]		
Tetrachloroethene			0.050 mg/L[d]	0.7 mg/L[d]		
Trichloroethene			0.050 mg/L[d]	0.5 mg/L[d]		
Vinyl Chloride			0.050 mg/L[d]	0.2 mg/L[d]		
Total Semivolatile Organic Compounds (SVOCs)	Water	8270C[c]	Analyte-specific estimated quantitation limits[d]	NA	50[e]	9-127[e]
	Soil				50[e]	11-142[e]
TCLP SVOCs						
o-Cresol	Aqueous	1311/8270C[c]	0.10 mg/L[d]	200 mg/L[d]	50[e]	9-127[e]
m-Cresol			0.10 mg/L[d]	200 mg/L[d]		
p-Cresol			0.10 mg/L[d]	200 mg/L[d]		
Cresol (total)			0.30 mg/L[d]	200 mg/L[d]		
1,4-Dichloro-benzene			0.10 mg/L[d]	7.5 mg/L[d]		
2,4-Dinitrotoluene			0.10 mg/L[d]	0.13 mg/L[d]		
Hexachloro-benzene	Aqueous	1311/8270C[c]	0.10 mg/L[d]	0.13 mg/L[d]	50[e]	9-127[e]
Hexachloro-butadiene			0.10 mg/L[d]	0.5 mg/L[d]		
Hexachloro-ethane			0.10 mg/L[d]	3 mg/L[d]		
Nitrobenzene			0.10 mg/L[d]	2 mg/L[d]		
Pentachloro-phenol			0.50 mg/L[d]	100 mg/L[d]		
Pyridine			0.10 mg/L[d]	5 mg/L[d]		
2,4,5-Trichloro-phenol			0.10 mg/L[d]	400 mg/L[d]		
2,4,6-Trichloro-phenol			0.10 mg/L[d]	2 mg/L[d]		

Table 3-1
General Analytical Requirements for Leachfield CAUs
(Page 2 of 4)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
Total Pesticides	Water	8081[c]	Analyte-specific Contract Required Quantitation Limits (CRQL)[e]	NA	27[e]	38-131[e]
	Soil				50[e]	23-139[e]
TCLP Pesticides						
Chlordane	Aqueous	1311/8081[c]	0.0005 mg/L[e]	0.03 mg/L[d]	27[e]	38-131[e]
Endrin			0.001 mg/L[e]	0.02 mg/L[d]		
Heptachlor			0.0005 mg/L[e]	0.008 mg/L[d]		
Heptachlor Epoxide			0.0005 mg/L[e]	0.008 mg/L[d]		
gamma-BHC (Lindane)			0.0005 mg/L[e]	0.4 mg/L[d]		
Methoxychlor			0.005 mg/L[e]	10 mg/L[d]		
Toxaphene			0.05 mg/L[e]	0.5 mg/L[d]		
Polychlorinated Biphenyls (PCBs)	Water	8082[c]	Analyte-specific (CRQL)[e]	NA	Lab-specific[f]	Lab-specific[f]
	Soil					
Total Herbicides	Water	8151A[c]	1.3 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		66 µg/kg[c]			
TCLP Herbicides						
2,4-D	Aqueous	1311/8151A[c]	0.002 mg/L[d]	10 mg/L[d]	Lab-specific[f]	Lab-specific[f]
2,4,5-TP			0.00075 mg/L[d]	1 mg/L[d]		
Total Petroleum Hydrocarbons (TPH)	Water Gasoline	8015B modified[c]	0.1 mg/L[g]	NA	Lab-specific[f]	Lab-specific[f]
	Soil Gasoline		0.5 mg/kg[g]			
	Water Diesel		0.5 mg/L[g]			
	Soil Diesel		25 mg/kg[g]			
Explosives	Water	8330[c]	14 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		2.2 mg/kg[c]			
Polychlorinated Dioxins and Furans	Water	8280A/8290[c]	0.05 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		5 µg/kg[c]			

Table 3-1
General Analytical Requirements for Leachfield CAUs
(Page 3 of 4)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
INORGANICS						
Total Resource Conservation and Recovery Act (RCRA) Metals						
Arsenic	Water	6010B/7470A[c]	10 µg/L[g,h]	NA	20[h]	75-125[h]
	Soil	6010B/7471A[c]	1 mg/kg[g,h]			
Barium	Water	6010B/7470A[c]	200 µg/L[g,h]			
	Soil	6010B/7471A[c]	20 mg/kg[g,h]			
Cadmium	Water	6010B/7470A[c]	5 µg/L[g,h]			
	Soil	6010B/7471A[c]	0.5 mg/kg[g,h]			
Chromium	Water	6010B/7470A[c]	10 µg/L[g,h]			
	Soil	6010B/7471A[c]	1 mg/kg[g,h]			
Lead	Water	6010B/7470A[c]	3 µg/L[g,h]			
	Soil	6010B/7471A[c]	0.3 mg/kg[g,h]			
Mercury	Water	6010B/7470A[c]	0.2 µg/L[g,h]			
	Soil	6010B/7471A[c]	0.1 mg/kg[g,h]			
Selenium	Water	6010B/7470A[c]	5 µg/L[g,h]			
	Soil	6010B/7471A[c]	0.5 mg/kg[g,h]			
Silver	Water	6010B/7470A[c]	10 µg/L[g,h]			
	Soil	6010B/7471A[c]	1 mg/kg[g,h]			
TCLP RCRA Metals						
Arsenic	Aqueous	1311/6010B[c] 1311/7470A[c]	0.10 mg/L[g,h]	5 mg/L[d]	20[h]	75-125[h]
Barium			2 mg/L[g,h]	100 mg/L[d]		
Cadmium			0.05 mg/L[g,h]	1 mg/L[d]		
Chromium			0.10 mg/L[g,h]	5 mg/L[d]		
Lead			0.03 mg/L[g,h]	5 mg/L[d]		
Mercury			0.002 mg/L[g,h]	0.2 mg/L[d]		
Selenium			0.05 mg/L[g,h]	1 mg/L[d]		
Silver			0.10 mg/L[g,h]	5 mg/L[d]		
Cyanide	Water	9010B[c]	0.01 mg/L[h]	NA	20[h]	75-125[h]
	Soil		1.0 mg/kg[h]			
Sulfide	Water	9030B/9034[c]	0.4 mg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil or Sediment		10 mg/kg[g]			
pH/Corrosivity	Water	9040B[c]	NA	pH >2[i]	Lab-specific[f]	Lab-specific[f]
	Soil	9045C[c]		pH<12.5[i]		
Ignitability	Water	1010[c]	NA	Flash Point <140° F[d]	NA	NA
	Soil	1030[c]		Burn Rate[c] >2.2 mm/sec nonmetals; >0.17 mm/sec metals		

Table 3-1
General Analytical Requirements for Leachfield CAUs
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Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
RADIOCHEMISTRY						
Gamma-emitting Radionuclides[j]	Water	L-E10.602.PC[k,l]	Isotope Specific[m]	NA	20[k]	Sample Spike 30-105[k] Blank Spike 80-120[k]
	Soil				35[k]	
Isotopic Plutonium[j]	Water	L-E10.601.PL[k,n] L-E10.608.PC[k] L-E10.620.PL[k]	2 pCi/L[k]	NA	20[k]	
	Soil		0.1 pCi/g Pu-238[o] 0.4 pCi/g Pu-239/240[o]		35[k]	
Isotopic Uranium[j]	Water	L-E10.605.PL[k,p] L-E10.620.PL[k] L-E10.608.PC[k]	2 pCi/L[k]	NA	20[k]	
	Soil		1 pCi/g[k]		35[k]	
Strontium - 90[j]	Water	L-E10.610.PL[k]	8 pCi/L[q]	NA	20[k]	
	Soil		1 pCi/g[r]		35[k]	

[a]RPD is used to Calculate Precision
Precision is estimated from the relative percent difference of the concentrations measured for the matrix spike and matrix spike duplicate analyses of unspiked field samples, or field duplicates of unspiked samples. It is calculated by:
RPD = $100 \times \{(|C_1-C_2|)/[(C_1+C_2)/2]\}$, where C_1 = Concentration of the analyte in the first sample aliquot, C_2 = Concentration of the analyte in the second sample aliquot.

[b] %R is used to Calculate Accuracy
Accuracy is assessed from the recovery of analytes spiked into a blank or sample matrix of interest, or from the recovery of surrogate compounds spiked into each sample. The recovery of each spiked analyte is calculated by: %R = $100 \times (C_s-C_u/C_n)$, where C_s = Concentration of the analyte in the spiked sample, C_u = Concentration of the analyte in the unspiked sample, C_n = Concentration increase that should result from spiking the sample

[c]U.S. Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste, 3rd Edition, Parts 1-4, SW-846 CD ROM Washington, DC (EPA, 1986; 1992; 1994d; and 1996)

[d]Estimated Quantitation Limit as given in SW-846 (EPA, 1996)

[e]EPA Contract Laboratory Program Statement of Work for Organic Analysis (EPA, 1988b; 1991; and 1994b)

[f] In-House Generated RPD and %R Performance Criteria
It is necessary for laboratories to develop in-house performance criteria and compare them to those in the methods. The laboratory begins by analyzing 15-20 samples of each matrix and calculating the mean %R for each analyte. The standard deviation (SD) of each %R is then calculated, and the warning and control limits for each analyte are established at ± 2 SD and ± 3 SD from the mean, respectively. If the warning limit is exceeded during the analysis of any sample delivery group (SDG), the laboratory institutes corrective action to bring the analytical system back into control. If the control limit is exceeded, the sample results for that SDG are considered unacceptable. These limits are reviewed after every 20-30 field samples of the same matrix and are updated at least semiannually. The laboratory tracks trends in both performance and control limits by the use of control charts. The laboratory's compliance with these requirements is confirmed as part of an annual laboratory audit. Similar procedures are followed in order to generate acceptance criteria for precision measurements.

