APPENDIX E

ENVIRONMENTAL FIELD SAMPLING PLAN
CHURCHILL COUNTY, NEVADA

Prepared in Support of:

CDC/NCEH Cross Sectional Assessment Study

Prepared by:

Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, Nevada

November 13, 2001

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

1.1 Executive Summary

This sampling plan was prepared by the Nevada Division of Environmental Protection (NDEP) to support the environmental sampling component of the Centers for Disease Control and Prevention's (CDC) National Center for Environmental Health (NCEH) study entitled, "A Cross-Sectional Exposure Assessment of Environmental Exposure Among Children with Acute Lymphoblastic Leukemia/Acute Myelocytic Leukemia and A Reference Population In Churchill County, Nevada." This document will be referred to as the CDC/NCEH study protocol within this sample plan.

The CDC/NCEH study protocol was designed to assess exposure to a variety of chemicals, radioactive elements, and infectious agents among children diagnosed with leukemia (acute lymphocytic leukemia [ALL] and acute myelocytic leukemia [AML]), and compare their exposure to that of their immediate family members (parents and siblings only) and to reference families. The reference families will consist of children without cancer diagnoses, and their parents. Exposure will be assessed by measuring for specific analytes within blood, urine, and indoor and outdoor environmental samples, in conjunction with a questionnaire about pertinent risk factors.

As described in the CDC/NCEH study protocol, the study was designed as a cross-sectional exposure assessment of current exposures; it is very difficult to collect reliable information about exposures that happened in the past. Environmental samples will be collected from the current household of each participating case and control family to help interpret the results of the blood and urine tests. In addition to the case-family's current home, environmental samples will be collected from each house they previously occupied within Churchill County, Nevada during the defined time period for this study. Environmental samples will also be collected from the previous residences of 1 out of every 4 control children in each frequency strata. The control family whose historic residences will be sampled will be randomly selected without prejudice to number of residences or duration of residence. The CDC/NCEH study protocol determined that environmental samples would consist of indoor air, play yard soil, drinking water, and household dust from each past and current residential location. NDEP will collect samples, coordinate the laboratory analysis, and disseminate the results of the indoor air, play yard soil, and household dust; the US Geological Survey will be responsible for the collection and analysis of drinking water.

The CDC/NCEH will be provided the laboratory analysis of the environmental measurements from participating family homes. If environmental contamination or exposure is detected above enforceable action levels, appropriate action by the Nevada Division of Environmental Protection (NDEP) or other appropriate governmental entity will be taken.

1.2 Background – Study History

The following background information was taken from the CDC/NCEH study protocol document. In July 2000, Dr. Randall Todd, State Epidemiologist, identified an increase in the incidence rate of ALL for Churchill County, Nevada. According to the Nevada State Cancer Registry, the first case of ALL diagnosed in Fallon, Nevada was in 1997, with 2 subsequent cases in 1999, and 9 additional cases diagnosed by July 2000. In September 2000, Dr. Todd began an investigation of the case families by administering a questionnaire and collecting drinking water samples from case-family homes. The questionnaire covered residential history prior to conception, pregnancy history, water supply choices and use, chemical use inside the home, occupational history of parents, sources for radiation and electromagnetic (EMF) exposure, child activities, and smoking in the home. The investigation did not reveal any obvious risk factor or etiology. In total, 14 cases of childhood leukemia were detected in Churchill County, Nevada between 1997-2001.

In February, 2001, Dr. Mary Guinan, State Health Officer for Nevada, convened an Expert Panel to review the State of Nevada's investigation and other literature about ALL among children. Following recommendations from this Expert Panel, the State of Nevada formally requested assistance from both CDC/NCEH and ATSDR on March 7, 2001 for further evaluation of risk factors or etiologic exposures linked to this childhood leukemia cluster in the Fallon area. ATSDR has been asked to evaluate contaminant releases in Churchill County, Nevada and provide an assessment of completed exposure pathways for the case families. CDC/NCEH was asked to design and conduct a cross-sectional exposure assessment of selective contaminants using environmental (household) and biologic specimens for case families and a reference population.

1.3 Site Location and Description

Environmental samples will be collected from residential properties of both case and control families. Residences will be located both in Fallon and throughout Churchill County. The control homes will be selected by CDC/NCEH through a random-digit dialing protocol. There are approximately 21 case homes, which include current and past Fallon residences of the case families. There will be approximately 60 control residential properties.

Situated in the Lahontan Valley at an elevation of 3,965 feet above mean sea level, the City of Fallon is located 60 miles east of Reno, Nevada. U.S. Highway 50 crosses the town in the east-west direction, and U.S. Highway 95 passes through the town in the north-south direction. U.S. Interstate 80 passes the area in a southwest-northeast direction 28 miles northwest of town and can also be reached traveling 32 miles north of town. The incorporated area occupies approximately two square miles within Sections 1, 25 and 36 of Township 19 North, Range 28 East, and Sections 30, and 31 of Township 19 North, Range 29 East, Mount Diablo Baseline and Meridian. The geographic coordinates are 39° 28' to 39° 29' N latitude, 118° 27' 45" to 118° 28' 45" W longitude.

2.0 PROJECT DESCRIPTION

2.1 Responsible Agencies

The Deputy Administrator of the NDEP will oversee this project with divisional bureaus and staff providing support. The NDEP will prepare and implement this Sample Plan that will support the environmental sampling objectives described in the CDC/NCEH Cross-Sectional Exposure Study. NDEP will collect environmental samples as appropriate, arrange for laboratory analysis of the samples, organize the laboratory results from the various laboratories used, and provide these results back to CDC and to the property owners, or renters, identified as case and control homes.

NDEP will coordinate other Federal and State Agency activities in support of this study. NDEP may also be utilizing commercial laboratories for selected environmental analysis.

- Nevada Department of Agriculture: Provide assistance in determining pesticide use in Fallon in order to determine appropriate analytical parameters. The Department will also be utilized to provide laboratory analysis of soil and home dust samples for a limited number of organo-phosphate and other pesticides.

- Nevada State Health Department: Provide radon screening test kits and laboratory analysis. Provide laboratory analysis of a limited number of radionuclides in soil and indoor dust.

- United States Environmental Protection Agency (U.S. EPA) Region 9: Provide laboratory analysis of soil and home dust samples for metals, organo-chlorine pesticides and polychlorinated biphenyls (PCB) and semi-volatile organics. The EPA regional laboratory will also be providing air sampling collection equipment.

- U.S. EPA Environmental Response Team (ERT): Provide home dust sample collection equipment.

- U.S. Geological Survey (USGS): Will be collecting tap water samples at the case and control homes, independent of NDEP sample collection activities.

- Agency for Toxic Substances And Disease Registry (ATSDR): Provide technical support to NDEP in reviewing and implementing the Sample Plan. ATSDR will also assist NDEP in coordinating Agency activities.

- Commercial laboratories: Contracted by NDEP, as necessary, in order to provide needed laboratory analysis. Specifically, a commercial laboratory will be utilized for indoor air samples to be analyzed for volatile organics.

2.2 Project Organization

The NDEP portion of the project will use the Incident Command System (ICS) as the model tool for command, control and coordination. ICS uses principles that have been proven to improve efficiency and effectiveness in a business setting. The entire Fallon Investigation includes personnel from the Nevada Division of Environmental Protection, Nevada State Health Division, Nevada Department of Agriculture, U.S. Geological Survey, U.S. Environmental Protection Agency, Agency for Toxic Substances and Disease Registry and the Centers for Disease Control and Prevention. Primary contacts for the Fallon Investigation are as follows:

Overall Project Manager:
Mary Guinan, Ph.D., M.D.
State Health Officer
Nevada State Health Division
505 East King Street
Kinkead Building, Room 304
Carson City, NV 89701
(775) 684-4200

Fallon Project Manager
Dr. Randall Todd
Nevada State Epidemiologist
Nevada State Health Division
(775) 684-5946

Assistant to Project Manager:
Ms. Kelly Service
Nevada State Health Division
(775) 684-5947

Public Information Officer:
Ms. Martha Framsted
Nevada State Health Division
(775) 684-4200

Environmental Project Technical Support:
Libby Levy
Regional Representative
ATSDR
75 Hawthorne St., Ste. 100
San Francisco, CA 94105
(415) 744-1776

CDC/NCEH Exposure Study Project Coordinator:
Adrianne Holmes, MPH
CDC/NCEH
(404) 498-1372

NDEP Project Manager:
Verne Rosse, P.E., Deputy Administrator
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706
775-687-4670 extension 3045

NDEP Operational Team Coordinator:
Jim Najima
Nevada Division of Environmental Protection
775-687-4670 extension 3154

NDEP Environmental Sample Coordinator:
Jennifer Carr, P.E., C.E.M.
Nevada Division of Environmental Protection
775-687-4670 extension 3020

NDEP Health & Safety Officer:
Marcia Manley
Nevada Division of Environmental Protection
775-687-4670 extension 3162

NDEP: Documentation/Logistics Unit Leader
Jennifer McMartin
Nevada Division of Environmental Protection
775-687-4670 extension 3152

2.3 Objectives and Data Use

The objective of this sampling event is to support the Centers for Disease Control and Prevention's study plan for "A Cross-Sectional Exposure Assessment of Environmental Exposure Among Children with Acute Lymphoblastic Leukemia/Acute Myelocytic Leukemia and a Reference Population in Churchill County, Nevada." The CDC study design is a cross-sectional exposure assessment of selective contaminants using biological specimens and environmental field sample analysis for case-family homes and a reference population. The cross-sectional exposure assessment design will allow for the comparison of laboratory testing results from case-children's blood and urine to their family members' samples; and between case families and control families. Environmental samples will be collected from the current and household of each participating family (case and control) to assist the CDC's interpretation of their results of the blood and urine tests. Past households of case families and a portion of the control families will also be sampled. The data collected in this study will also be used by ATSDR to investigate and assess any completed exposure pathways in the case families. Finally, the results of the environmental sampling will be reviewed by the NDEP. If environmental contamination is detected above enforceable action levels, appropriate action will be taken by the NDEP.

2.4 Scope of Work

The NDEP designed this environmental sampling protocol for the collection of surface soil, indoor air and home dust sampling for the participating study homes. The NDEP will implement this environmental sampling plan upon concurrence of the CDC/NCEH and appropriate agencies that are part of this multi-agency investigation.

The CDC/NCEH study protocol estimated that environmental samples would be collected from approximately 100 residences in Churchill County. This figure includes current and past residences of cases (n=22), and current residences of all control subjects (n=52), and past residences of 1 out of every 4 control children enrolled in the study, assuming each control family has 2 past residences in Churchill County (n=26).

The types of samples and analytical parameters were determined based on goals and objectives of the CDC/NCEH study protocol and recommendations of the expert panel that met in March and July 2001.

