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SAMPLING PLAN FOR OBTAINING PITS 5,6 AND CLEARWELL SAMPLES FOR OPERABLE UNIT 1 TREATABILITY STUDIES (REVISION 2) DECEMBER, 1991

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SAMPLING PLAN

for

OBTAINING PITS 5, 6 AND CLEARWELL SAMPLES

for

OPERABLE UNIT 1 TREATABILITY STUDIES

(Revision 2)

December, 1991

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for

THE UNITED STATES DEPARTMENT OF ENERGY
FERNALD OFFICE

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1. NEED

Operable Unit 1 (OU-1) is one of five operable units comprising the Fernald Environmental Management Project (FEMP) Environmental Remedial Action (ERA) Project. The task for Operable Unit 1 is to remediate the Waste Pit Area. A Remedial Investigation & Feasibility Study (RI/FS) is underway to determine the best method to remediate the waste pits. Initial screening of alternatives has resulted in the selection of the following options for remediation:

a. Non-removal - physical stabilization, slurry wall, and cap

b. Removal - waste treatment and on-site disposal

c. Removal - waste treatment and off-site disposal

d. Waste removal, treatment, on-property disposal, and cap

e. Waste removal, treatment, on-property disposal, soil treatment and cap

All alternatives under consideration for OU-1 need treatability studies to demonstrate that the pit wastes can be stabilized and that the stabilized wastes will meet the requirements for the protection of the public and environment. All alternatives, except Alternative "a", currently offer solidification or vitrification as the treatment process. Because the wastes in the waste pits are unique for a given volume and location a standard design mix (formula) can be applied for their treatment.

The main treatment processes being considered in the RI/FS include solidification and vitrification. This Sampling Plan addresses the collection of samples for use in the development of treatability protocols for Waste Pits 5, 6 and the Clearwell. Waste material collected from the waste pit sampling activities identified in this Sampling Plan will be used in solidification/vitrification development efforts. Separate plans are being developed for the conduct of all phases of the necessary treatability studies.

2. OBJECTIVES AND GOALS

The primary intent of this sampling effort is to collect sample material from Waste Pits 5, 6 and the Clearwell to be used in the development of treatability protocols. The samples will be collected and utilized by off-site laboratories in the development of treatability protocols to treat or stabilize pit wastes into less hazardous forms to make them more easily manageable. While previous sampling and characterization of Waste Pits 5, 6 and the Clearwell were conducted during the site Characterization Investigation Study (CIS) by Weston, the secondary intent of this sampling effort will be to provide additional data in support of the waste pit area characterization. The sampling effort will also be used to augment the characterization requirements for Waste Pit 5 and the Clearwell since they have been declared as Hazardous Waste Management Units (HWMUs) and are subject to Resource Conservation Recovery Act (RCRA) regulations. The goal of this sampling effort is to collect samples that are characteristic of the waste material contained within the pits, characterize the waste, and use it in the development of treatability protocols and requirements. The eventual goal is to address the potential delisting of the material as a hazardous waste upon treatment of the waste.

Samples will be collected from the Waste Pits 5, 6 and Clearwell in 55-gallon drums situated in close proximity to the pits. Representative samples of the waste pit will be obtained using a stratified random sampling procedure. In, addition, in Pit 5 and the Clearwell a directed sample at the outflow into the units have been designated. These directed samples will be used to evaluated heavier contaminants (such as residues of ores containing heavy metals) which would be subject to rapid settling. Pit 6 did not receive a liquid discharge, therefore, no directed sample locations are designated.

A computer program has been used to determine the stratified random sample locations. The computerized model is based upon the National Technical Information Service Document "Method for Evaluating the Attainment of Clean-up Standards, Vol. 1, Soils and Media." Eight sample locations (random and directed as applicable) were identified for each Pit 5, 6 and the Clearwell.

Preliminary discussions with the contractors who will be conducting the treatability studies indicate that a minimum of eight 55-gallon drums will be collected from each waste pit to develop satisfactory design formulae.