[g]*Industrial Sites Quality Assurance Project Plan* (DOE/NV, 1996)

[h]EPA Contract Laboratory Program Statement of Work for Inorganic Analysis (EPA, 1988a and 1994a)

[i]RCRA Regulations and Keyword Index, 1998 Edition

[j]Isotopic minimum detectable concentrations are defined during the DQO process and specified in the CAIP as applicable

[k]*Bechtel Nevada Analytical Services Laboratory Procedures Manual* (1998) or equivalent method

[l]DOE, 1992 or equivalent method

[m]Isotope Specific Minimum Reporting Limit to be specified in CAIP

[n]*Separation and Preconcentration of Actinides from Acidic Media by Extraction Chromatography* (Horwitz, 1993)

[o]The Nevada Test Site Performance Objective Criteria requirement for certifying that hazardous waste has no added radioactivity requires that the total plutonium (the sum of the Pu-238, 239, 240 concentrations) not exceed 0.5 pCi/g (BN, 1995)

[p]*Separation and Preconcentration of Uranium from Acidic Media by Extraction Chromatography* (Horwitz, 1992)

[q] 40 CFR 141.16, Table A, "Average Annual Concentrations Assumed to Produce a Total Body or Organ Dose of 4.0 mrem/yr," (CFR, 1976)

[r] The 1.0 pCi/g concentration is approximately twice the concentration of fallout Sr-90 in background surface soils reported in the "Environmental Monitoring Report for the Proposed Ward Valley California Low-Level Radioactive Waste Facility," (Atlan-Tech, 1992)

Definitions:
µg/kg = Microgram(s) per kilogram
mg/kg = Milligram(s) per kilogram
pCi/L = Picocurie(s) per liter
mg/L = Milligram(s) per liter
pCi/g = Picocurie(s) per gram
µg/L = Microgram(s) per liter

3.2.1 Geotechnical/Hydrological Analysis and Bioassessment

Geotechnical and hydrological parameters will be measured for at least one sample collected from soil underlying the base of each leachfield. These samples will be collected within brass sleeves (or other containers as appropriate) so as not to disturb the natural physical characteristics of the soil. Table 3-2 lists general geotechnical and hydrological parameters of interest for the leachfield CAUs. The testing methods shown are minimum standards and other equivalent or superior testing methods may be used. The need for geotechnical data and the specific parameters required will be addressed in the site-specific CAIPs. In some cases, a bioassessment will also be performed on the sample material. Bioassessment is a series of tests designed to evaluate the physical, chemical, and microbiological characteristics of a site. Bioassessment tests include determinations of nutrient availability, pH, microbial population density, and the ability of the microbial population to grow under enhanced conditions. This type of analysis is most appropriate for hydrocarbon contamination sites where bioremediation is a potential corrective action.

Table 3-2
General Geotechnical and Hydrological Analyses for Leachfield CAUs

Geotechnical Parameter	Methods
Initial moisture content	ASTM[a] D 2216-92
Dry bulk density	ASTM[a] D 2937-94
Calculated porosity	EM[b]-1110-2-1906 or MOSA[c] Chp. 18
Saturated hydraulic conductivity	ASTM[a] D 2434-68(74) MOSA[c] Chp. 28
Unsaturated hydraulic conductivity	van Genuchten[d]
Particle-size distribution	ASTM[a] D 422-63(90)
Water-release (moisture retention) curve	MOSA[c] Chp. 26 ASTM[a] D 2325-68(94) MOSA[c] Chp. 24 Karanthanasis and Hajek[e]

[a]ASTM, 1996
[b]USACE, 1970
[c]MOSA (Soil Science Society of America, 1986)
[d]van Genuchten, 1980
[e]Karanthanasis and Hajek, 1982

3.3 Preliminary Action Levels

The following field screening levels will be used to guide investigations:

- Headspace screening for volatile organic concentrations above 20 parts per million (ppm) or 2.5 times background, whichever is greater
- Total petroleum hydrocarbon (TPH) field screening results greater than 100 ppm measured using an appropriate field screening method (i.e., Hanby™ or other test kit)
- The radiological (alpha/beta/gamma) field screening level for soil samples is the mean background activity plus two times the standard deviation of the mean background activity (Adams, 1998).

Concentrations exceeding the field screening levels indicate the presence of potential contamination at that sample location. This information will be documented and the investigation will be continued to delineate the extent of contamination. Concentrations above field screening levels may also be used to select discretionary sample locations.

Off-site laboratory analytical results for chemical constituents will be compared to the following preliminary action levels (PALs) to evaluate the need for possible corrective actions:

- Region IX Preliminary Remediation Goals (PRGs) for Industrial Soil (Smucker, 1998) will be used as PALs for CAUs covered by this Work Plan.
- NDEP Corrective Action Regulations (NAC, 1996a)
- TPH concentrations above the TPH action level of 100 ppm per the *Nevada Administrative Code* (NAC) 445A.2272 (NAC, 1996a)

Area-specific background concentrations of radioactive material will be established for radiological constituents. The background concentrations will be based on existing analytical data from previous sampling efforts near each site and site-specific data collected as necessary. The PAL will be the mean background concentration of samples in this dataset plus two times the standard deviation of the mean background concentration. Variations in analytical methods and analytical method precision and accuracy will be considered when comparing background concentrations to investigation analytical results. The radiological constituent PAL will be used to indicate the presence of radiological contamination distinguishable from area background concentrations.

The comparison of laboratory results to PALs will be discussed in Corrective Action Decision Documents (CADDs). The evaluation of potential corrective actions and the justification for a preferred corrective action will be presented in a CADD based on the results of field investigations at each CAU.

Data packages from off-site laboratories will be reviewed by contractor staff to verify the quality of the data at a Tier II level as described in the QAPP (DOE/NV, 1996c). Any deficiencies noted must be checked to verify the analytical results fall within the established QA/QC requirements agreed upon during CAU-specific DQOs for the site. Any deviations must be noted and evaluated for impact.

3.4 DQO Process Discussion

The DQO process for each CAU will be discussed in the CAIP. Generic details of the DQO process that apply to all of the leachfield are integrated into this Work Plan. Each CAU will have a DQO kickoff meeting as required by the FFACO (1996).

4.0 Field Investigation

Data will be collected during field investigations to confirm or refute the general and CAU-specific conceptual models, to assess the migration of COPCs, and to determine if COPCs are present in concentrations exceeding the PALs established for the CAUs. Samples may also be collected to obtain site-specific geotechnical/hydrological and bioassessment information applicable to the evaluation of potential corrective actions.

The field investigation program will allow either the modification or termination of the investigation activities when sufficient data exist to support or refute the conceptual model. If the conceptual model is proven to be incorrect (e.g., contamination is deeper or more widespread than expected) during the planned activities, an alternate model will be adopted and the investigation scope changed accordingly. Alternate models typically assume that infiltration was greater and contaminants have migrated to a deeper and/or greater lateral extent than indicated in the general conceptual model. If the investigation demonstrates that this has occurred, the following two contingency plans can be initiated:

- If contamination exceeds the planned excavation or borehole depths, the investigation will continue deeper than the conceptual model indicates. Investigation will continue until two consecutive samples with concentrations below field screening levels are obtained or the limit of the available investigation techniques is reached.

- If the contamination covers a larger area or is more complexly distributed than expected, the investigation will include soil sampling outside the area defined in the conceptual model using additional excavations or boreholes as appropriate.

Contingent investigations will be based on results generated by initial field screening or sampling efforts.

4.1 Basic Technical Approach

This section presents investigation activities that may be conducted at leachfield CAUs and alternatives based on type of intrusive method (trenching, drilling, etc.).

Trenching is typically the preferred investigation strategy for leachfield systems, but drilling may be selected for specific CAUs that may be contaminated with radiological or certain hazardous materials for health and safety, waste management, or other considerations. Excavation will usually be required to inspect and sample certain subsurface leachfield system features (i.e., septic tanks) even at sites where drilling is the chosen investigation alternative. Drilling is usually required to investigate contamination deeper than approximately 4.5 m (meters) (15 feet [ft]) below ground surface.