The locations and analytical parameters of the sampling will be discussed in the following sections. Overall, NDEP will be collecting the same set of samples from each participating case and control home. These samples will include:

- One outdoor soil sample
- One indoor air sample
- One indoor dust sample
- One indoor radon kit

Field sampling will be consistent with EPA standard operating procedures (SOPs), as appropriate, or other SOPs as determined by NDEP. Sample handling and shipping will follow standard EPA Chain

of Custody protocols. All SOPs may be found as attachments to this document. If any significant deviations from the SOPs occur during field implementation, the sampling team will be responsible for documenting such deviations.

Laboratory analysis provided by EPA Region 9 will follow the Regional Laboratory's Quality Assurance and Quality Control (QA/QC) practices followed for EPA Superfund Sites. Some samples analyzed through the EPA Regional laboratory will be sent to EPA Contract Laboratory Program (CLP) laboratories for analysis. These laboratories will also follow their EPA contract specified QA/QC procedures. The commercial laboratories contracted by NDEP will provide the NDEP with information regarding their use of performance evaluation samples, previous laboratory audits, and ethical conduct. In addition, specific information regarding the laboratory's performance with the particular methods to be used for the samples will also be provided. This and other information will be reviewed by the NDEP Project Manager and deemed satisfactory before the laboratory is selected and a contract negotiated.

3.0 SAMPLING PROCEDURE

3.1 Sample Collection

All sampling activities will be performed by the NDEP sampling teams. Each team will consist of a team leader and two to three samplers. A NDEP field coordinator will be stationed in Fallon and will coordinate sampling schedules with the team leader and the residents. The team leader will be responsible for communication with the residents of each home. Each sample team will be responsible for the proper field documentation and field collection of environmental samples. NDEP sample teams will be familiar with the standard operating procedures (SOPs) for this study and SOPs will be followed whenever possible.

Every effort will be made by the NDEP to ensure that the sample teams will not know if a residential property is from the case or control group. Samples will be identified by a house number assigned by the CDC/NCEH and given to the NDEP field coordinator. The house number and address will be given to the team leader. All samples and chain of custody records will only utilize the house number. Sample number and type will be denoted by the following code:

House Number -- Matrix -- Sequence:

House Number:
Assigned by CDC/NCEH. Numbers will run from 001 through 100.

Matrix:
Surface Soil = SS
Home Dust = HD
Wipe Sample = WS
Indoor Air = IA
Radon Kit = RK
Equipment Blank = EB

Sequence:
Samples will be numbered according to the number of samples collected at each residence. This last number is provided in case additional samples are needed at a sample location. For example, if two dust samples are required at House #17, the following sample numbers would be used:

017-HD-01 and 017-HD-02

This would denote that House 17 had two dust samples; HD-01 and HD-02.

Table 1 provides a summary of sample type and general location for the sample.

TABLE 1. SAMPLING SUMMARY

Sample Identifier	Matrix	Type of Sample	Location
(001-100) – SS - 01	Soil	Surface Soil	Outdoor Play Area
(001- 100) - HD -01	Dust	Dust	Indoor Living Area
(001-100) – IA- 01	Air	Air	Indoor Living Area
(001- 100) - RK-01	Air	Radon Kit	Indoor Living Area
(001- 100) - WS -01	Dust	Dust	Television/Computer Monitor

3.2 Sampling Matrices

The following sections describe the sample collection procedures for the various matrices that will be collected during the sampling event.

3.2.1 Soil Samples

One soil sample will be collected from a children's play area at each study residence. The specific area will be determined by the team leader after consulting with the residents of each home. The sample will consist of a three-part composite of the surface soil of the designated play area. Samples will preferably come from dirt play areas.

All surface soil composite samples will be collected at a depth of 0 to 3 inches using disposable scoops and aluminum pans. The sampler will don a disposable Tyvek suit and booties and use clean powder-free latex or nitrile gloves at each sampling location to minimize the chance of cross-contamination. The samples will be homogenized in a dedicated aluminum tray. Homogenization will be performed by removing all stones and extraneous matter, thoroughly mixing the aliquots, and dividing the soil into four roughly equal aliquots. This procedure will be repeated three times.

If all of the play areas at a study residence are grass covered, three (3) small areas of grass will be removed and the first 0-3 inches of soil below the grass cover will be collected from the area. The grass will be removed with a small disposable or steel garden trowel. Care will be taken to replace the grass and clean potting soil will be added below the grass to restore the sample area. All soil sampling activities will be conducted according to the Surface Soil Sampling Standard Operating Procedure (SOP) developed for this sampling event; this SOP may be found as Attachment A.

3.2.2 Air Samples

One air sample will be collected from a frequently used room of each study home, such as the living room or other room frequently used by the children of the family. The sample will be collected as a "grab" or instant sample by using a Summa canister. The exact location will be determined after consulting with the residents of each home. The canister will be placed at a height of approximately three feet off the ground. This height was selected to approximate a child's breathing zone.

Air samples will be collected in accordance with the Summa Canister Air Sampling SOP, developed for this sampling event; this SOP may be found as Attachment B. The samples will be sent to an approved laboratory for analysis of volatile organic compound parameters. The canisters and all sampling equipment will be pre-cleaned and provided by the EPA Regional laboratory. The Summa will be sent to the selected laboratory for analysis and then returned to the EPA Regional laboratory to be cleaned for reuse.

3.2.3 Dust Samples

Vacuum dust samples will be collected from the living areas of each study home. This will include the living room, dining room, bedrooms, hallways and kitchen. Samples will not be collected from generally inaccessible areas such as behind the refrigerator, storage closet/attic or crawl spaces. The areas sampled will be measured and recorded in order to perform quantitative calculations.

Approximately 70 grams of sample will be needed to perform the full list of analytical parameters described in the CDC/NCEH Cross Sectional Exposure Study. The EPA Regional laboratory will be using approximately 5-10 grams for metals analysis and approximately 30 grams for organo-chlorine pesticide and PCB analysis. The remaining sample volume will be sent by the EPA Regional Laboratory to the Nevada Department of Agriculture (NDOA) to be analyzed for organo-phosphate, carbamate, and pyrethroid pesticides.

Samples will be collected with a Nilfisk Vacuum and collection procedures will follow the Nilfisk Home Dust Sampling SOP, developed for this sampling event; this SOP may be found as Attachment C.

A separate dust sample will be collected as a dry-wipe sample and will be laboratory analyzed for gamma spectrometry, and Uranium 234, 235, and 238. This sample will be collected from a television screen in a family room or a computer monitor, if the television screen is inappropriate for sample collection. The wipe sample will be sent directly to a contract laboratory arranged through the Nevada State Health Department. The field sampling will be conducted according to the Dry-wipe Sampling SOP, developed for this sampling event; this SOP may be found as Attachment D.

3.2.4 Radon Kits

Radon test kits will be placed in an appropriate location by the sample team leader in accordance with the Radon Canister SOP developed for this sampling event; this SOP may be found as Attachment E.

The homeowner will be contacted prior to placement of the radon test kit and instructed to keep the house closed at least 12 hours prior to placement. It is necessary to keep all external doors and windows closed for at least 12 hours prior and during the entire test period. Normal coming and going is acceptable, however external doors should not be left open for periods of more that a few minutes. Internal/external air exchange systems other than the furnace, such as high volume attic and window fans, should not be operated for at least 12 hours prior to and during

the measurement period. Operation of closed circulation systems should not affect the test. Swamp coolers must not be utilized.

At the end of the test period, the testing team will collect the test kits, prepare the appropriate forms and send the test kit to the laboratory for analysis. The homeowner will receive the test results within two weeks. The Nevada State Health Division will also receive the test results on a monthly report. The homeowner may obtain interpretation of the test results from the Nevada State Health Division at (775) 687-5394 extension 275.

3.3 Documentation

A sampling team member will document sample conditions; estimate ambient air temperature (indoor and outdoor), cloud cover, and other relevant observations of the sample property and adjacent properties. Documentation will be conducted by using the Combined Field Data Sheets, developed for this sampling event. These field data sheets can be found at the end of every SOP.

3.4 Decontamination

Personnel field gear and the majority of field sampling equipment scheduled to be used at this site will be disposable and will be double-bagged and disposed of as dry industrial waste. Any non-disposable sampling equipment, such as stainless-steel trowels, will be decontaminated at the Fallon field office and will utilize appropriate procedures, such as washing with a solution of Alconox (phosphate detergent) and distilled water. Decontamination of the Nilfisk dust sample equipment will follow procedures outlined in the Vacuum Sampling SOP. All other field decontamination will follow the Decontamination SOP developed for this sampling event; this SOP may be found as Attachment F.

4.0 ANALYTICAL PARAMETERS

Table 2 provides a summary of the sampling matrices, analytical parameters, analytical methods, sample containers, and designated laboratory for this sampling event. Detection levels will be the best achievable given the sample volumes actually collected for each parameter. A complete list of analytical parameters is found as at the end of this SOP.

TABLE 2. SUMMARY OF ANALYTICAL PARAMETERS

Sample Type	Analytical Parameter	Test Method	Laboratory	Containers Preservatives Volumes
Soil	TAL Metals	CLP SOW ILM04.1	EPA CLP Laboratory	One 8-oz CWM 4°C
	TCL Pesticide/PCB Organo-chlorine	CLP SOW OLM04.2	EPA Region 9 Laboratory	One 8-oz CWM 4°C
	Uranium 234, 235, and 238 Gamma Spectroscopy		NSHD Contract Laboratory	Plastic Ziploc® Bag
	Pesticides (NDOA Lab List) Organo-phosphate, Carbamate, Pyrethroid	Methanol Extraction and ELSA Kit	NDOA Laboratory	One 8-oz CWM 4°C
Dust	TAL Metals	CLP SOW ILM04.1	EPA Region 9 Laboratory	5-10 grams of dust sample
	TCL Pesticide/PCB (Organo-chlorine)	CLP SOW OLM04.2	EPA Region 9 Laboratory	30 grams of dust sample
	Uranium 234, 235, and 238 Gamma Spectroscopy		NSHD Contract Laboratory	Plastic Ziploc® Bag
	Pesticides (NDOA Lab List) Organo-phosphate, Carbamate, Pyrethroid	Methanol Extraction and ELSA Kit	NDOA Laboratory	30 grams of dust sample
Air	Volatile Organics	T015	NDEP Contract Laboratory	Summa – Grab Sample
Radon	Radon Kit		NSHD Contract Laboratory	7 Day Sample

Notes:
CLP SOW Contract Laboratory Program Statement of Work
CWM clear wide mouth
Oz ounce
°C degrees Celsius
TAL EPA Target Analyte List
TCL EPA Target Compound List
TIC Tentatively Identified Compound

5.0 QA/QC PROCEDURES

5.1 Responsibility

The NDEP Environmental Sample Coordinator will be responsible for ensuring that sample quality and integrity are maintained. The Sample Coordinator will also ensure that sample labeling and documentation are performed in accordance with the labeling SOP developed for this sampling event; this SOP may be found as Attachment G.