3. WASTE PITS 5, 6 AND THE CLEARWELL HISTORY AND DESCRIPTION

Waste Pit 5 is basically an open pond which was constructed in 1968 and lined with a 60 mil thick, Royal-Seal®, ethylene-propylene-diene monomer (EPDM), elastomeric membrane. Waste Pit 5 has an approximate 30-foot depth and a 161,105-square-foot area containing an estimated 98,840 cubic yards of waste. The pit/pond contains solids

from raffinate, slag-leach slurry, sump-slurry, and lime-sludge. Radiologically, Pit 5 waste contains an estimated 112,000 pounds of uranium and 37,000 pounds of thorium. The pit was taken out of service in 1987, but remains open to the atmosphere. The level of surface water varies depending on the precipitation and evaporation rates from complete coverage of the pit with three feet of water near the pit's west end down to complete open-air exposure of the waste for approximately one-third of the length of the pit at the east end. Additional information on the physical and chemical characteristics of Waste Pit 5 is provided in Table 1.

Waste Pit 6, with a 24-foot depth, was constructed in 1979 in a manner similar to Waste Pit 5 and is lined with an EPDM elastomeric membrane. Waste Pit 6 has a 32,400 sq.ft. area with an estimated 11,556 cu.yds. of disposed waste. It contains green salt (uranium tetrafluoride), filter cake, slag, process residues, and asbestos. Within these materials is an estimated 1.9 million pounds of uranium. The pit was taken out of service in 1985 but remains open to the atmosphere. The pit surface is presently covered with up to two feet of standing water, the surface elevation of which varies depending on the amount of rainfall and evaporation rates. Until March 1987, rainfall that had collected in the pit was pumped to Waste Pit 5 for settlement before being discharged via the Clearwell. Presently, collected rainfall is transferred to nearby waste water treatment facilities before discharge. Additional information on the physical and chemical characteristics of Waste Pit 6 is provided in Table 2.

Constructed at the time of the Waste Pit 1 excavation in 1952, the Clearwell currently receives surface water runoff from the surfaces of Pits 1, 2, and 3, as well as excess impounded stormwater from Pit 5. Before March 1987, the Clearwell was used as a final settling basin for process water that passed through Waste Pits 3 and 5 before discharge to the Great Miami River, a National Pollutant Discharge Elimination System (NPDES) discharge point. Water of varying depth remains in the Clearwell at all times. The depth of sediment in the Clearwell is presently estimated at 11 feet. Additional information on the physical and chemical characteristics of Clearwell is provided in Table 3.

4. SAMPLING STRATEGY

Five methods are proposed for collecting these samples from the pits in question. Multiple methods are being considered due to the differences noted in the form and consistency of pit wastes. It cannot be stated with absolute certainty at the present time that a single method will provide success in obtaining adequate samples from Waste Pits 5, 6 and the Clearwell. It is felt, however, that one or a combination of the methods described will work for each of the individual pits. The five alternatives under consideration involve use of a slurry pump, a backhoe, a baler, a Vibra-Core system, and a clamshell-crane, respectively. The prioritized sampling method that will be employed for the Waste Pits 5, 6 and the Clearwell are as follows.

	WASTE PIT 5	WASTE PIT 6	CLEARWELL
Primary Sampling Method	Baler and Backhoe[1]	Baler	Slurry Pump
Secondary Sampling Method	Vibra-Core	Clamshell-Crane	Clamshell-Crane
Tertiary Sampling Method	Slurry Pump	Vibra-Core	
Other Sampling Methods	Clamshell-Crane	Slurry Pump	

Figures 1, 2 and 3 illustrate the locations of the Waste Pits 5, 6 and the Clearwell as well as the established transitions, restricted access area, sample collection, and sampling location areas. Prior to the start of the sampling, preliminary efforts to establish the transitions area, restricted access area, and sample location area shall be performed as outlined in Appendix A. The details of the five sample collection options are summarized below.