Several factors contribute to selecting the specific investigative approach for each leachfield CAU. These factors include the degree of uncertainty regarding leachfield configuration or location and the possible existence of multiple or overlapping leachfields. While the CAIPs will provide specific technical approaches tailored to anticipated site conditions and parameters, the following activities may be used to investigate the leachfield CAUs:

- Field Inspection and surveys
  - Preliminary field inspection and mapping to verify leachfield system feature locations
  - Radiological walkover surveys if radionuclides are a potential COPC
  - Geophysical surveys to verify or identify locations of subsurface features
  - Video surveys using a commercial down-pipe camera system to locate and inspect collection system pipes. Video surveys may be augmented with a radio transmitter to track the camera head at the ground surface and with an optional radiation detector for qualitative in-situ radioactivity measurements.
- Intrusive investigation
  - Trenching or other intrusive investigations (e.g., direct push or hollow stem auger methods) to locate collection system components including discharge lines, septic tanks, outfall lines, distribution boxes, and diversion structures
  - Trenching to locate and inspect leachfield components. Trenching or other intrusive investigations (e.g., direct push or hollow stem auger methods) perpendicular to leachfield components at both proximal and distal ends of the leachfield
- Field Screening
  - Field screening to guide investigation activities and laboratory sample selection, and support health and safety and waste management decisions

- Sampling
  - Collection of soil samples around collection system pipes and at identified system breaches and from both influent and effluent ends of septic tanks
  - Collection of water or sludge samples from septic tanks
  - Collection of soil samples from soil at distribution structure outlet(s)
  - Collection of samples from soil underlying distribution pipes at proximal and distal ends of leachfields
  - Collection of soil samples to be analyzed for geotechnical and hydrological parameters from native soil underlying distribution system
  - Collection of bioassessment samples from native soil underlying distribution system if hydrocarbon or certain Volatile Organic Compound (VOC) contamination is anticipated
  - Analysis of samples as specified in the CAIPs
- Additional methods as specified in the CAIPs

4.1.1 Field Inspections and Surveys

The following techniques may be used to estimate the magnitude of potential contamination associated with leachfield systems or their components prior to or in conjunction with intrusive investigation.

4.1.1.1 Field Inspections

Field inspections will be used to verify leachfield system feature locations (e.g., cleanouts, manhole covers, breather risers, evidence of excavation) as shown on engineering drawings. Detailed site maps may be prepared based on existing engineering drawings and surveys, Global Positioning System surveys, and observations made during field inspection.

4.1.1.2 Radiological Walkover/VMRD Surveys

The objective of radiological surveys is to identify locations of potential surface contamination and provide radiological trending information to focus the investigation effort at sites where radiological material is an expected COPC. Walkover and subsequent radiation survey(s) are generally performed as part of the preliminary assessment effort prior to conducting a DQO scoping for sites with potential radiological contamination. These initial surveys provide a baseline for potential health and safety concerns and aid in identifying site elements that may require sampling or further investigation.

A Vehicle-Mounted Radiometric Detector (VMRD) may be used to rapidly survey extensive areas to determine the location of surface and near surface beta/gamma emitting contaminants. The VMRD uses the global positioning system to store measurements and respective locations in Universal Transverse Mercator (UTM) grid coordinates. An NE Technology model Electra alpha/beta rate meter may be used at specific areas to augment detection capabilities and allow alpha detection. Additionally, a gamma spectroscopy instrument system may be used to identify gamma emitters present in the near surface.

4.1.1.3 Geophysical Surveys

Geophysical surveys including basic utility location devices and more sophisticated electromagnetic (i.e., EM-31, EM-61) and Ground Penetrating Radar methods can be used to determine the probable locations of poorly constrained leachfield systems. Like radiological surveys, these surveys are typically performed as part of the preliminary assessment effort prior to conducting a DQO scoping.

4.1.1.4 Video Surveys

A video survey of discharge and outfall lines may be conducted to inspect the current physical condition and layout of the leachfield system. Video surveys allow a visual assessment of the system’s integrity and can be used to identify obvious breaches, unexpected branchings (i.e., tie-ins or off-shoots), and open joints. A commercially available camera and cable system can be introduced through several easily available access points (cleanouts, surface drains, or capped terminations) that require little or no excavation. Subsurface features may be excavated to gain additional access for inspection or sampling or to introduce the video system. Distances between access points greater than approximately 90 m (300 ft) or jamming of the video system may require excavation to continue a video survey.

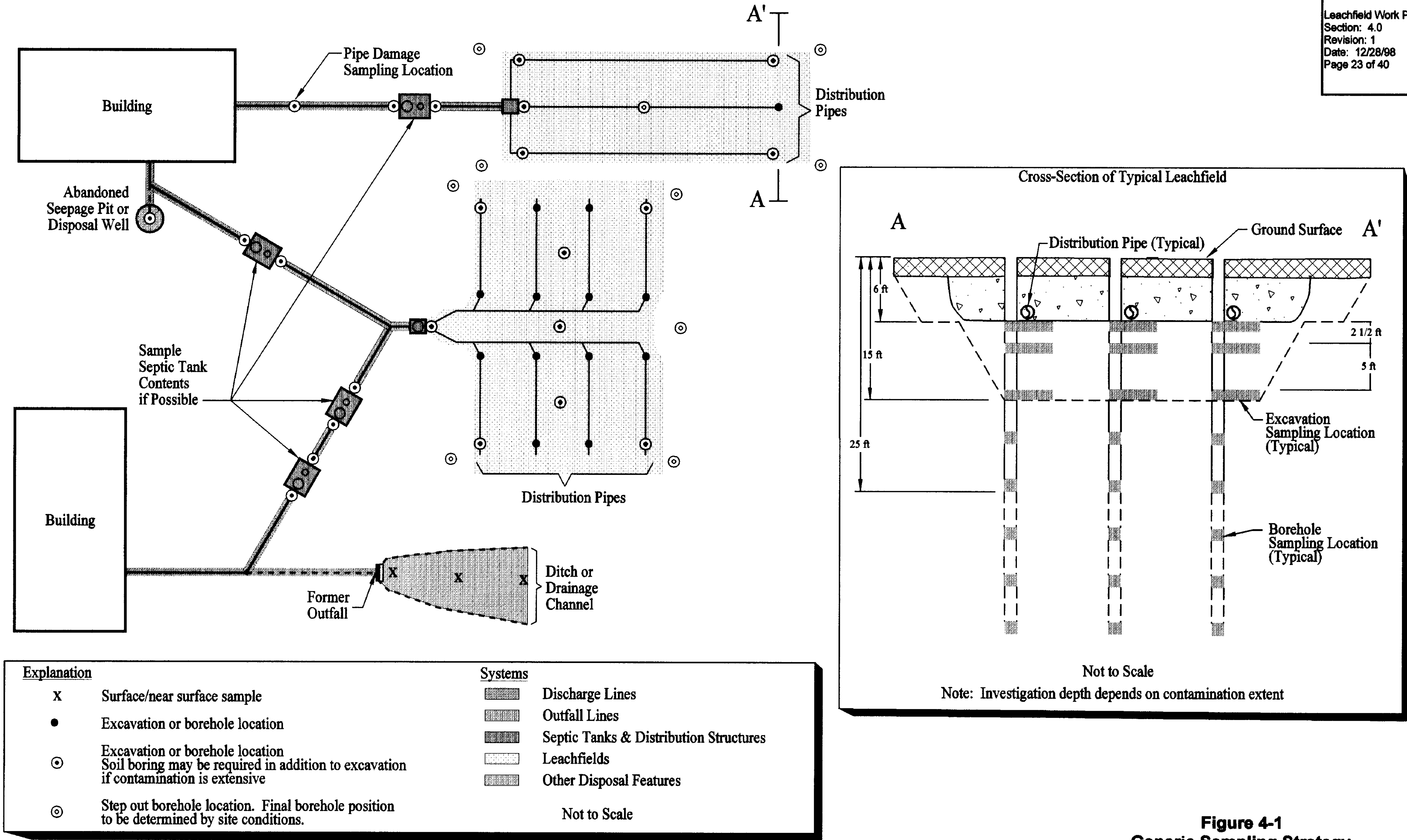
A radio locator which emits a signal that can be tracked at the ground surface may be coupled with the video setup and introduced into the piping. Several leachfield system components can be inspected and physically mapped by tracking the camera head inside the piping network. A radiation detector (beta and gamma probe) may be attached to the camera to qualitatively measure radiation levels within the surveyed components. The video system can be decontaminated using standard techniques and equipment, and can be sheathed in disposable plastic to simplify decontamination activities, if necessary.

4.1.2 Intrusive Investigation

Intrusive investigation will be required to determine the extent of contamination associated with the leachfield system features covered by this Work Plan. Both trenching (excavation) and drilling are viable techniques for investigating leachfield systems. Trenching is often favored over drilling, because it allows inspection of pipe connections, component condition, and the relative placement of installed materials within the leachfield without the uncertainty associated with other types of subsurface investigation (i.e., drilling). Both trenching and drilling allow an assessment of horizons within the leachfields, definition of the leachfield base, and determine if the location is within the boundaries of the leachfield.