Air carriers that transport hazardous materials, in particular Federal Express, require compliance with the current International Air Transport Association (IATA) Regulations, which applies to the shipment and transport of hazardous materials by air carrier. This study will be utilizing air carriers to transport environmental samples (not hazardous waste samples), and will be shipping small quantities of water samples preserved with nitric acid. The water samples will be generated during field QA/QC procedures. NDEP will follow IATA regulations to ensure compliance.

5.2 Field QC

Field QC will consist of collecting and analyzing rinsate blanks and field duplicates.

The duplicate samples will be collected for the soil and air samples at a rate of one per 20 samples. Duplicates for the air samples will be collected by filling the containers simultaneously. Duplicates for the soil will be collected by splitting the sample volume into two distinct samples. Each sample from a duplicate set will have a unique sample number; the duplicates will be sent "blind" to the lab. Because of limited availability of amounts (mass) of dust, duplicate dust samples will be collected as appropriate, based on mass collected in the field.

Rinsate blanks will be collected to test for contamination that could possibly be introduced by the reusable sample equipment used for this study. They will be collected on the vacuum sampling equipment that will be decontaminated for reuse. The blanks will be collected at the rate of one per 20 samples and be analyzed for all parameters. The blanks will be collected according to the Field Rinsate Blank SOP, prepared for this sampling event; this SOP may be found as Attachment H.

Field QC will also include completing Chain of Custody documentation.

5.3 Laboratory QC

A field sample will be designated as a "lab QC sample" at a frequency of 1 per 20 samples and be analyzed for all parameters. The lab QC sample is the sample the laboratory will use for its internal quality control analyses. The lab QC sample will be a sample suspected of being contaminated and which is representative of other contaminated samples. The lab QC sample will consist of a double volume of sample. The sample containers and paperwork will be clearly labeled "Lab QC Sample."

Laboratory QC samples will be collected from the soil and dust samples as field conditions permit:

The EPA Regional Laboratory QC will comply with all Regional Laboratory SOPs. Contract Laboratory Program (CLP) analysis will consist of all QC stated in the CLP Statement of Work (SOW) and includes all forms and deliverables required in the SOW. Laboratory QC for commercial labs will be determined by the NDEP contract with the laboratory.

The NDOA and contract laboratories will follow their standard QC procedures.

5.4 Field Variances

As conditions in the field may vary from that planned or conceived, it may become necessary to implement minor modifications to sampling as presented in this plan. When modifications are needed, the team leader will be notified, and when appropriate, other members of the project team may be consulted. In all cases, documentation of field changes will be conducted by the sample team.

5.5 Data Validation

Data validation for the samples analyzed through EPA Regional laboratory and CLP laboratory will be performed by EPA Region 9 Regional Laboratory's Quality Assurance Staff in accordance with CLP National Functional Guidelines for Data Review for all soil and dust samples analyzed through EPA. Data validation for analysis through commercial labs will be determined by the NDEP contract with the laboratory.

6.0 REPORTING

Information gathered from this study will be received by the NDEP. NDEP will compile the analytical results and field reports according to study number designations. The completed sampling information will be forwarded to the CDC/NCEH. **A summary of the results will also be prepared so that a report from NDEP can be forwarded to the property owner of each study home.** The results of the environmental sampling will also be reviewed by NDEP. If environmental contamination is detected above enforceable action levels, appropriate action by will be taken by the NDEP.

ATTACHMENT A
SURFACE SOIL SAMPLING
STANDARD OPERATING PROCEDURE

TABLE OF CONTENTS

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide the sampling teams with a step-by-step guide for collecting composite surface soil samples using hand trowels. Samples will be collected in outdoor areas most frequently used by children.

2.0 EQUIPMENT/MATERIAL REQUIRED

Below is a list of the materials needed for surface soil sampling events. Both disposable and reusable sampling equipment are required.

- ☐ Personal protective equipment (as specified in the Health and Safety Plan)
- ☐ Sampling Plan (SP)
- ☐ Property location Map/Fallon Street Map
- ☐ 8-oz glass sample containers w/lids
- ☐ Sample log sheets
- ☐ Sample labels/tags
- ☐ Coolers
- ☐ Ice
- ☐ Aluminum mixing tray
- ☐ 1-gallon Ziploc® bags
- ☐ Paper towels
- ☐ Ballpoint pen
- ☐ Permanent marker
- ☐ Plastic (disposable) trowels
- ☐ Steel trowel
- ☐ Plastic trash bags
- ☐ Potting soil

3.0 SAMPLING PROCEDURES

3.1 Perform a general site reconnaissance to verify actual site conditions consistent with the HASP. Make entries onto the field data sheet as called for on the sheet.

3.2 Locate surface soil sampling area: Identify area of the property most used by children, for example; play areas, or walk ways. Describe the area on the Field Data Sheet and estimate the distance and direction from a permanent marker, (20 feet NW of the NE corner of the house, utility pole, etc.).

3.3 Select a sample area of approximately 25 square feet for the collection of a three-part composite sample. Sample parts will be collected from three locations within the sample area. If the child-use area is less than 25 square feet, see Grab Sample instructions in Step 3.10 below.

3.4 Collect Samples: Put on clean, disposable latex surgical gloves (equivalent) prior to collecting soil samples.

With the plastic and/or steel trowel, collect 6 heaping trowel-volumes from each of the three-part sample locations (18 total volumes) from 0-3 inches below ground surface and put the soil into an aluminum mixing pan. Sample collection will focus on soil particles, not other materials intermixed in the soil matrix. Using hands covered with surgical gloves, remove plant material, roots, pebbles greater-than-pea-size (1/4" diameter), rocks, concrete etc. from the aluminum mixing pan and place them in one of the sample holes.

If the sample area is covered by grass turf or other non-soil material, cut away or remove approximately 1 square foot of the non-soil material with a steel trowel and collect soil from 0-3 inches below the cut-away material with the plastic trowel. Replace the removed soil with potting soil, and place non-soil material on top. Tamp it down with your foot and water with home resident's approval and water source.

3.5 Thoroughly mix the soil volume in the aluminum pan with the plastic trowel or glove-covered hands. Note the qualities (color, texture, etc.) of the homogenized sample on the sample log sheet as called for on the sheet.

3.6 With the plastic trowel, place the mixed soil into sample containers as follows.

- ☐ 1 full 8-oz glass jar (Metals analyses)
- ☐ 1 full 8-oz glass jar (o-chlorine pesticides analyses)
- ☐ 1 full 8-oz glass jar (o-phosphate pesticides analyses)
- ☐ 1 full 8-oz glass jar (Aroclor PCBs and SVOCs analyses)
- ☐ 1 full 8-oz glass jar (Archive)
- ☐ 16 oz (approximate) of soil in a double Ziploc® bag (rad analyses)

Place remaining soil into one or more of the sample holes. Top off with potting soil.

3.7 Label each sample container according to the labeling conventions outlined in the SP. Sample labels will be preprinted. Fill out information called for on the label with a permanent marker *(ballpoint pen ink bleeds when wet)*.

3.8 Place each glass sample container into a separate Ziploc® bag and put on ice in a cooler. Place the double Ziploc® bag sample container (Rads sample) in cooler <u>without</u> ice.

3.9. Place disposable plastic trowel, aluminum mixing pan and other trash into a plastic bag for disposal. If a steel trowel is used, place it in a bag for transport back to the field office where it will be decontaminated.

3.10 If the sampling location is less-than 25 square feet, collect one grab sample from one sample hole from 0-3 inches below ground surface. Follow Steps 3.4 through 3.9.

3.11 Keep samples, clean equipment, and trash separate to prevent cross-contamination. Transport these items to the field vehicle.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

To prevent contamination of soil samples from compounds introduced to the site by the sampling teams, personal protection equipment must be worn and used as specified in the Health and Safety Plan (HASP). Health and Safety procedures outlined in the HASP must be followed.

Duplicate samples shall be collected at a ratio of 1 for every 10-sample properties (1:10) for quality control purposes (Blind to Labs).

4.1 Collect 12 heaping scoops from each sample hole to be able to fill duplicate sample containers for each analysis (i.e.: 2 jars for metals, 2 jars for o-chlorine pesticides, etc.).

4.2 Follow Steps 3.4 through 3.6 above.

4.3 Label the original and duplicate sample containers according to the labeling conventions outlined in the SAAP.

4.4 Follow steps 3.7 through 3.11 above.

Lab matrix blanks shall be collected at a ratio of 1 for every 20-sample properties (1:20) for quality control purposes (Not blind to Lab).

4.5 Collect extra sample volumes from each sample hole to be able to fill 5 extra (lab matrix) sample containers.

4.6 Label these samples the same as the original sample and note on the label “lab matrix QC”.

5.0 HEALTH AND SAFETY

Health and Safety procedures as described and defined in the NDEP Health and Safety Plan (HASP) must be observed and implemented prior to dust sample collection. Chemical exposures are not anticipated, and physical or mechanical hazards are only those that would be found in any typical household environment.

6.0 REFERENCES

6.1 EPA. 1991. *Compendium of Emergency Response Team (ERT) Soil Sampling and Surface Geophysics Procedures.* Office of Solid Waste and Emergency Response, Washington, DC. EPA/540/P-91/006.

6.2 EPA. 1991. *Removal Program Representative Sampling Guidance. Volume* 1 - Soil. Office of Solid Waste and Emergency Response, Washington, DC. 9630.4-10 P892-963408.

6.3 WESTON, Inc. (Roy F. Weston, Inc.) 1993. *Standard Practices Manuel for Soil Sampling With a Spade, Scoop and Stainless Surface Soil Sampler Auger and Tube Sampler.* West Chester, PA.

6.4 Health and Safety Plan, *Prepared in Support of: CDC/NCEH Cross-sectional* Exposure Assessment Study – Churchill County, Nevada. September 25, 2001.

FIELD DATA SHEET A

House Number:	Date:
Arrival Time:	Departure Time:

Weather Summary/Estimates:

Sunny/PC/Cloudy _____
Est. Wind Speed and Direction _____
Est. Air Temp – Outdoor _____

Soil Sample Area:

Estimate Area Size (square feet): _____
Description of Area (Play area / Walkway) _____

Sample Description:

Composite (3 part) or Grab Sample _____
Approximate distance and direction from fixed point of reference: _____
_____

Sketch/ General Comments:

ATTACHMENT B
INDOOR AIR SAMPLING
STANDARD OPERATION PROCEDURE

TABLE OF CONTENTS

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to describe a procedure for sampling of volatile organic compounds (VOCs) in ambient air. The method is based on samples collected as whole air samples in Summa passivated stainless steel canisters. The VOCs are subsequently separated by gas chromatography (GC) and measured by mass-selective detector or multidetector techniques. This method presents procedures for sampling into canisters at final pressures below atmospheric pressure (referred to as sub-atmospheric pressure sampling). The Fallon Cross-sectional Exposure Assessment (CEA) study will include sampling for VOCs from "control and case" sets of homes to develop a statistical database. The canisters are sent to a certified testing lab in a timely fashion to insure quality of sample. The results will be returned to NDEP for consolidation and distribution to appropriate agencies or homeowners.