4.1 Slurry Pump Sampling Operation

An illustration of the slurry pump operation is provided in Figure 4. The slurry pump system consists of a slurry pump mounted on a platform and placed into the waste pit. A hose runs from the pump platform to the bank where the hose discharges into a 55-gallon drum. The slurry pump will be activated and the waste material will be pumped into the 55-gallon drum until the drum is filled. The drum will be allowed to settle for a 24-hour period at which time the liquid will be decanted, collected and stored appropriately or returned to the waste pit. This method will provide for a drum that is only partially filled. Several drums of material will be combined into one full drum. When the 55-gallon drum has been filled with the required amount of material, it will be sampled, sealed, decontaminated at the site, and moved to a predetermined waste storage location. Prior to shipment, the 55-gallon drum will be overpacked into a radiologically clean 85-gallon drum and prepared for shipment. While awaiting shipment to the subcontractor performing the treatability studies, the drum will be stored in a RCRA storage area as discussed in Section 5.6. All shipments of material will be conducted in accordance with Department of Transportation (DOT) regulations and DOE Orders.

The following specific safety requirements will be in place to minimize the potential for environmental damage during this sampling activity:

a. The entire slurry exchange and handling area will be lined with a herculite

[1] The backhoe will be used to collect samples from the east end of Waste Pit 5 where the terrain is level and the area is accessible.

liner and will be bermed to collect any material which may be released.

b. The positioning of the drums will be such that access to them can be achieved without damaging the integrity of the pit berms.

If it is determined that the use of this slurry pump system is technically not feasible, then an alternate method will be employed. The slurry pump system will be considered technically unfeasible if the volume of liquid generated is such that solids can not be obtained or if the density of the material encountered prevents the system from operating. It is anticipated that this system will be able to provide the required samples from the Clearwell and possibly Waste Pit 5. This pump has been used previously in Waste Pit 5 to relocate materials in the pit. The nature of materials in Pit 6 however, may not be amenable to use of the slurry pump method. A procedure outlining the sampling activity utilizing the slurry pump is provided in Appendix B.

4.2 Backhoe Sampling Operation

If it is determined that the slurry pump system cannot collect the required samples, material can be obtained using other methods. One such method is through the use of a backhoe. An illustration of the backhoe operation is provided in Figure 5.

Prior to the collection of samples from the waste pits, trial-runs will be performed by placing radiologically-clean soil or mud into 55-gallon drums under conditions simulating those where the actual samples will be collected. The trial-runs will simulate the backhoe-reach and conditions expected at the waste pits. Sampling will not proceed until the trial-runs are successful. Trial-run success will be achieved when the spread of test-debris is confined to the work area on tarps and the backhoe operator can demonstrate backhoe dexterity sufficient to obtain the samples without damage to the pit liner. A procedure outlining the sampling activity utilizing the backhoe equipment is provided in Appendix C.

4.3 Baler Crane Sampling Operation

Figure 6 illustrates the layout and set-up for the use of the crane baler system. Use of a baler is indicated in situations where the material to be collected is of a sludge-like or semi-solid consistency. The baler used with a crane is also advantageous for retrieving sample material in situations where the reach of a backhoe may prove to be insufficient. This approach would have particular application in Waste Pits 5 and 6 if adequate sample material cannot be obtained utilizing other methods.

The baler simply described, is a long hollow tube or pipe containing a check valve assembly on the advancing end. The baler will be provided with a

counterweight and guide sleeve to provide a method to advance the baler into the waste material. When connected to a crane with an extended boom, the counterweight is dropped onto the top of the baler to allow it to advance into the material. As the baler progresses into the pit wastes, sample material will be forced into the tube past the check valve assembly. When the baler is extracted, the valve gate prevents the sample material from exiting the tube. The captured material can then be transferred from the baler into the sample drum by operating a release mechanism on the baler. A procedure outlining the sampling activity utilizing the baler equipment is provided in Appendix D.