Intrusive investigation will locate critical leachfield system components and allow sampling from within and around them. Examples of potential sample locations are provided in Figure 4-1. The sample collection method, actual (rather than generic) sample locations, and number of samples required will be determined in the CAIPs. Samples may be recovered from the general locations shown in Figure 4-1 using a combination of intrusive investigation techniques selected in the CAIPs. The following description of general intrusive investigation activities assumes that excavation will be the chosen investigation method. Modifications required if drilling is the chosen investigation method are subsequently described.

Collection system features (e.g., septic tanks, distribution structures, pipe disruptions) will be located using excavations. The dimensions of these excavations will be minimized to reduce spoils. Exploratory excavations conducted to locate features with unknown or poorly constrained locations will typically have larger dimensions than excavations required for sample collection from features with known locations. Spoils will be staged on plastic sheeting (i.e., Visqueen) adjacent to the excavations or managed as investigation-derived waste (IDW) according to Section 5.0 of this Work Plan and the CAIPs. Spoils not managed as IDW will be returned to the excavation when access to



Note: Leachfield septic systems shown are hypothetical
and as shown in Figure 3-1

Figure 4-1
Generic Sampling Strategy for Leachfield Systems

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the subsurface at a particular location is no longer required. Samples required for the investigation will be collected as described in Section 4.1.4.

Excavations will also be used to locate and collect samples from leachfields included in the distribution systems. Leachfield investigation will concentrate on the proximal and distal ends of the leachfield distribution pipes. Leachfield trenching will consist of linear excavations perpendicular to the long axis of the distribution pipes and will expose the pipes for inspection and sampling. Trenching activities will uncover only enough pipe or material to expose sampling horizons. Spoils and IDW generated will be managed as described for collection system excavations.

If drilling is the chosen investigation alternative, boreholes will be positioned to intersect the assumed location of subsurface leachfield system features. The drilling based investigation strategy will be as similar as possible to the excavation based investigation strategy. Samples will be collected as close as possible to the planned sample location (e.g., a outfall or pipe). In some cases, a combination of drilling and trenching will be used with excavations to allow samples to be collected around collection system features and drilling within radiologically controlled areas such as leachfields. Subsurface feature locations are more ambiguous when drilling, but in most cases the location of the feature to be sampled may be determined from video surveys, geophysical surveys, or inspection of engineering drawings.

4.1.2.1 Additional Intrusive Investigation

Supplementary drilling may be required if contamination exceeds the maximum depth of the chosen investigation technique (i.e., excavation) (Figure 4-1). These boreholes will be positioned at locations where collection of samples below field screening levels or PALs was not possible during the first stage of sampling. The minimum depth of these boreholes will allow recovery of two consecutive samples below field screening levels and allow field personnel to track the vertical extent of contamination. Samples will be collected in 1.5-m (5-ft) intervals, but sample depths will not necessarily be duplicated for boreholes drilled through locations previously sampled by excavations.

Additional stepout borings outside the boundaries of the leachfield may be required if supplementary drilling at leachfield locations fails to constrain the vertical and lateral extent of potential contamination. Boreholes outside the leachfield boundaries may be required if contamination is more extensive than expected or if a leachfield region received preferential effluent flow. Preferential flow could occur within a leachfield system as a result of blockage of distribution lines, a broken distribution box, pipe disruptions, or other system failures. This condition could be identified by recognizing damaged components during video surveys or excavations, or an unexpected distribution of screening or analytical results. If unexpected effluent disposal conditions produced a contamination plume with significant impact outside the leachfield boundaries, an initial borehole will be placed near the estimated contaminant plume center. If the contamination extent is not constrained by data from the initial borehole, at least three stepouts will be drilled in a triangular pattern emanating from the center. Initial stepouts will be constructed using the same total depths as other investigation boreholes and 4.5 m (15 ft) horizontal resolution.

4.1.3 Field Screening

All field screening performed in support of this project will be considered Category I data as defined in the QAPP (DOE/NV, 1996c). Calibration and preventative maintenance of field screening equipment will also be conducted according to the QAPP (DOE/NV, 1996c), manufacturers' specifications, and the requirements of the CAIPs. Field screening may be conducted to indicate the presence of radiological constituents, volatile organics, TPH, and other COPCs. Field screening data will serve three primary purposes. First, the data will provide qualitative or semiquantitative measurement of potential subsurface contamination within the established study areas. Second, the data will be used to assist sample selection for laboratory analysis. Typically, these samples are those identified by field screening as having the highest contamination concentrations if contamination is present. In some cases, additional samples with lower field screening results may be submitted to facilitate contamination plume definition or waste management decisions. Third, the data will provide a mechanism for guiding further investigation. If field screening results exceed CAU-specific field screening levels, additional excavation or drilling will be conducted to allow continued sampling as appropriate. Field screening will be used to establish vertical and lateral contamination boundaries determined by two successive, field screening measurements below field screening levels. Soil samples will be collected at these depths for laboratory confirmation of the maximum contamination extent. Laboratory results are of higher quality than field screening data and will generally be relied upon to determine the nature and extent of contamination; however, both field screening data and laboratory results may be considered.

4.1.4 Sampling

All sampling activities will be conducted in compliance with requirements of the QAPP (DOE/NV, 1996c) and the CAIPs. The primary sampling objectives are to evaluate COPC concentrations and define contaminant extent. Sampling data will also be used to determine waste types for appropriate waste characterization. The sampling approach will consist of discrete field screening and environmental sampling during the investigation. Samples will typically be recovered from fixed intervals (i.e., every 1.5 m [5 ft]) or at predetermined locations with respect to collection system components or leachfield features (i.e., Figure 4-1). Additional samples may be collected at the Site Supervisor's discretion. The investigation results will be considered in the corrective action decision process.

Soil samples will be collected within and around collection system features to investigate possible release points in the collection systems contributing to leachfields. Features that may be sampled include septic tanks, distribution structures, and disrupted pipes. Specific combinations of system features are unique to each CAU and will be identified during the DQO process and presented in the CAIPs. The required depth intervals, specific sampling locations, and the sample collection rationale will be further discussed in the CAIPs. Additional sampling may be conducted from greater depths or using lateral step-outs if results show that concentrations exceed field screening levels or PALs.

In general, an investigation sample will be collected from the underlying soil at both the outfall and inlet ends of septic tanks. A soil sample will be collected from below the outlet-end of leachfield distribution structures (i.e., a distribution box). If a distribution box or diversion structure does not exist, then the sample will be collected at a similar place or feature (i.e., the distribution center or fork). These soil samples will be collected below the base of the distribution structure. Additionally, water or sludge present in septic tanks will be sampled if recoverable.

Soil samples will be collected near the distribution pipes in the leachfields. Investigation of soil underlying individual distribution pipes assures the selection of sampling points most likely to have been contaminated by effluent disposal. This biased sample selection should provide a "worst-case" scenario if contamination is present.

A soil sample from below the leachfield base (leachfield/native soil interface) will be collected and submitted to analytical laboratories for geotechnical/hydrological analysis. A bioassessment will be performed if hydrocarbon or certain VOC contamination is anticipated. Geotechnical/hydrological analysis and bioassessment samples will be collected using a split spoon sampler with sleeves or packed in appropriate jars depending on the investigation technique used to recover the samples.

Samples to be analyzed by the off-site laboratory will be selected based on the results of field screening and planned sampling intervals. The actual number of samples analyzed will depend on decisions made in the field. Additional (or fewer) characterization samples may be sent for off-site analysis based on field screening results and the results of sample analyses when they become available.

If sampling results indicate concentrations exceed specified PALs for confirmatory "clean" samples, the conceptual model or field screening may have failed. If this occurs, contamination has not been bounded and additional locations may be selected (i.e., lateral step-outs) and/or subsurface investigations may be conducted to further track the vertical extent of contamination.

4.1.4.1 Quality Control Samples

Quality control samples will be collected as required by the Industrial Sites QAPP (DOE/NV, 1996c). These samples will include trip blanks, equipment blanks, field blanks, field duplicates, and matrix spike/matrix spike duplicate samples. Except for trip blanks, all QC samples will be analyzed for applicable parameters in Table 3-1 as identified in the individual CAIPs. If required, trip blanks will only be analyzed for VOCs. One set of QC samples will be collected for every twenty (or fraction of twenty) environmental characterization samples submitted to the laboratory. Additional QC samples may be submitted at the discretion of the Site Supervisor.

4.1.4.2 Decontamination and Sample Collection Techniques

Clean sampling equipment and containers will be used for each sampling event. All equipment which contacts the soil will be decontaminated in accordance with written and approved procedures consistent with the DOE/NV Environmental Restoration Division (ERD) Standard Operating Procedure ERD-05-701, "Sampling Equipment Decontamination," Rev. 1 (DOE/NV, 1998b) or as appropriate for special equipment being decontaminated (i.e., steam-cleaning core barrels). This will minimize the potential for cross-contamination between sample locations.

Only soil will be sampled; leachrock will be excluded from investigation sampling. All samples collected for laboratory analysis will be from fresh media. With the exception of radiological screening, sample media used for field screening will not be reused or submitted to the laboratory.