This method is applicable to specific VOCs that have been tested and determined to be stable when stored in sub-atmospheric pressure canisters. The organic compounds that have been successfully collected in pressurized canisters by this method are listed in the Volatile Organic Compound Data Sheet at the end of this SOP. These compounds have been measured at the parts per billion by volume (PPBV) level. Chemical compounds to be analyzed are listed in Table 3.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure or other site limitations. In all instances, the sampling team should document the procedures employed.

Mention of trade names or commercial products does not constitute NDEP endorsement or recommendation of use.

2.0 METHOD SUMMARY

Sub-atmospheric pressure sampling uses an initially evacuated canister. The canister has a hand valve and fixed orifice to regulate flow. Sub-atmospheric pressure sampling is performed without a micrometering valve for taking grab samples. With this configuration, a grab sample of ambient air is drawn into a pre-evacuated Summa passivated canister. The canister is placed in the approximate breathing height of the child. The hand valve is opened a quarter turn until the sound changes as it nears atmospheric pressure, and the hand valve is then closed. Normal documentation, custody and sealing of the sample are completed and the package is readied for shipping.

3.0 SAMPLE PRESERVATION, CONTAINERS HANDLING, AND STORAGE

After the air sample is collected, the canister valve is closed, cap is installed, an identification tag is attached to the canister, and the canister is transported to a laboratory for analysis. Upon receipt at the laboratory, the canister tag data is recorded. Sample holding times and expiration are to be determined prior to initiating field activities.

Care must be taken not to exceed 40 psi in the canister (do not heat canister above 140 ^{o}F). Canisters should not be dented or punctured. They should be stored in a cool dry place and always be placed in their cardboard shipping boxes or similar protective carrier during transport and storage.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Contamination may occur in the sampling system if canisters are not properly cleaned before use. Additionally, all sampling equipment should be thoroughly cleaned. Instructions for cleaning the Summa canisters are described in ERT/REAC SOP # 1703, Summa Canister Cleaning Procedures. During this study pre-certified and clean canisters are being supplied. No cleaning of the exterior is required.

5.0 EQUIPMENT/MATERIALS REQUIRED

The following equipment/apparatus (see Figure 1) is required:

- ☐ Sub-atmospheric Pressure Sampling Equipment
- ☐ VOC canister sampler – whole air sampler capable of filling an initially evacuated canister by action of the hand valve from vacuum to near atmospheric pressure.

6.0 PROCEDURE

6.1 Sub-atmospheric Pressure Sampling using a Hand Valve and SUMMA (vacuum) Canister.

6.2 Prior to sampling collection, the appropriate information is completed on the Canister Sampling Field Data Sheet found at the end of this SOP and brass cap is removed with $^{9}/_{16}$-inch end wrench.

6.3 Place canister at the "breathing height" of the child (approximately the height of an average knee) in a room where the child spends the most of the time.

6.4 A canister, which is evacuated to at least 26 inches Hg hand valve, is opened to the atmosphere containing the air to be sampled.

6.5 The pressure differential causes the sample to flow into the canister.

6.6 This technique is used to collect grab samples (duration of 15 to 30 seconds). The sampling duration depends on the degree to which the flow is restricted.

6.7 A fixed-orifice flow restrictor will have a decrease in the flow rate as the vacuum canister approaches atmospheric (which is indicated by a change in pitch or sound level). Shut off hand valve immediately to avoid canister becoming neutral with atmosphere. (It should remain in a slight vacuum.) If the canister is allowed to become neutral, the test is void. Repeat test with new canister.

6.8 Upon sample completion at the location, the appropriate information is recorded on the Canister Sampling Field Data Sheet and labels (Note the final vacuum reading on canister: approximately 2 to 10 inches of mercury (Hg) by gauge on tank or separate gauge as available on each canister. Separate gauge will need to be attached and removed. Zero gauge before reading).

6.9 Cap the SUMMA Canister with the cap and tighten with wrench slightly to seal vacuum.

6.10 Place canister into a cardboard box labeled for shipping with the Field Data Sheet information and labels in the plastic luggage tag type of holder.

7.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality assurance procedures apply:

7.1 All data must be documented on standard chain of custody records, field data sheets, or site logbooks.
7.2 All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.
7.3 Duplicate samples will be taken as 1 in 10-samples.
7.4 Blank samples or "zero air," (sample not taken) will be returned as 1 in 20-samples.

8.0 HEALTH AND SAFETY

Health and Safety procedures as described and defined in the NDEP Health and Safety Plan (HASP) must be observed and implemented prior to dust sample collection. Chemical exposures are not anticipated, and physical or mechanical hazards are only those that would be found in any typical household environment.

9.0 REFERENCES

9.1 U.S. EPA, "Environmental Response Team Standard Operating Procedures #1704", July 27, 1995.

9.2 AIR TOXICS LTD, "Method: TO-14 list of proposed sample tests," September 30, 2001.

9.3 Health and Safety Plan, *Prepared in Support of: CDC/NCEH Cross-sectional* Exposure Assessment Study – Churchill County, Nevada. September 25, 2001.

TABLE 3. CHEMICALS TO BE ANALYZED

Chemical Abstract Service (CAS #)	CHEMICAL COMPOUND	FORMULA	Molecular Weight	Boiling Point (^{o}C)	Melting Point (^{o}C)
Freon 12	Dichlorodifluoromethane	Cl_2CF_2	120.91	-29.8	-158.00
74-87-3	Methyl chloride (Chloromethane)	340	50.49	-24.2	-97.10
Freon 114	1,2-Dichloro-1,1,2-tetrafluoroethane	$ClCF_2CClF_2$	170.93	4.1	-94.00
75-01-4	Vinyl Chloride, Chloroethylene	CH_3=CHCl	62.5	-13.4	-1,538.00
74-83-9	Methyl bromide, Bromomethane, monobromomethane, embafume	CH_3Br	94.94	3.6	-93.60
75-00-3	Ethyl chloride, Chloroethane, monochlorethane, chlorethyl, aethylis chloridum, ether chloratus, ether hydrochloric, ether muriatic, Kelene, Chelen, Anodynon, Chloryl Anesthetic, Narcotile	CH_3CH_2Cl	64.52	12.3	-136.40
Freon 11	Trichlorodifluoromethane	CCl_3F	137.38	23.7	-111.00
75-35-4	Vinylidene chloride, 1,1-Dichloroethylene, 1,1-Dichloroethene, asym-dichloroethylene	$C_2H_2Cl_2$	96.95	31.7	-122.50
75-09-2	Methylene chloride, Dichloromethane, Methylene dichloride	CH_2Cl_2	84.94	39.8	-95.10
Freon 113	1,1,2-Trichloro-1,2,2-trifluroethane	CF_2ClCCl_2F	187.38	47.7	-36.40
74-34-3	1,1,2-Dichloroethane, Ethylidene Chloride	CH_3CHCl_2	98.96	57.3	-97.00
	cis-1,2-Dichloroethylene	CHCl=CHCl	96.94	60.3	-80.50
67-66-3	Chloroform, trichloromethane	$CHCl_3$	119.38	61.7	-63.50
107-06-2	Ethylene dichloride, 1,2-Dichloroethane, sym-dichloroethane, ethylene chloride, dutch liquid, brocide	$ClCh_2CH_2Cl$	98.96	83.5	-35.30
71-55-6	Methyl chloroform, 1,1,1-Trichloroethane, Methylchloroform, chlorothene	CH_3CCl_3	133.41	74.1	-30.40
71-43-2	Benzene (including benzene from gasoline), benzol, cyclohexatriene	C_6H_6	78.12	80.1	5.50
56-23-5	Carbon Tetrachloride, tetrachloromethane, perchloromethane, necatorina, benzinoform	CCl_4	153.82	76.5	-23.00
78-87-5	Propylene dichloride (1,2-Dichloropropane)	$CH_3CHClCH_2Cl$	112.99	96.4	-100.40
	cis-1,3-Dichloropropene (cis-1,3-dichloropropylene)	CH3CCl=CHCl	110.97	76	
	trans-1,3-Dichloropropene (cis-1,3-dichloropropylene)	CH3CCl=CHCl	110.97	112	

Chemical Abstract Service (CAS #)	CHEMICAL COMPOUND	FORMULA	Molec-ular Weight	Boiling Point (^oC)	Melting Point (^oC)
79-00-5	Trichloroethane; 1,1,2-Trichloroethane, vinyl trichloride, beta-trichloroethane	$CH_2ClCHCl_2$	133.41	113.8	-36.50
108-88-3	Toluene, methylbenzene, toluol, phenylmethane, methacide	$C_6H_5CH_3$	92.15	110.6	-95.00
106-93-4	Ethylene Dibromide, Dibromoethane	$BrCH_2CH_2Br$	187.88	131.3	9.80
127-18-4	Perc, Perk, Tetrachloroethylene, Perchloroethylene, ethylene tetrachloride, tetrachlorethene, nema, tetracap, tetropil, perclene, ankilostin, didakene	$Cl_2C=CCl_2$	165.83	121.1	-19.00
108-90-7	Chlorobenzene, monochlorobenzene, benzene chloride	C_6H_5Cl	112.56	132	-45.60
100-41-4	Ethylbenzene, Ethyl benzene	$C_6H_5C_2H_5$	106.17	136.2	-95.00
	m-xylene (1,3-Dimethylbenzene)	1,3-$(CH_3)_2C_6H_4$	106.17	139.1	-47.90
	p-xylene (1,4-Dimethylbenzene)	$C_6H_5C_2H_5$	106.17	138.3	13.30
100-42-5	Styrene, Ethenylbenzene, styrol, styrolene, cinnamene, cinnamol, phenylethylene, vinylbenzene	$C_6H_5CH=CH_2$	104.16	145.2	-30.60
79-34-5	Tetrachloroethane, 1,1,2,2-Tetrachloroethane, sym-tetrachloroethane, acetylene tetrachloride, cellon, bonoform	$CHCl_2CHCl_2$	167.85	146.2	-36.00
	o-Xylene (1,2-Dimethylbenzene)	1,2-$(CH_3)_2C_6H_4$	106.17	144.4	-25.20
108-67-8	1,3,5-Trimethylbenzene (Mesitylene)	1,3,5-$(CH_3)_3C_6H_6$	120.2	164.7	-44.70
95-63-6	1,3,4-Trimethylbenzene (Pseudocumene)	1,3,4-$(CH_3)_3C_6$	120.2	169.3	-43.80
541-73-1	m-Dichlorobenzene (1,3-Dichlorobenzene)	1,3,-$Cl_2C_6H_4$	147.01	173	-24.70
100-44-7	Benzyl chloride	$C_6H_5CH_2Cl$	126.59	179.3	-39.00
95-50-1	Dichlorobenzene; o-Dichlorobenzene, 1,2-dichlorobenzene	1,2-$Cl_2C_6H_4$	147.01	180.5	-17.00
106-46-7	Dichlorobenzene; 1,4 Dichlorobenzene, p-Dichlorobenzene, 1,4-Dichlorobenzene(p)	1,4-$Cl_2C_6H_4$	147.01	174	53.10
120-82-1	Trichlorobenzene; 1,2,4-Trichlorobenzene	1,2,4-$Cl_3C_6H_3$	181.45	213.5	17.00