The crane will be situated on level ground away from the waste pits due to the weight of the equipment. The depth of the water will need to be measured from a predetermined location at the start of each day. The intent of this is to determine the actual depth that the sample collection devise may be inserted into the waste pit. Since the water level (depth of the water within the pit) in the pits may vary depending upon the amount of precipitation, a stable reference point is identified for each pit. Prior to the start of each day of sampling, a measurement will be taken of the water depth at a predetermined location to allow for the correlation with the reference point. The sampling equipment will then be marked accordingly based upon any variances in the water level. Markings will be placed on the crane cable to identify the maximum depth the baler could be lowered into the pits assuring a minimum 5-foot clearance between the bottom of the baler and the pit liner. The baler shall be slowly lowered into the waste pit until it rests firmly on the surface of the waste material accumulating in the waste pit. This will verify that there is sufficient clearance between the sediment or accumulated material and the pit liner or bottom of the waste pit.

Prior to the collection of samples from the waste pits, trial-runs will be performed by placing radiologically-clean soil or mud into 55-gallon drums under conditions simulating those where the actual samples will be collected. The trial-runs will simulate the use of the baler reach and conditions expected at the waste pits. Sampling will not proceed until the trial-runs are successful. Trial-runs success will be achieved when the spread of test-debris is confined to the work area on tarps and the crane operator can demonstrate dexterity sufficient to obtain the samples without damage to the pit liner.

4.4 Vibra-Core Sampling Operation

Figure 7 illustrates the layout and set-up for the use of the crane Vibra-Core system. Use of the Vibra-Core system is indicated in situations where the material to be collected is of a semi-solid or solid consistency and the baler equipment cannot penetrate the surface. The Vibra-Core used with a crane is also advantageous for retrieving sample material in situations where the reach of a backhoe may prove to be insufficient. This approach would have particular

application in Waste Pits 5 and 6 if adequate sample material cannot be obtained utilizing other systems or equipment.

The use of the Vibra-Core is similar in principle to the use of the baler in the sense that similar equipment is used. The Vibra-Core system consists of a 165-ton crane equipped with a 220-foot long boom. The crane is positioned on a flat grade away from the berms of the pits. The Vibra-Core sampling device consists of a cable driven head assembly connected to a pipe barrel with a threaded penetration probe containing an inner Lexan® sleeve used in the extraction of the samples. A cutter assembly may be connected to the bottom of the pipe barrel to be used to penetrate the sample residues depending upon the consistency of the material.

The Vibra-Core tube will be lowered into either of the waste pits until it rest firmly on the surface of the material collecting in the bottom of the waste pit at which time the power supply will be connected to the end. The power supply will be adjusted to allow for maximum penetration without adverse cracking of the residue material. As the Vibra-Core device progresses into the waste pits, material is captured and collected in the tube. When the tube is removed from the waste pit, the material is collected and placed in a laydown area. Because of the anticipated length of the Vibra-Core tube and the attempt to collect material at discrete depths, sectioning of the Vibra-Core tube will be necessary. When the waste material has been sectioned from the predetermined depth, the waste will be placed in a 55-gallon drum.

The Vibra-Core system utilizes acoustical vibrations imparted upon the collection tube. These vibrations combined with the weight of the equipment, liquifies the particles directly in contact with the collection tube instead of the churning or torquing as used in traditional drilling operations. The major advantage for the use of a Vibra-Core sampling system is (a) with the use of the crane, samples can be collected from the center of the waste pits thereby obtaining a more characteristic sample; and (b) the sample collected will be useful in characterizing the stratified wastes within the pits. A procedure outlining the sampling activity utilizing the Vibra-Core and crane equipment is provided in Appendix E.