Soil samples will typically be collected directly from the excavation or from the backhoe bucket (in the case of trenching) or near the bottom of each sample interval within the core barrel sampler (for drilling or direct push methods). The first portion of soil will be retained for the analytes most sensitive to volatilization. The next portion of the soil will be retained for field screening. The third portion will be retained for the other analytes. The remaining soil will be used if additional sample volume is needed for samples that are not sensitive to volatilization. If more volume for a given sampling event is required, then sample collection will be extended laterally at the same depth if possible. The entire core will be field screened for elevated radiological activity (e.g., alpha/beta, or alpha/beta and gamma) prior to sample aliquot collection. The same aliquot partitioning, sample handling, and screening will be adapted for either the trenching or drilling alternatives as required.

4.1.5 Documentation

Records will be kept of the soil description, field screening measurements, and all other relevant data. Approved chain of custody procedures will be followed to assure data defensibility. Project records will be maintained according to the Industrial Sites QAPP (DOE/NV, 1996c) and written and approved procedures, plans, or instructions that meet the requirements of the ERD Standard Operating Procedures.

4.1.6 Additional Methods

Unique designs, requirements, and parameters associated with individual leachfield CAUs may require development of additional methods not presented in this Work Plan. Additional methods will be developed in the CAIPs if required.

5.0 Waste Management

Management of IDW will be based on regulatory requirements, field screening results, process knowledge, and laboratory analysis results from study area investigation samples. Administrative controls including decontamination procedures and waste characterization strategies will minimize waste generated during investigations.

Waste other than soil, such as disposable sampling equipment, personnel protective equipment (PPE) and decontamination rinsate, is considered potentially contaminated waste only by virtue of contact with potentially contaminated media. Therefore, sampling and analysis of the IDW, separate from analyses of site investigation samples may not be necessary. The data generated as a result of site investigation and process knowledge will be used whenever possible to assign the appropriate waste type (i.e., sanitary, hydrocarbon, hazardous, polychlorinated biphenyls [PCBs], low-level radioactive [LLW], or mixed) to the IDW. The action levels for IDW contaminants are provided in Table 5-1.

Table 5-1
Action Levels for Investigation-Derived Contaminants

Parameter	Action Level	Source	Comments
TPH[a]	100 mg/kg[b]	NAC[c] 445A.2272	Regulated by the NDEP[d]
TCLP or Total VOCs[e], SVOCs[f], and RCRA[g] metals	Table 1 of 40 CFR 261.24	40 CFR 261[h]	---------------
Total Polychlorinated Biphenyls (PCBs)	50 ppm	40 CFR 761.1(b)[i] NAC 444.940 to 444.9555[j]	NDEP requires manifesting as hazardous waste for shipping and disposal purposes
Radiological	Isotope-specific	NTS POC[k]	----------------

[a]Total Petroleum Hydrocarbons
[b]Milligram(s) per kilogram
[c]*Nevada Administrative Code* (NAC, 1997)
[d]Nevada Division of Environmental Protection
[e]Volatile Organic Compound(s)
[f]Semivolatile Organic Compound(s)
[g]Resource Conservation and Recovery Act
[h]Code of Federal Regulations (CFR, 1997b)
[i] *Code of Federal Regulations (CFR, 1998)*
[j] *Nevada Administrative Code (NAC, 1997)*
[k] *Nevada Test Site Performance Objective Criteria (POC) for Certification of Nonradioactive Hazardous Waste (BN, 1995)*

TCLP - Toxicity Characteristic Leaching Procedure

Sanitary, hydrocarbon, hazardous, PCBs, radioactive, and/or mixed waste, if generated, will be managed and disposed of in accordance with applicable U.S. Department of Energy (DOE) Orders, U.S. Department of Transportation (DOT) regulations, *Resource Conservation and Recovery Act* (RCRA) regulations, *Nevada Revised Statutes* (NAC, 1996b), agreements and permits between the DOE and NDEP, and site specific requirements. Decontamination activities will be performed according to approved contractor procedures (IT, 1996) specified in the contractor field sampling instructions and as appropriate for the COPCs likely to be identified at the leachfield sites.

5.1 Waste Minimization

Corrective action investigation activities have been planned to minimize IDW generation. When possible, disturbed media (such as soil removed during trenching) will be returned to its original location. This will be specified in the site specific CAIP. Media, such as soil which must be managed as waste, as well as other IDW will be segregated to the greatest extent possible to minimize generation of hazardous, radioactive, or mixed waste. Hazardous material use at the sites will be minimized to limit unnecessary generation of hazardous or mixed waste. Decontamination activities are planned to minimize the use of rinsate.

5.2 Potential Waste Streams

Process knowledge will be reviewed during the DQO process to identify COPCs that may have been released to the leachfield and waste types (hydrocarbon, hazardous, low-level, mixed) that may be generated during the investigation process. Radioactive or mixed wastes are anticipated at several potential sites. There is a potential that hydrocarbon, hazardous, PCBs, and/or sanitary wastes will be generated during the field investigation activities. In addition, the reagents used in the TPH and immunoassay field-screening methods (if performed) may produce small quantities of hazardous wastes. If hazardous waste is produced by field screening, it will be segregated and managed as a separate waste stream. Investigation derived wastes typically generated during investigation activities may include the following:

- Potentially contaminated media
- Soil, spent solvent, rinsate, disposable sampling equipment and PPE contaminated by field screening activities

- Potentially contaminated disposable sampling equipment (such as plastic, paper, sample containers, aluminum foil, spoons, scoops, and bowls)
- Potentially contaminated personal protective equipment
- Potentially contaminated decontamination rinsate

Each waste stream generated will be segregated, and additional segregation may occur within each waste stream.

5.3 Investigation-Derived Waste Management

Investigation derived waste may be managed in drums, bins, roll-off boxes, or other containers as appropriate. Specific IDW management methods will be identified in individual CAIPs.

Containers used to accumulate IDW shall be inspected prior to use. Containers that are damaged or can not be access controlled when required (e.g., drums of LLW must be able to be locked or fitted with a tamper-indicating device), shall not be used. Waste containers will be marked as "Hazardous Waste Pending Analysis." Each container will also be marked with a description of the contents and the accumulation start date as appropriate. Waste will be traceable to its source and/or samples considered analogous to the waste (such as waste PPE associated with a sample). Traceability will be maintained by assigning unique waste tracking numbers to each container and by maintaining records that trace the waste back to the source, to a specific sample location, and/or specific sample numbers). This information will be logged in a contractor-specific waste management logbook.

If radiological COPCs are expected at a leachfield CAU addressed by this work plan, radiological swipe surveys may be conducted on reusable sampling equipment and the PPE and disposable sampling equipment waste streams exiting from within the controlled area. This will allow the segregation of radioactive and nonradioactive waste and materials. Removable contamination limits, as defined in Table 2-2 of the *NV/YMP Radiological Control Manual* (Gile, 1996), will be used to determine if such materials may be declared nonradioactive. Additional sampling may be used to aid in determining if a particular waste unit (e.g., drum of soil) contains low-level radioactive waste.

Characterization of the IDW will be based on laboratory results and process knowledge. Once characterized, waste will be marked and managed in accordance with the requirements that pertain to the type of waste that has been identified.

Management requirements for sanitary, hydrocarbon, hazardous, low-level, and mixed wastes are discussed further in the following sections.

5.3.1 Sanitary Wastes

Sanitary waste will be contained in plastic bags, dumpsters, or drums and transported to an approved sanitary waste landfill.

At sites where radiological contamination is a potential concern, sanitary waste generated outside radiologically controlled areas will be disposed of as described in the previous paragraph. When possible, sanitary waste generated within radiologically controlled areas will be swiped to determine if the removable and total surface contamination is under the limits defined in Table 2-2 of the *NV/YMP Radiological Control Manual* (Gile, 1996).

5.3.2 Hydrocarbon Waste Management

Hydrocarbon waste such as soil containing more than 100 ppm of TPH contamination will be transported to an appropriately permitted hydrocarbon waste management facility after the waste is fully characterized.

5.3.3 Hazardous Waste Management

Suspected hazardous wastes will be managed in accordance with RCRA and State of Nevada hazardous waste management regulations, interpreted as follows. Suspected hazardous wastes will be placed in DOT-compliant containers (49 CFR 172 [CFR, 1997a]). The containers shall be compatible with the waste in accordance with the requirements of 40 CFR 265.172 (CFR, 1997d). Containers shall be handled and inspected in accordance with the requirements of 40 CFR 265.173 and 174, respectively (CFR, 1997b). Based on process knowledge, incompatible wastes shall be managed in accordance with 40 CFR 265.177 (CFR, 1997d) (i.e., shall not be placed in the same container), and they shall be separated so that in the event of a spill, leak, or release, incompatible wastes shall not contact one another.

Hazardous wastes will be characterized in accordance with the requirements of 40 CFR 261 (CFR, 1997b). Characterization will be based on laboratory results and process knowledge. After receipt of analytical results, hazardous wastes, if identified, will be labeled and marked in accordance with the requirements of 40 CFR 262.32 (CFR, 1997b) and State of Nevada requirements.

Hazardous waste management methods, including the establishment of Satellite Accumulation Areas or a 90-day Hazardous Waste Accumulation Area, will be employed to temporarily accumulate IDW, pending characterization. These methods will be appropriate for the amount of waste being accumulated and compliance with applicable State of Nevada and federal requirements.