Chemical Abstract Service (CAS #)	CHEMICAL COMPOUND	FORMULA	Molecular Weight	Boiling Point (^{o}C)	Melting Point (^{o}C)
	Hexachlorobutadiene (1,1,2,3,4,4-Hexachloro-1,3-butadiene)				
	1,2-Dichloroethane				
	cis-1,3-Dichloroethane				
	Chlorotoluene				
	1,2-Dichlorobenzene				
	2,5-Dimethylfuran				
	1,3-Butadiene				
	Acetone				
	Carbon Disulfide				
	2-Propanol				
	trans-1,2-Dichloroethene				
	Vinyl Acetate				
	2-Butanone (Methyl Ethyl Ketone)				
	Hexane				
	Tetrahydrofuran				
	Cyclohexane				
	1,4-Dioxane				
	Bromodichloromethane				
	4-Methyl-2-pentanone				
	2-Hexanone				
	Dibromochloromethane				
	Bromoform				
	4-Ethyltoluene				
	Ethanol				
	Methyl tert-Butyl Ether				
	Heptane				

FIELD DATA SHEET B

Site: Date:	Samplers:
Sample #	
Location:	
Summa ID:	
Method: Grab	
Time (Seconds):	
Summa went to ambient pressure? (y/n)	
Pressure gauge reading (Pre opening)	
Pressure gauge reading (Post opening)	
Sketch/ General Comments:	

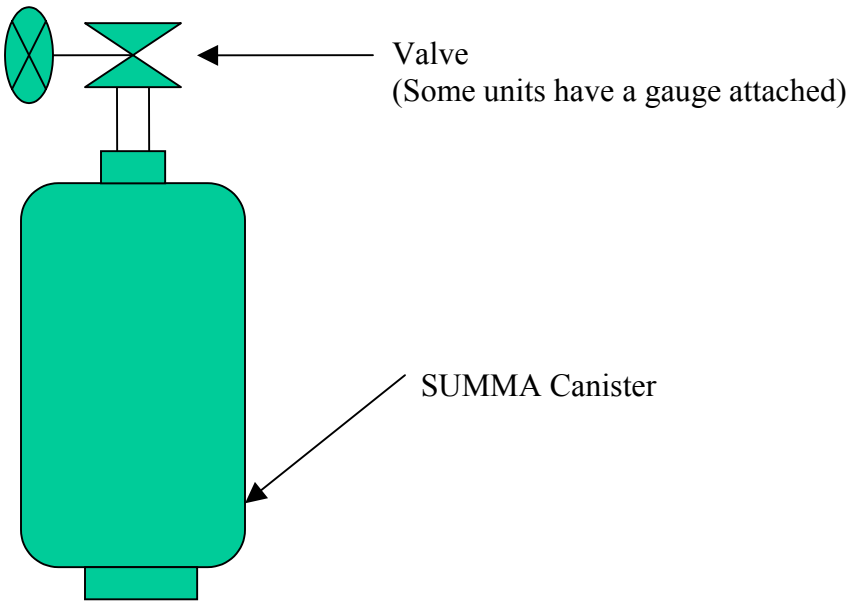

FIGURE 1. SUB-ATMOSPHERIC/SAMPLING EQUIPMENT

ATTACHMENT C
INDOOR DUST (VACUUM) SAMPLING
STANDARD OPERATING PROCEDURE

TABLE OF CONTENTS

1.0 SCOPE AND APPLICATION

The collection of indoor dust samples for multi-purpose comparison requires systematic and regimented collection and handling protocol. It is the consistent routine practiced at each individual collection location that allows a direct and representative interpretation of data.

This sampling method defines the fundamental techniques necessary to obtain representative and defensible indoor dust samples to support an environmental project or study effort. Recognize that there may be site-specific circumstances that necessitate deviation from the standard protocol described in this sample collection procedure, and in such case, documentation and record-keeping diligence is of utmost importance to justify any alternative practice employed.

2.0 METHOD SUMMARY

Sample collection focuses on maximization of both sample mass and careful documentation of area in which sample mass is collected. The Nilfisk GS-80 high-volume sampler, equipped with a high-efficiency particulate air (HEPA) filter, will be used to collect sample mass from pre-measured areas throughout study homes. Recoverable sample media includes soil and particulate matter having cross-sectional dimensions of approximately 5 micrometers (µm) and larger, typically embedded in carpets or deposited on hard-surface areas.

Sample mass will be collected in a vacuum bag protected and secured with a secondary poly liner. The poly liner allows the vacuum bag to be used, removed, and shipped with minimal exposure to cross-contamination locations. The initial sample is a combination of the dust collected, the vacuum bag, and the liner until the sample can be properly processed in a controlled, laboratory environment. A diagram of the Nilfisk GS-80 vacuum is shown as Figure 2.

Primary sample areas will target living areas in which children are most likely to play or spend proportionately longer amounts of time, i.e. in front of the television, in the middle of the family-room floor, and the bedroom floor. In addition, entryways or areas in front of doorways will also be considered primary sample target locations because of the propensity to track dirt and dust inside the home from outside areas.

It is crucial to the success of this sampling effort to make every attempt to properly obtain as much sample mass as may be available in any particular household. Because the target analyte list (TAL) is relatively extensive, sample mass is the overall limiting factor affecting the comparability of data obtained. Consequently, in instances where study homes are relatively small or when extracted dust mass from primary target living areas is not likely to be sufficient to support the TAL, secondary target areas including hallways and/or additional bedrooms may be systematically sampled to increase the total mass of the dust sample acquired.

In addition to the dust sample collected using the Nilfisk High-Volume Surface Sampler, relinquished household vacuum bags will be collected as a precautionary measure. In the event that analytical results pertaining to the collected dust sample indicate discrepancies or inconsistencies, additional dust mass will then be available for supplemental examination. The household vacuum bags will be collected only if they have been used exclusively in the home.

Collected samples will be transported to the Nevada Division of Environmental Protection (NDEP) field office for shipment to the Environmental Protection Agency (EPA) Laboratory in Richmond, California. If additional TAL analyses are required to be performed at alternate laboratories, sample mass will be divided at the EPA Laboratory and shipped under supplemental chain-of-custody procedures.

3.0 EQUIPMENT/MATERIALS REQUIRED

The following materials will be required to conduct the dust samples. Both disposable and reusable sampling equipment is required.

- ☐ Nilfisk Model GS-80 High-Volume Surface Sampler (vacuum cleaner)
- ☐ Nilfisk vacuum bags
- ☐ Poly liners for vacuum bags
- ☐ Sealed storage container (Ziploc® bags)
- ☐ Razor Blade or knife
- ☐ One (1) square meter (m^2) folding rulers or similar measuring device
- ☐ Masking tape
- ☐ Analytical balance (at field office)
- ☐ Distilled water
- ☐ Methanol
- ☐ Kimwipes™ or equivalent laboratory tissue/towel
- ☐ Plastic bags

4.0 SAMPLE PROCEDURES

4.1 Review field data sheets, and documentation materials to confirm adequate and appropriate field supplies, sample locations, and preliminary measurement requirements.

4.2 Upon arrival at the sampling location, document field conditions per the field log forms and record all requested general information. Don appropriate field sampling apparel including Tyvek™ pants, Tyvek™ over-shirt, and booties. Make sure to don booties at the threshold to the residence prior to entering. Take extra surgical gloves in the house for subsequent use.

4.3 Survey primary and secondary target sample areas and sketch the area to be sampled. At a minimum, primary target areas should include the main area in the living room and/or family room, the area immediately in front of the television (if possible), the main area in the child's or children's bedroom(s), and the entry way or area in front of the primary entrance to the home. Secondary areas may include hallways or additional bedrooms, (not bathrooms) as necessary or appropriate, depending on the mass of sample that is expected to be available at the residence. Record additional information required on the field log forms, as appropriate.

4.4 Use the folding ruler or template to define 1-square meter (m^2) areas to be vacuumed. Masking tape can be used, if needed, to mark off the perimeter of the 1-square meter areas designated for sample collection. Do not touch the designated sample areas with ungloved hands. Using masking tape with surgical gloves is not practical; therefore, extreme caution must be observed while taping to protect the unaltered integrity of the sample area. If square meter areas are immediately adjacent, the entire area may be taped in a single unit as long as the exact area is measured and logged. Allow narrow walking paths between the targeted sample areas for maneuverability. Make every attempt to remain outside the delineated areas while preparing the sample areas and conducting the sampling. Do **not** allow the Nilfisk vacuum canister to roll into the segregated sample areas. If used, put the used masking tape in a Ziploc® bag when finished taping delineated sample areas.

4.5 Record the area designed for sampling in each room, as well as the total area designated for sampling within the entire residence.

4.6 Assemble the Nilfisk GS-80:

(Done at office before leaving by staff)

4.6.1 Unlatch the two lower, side canister wing nuts configured in the front and back of the unit (below the Nilfisk logo and above the hose connection).

4.6.2 Cut a 3-inch cross in one side of the poly liner approximately ½-way between the top and bottom of the liner.

4.6.3 Slip the cut aperture over the vacuum intake port and fit the body of the liner into the canister so that the edges of the liner fold out over the lip of the canister bottom. The top of the liner bag will be seen from the outside of the canister and will be secured when the top of the canister is reattached.

4.6.4 Set the vacuum bag on top of the poly liner (note the bag indicates which side should face up) and expand the bag manually to allow unimpeded flow through the bag.

4.6.5 Secure the opening of the vacuum bag to the aperture where the hose fits onto the canister.

4.6.6 Once the poly liner and the bag are secured, reseat the top of the canister over the housing compartment, engage the wing nuts, and fold the wings for a secure fit. Make sure not to pinch or tear the edges of the exposed poly liner. Tape down wing nuts with packing tape to prevent opening.