The crane will be situated on level ground away from the waste pits due to the weight of the equipment. The depth of the water (depth of the water within the pit) will need to be measured from a predetermined location at the start of each day. The intent of this is to determine the actual depth that the sample collection devise may be inserted into the waste pit. Since the water level in the pits may vary depending upon the amount of precipitation, a stable reference point is identified for each pit. Prior to the start of each day of sampling, a measurement will be taken of the water depth at a predetermined location to allow for the correlation with the reference point. The Vibra-Core tube will then be marked

accordingly based upon any variances in the water level. Markings will be placed on the tube to identify the maximum depth it can be advanced into the pits allowing for a minimum 5-foot clearance between the bottom of the tube and the liner. The Vibra-Core tube shall be slowly lowered into the waste pit until it rests firmly on the surface of the waste material accumulating in the waste pit. This will verify that there is sufficient clearance between the sediment or accumulated material and the pit liner or bottom of the waste pit.

Prior to the collection of samples from the waste pits, trial-runs will be performed by placing radiologically-clean soil or mud into 55-gallon drums under conditions simulating those where the actual samples will be collected. The trial-run(s) will simulate the use of the Vibra-Core and crane equipment reach and conditions expected at the waste pits. Trial-run success will be achieved when the spread of test-debris is confined to the work area on tarps and the crane operator can demonstrate dexterity sufficient to obtain the samples without damage to the pit liner.

4.5 Clamshell-Crane Sampling Operation

An illustration depicting the use of the clamshell-crane equipment is provided in Figure 8. Use of the clamshell-crane system for collecting samples is indicated in situations where the material to be collected is of a semi-solid or solid consistency and the use of other equipment may prove unfeasible. The clamshell-crane system is also advantageous for retrieving sample material in situations where the reach of a backhoe may prove to be insufficient. This approach would have particular application in Waste Pits 5 and 6 if adequate sample material cannot be obtained utilizing other systems or equipment.

The crane will be situated on level ground away from the waste pits due to the weight of the equipment. The depth of the water will need to be measured from a predetermined location at the start of each day. The intent of this is to determine the actual depth that the sample collection devise may be inserted into the waste pit. Since the water level (depth of the water within the pit) in the pits may vary depending upon the amount of precipitation, a stable reference point is identified for each pit. Prior to the start of each day of sampling, a measurement will be taken of the water depth at a predetermined location to allow for the correlation with the reference point. The sampling equipment will then be marked accordingly based upon any variances in the water level. Markings will be placed on the crane cable to identify the maximum depth the clamshell bucket could be lowered into the pits without causing damage to the liner. The clamshell bucket shall be slowly lowered into the waste pit until it rests firmly on the surface of the waste material accumulating in the waste pit. This will verify that there is sufficient clearance between the sediment or accumulated material and the pit liner or bottom of the waste pit. The bucket shall then be raised 5-feet above

the waste pit water line and allowed to free-fall into the pit. The material captured in the clamshell bucket shall be transferred to the sample collection area where it will be loaded into the 55-gallon drums. If material is not collected, the bucket will be raised in 5-foot increments above the water-line to obtain the samples. A spotter will be present at all times to assure that the clamshell bucket is not lowered below the allowable depth. A procedure outlining the sampling activity utilizing the Clamshell-Crane equipment is provided in Appendix F.

5. SAMPLING METHODOLOGY

5.1 General

Sample locations will be precisely marked on site-topographical and available Waste Characterization drawings and delivered to the OU-1 Manager/Project Engineer for records retention.

Close-up pictures (using a high-resolution, 35-mm or larger format camera) will be taken to document the sampling activities, the sampling locations, and appearance of the materials removed.

The drums will remain at the sample site for 24-hours to allow the excess water in the sample material to separate. Water in the drums will be decanted and returned to the pit or stored in accordance with Section 5.6. The 55-gallon drums of waste material will be sampled as discussed in Section 5.2, sealed, decontaminated at the sample site, and the appropriate identification labels applied prior to transfer to a predetermined waste storage location awaiting shipment off-site.