Suspected hazardous wastes will be accumulated at or near the site of generation for up to 90 days in accordance with 40 CFR 262.34 (CFR, 1997c). Prior to or on the 90th day of accumulation as specified in 40 CFR 262.34(a) (CFR, 1997c) or generation of wastes in excess of quantity limits specified in 40 CFR 262.34(c)(1) (CFR, 1997c), hazardous waste will be shipped by a licensed/permitted hazardous waste transporter to a permitted treatment, storage, and disposal facility. If hazardous waste must remain on site for longer than 90 days due to unforeseen, temporary, and uncontrollable circumstances, a letter requesting an extension for up to 30 days will be sent to the NDEP in accordance with 40 CFR Part 262.11(b) (CFR, 1997c). A copy of the uniform hazardous waste manifest shall be provided to the State of Nevada.

5.3.4 Low-Level Radioactive Waste Management

Low-level radioactive waste, if generated, will be managed in accordance with the contractor-specific waste certification program plan, DOE Orders, and the requirements of the Nevada Test Site Waste Acceptance Criteria (NTSWAC) (DOE/NV, 1997). Waste drums containing soil, PPE and disposable sampling equipment, and rinsate shall be staged at a designated Radioactive Materials Area (RMA) when full or at the end of an investigation phase. The waste drums will remain at the RMA pending certification and disposal under NTSWAC requirements (DOE/NV, 1997).

Contractor-specific waste tracking tags will be used and may be attached to the inside liner, the exterior of the drums, or marked with the drums's unique identification number, and stored with the contractor-specific logbook. The borehole number must be placed on each tracking tag. Drum inspection and absorbent addition shall be documented on the appropriate form.

5.3.5 Mixed Wastes

Mixed waste, if generated, shall be managed in accordance with RCRA (40 CFR 262) (CFR, 1997b) and State of Nevada (NAC, 1990) regulations as well as DOE requirements for radioactive waste, interpreted as follows. Where there is a conflict in regulations or requirements, the most stringent shall apply. For example, the 90-day accumulation time limit and weekly inspections per RCRA regulations will be applied to mixed waste even though it is not required for radioactive waste. Conversely, while RCRA does not require documented traceability, the waste acceptance program for low-level radioactive waste does; therefore, traceability shall be documented as described in Section 5.3.4.

In general, mixed waste shall be managed in the same manner as hazardous waste, with added mandatory radioactive waste management program requirements. Pending characterization and confirmation of its regulatory status, suspected mixed waste will be managed in accordance with applicable regulations and requirements and will be marked with the words "Hazardous Waste Pending Analysis." However, once the waste determination is made, or the RCRA 90-day time requirement draws to an end, mixed waste shall be transported via a permitted hazardous waste hauler to the NTS transuranic waste storage pad for storage pending treatment or disposal. Mixed waste with hazardous waste constituents below land disposal restrictions may be disposed of at the NTS Area 5 Radioactive Waste Management Site. Mixed waste not meeting land disposal restrictions will require development of a treatment plan under the requirements of the Mutual Consent Order between DOE and the State of Nevada (NDEP, 1995).

6.0 Duration and Records Availability

6.1 Duration

Tentative activity schedules will be provided for each site in the CAIPs.

6.2 Records Availability

This document is available in the DOE public reading rooms located in Las Vegas and Carson City, Nevada, or by contacting the DOE project manager. The NDEP maintains the official Administrative Record for all activities conducted under the auspices of the FFACO.

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Appendix A

Area 25 Leachfields Facility Description

A.1.0 Area 25 Leachfield Facility Description

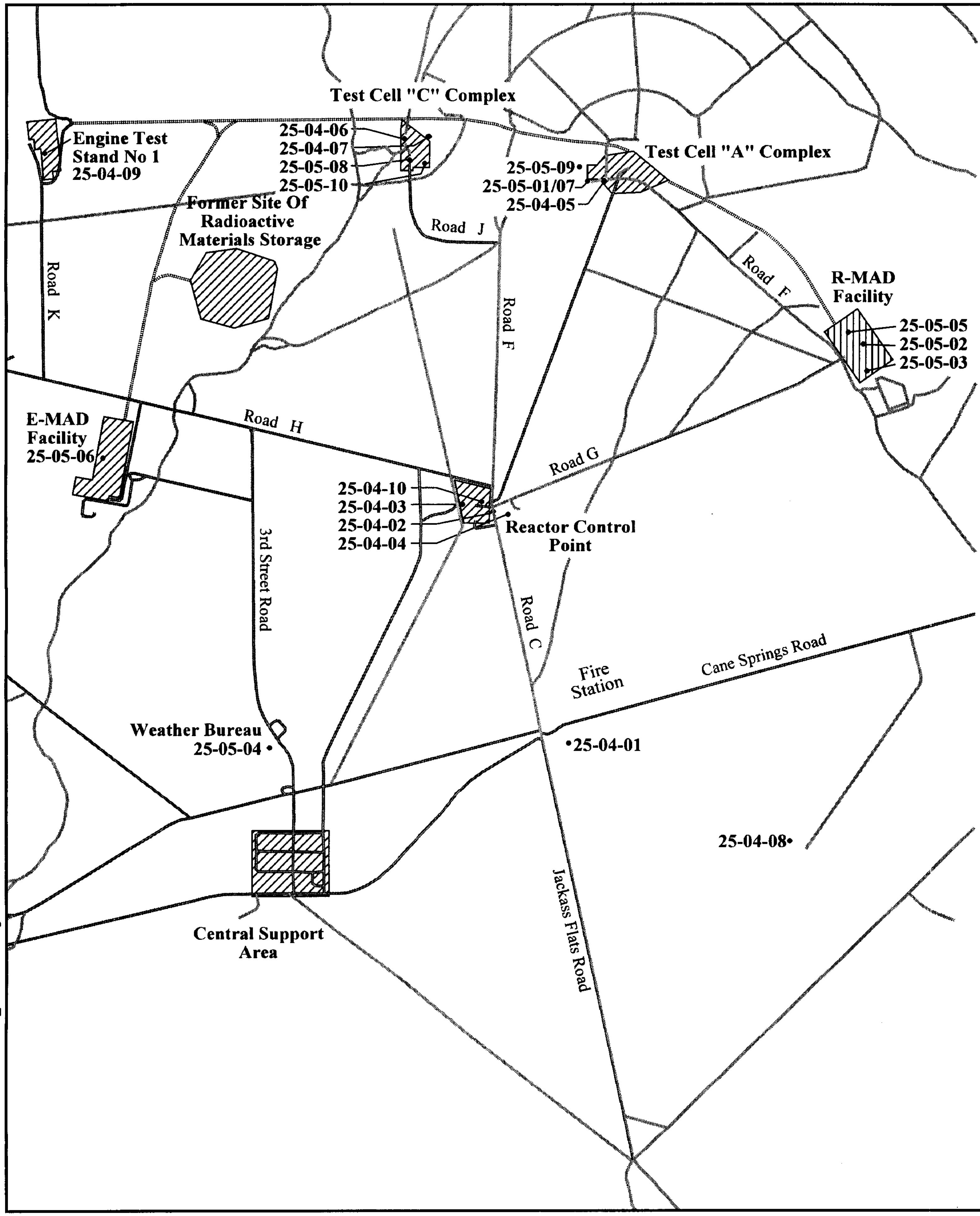
This Appendix contains information about Area 25 of the NTS applicable to the CAUs and CASs identified in Figure A.1-1. The information in this Appendix was developed during the initial preparation for the CAU 261 CAIP. Because the information is applicable to other CAUs, it is included as an appendix to the work plan to reduce efforts and redundancy. This information will be referenced in all applicable CAIPs.

A.1.1 Physical Setting

Topographically, Area 25 (Jackass Flats) is an intermontane valley bordered by highlands on all sides except for a large drainage outlet to the southwest. Elevations range from 1,020 to 1,670 m (3,400 to 5,600 ft). The dominant plant community is *Larrea-Ambrosia* associated with a transition zone between the Mojave and Great Basin Deserts (DOE, 1988a).

The Jackass Flats basin is underlain by alluvial, colluvial, and volcanic rocks of Cenozoic age. The alluvium and colluivium are above the saturated zone throughout most of Jackass Flats. Paleozoic sedimentary rocks, limestone, and dolomite, occur at greater depths. The Paleozoic rocks are productive aquifers throughout the region but locally are considered too deep (~518 m [1,700 ft]) to be an economic source of water. In western Jackass Flats, a highly fractured welded-tuff aquifer (Topopah Spring Member) is an important water-producing unit. Groundwater flow for the region is generally to the south and southwest (DOE, 1988a).

Surface water flow is ephemeral and is a function of variations in annual climate patterns. Climate in this area is affected by the rain shadow of the Sierra Nevada. The average annual rainfall for Jackass Flats is approximately 10 centimeters (4 inches). Most of the precipitation (~65 percent) for the area occurs between October and April as a result of Pacific coast storms. The remaining precipitation occurs in the summer months and is the result of convection of moist air brought on by southeasterly winds from the Gulf of Mexico, or cyclonic lows developed over the Great Basin. Summer showers are generally isolated and precipitation is variable. Occasionally, storms move directly from the Gulf of California, resulting in wide-spread heavy rain (DOE, 1988a).