(Done in the field)

4.6.7 Insert the hose into the intake port, matching the notches in the male connection to the notches in the female port, press and turn to engage and lock the connection. The hose should be snug, without lateral give, and the rubber gasket should be square to the base of the intake port.

4.6.8 Slip the appropriate vacuum head for the sample surface onto the loose end of the vacuum hose. This connection is a tapered-slip connection, therefore, use conservative pressure to secure the vacuum head to the hose. Should the vacuum head dislodge, slightly twist the hose into the vacuum head while applying pressure to create additional friction.

4.6.9 Adjust the vacuum head to extend brush down on hard surfaces or up for use on carpet surfaces.

4.7 Working from the sample area at nearest side of each room toward the farthest, begin sample collection at one corner of a delineated sample area. Move the vacuum head slowly and deliberately in strips the width of the vacuum head along a lateral axis of the square area. Pass the vacuum head back and forth four times over each lateral strip, for a total of eight strokes, and on the last pass, angle the vacuum head to the right or left (depending on the initial corner selected) to begin the next strip, which will be the width of the vacuum head, immediately adjacent to the completed strip. Again, pass the vacuum head back and forth for four complete cycles over the second lateral strip and then angle the vacuum head to begin the third adjacent strip. Continue this process until the entire designated unit has been vacuumed with four "double" passes of the vacuum head.

4.8 Visually inspect the sampled area to assess sample collection efficiency. If visible dust and dirt remain, or if dust or dirt can be dislodged by agitating carpet fibers with fingertips, then document the observations and rationale used for continuing the sample collection protocol and repeat step 4.7. If not, prepare to sample the remaining delineated sample areas.

4.9 Move to the next delineated area designated for sample collection and repeat steps 4.7 and 4.8 until all of the delineated sample areas have been carefully sampled. Turn off the vacuum when sampling is complete.

4.10 After all delineated sample areas have been vacuumed according to steps 4.8 and 4.9:

4.10.1 Hold the vacuum head in the air away from any objects or surfaces and turn on the vacuum;

4.10.2 Tap the nozzle against your hand to dislodge any residual dust remaining in the nozzle or the hose for collection in the canister;

4.10.3 Turn off the vacuum cleaner and allow it to sit undisturbed for at least 30 seconds;

4.10.4 Unsnap the two lower wing-nuts and remove the upper body of the canister from the collection chamber;

4.10.5 Carefully pull the poly liner away from the outside of the canister and surround the inner vacuum bag;

4.10.6 Carefully pull the vacuum bag away from the intake port and fold the aperture to secure the dust contents to the degree possible without the use of adhesives. Close the poly liner around the vacuum bag using caution to secure the package;

4.10.7 Transfer the poly liner/vacuum bag package into a Ziploc® plastic bag;

4.10.8 Label the exterior of the plastic bag with the designated sample number as described in Section 3.0 of the Sampling Plan; and

4.10.9 *(By office staff)*: Log the sample numbers on the proper Chain-of-Custody form(s). Complete the field sample form and store the secured sample in a

moderately chilled cooler during transportation and shipment to the designated laboratory. Custody-seal the cooler prior to shipment.

4.11 Unplug and prepare the Nilfisk GS-80 for demobilization. Collect all auxiliary equipment and gear and remove them from the residence.

4.12 Request from the residence, if available, contents of the household's vacuum bag for back-up samples.

5.0 CONTINGENCY SAMPLE MEASURES

5.1 If there is no carpet, measure and tape, if needed, hard-floor areas using the same protocol as that described for carpeting, but work with the vacuum head brushes down. It will be imperative to maximize sample area and avoid touching delineated sample areas with anything except the vacuum head. Delineated sampling units in a configuration that affords access and maneuverability and follow the standard operating procedures.

5.2 Determine if the household vacuum has been used exclusively in the home and if so, politely request the study participant to relinquish the household vacuum bag. If the study participant consents, collect the vacuum bag while wearing gloves to avoid contaminating the sample, and secure the vacuum bag in a plastic bag. Double bagging may be necessary. Label the household vacuum bag sample in accordance with the procedures defined in Section 3.0 of the Sampling Plan.

5.3 Maximizing sample mass is critical to the success and comparability of this environmental sampling event. Consequently, if subject residence conditions are atypical and cannot be accommodated by standard operating procedure, alternative sampling procedures may be implemented as long as conditions and rationale used to justify such deviations are documented and recorded in detail on field sample forms. There is no reasonable way to anticipate every possible conditional anomaly, therefore, field teams must use sound judgment and good, defensible scientific practice if implementing sampling procedures alternative to those described.

6.0 NILFISK SYSTEM DECONTAMINATION GS-80 S

At the end of each sampling event, decontaminate the Nilfisk GS-80 and all auxiliary equipment in a well-ventilated area in accordance with the following procedure:

6.1 Assemble one of the sampling trains to be used as the decontamination unit for decontaminating all of the used vacuum heads, hoses, and wands. Insert a clean poly liner and vacuum bag to perform the bulk decontamination procedure.

6.2 Put on clean surgical gloves and attach a hose and vacuum head assembly to the vacuum canister. Turn on the vacuum and use a bottle brush to remove any accumulated dust. Tap your hand on the vacuum head to remove any visible dirt that accumulates on the brush. When the vacuum head is visibly clean, remove the vacuum head and spray with reagent grade methanol. Allow the vacuum head to air dry on a clean surface.

6.3 Use the bottle brush again to clean the wand and hose to dislodge residual dirt and dust. Again, tap your hand on the wand intake while cleaning with the bottle brush to increase the vacuum in the hose.

6.4 Repeat steps 6.2 and 6.3 for each vacuum head, wand, and hose assembly requiring decontamination.

6.5 When all ancillary Nilfisk GS-80 equipment has been decontaminated, remove the dirty dust bag and poly liner and wipe the inside of the collection chamber with distilled water. Wipe the inside of all other collection chambers with distilled water as well. Spray all Nilfisk collection chambers with reagent grade methanol and allow to air-dry. If decontaminating equipment between residences, wipe the inside of the collection chambers between uses.

6.6 Wipe the one (1) square meter (m^2) folding ruler, or equivalent, with distilled water and then spray with methanol. Allow to air-dry on a clean surface.

6.7 Label decontaminated equipment indicating the date of last decontamination and the initials of the person performing the decontamination procedure.

Never collect a dust sample without being completely sure that the Nilfisk GS-80 and auxiliary equipment have been properly decontaminated prior to use.

7.0 QUALITY ASSURANCE/QUALITY CONTROL

With limited sample mass available for primary TAL analyses, duplicate or replicate sample protocol may not be viable or feasible (if the team leader determines a duplicate sample is viable, he or she will use the extra bags supplied by the field office). If viable, duplicate samples can be taken for 1 in 10-samples.

8.0 SAFETY PRECAUTIONS

Health and Safety procedures as described and defined in the NDEP Health and Safety Plan (HASP) must be observed and implemented prior to dust sample collection. Chemical exposures

are not anticipated, and physical or mechanical hazards are only those that would be found in any typical household environment.

9.0 REFERENCES

9.1 Compendium of Emergency Response Team (ERT) Collection of Indoor Dust Samples from Carpeted Surfaces for Chemical Analysis Using a Nilfisk GS-80 Vacuum Cleaner.

9.2 Chuang, Jane C., Callahan, Patrick J., Menton, Ronald G., and Gordon, Sydney M, *Monitoring Methods for Polycyclic Aromatic Hydrocarbons and Their Distribution in House Dust and Track-in Soil*, Environmental Science & Technology, Vol. 29, No. 2, 1995.

9.3 Lewis, R.G., Fortmann, R.C., Camann, D.E., *Evaluation of Methods for Monitoring the Potential Exposure of Small Children to Pesticides in the Residential Environment*, Arch. Environ. Contam. Toxicology 26, 37-46, 1994.

9.4 American Society for Testing and Materials, *Standard Practice for Collection of Floor Dust for Chemical Analysis, Designation: D 5438-00*.

9.5 Health and Safety Plan, *Prepared in Support of: CDC/NCEH Cross-sectional Exposure Assessment Study – Churchill County, Nevada.* September 25, 2001.

FIELD DATA SHEET C

Site:		Samplers:	
Date/Time:		Team Leader:	
Sample ID Number:		Nilfisk I.D:	
Sample Location:	Surface Type	Dimensions of Sample Area (Grid)	Total Area (m^2)

Total Area Sampled =_____

Type of Surfaces: Carpet Style: Plush, Level Loop, Multilevel, Shag, Other
Floors: Hardwood, Cement, Tile, Vinyl, Other

Sketch/ General Comments:

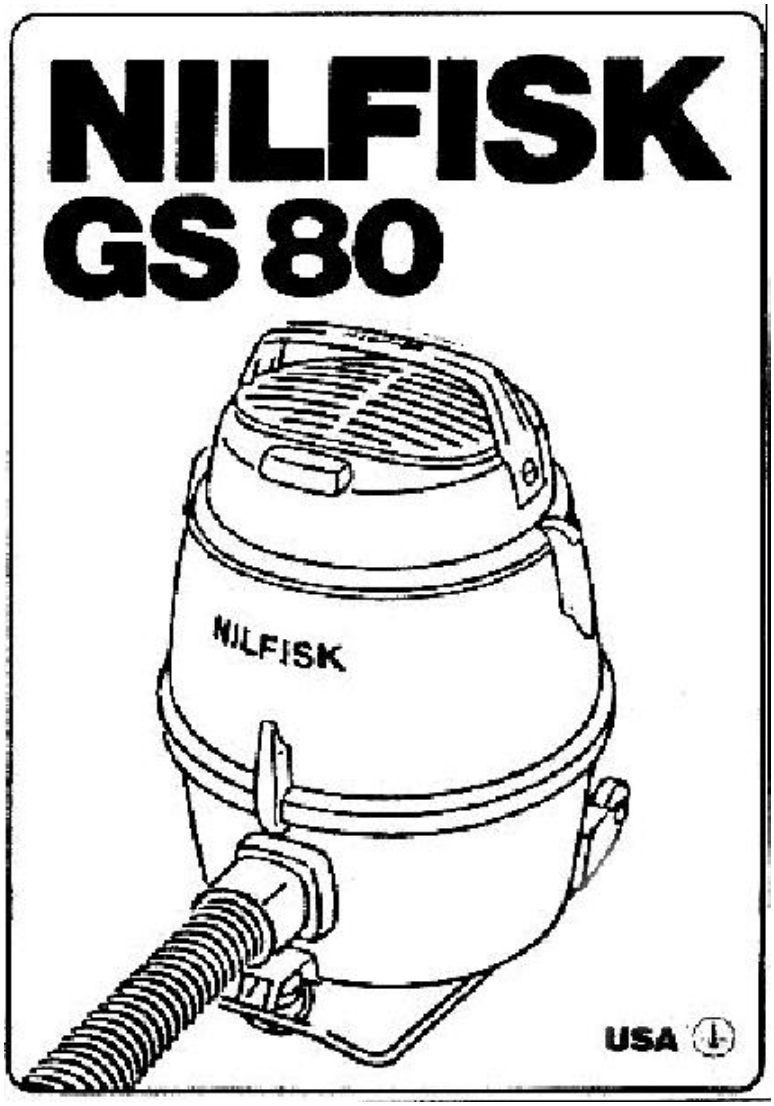

FIGURE 2. DIAGRAM OF NILFISK GS-80

ATTACHMENT D
INDOOR DUST (DRY-WIPE) SAMPLING
STANDARD OPERATING PROCEDURE

TABLE OF CONTENTS

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) outlines the recommended protocol and equipment for collection of a dry-wipe sample to analyze potential surface contamination.

This method of sampling is appropriate for surfaces contaminated with non-volatile species of analytes. Sample size should be determined based upon detection limit desired and the amount of sample requested by the analytical laboratory. Typical sample size for this investigation is 95.72 square inches (in^2). Based upon sampling location, the sample size may need modification due to area configuration but only one gauze pad will be used.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure or other procedure limitations. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute NDEP endorsement or recommendation for use.

2.0 METHOD SUMMARY

Since surface situations vary widely, no universal sampling method can be recommended. Rather, the method and implements used must be tailored to suit a specific sampling site. The sampling location should be selected based upon the potential for contamination. For this investigation, the recommended sampling locations are: tube television screens, the top and sides of a projection television, computer monitor screens, and similar surfaces that attract dust.

Dry-wipe samples are collected from a measured surface to indicate surface contamination. While wearing a new pair of surgical gloves, open a sterile gauze pad and stroke firmly over the sample surface, vertically and horizontally, to ensure complete coverage. The pad is then transferred to the sample container, labeled and sent to the laboratory for analysis.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Samples should be stored in a plastic bag, labeled, placed in a second plastic bag, and shipped to the laboratory performing the analysis. The laboratory will provide the shipping labels and containers. The amount of sample required has been determined in concert with the analytical laboratory.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

This method has few signification interferences or problems. Typical problems result from rough porous surfaces, which may be difficult to wipe.

5.0 EQUIPMENT/MATERIALS REQUIRED

Equipment required for performing wipe sampling is as follows:

- ☐ Clean plastic bags (Ziploc®)
- ☐ Pre-measured template
- ☐ Field data sheets
- ☐ Sample labels
- ☐ Disposable surgical gloves
- ☐ Sterile wrapped gauze pad (4 in. x 4 in.)
- ☐ Chain of custody records

6.0 PROCEDURES

Wipe-sampling is accomplished by using a sterile gauze pad, wiping a pre-determined, pre-measured area. The sample is packaged in a plastic bag, labeled, double-bagged and packed in shipping containers provided by the lab. Each gauze pad is used for only one wipe sample. (Use a second gauze pad to clean the rest of the surface; see 6.9 below.)

6.1 Choose an appropriate sampling surface. Without contacting the surface, measure off the designated area or use the pre-measured template (95.72 in^2).
6.2 Record the surface area to be wiped.
6.3 Don a new pair of disposable surgical gloves.
6.4 Open a new sterile package of gauze pads.
6.5 Wipe the marked surface area using firm strokes. Wipe vertically, then horizontally to ensure complete surface coverage.
6.6 Place the gauze pad in a plastic bag.
6.7 Seal the plastic bag, attach the label and place in a second plastic bag (and place in container without ice).
6.8 Record all pertinent data on the field data sheets.
6.9 Using a new gauze pad, clean the remainder of the surface and dispose of template and cleaning gauze pad properly.
6.10 Complete the sampling analysis request form and chain of custody record (this can be done by the office staff).

7.0 CALCULATIONS

Results are usually provided in pCi/area, or other appropriate measurement. Calculations are typically done by the laboratory.

8.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality assurance procedures apply:
All data must be documented on standard chain of custody forms, field data sheets.

The following specific quality assurance activities apply to wipe samples:
For wipe samples, a blank sample should be collected at one out of every 20th sampling event. This consists of a sterile gauze pad placed in a sample container done in the home. The blank will help identify potential introduction of contaminants via the sampling methods, the pad, and the sample container.

Duplicate samples will be collected at one out of every 10th sampling event.

9.0 DATA VALIDATION

A review of the quality control samples will be conducted and the data utilized to qualify the environmental results.

10.0 HEALTH AND SAFETY

Health and Safety procedures as described and defined in the NDEP Health and Safety Plan (HASP) must be observed and implemented prior to dust sample collection. Chemical exposures are not anticipated, and physical or mechanical hazards are only those that would be found in any typical household environment.

11.0 REFERENCES

11.1 U.S. EPA Environmental Response Team, Standard Operating Procedures 2011, November 1994.

11.2 Health and Safety Plan, *Prepared in Support of: CDC/NCEH Cross-sectional Exposure Assessment Study – Churchill County, Nevada.* September 25, 2001.

FIELD DATA SHEET D

Site:	Samplers:
Date/Time:	
Sample Location:	

Sample ID Number:	Surface Type	Dimensions of Sample Area (template)	Total Area (in^2)
		Template	95.72

Sketch/ General Comments:

ATTACHMENT E
INDOOR AIR RADON CANISTER KIT SAMPLING
STANDARD OPERATING PROCEDURE

TABLE OF CONTENTS

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to describe a procedure for sampling of radon and radon decay product measurements found in homes. This method is based on samples collected in pre-packaged kits manufactured and distributed by Key Technology, Inc., P.O. Box 562, Jonestown, PA 17038, Phone (717) 274-8310. Nevada Health Division (NHD) has purchased the kits and contracted with Key Technology, Inc. to perform the lab test and provide the results for this study. Nevada Division of Environmental Protection (NDEP) will place each kit in the home, collect the kits, and mail them to the lab.

2.0 METHOD SUMMARY

The method is based on the sample collected in a test period of 48 to 96 hours (2 to 4 days) in a room where the canister will not be disturbed and away from drafts, an open door, windows, fireplace, (about 3 feet distance), etc. It should be placed preferably in a basement or the lowest level of the home (for multi-level homes), and 1 foot away from the exterior walls of the home, but not in the kitchen, laundry room, cupboard, closet or bathrooms. The canister should be placed at a height of 2 feet above the floor, and the space chosen should have remained closed for 12 hours previous to the test period (normal entry and exit is OK).

The “KEY-RAD” kit should be stored in a cool dry place and remain in the box it comes in until the time of use, then returned to that same box. Radon and radon decay products long-term exposure rate recommended by EPA and the Surgeon General is 4 pico Curie intensity per liter (pCi/L) or below. The average indoor rate is 1.3 pCi/L and the outdoor is 0.4 pCi/L. Nevada is in a region of the U.S. where 9% of the housing units may exceed 4 pCi/L. This is a naturally occurring product where only a sample can determine the radon or radon decay products exposure rates for a particular site.

3.0 SAMPLE PRESERVATION, CONTAINERS HANDLING, AND SHIPPING

After the radon sample is collected, the container lid is replaced and resealed with the gray vinyl tape. Make sure the tape tightly seals the lid to the can in the same fashion as when it was removed. Record the date and time on the information card and the FIELD data sheet. Information card and canister must be mailed to the laboratory within 24 hours. Results are returned to the NDEP and the Nevada Division of Health for consolidation of all sample results. Results will be included in the environmental sampling results packet to the homeowner.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Invalidation may occur in the sampling system if canister is punctured, not properly placed, overexposed to outdoor air supply, overexposed in the open mode (over 96 hours) or not delivered to the laboratory in a timely manner. Use of internal/external air exchange systems (other than the furnace) such as high volume attic and window fans (swamp coolers) should not be operated for at least 12 hours prior to and during the measurement period. Any circulation system that brings outdoor air into the home should not be utilized.

5.0 EQUIPMENT/MATERIALS REQUIRED

The radon sample kit as manufactured by Key Technology, Inc., named "KEY-RAD-KIT."

6.0 PROCEDURE

Radon and radon decay products sampling:

6.1.1 A radon kit, "KEY-RAD-KIT" manufactured by Key Technology, Inc. is placed in an appropriate site of the control home (on a hard surface, at 2 feet or higher above the floor, not in a kitchen, bathroom, laundry room, closet, drawer, cupboard, and not near the fireplace, a window, nor a place with noticeable drafts). This test should not be run during severe weather conditions (i.e. blizzards, hurricane, and high winds). The canister should be exposed to the air people breathe.

6.1.2 Remove the vinyl tape from the can and remove the lid. Put the lid on the bottom of the can and replace the tape around the can. Do not allow the tape to twist or pick up any foreign material.

6.1.3 Place the can on a hard surface with the open side up in the selected location (it should not be moved). Record the date and time (include AM or PM) on the information form and FIELD data sheet.

6.1.4 After 48 hours (2 days) but no more than 96 hours (4 days), pick up the unit, reseal the canister and replace the vinyl tape around the seam of the canister. If the vinyl tape is lost, use electrical tape to seal the canister (the canister must be sealed or it cannot be analyzed). Record the date and time (include AM or PM) on the information form and FIELD data sheet.

6.1.5 Record on the information form and the FIELD data sheet the type of room where the canister was exposed (e.g. basement, living room, bedroom, etc.).

6.1.6 Record on the information form and the FIELD data sheet the level of the home where the canister was exposed (e.g. basement, 1^{st}, 2^{nd}, etc.).

6.1.7 Mail the kit and the information form (place the yellow copy in the box the kit came in, keep white copy for NDEP and NHD), tape the mailing box closed (use clear tape over the label address and add the NDEP phone number, 775-687-4670, at the bottom).

6.1.8 Place in pre-paid postage box with addresses and mail the canister within one day.

7.0 QUALITY ASSURANCE/QUALITY CONTROL

7.1 All data must be documented on standard chain of custody records, FIELD data sheet, or site logbooks.
7.2 All kits must be placed and collected in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. The radon sample kit should be intact when placed in the home and when picked up, and must have documentation completed by the agent of the NDEP.
7.3 Duplicate samples will be taken as 1 in 10-samples. Two (2) canisters will be set side- by-side at the selected site and returned as specified in Section 6.0 above.
7.4 Blank samples or "unopened canisters" (sample not taken) will be returned as 1 in 20-samples.

8.0 HEALTH AND SAFETY

Health and Safety procedures as described and defined in the NDEP Health and Safety Plan (HASP) must be observed and implemented prior to dust sample collection. Chemical exposures are not anticipated, and physical or mechanical hazards are only those that would be found in any typical household environment.