Corrective Action Unit	FFACO Corrective Action Site	Septic Tank System[1]	Area 25 Septic Tank
361	25-04-01	A25SS	Security Station
361[2]	25-04-02[2]	A25J5	Warehouse J5
361	25-04-03	A25PAN	Pan Am Trailers
361	25-04-04	A25RCPGA	Reactor Control Point
361[3]	25-04-05[3]	A25TCA	Test Cell A
361	25-04-06	A25TCC1	Test Cell C Tank 1
361	25-04-07	A253210	Test Cell C Building 3210
361	25-04-08	A25BRE	BREN TOWER
361	25-04-09	A25ETS	Engine Test Stand
361	25-04-10	A25RAD	Rad Safe Building
261	25-05-01/07		Test Cell A: Leachfield[4]
262	25-05-02		RMAD Leachfield: Buildings 3110 and 3126
262	25-05-03		RMAD Leachfield: Building 3125
263	25-05-04		Central Propellant Storage Area: Building 4839
262	25-05-05		RMAD Leachfield: Building 3110 Sanitary
264	25-05-06		EMAD Decontamination Area Leachfield
265	25-05-08	A25TCC2	Test Cell A Tank 2
266	25-05-09		Treatability Test Facility Leachfield
267	25-05-10		Test Cell C Leachfield

[1] Site included in Preliminary Characterization of Abandoned Septic Tank Systems (DOE/NV--414, December 1995; REECo, 1995)
[2] No longer considered an FFACO Corrective Action Site
[3] Numbers are under FFACO revision
[4] See Comments in CAU 261 CAIP, Section 2.5

Explanation

N

- Various Areas or Compounds
- Railtrack
- Road
- Road
- Corrective Action Site

Scale

0 1000 2000 Feet

0 .5 2 Kilometers

**Figure A.1-1
NRDS Installation Leachfields and Related CASs, Nevada Test Site**

h:\area_25\2802b01.dgn

18-SEP-1998

An overview of the area hydrogeology including depths to groundwater are provided in the *Yucca Mountain Site Characterization Plan* (DOE, 1988b).

A.1.2 Operational History

This section consists of a summary of past operations at the NTS Area 25 as was provided in the DOE Environment, Safety and Health Office of Environmental Audit publication; *Environmental Survey Preliminary Report, Nevada Test Site* (DOE, 1988b). Developments since this 1988 document was published, such as facility refurbishments for research-related projects will be discussed in more detail in the CAIPs.

In the early 1960s, the Atomic Energy Commission and the National Aeronautics and Space Administration (NASA) negotiated an interagency agreement to establish and manage a test area known as the Nuclear Rocket Development Station (NRDS). The NRDS, located in Area 25, was used from the 1960s to 1973 to test reactors, engines, and rocket stages as part of a project to study the feasibility of developing nuclear reactors for the United States space program.

Within the (Area 25) test area, several installations were built, covering approximately 8,000 acres of land. These installations were the Central Support Area (CSA), Reactor Control Point (RCP), Engine Maintenance Assembly and Disassembly Building (E-MAD), Reactor Maintenance Assembly and Disassembly Building (R-MAD), Engine Test Stand, Test Cell “A,” and Test Cell “C” (see Figure A.1-1). The following is a brief description of each installation.

The CSA provided support for NRDS users through a technical shops building, an administrative and engineering building, a medical facility, warehousing and storage areas, and facilities for radiographics support.

The RCP provided control for and support of the reactor test programs at Test Cell “A” and Test Cell “C.” The facility included a control building, technical services building, technical operations building, administrative building, cafeteria, warehouse, service station, and a weather station.

The E-MAD facilities were used to assemble and prepare Nuclear Engine for Rocket Vehicle Application (NERVA) engines for testing; refurbish engines for additional testing; and disassemble and conduct detailed, post-mortem inspection of tested rocket engines and components. The E-MAD building is divided into seven areas. These areas include a cold assembly area, a hot maintenance and disassembly area, post-mortem cells, high- and low-level cells, operating galleries, and a shop and service area. Specialized equipment used for E-MAD consisted of a railroad and transport system, which included a crane and handling/transfer systems.

The R-MAD consisted of two assembly bays where nuclear rocket reactors were assembled and installed on test cars. The R-MAD compound was also equipped with a 180-square-meter (2,560-square-foot) decontamination facility which was accessible via the railroad system. Railroad trackage was provided to allow remote-controlled transport of the reactor from the assembly bay to the test cell, approximately 2.4 kilometers (km) (1.5 miles [mi]) away; and after testing, back to the disassembly bay.

The Engine Test Stand was designed for the ground developmental testing of a downward-firing, NERVA-type engine in a flight-simulated environment.

Test Cell-A was designed for testing nuclear rocket reactors. During reactor operations, the enclosed areas of the test cell were made inert with nitrogen, and the entire facility was operated from the RCP. The facility was constructed with the piping and systems necessary for the storage and transfer of fluids such as liquefied and gaseous hydrogen, nitrogen, helium, liquid oxygen, and demineralized cooling water. The facility was equipped with a 190,000-liter (L) (50,000-gallon [gal]) elevated water reservoir and a 380,000-L (100,000-gal) tank for cooling water.

Test Cell-C was operated in the same manner as Test Cell-A for testing nuclear rocket reactors. Test Cell-C was constructed with piping and systems required to handle numerous gases and liquids. The facility was equipped with 570,000-L (150,000-gal) elevated water reservoir, a 950,000-L (250,000-gal) water tank used to store heated, borated water, and a 850,000-L (225,00-gal) water tank used to store 200-degree water supplied to a water/hydrogen heat exchanger. In addition, a cryogenic evaluation laboratory was located in the facility.

In 1969, the reactor development, engine testing, and rocket development activities were concluded at the NRDS. When Project Rover was completed in 1973, the NRDS area was returned to NTS for close-down. Following close-down, the facilities were deactivated and decontaminated for their potential transfer to other DOE programs.

In the late 1970s, the United States Air Force/Ballistic Missile Office selected Area 25 for development and testing of the Missile Experimental (MX) support systems and programs. Since 1980, Area 25 has been primarily used for nonweapons research and development.

A.1.3 Waste Inventory

Information from interviews with former NTS workers, interpretations of engineering drawings and aerial photos, and descriptions of operational practices has revealed that facility leachfields and collection systems were designed and installed to receive wastewaters. Process effluents and potential waste streams were generated during routine operations throughout Area 25 facilities. In general, operations at Area 25 consisted of general decontamination of equipment, cleaning operations with solvents, acid neutralization processes, vehicle washdown, miscellaneous laboratory processes, reactor coolant operations generating wastewaters, and sanitary sewer drains.

Detailed records of chemical or radioactive effluents disposed at the various facilities may not be available. Processes within buildings and descriptions of specific compounds or constituents that may have been stored, used, or generated within source buildings during the various years of operation are limited (DOE, 1988a). Additionally, quantities of process water and other effluent generated or discharged during the operational periods is not well documented (DOE, 1988a).

Site-specific information, when available, will be contained in the individual CAIPs. The DQO process evaluates available information, and a detailed waste inventory for each CAU will be developed and listed in the CAIPs.

A.1.4 Release Information

The NRDS reactor, engine test, and decontamination operations released an undocumented quantity of radioactive waste to the environment, mostly as gaseous and particulate emissions. The decontamination of equipment and test facilities resulted in mixed chemical and radioactive waste. Specific releases for each of the sites at the NRDS testing facility are not known (DOE, 1988a).

The source of potential contamination at each leachfield and associated collection system is wastewater effluent(s) that were channeled from building drains through underground lines, into septic tanks, and released into leachfields. In some cases the collection system lines released effluents to the ground surface via outfalls or leaching pits. If systems were modified (or extended), a complete connection would result in the drainlines reaching the leachfields. The leachfields were designed for liquid to be dispersed over an area just below the basement of installed leachfield materials and to percolate down into the subsurface soil. The driving force for downward migration of the contamination was the discharge from the septic tanks, which no longer exists if the tank has been abandoned or inactive, therefore not receiving input of effluent.

Individual CAIPs will assess if there is any evidence of documented leaks or releases at individual systems.

A.1.5 Investigative Background

Several radiological surveys were conducted by Reynolds Electrical & Engineering Company, Inc. (REECo) Environmental Sciences Department from 1973 to 1983 of the NRDS facilities. A preliminary survey was conducted in 1973-1974 to access the scope, nature, and location of existing radioactive contaminated areas. This survey did not include radioactive material storage sites, buried waste lines, leachfields, or land area debris (DOE, 1988a).

A more detailed radiological survey was conducted in 1976 and included the railroad track system, the TNT site, areas near the fenced R-MAD and E-MAD compounds, Test Cell "A," Test Cell "C," Engine Test Stand-1, contaminated waste dumps, and the Radioactive Materials Storage Facility. From 1978-1983 radiological surveys consisted of the collection of thousands of swipe samples, soil samples, and portable instrumentation readings. These surveys were conducted in conjunction with an extensive cleanup project that included the removal of 9,940 cubic meters (13,000 cubic yards) radioactive material for buried disposal in Area 3 or Area 5 Radioactive Waste Management Site at the NTS. The types and levels of any radioactive contamination present after the clean up was posted with warning signs and barricades (DOE,1988a).