9.0 REFERENCES

9.1 Key Technology, Inc., KEY-RAD-KIT instructions.
9.2 U.S. Census, 1990.
9.3 U.S.G.S. survey on distribution of radon in Nevada.
9.4 Health and Safety Plan, *Prepared in Support of: CDC/NCEH Cross-sectional Exposure Assessment Study – Churchill County, Nevada.* September 25, 2001.

FIELD DATA SHEET E

Site:		Date:		Samplers:				
Sample #								
Location:								
Radon Kit ID:								
Method:	Grab							
Time (incl. AM/PM)								

Is kit at 2 ft height or above? (y/n)	
Is it exposed to drafts? (y/n)	
Was canister kit moved? (y/n, Post opening)	

Sketch/ General Comments:

ATTACHMENT F
FIELD DECONTAMINATION
STANDARD OPERATING PROCEDURE

The objective of decontamination procedures is to provide clean equipment for the retrieval of representative environmental samples. All decontamination will be done in the controlled environment of the NDEP Fallon Field office.

The types of equipment that have contact with the soil samples and will be decontaminated are hand trowels and disposable aluminum trays. Data collection equipment, such as clipboards, floor area vacuuming templates and pressure gauges for the Summa Canister will also be decontaminated, as well as any other reusable equipment which enters the homes, such as buckets for carrying small items. Decontamination of the dust vacuum sample collection equipment (Nilfisk) is covered under the dust sample collection SOP.

PROCEDURES:

Field Data Collection Equipment:

Clipboards, area templates, calibration equipment (for Summa Canister) and other equipment will be cleaned using the following procedures:

- ☐ Wipe with a paper towel
- ☐ Alconox and potable water wash
- ☐ Deionized water rinse
- ☐ Air dry

Sampling Equipment:

Equipment used for soil sample collection includes: stainless steel trowels, disposable aluminum trays and the rinsate blank water transfer funnel. This equipment will be cleaned using the following procedures:

- ☐ Alconox and potable water scrub
- ☐ Thorough potable water rinse
- ☐ Deionized water rinse
- ☐ Air dry

Sampling instruments will be wrapped in aluminum foil after decontamination to keep them clean before sampling.

ATTACHMENT G
LABELING STANDARD OPERATING PROCEDURE

TABLE OF CONTENTS

1.0 LABELING SCHEME FOR SAMPLES

1.1 Soil Sample labels
(Examples below represent example House #215)

- 1 full 8-oz glass jar (Metals analyses)
  215-SS-01 (Metals)
  CLP Label MY0000-Total Metals

- 1 full 8-oz glass jar (organo-chlorine pesticides analyses and Aroclor PCBs)
  215-SS-01 (o-chlor pest & PCB)
  CLP Label Y0AK0-PEST/PCB

- 1 full 8-oz glass jar (organo-phosphate pesticides analyses)
  215-SS-01 (o-phos pest)

- 1 full 8-oz glass jar (SVOCs analyses)
  215-SS-01 (SVOC)
  CLP Label Y0AK0-BNA

- 1 full 8-oz glass jar in case of breakage
  215-SS-Archive

- 16 oz of soil in a double Ziploc® bag (rad analyses)
  215-SS-01 (Rads)

1.2 Dust – Dry-wipe
Samples should be stored in a plastic bag, labeled & placed in a second plastic bag.
- 215-WS-01

1.3 Summa Canisters
Label will be affixed to a paper tag to be attached with wire to the handle
- 215-IA-01

1.4 Nilfisk Vacuum Bag
Samples should be stored in a plastic bag, labeled & placed in a second plastic bag.
- 215-VS-01

1.5 Home Vacuum Bag
Samples should be stored in a plastic bag, labeled & stored in a cardboard box.
- 215-HV-01 (Home Vac Bag)

2.0 LABELING SCHEME FOR DUPLICATES (1/10)

2.1 Soil Sample labels

Use the house number plus 100 to code the duplicates and blind the laboratory. For example, House #15 would become #115.

- 1 full 8-oz glass jar (Metals analyses)
  115-SS-01 (Metals)
  CLP Label MY0000-Total Metals (New CLP #, different than for House #215)

- 1 full 8-oz glass jar (organo-chlorine pesticides analyses and Aroclor PCBs)
  115-SS-01 (o-chlor pest & PCB)
  CLP Label Y0AK0-PEST/PCB (New CLP #, different than for House #215)

- 1 full 8-oz glass jar (organo-phosphate pesticides analyses)
  115-SS-01 (o-phos pest)

- 1 full 8-oz glass jar (SVOCs analyses)
  115-SS-01 (SVOC)
  CLP Label Y0AK0-BNA (New CLP #, different than for House #215)

- 1 full 8-oz glass jar in case of breakage
  115-SS-Archive

- 16 oz of soil in a double Ziploc® bag (rad analyses)
  115-SS-01 (Rads)

2.2 Dust – Dry-wipe

Samples should be stored in a plastic bag, labeled and placed in a second plastic bag.

- 115-WS-01

2.3 Summa Canisters

Label will be affixed to a paper tag to be attached with wire to the handle

- 115-IA-01

2.4 Nilfisk Vacuum Bag

Samples should be stored in a plastic bag, labeled and placed in a second plastic bag.

- 115-VS-01

3.0 LABELING SCHEME FOR LAB QC DOUBLE VOLUME (1/20)

Use the same actual house # for these and continue with the sample numbers. These are not blinded to the laboratory.

3.1 Soil

Collect double the original volume (4 more jars)
Continue same labeling scheme as in original samples

- 1 full 8-oz glass jar (Metals analyses)
  215-SS-01 (Metals)
  CLP Label MY0000-Total Metals (Same CLP # as that for House #215)

- 1 full 8-oz glass jar (organo-chlorine pesticides analyses and Aroclor PCBs)
  215-SS-01 (o-chlor pest & PCB)
  CLP Label Y0AK0-PEST/PCB (Same CLP # as that for House #215)

- 1 full 8-oz glass jar (organo-phosphate pesticides analyses)
  215-SS-01 (o-phos pest)

- 1 full 8-oz glass jar (SVOCs analyses)
  215-SS-01 (SVOC)
  CLP Label Y0AK0-BNA (Same CLP # as that for House #215)

  Note: not applicable to Rad lab.

3.2 Dust – Dry-wipe – Not Applicable

3.3 Summa Canisters – Not Applicable

3.4 Nilfisk Vacuum Bag

Samples should be stored in a plastic bag, labeled and placed in a second plastic bag.

- 215-VS-01

NOTE: Duplicates and Lab QC volumes may not be able to come from the same residence. This is particularly true with the dust. They will rarely be able to collect 2x dust let alone 3x dust.

4.0 LABELING SCHEME FOR BLANKS (1/20)

4.1 Rad Dust

New unused gauze pad in new double Ziploc® bag w/ label

- 215-WS-Blank

4.2 Summa Canisters

Label will be affixed to a paper tag to be attached with wire to the handle

- 215-IA-Blank

5.0 LABELING SCHEME FOR EQUIPMENT BLANKS (1/20)

Collect the equipment rinsate in a turkey pan and transfer to the following containers. Label numbering scheme will begin at 501 and does not correspond to a particular residence location. *NOTE: 7 liters of liquid are needed below.*

- 1 full 1-liter poly bottle (Metals analyses) with nitric acid preservative
  Typically 1 ml to 2 ml nitric acid to get to pH<2.
  501-EB-01 (Metals)
  CLP Label MY0000-Total Metals (New CLP #, different from any house #)

- 2 full 1-liter amber glass bottle (o-chlorine pesticides analyses and Aroclor PCBs)
  501-EB-01 (o-chlor pest & PCB)
  CLP Label Y0AK0-PEST/PCB (New CLP #, different from any house #)

- 2 full 1-liter amber glass bottle (organo-phosphate pesticides analyses)
  501-EB-01 (o-phos pest)

- 2 full 1-liter amber glass bottle (SVOCs analyses)
  501-EB-01 (SVOC)
  CLP Label Y0AK0-BNA (New CLP #, different from any house #)

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
1	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
2	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
3	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
4	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
5	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
6	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
7	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
8	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
9	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
10	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
11	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
12	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
13	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
14	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
15	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
16	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
17	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
18	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
19	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
20	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
2xV	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
21	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
22	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
23	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
24	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
25	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
26	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
27	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
28	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
29	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
30	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
31	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
32	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
33	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
34	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
35	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
36	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
37	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
38	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
39	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
40	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
2xV	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
41	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
42	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
43	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
44	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
45	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
46	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
47	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
48	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
49	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
50	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
51	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
52	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
53	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
54	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
55	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
56	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
57	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
58	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
59	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
60	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
2xV	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
61	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
62	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
63	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
64	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
65	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
66	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
67	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
68	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
69	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
70	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
71	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
72	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
73	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
74	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
75	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
76	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
77	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
78	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
79	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
80	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
2xV	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
81	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
82	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
83	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
84	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
85	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
86	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
87	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
88	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
89	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
90	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

Set #	NDEP Sample #	CLP Sample #	Soil Jars	Radon Kits	Rad Soil	Dry Wipe	Vac Bag	Summa Canister
91	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
92	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
93	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
94	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
95	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
96	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
97	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
98	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
99	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
100	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
Dup	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							
2xV	-SS-01 (Metals)							
	-SS-01 (o-chlor pest & PCB)							
	-SS-01 (SVOC)							

ATTACHMENT H
FIELD RINSATE BLANK
STANDARD OPERATING PROCEDURE

The objective of the rinsate blank is to provide a laboratory analytical check on possible sources of contamination of a sample that may be related to equipment decontamination and sample handling procedures. All rinsate blank samples will be collected in the field. Samples will be collected at a rate of one blank per 20 soil samples.

The types of equipment that will have contact with the soil samples and will be decontaminated are steel hand trowels and disposable aluminum trays. The funnel used for transferring the rinsate blank to the sample bottles will also be decontaminated according to procedures. Sample jars and disposable plastic scoops will also come in contact with the soil sample. The rinsate blank procedures will encompass all these pieces of equipment.

Rinsate blanks will be handled, transported and analyzed in the same manner as the soil samples acquired that day. The rinsate blank is collected in the field and therefore may also be used to assess ambient conditions that may potentially affect the sample quality.

PROCEDURES:

At the appropriate field location, de-ionized water is passed over the disposable and decontaminated sample equipment. This equipment includes: hand trowels, disposable aluminum trays, sample jars and disposable plastic scoops.

The water is collected into the disposable aluminum tray and transferred via a funnel to the appropriate sample jars, based on analysis to be performed:

- □ 1-liter poly bottle for TAL metals analysis (sample water preserved to a pH of <2 with dilute nitric acid) and sent to CLP Lab.

- □ Two 1-liter amber bottles for Pesticide/PCB and sent to CLP Lab.

- □ Two 1-liter amber bottles for Semi-Volatile Organics and sent to CLP Lab.

All rinsate samples will be packed in coolers and on ice to 4ºCelsius.