A soil sampling effort consisting of several NTS sites was performed by the DOE and a subcontractor and a report with the findings was published; *Environmental Survey Preliminary Report*, Nevada Test Site, Nevada, 1988 (DOE, 1988b). Analytical results for certain selected leachfield soil samples and wastewater-effluent (liquid and sludge that remained in septic tanks) samples are contained in that report.

REECo and subcontractor personnel conducted sampling of 20 septic tank systems; including the contents of septic tanks, leachfield soil samples, and a set of "background soil" samples at the NTS during 1993 and 1994 (REECo, 1995). The sample locations and the names assigned to the septic tank systems are presented in Figure A.1-1. The purpose was to determine the presence and concentrations of select organic, inorganic, and radioactive constituents in the inactive septic-tank systems (REECo, 1995). Sample results as they may relate to site conditions at the various sites will be discussed in individual CAIPs.

Appendix B

Project Organization

B.1.0 Project Management

The DOE/NV Project Manager is Janet-Appenzeller Wing, telephone at (702) 295-0461.

The names of the project Health and Safety Officer and the Quality Assurance Officer can be found in the appropriate DOE/NV plan. However, personnel are subject to change, and it is suggested that the Project Manager be contacted for further information. The Task Manager will be identified in the FFACO Biweekly Activity Report prior to the start of field activities.

Appendix C

NDEP Comments

NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET
(Page 1 of 4)

1. Document Title/Number: Work Plan for Leachfield Corrective Action Units: Nevada Test Site and Tonopah Test Range, Nevada	2. Document Date: 07/01/98
3. Revision Number: Draft	4. Originator/Organization: IT Corporation
5. Responsible DOE/NV ERP Subproject Mgr.: Clayton Barrow	6. Date Comments Due:
7. Review Criteria:	
8. Reviewer/Organization/Phone No.: Gregory A. Raab / Bureau of Federal Facilities / (702) 486-2867	9. Reviewer's Signature:

10. Comment Number/ Location	11. Type*	12. Comment	13. Comment Response	14. Accept
1. Page 4, Section 2.0, 1st para., last sent.		The underlined portions are the desired inserts or additions, and strikeouts are those to be deleted: ...the discharge from the septic tanks~~, which~~ <u>. This</u> no longer exists ...	The text was revised as follows: "The driving force for potential downward migration of the contamination was effluent discharge to the leachfields via septic tanks. All of the leachfield systems considered under this Work Plan are inactive."	Yes
2. Page 5, Section 3.0, 1st para., last sent.		The underlined portions are the desired inserts or additions, and strikeouts are those to be deleted: ~~One element of the DQO process is~~ The formulation of a conceptual model <u>is an aid to facilitate the DQO process and help with the decision making concerning data quality.</u> [Conceptual models are not necessarily elements of the DQO process and, as stated, it implies that it is one of many options on a menu.]	Comment accepted as stated.	Yes

NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET
(Page 2 of 4)

10. Comment Number/ Location	11. Type*	12. Comment	13. Comment Response	14. Accept
3. Page 7, Section 3.3		The following screening levels will be used to guide the investigations: [There are no methods or Standard Operating Procedures (SOPs) referenced anywhere for the field-portable instruments. There are no SOPs or accepted methods for field instruments referenced in the Industrial Sites Quality Assurance Project Plan. If the quality of data is to be established, there must be both procedures and documentation to verify and validate the analytical data. This is especially important when you are in the initial stages of the project and making decisions based upon field-portable instruments. If there is no documentation, either as an SOP or an accepted method, the data can be invalidated on that premise alone.]	Field instruments are calibrated and operated to manufacturer's specifications. All field screening data is Category I to be used as a qualitative estimate of the limits of contamination. Field screening data are supported by laboratory analysis. The decisions on corrective action are based on laboratory analysis, not field screening. Samples for laboratory analysis are collected and analyzed as specified in the CAIPs, including data collection decision points and sampling intervals. The field screening data are used to guide the investigation. If laboratory data do not substantiate the field screening data, additional investigation activities would be considered. This information has been incorporated into the Work Plan and will be referenced by the CAIPs if applicable.	In part
4. Page 7, Section 3.3, 1st para., 1st bullet		[How does the 20 ppm in the headspace relate to concentration in the soil? How and where is the background measured? If there were listed wastes involved, this may not suffice.]	The 20 ppm is a relational value based on historical field screening and laboratory results. The field screening data do not represent absolute decision points because they are verified by laboratory data. Confirmatory samples will be collected from every boring as stated in the Work Plan and the CAIPs.	No
5. Page 7, Section 3.3, 1st para., 3rd bullet		Radiation (alpha, beta/gamma) *screening levels 2.5 times greater than an area background*... [How is this going to be done? Why specifically 2.5 times? Define what area background is? Please explain in detail. An example of the kind of details NDEP needs can be found in Roller Coaster Rad Safe Area CAIP.]	Revised text to reflect the procedure in the Roller Coaster CAIP.	Yes
6. Page 14, Section 4.2.1, 2nd para.		[There are no SOPs or methods referenced here. There should be one for the Vehicle-Mounted Radiometric Detector and the Global Positioning System (GPS). These methods should include, among others, QA/QC procedures on data acquisition with a multichannel analyzer and GPS, calibration, detection limits for the detectors, data verification, and operating parameters.]	See comment response 3.	No

NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET

10. Comment Number/ Location	11. Type*	12. Comment	13. Comment Response	14. Accept
7. Page 15, Section 4.2.3, 1st para., last sent.		The underlined portions are the desired inserts or additions, and strikeouts are those to be deleted: ...Industrial Sites QAPP (DOE/NV, 1996~~b~~) ...	Text revised.	Yes
8. Page 15, Section 4.2.4, 1st para.		[This section has no reference to SOPs, methods, or kind of documentation, either. See comment under Page 7 of 30, Section 3.3 Preliminary Action Levels above.]	See comment response 3.	No
9. Page 17, Section 4.2.6, 2nd para., 1st sent.		[There is no “transect-line” drawn in Figure 4-1.]	Figure replaced in revision. “Transect-line” terminology was removed from the Work Plan in the Final Rev. 0.	Yes
10. Page 19, Section 4.4, 1st para., 1st sent.		Clean core barrels and other sampling apparatus will be used... [Please provide a better description of what is meant by “clean.” Does this mean a new, never before used device, or does it mean the equipment has been cleaned, and will be cleaned in between each sampling effort? If so, reference the DOE/NV ERD Procedure ERD-05-701, *Sampling Equipment Decontamination* if it applies. If it does not apply, describe the decontamination process, and include how clean is determined (e.g. multiple washes, etc.) and reference Section 5.0 for the handling of the investigation-derived waste.]	Sampling equipment will be decontaminated according to ERD-05-701 and the requirements of the Work Plan and the CAIPs. All IDW is implicitly managed under the requirements of Section 5.0. The section was renamed and revised for clarity.	In part
11. Page 22, Section 5.2, 2nd para., 1st sent.		The underlined portions are the desired inserts or additions, and strikeouts are those to be deleted: The waste will be managed in ~~three~~ four waste streams: soil, rinsate, PPE, and disposable sampling. [or] The waste will be managed in three waste streams: soil, rinsate, PPE, and disposable sampling equipment.	Text revised.	Yes

NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET
(Page 4 of 4)

10. Comment Number/ Location	11. Type*	12. Comment	13. Comment Response	14. Accept
12. Page 22, Section 5.3, 1st para., 1st sent.		The underlined portions are the desired inserts or additions, and strikeouts are those to be deleted: to allow for the segregation of radioactive and nonradioactive waste and materials, radiological swipe surveys ~~may~~ <u>will</u> be conducted...	Radiological swipe surveys are not always appropriate. The need for swipe surveys will be established in the CAIPs or other project documentation.	No
13. Appendix, Page A-8, 1st para., 2nd sent.		The underlined portions are the desired inserts or additions, and strikeouts are those to be deleted: the sample locations and the names assigned to the septic tank systems are presented in Figure <u>A.</u>1-1.	Text revised.	Yes
14. General		Overall, there needs to be a clarification from the generic to the specifics expected in the CAIP. Where there are activities noted, and generalizations made, there needs to be a description of what is expected in the individual CAIPs. Provide an outline which lays out the specific requirements to be met in each of the individual CAIPs. Some of these requirements are scattered throughout the document, but for both completeness and clarity, they must be placed together, readily available to the reader.	The Work Plan text has been revised to more clearly identify technical details that will be developed in the CAIPs. The Work Plan and CAIPs follow the FFACO outline for CAIPs. Information common to the leachfield CAUs is contained in the Work Plan. Technical details specific to individual leachfield CAUs are contained in the CAIPs.	In part

[a] Comment Types: M = Mandatory, S = Suggested. (Were not provided by reviewer)

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