Each 55-gallon drum will be overpacked into an 85-gallon drum overpack and voids between the drums filled with Dicalite^{T} or other approved absorbent material in accordance with DOT requirements since the materials in these drums may be damp. The drums will be appropriately labeled, have the proper forms prepared for transport, and the proper notifications for transport off-site to the laboratories where the samples will be used in treatability and development studies. All drums will be properly labeled in accordance with DOT and site policies and procedures. Samples will be shipped by WEMCO Transportation or an approved representative in accordance with DOT regulations and established site policies and procedures for radioactive hazardous material shipments.

All information pertinent to the field sampling shall be recorded in a field log book. This log book shall include, at a minimum, the following information:

- Name and address of field contact.
- Producer of waste and address, if different from location.

- Purpose of sampling.
- Locations of sampling points.
- Type of process producing waste, if known.
- Description of sampling points and sampling methodologies.
- Suspected waste composition, including concentrations.
- Type of waste being sampled.
- Sample numbers and volumes collected.
- Date and time of sample collection.
- Collectors sample identification number.
- Data of any field measurements performed at the sampling locations.
- Field observations.
- Prevailing weather conditions.
- Sample distribution and transport modes.
- References, such as maps or photographs of the sampling sites.
- Signatures of personnel responsible for observations.

Field conditions and sampling situations vary widely. The above information, plus any other details or data, will be recorded in the field log book. Every effort will be made to collect sample material that is truly characteristic of the waste. Evidence of deviations or factors which may effect the sampling operation will be noted in the field log book.

5.2 Drum Sampling

After the waste material from the waste pit is collected in the 55-gallon drum, a sample will be collected from the drum in order to characterize the waste material. All samples that are collected shall have the following information recorded on a label attached to the appropriate sample container:

- Sample number
- Number of collector
- Date and time of sample collection
- Location of sample collection

All sample containers shall be sealed with evidence tape to detect any unauthorized tampering of the samples, following sample collection to the time of analysis. The sample information identified above must also be recorded on the evidence tape. This tape must be attached in such a way that it is necessary to break the seal in order to open the sample container. Seals must be affixed to the sample container before the sample leaves the custody of the sample personnel. These requirements are consistent with EPA Document SW-846, "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods."

All samples being transported to the laboratory for analysis shall be accompanied

by the required Analysis Request/Custody Record form in accordance with Environmental Monitoring Section (EM) procedures, "Environmental Monitoring On-site Media Sampling", EM-2-013.

All activities performed as part of this sampling and analysis plan shall be conducted in accordance with, at a minimum, the following:

- RI/FS Quality Assurance Project Plan (QAPP), and
- EPA Document SW-846, "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods.

5.3 Sample Analysis

The samples that will be collected from the Waste Pits 5, 6 and Clearwell will be analyzed for constituents similar to those for the other waste pits as performed by ASI/IT. The samples will be analyzed for the following items or constituents:

• Full Radiological	Parameters listed in RI/FS QAPP Table 4.3 plus Pb-210
• HSL +	Plus boron, cobalt, & thallium
• Full Appendix IX	May be an overlap with the HSL + This covers analysis for all dioxins, furans, vols, semi-vols, metals, PCB's, & pesticides
• TCLP	
• General Chemistry	Includes total phosphates, TBP, ammonia, pH, total Kiedahl nitrogen, total organic nitrogen, oil & grease, bromide, chloride, nitrate, and sulphate
• Physical & Misc Parameters	Moisture content, Total Organic Carbon, Specific Gravity, Particle Size, Cation Exchange Capacity, Atterberg Limits

A minimum of eight drums of material will be collected from each Waste Pits 5, 6 and the Clearwell of which all will require sampling and characterization analysis for the above identified constituents.

analysis for the above identified constituents.

All analyses will be performed in accordance with EPA Contract Laboratory Program (CLP) protocols and EPA document SW-846, "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods".

Container requirements, weighted volumetric specifications, and holding times for the suggested analyses are as identified below. The holding times indicated are from sample collection in the field to sample extraction in the laboratory.

PARAMETER	VOLUME	CONTAINER	HOLDING TIMES
Total Uranium	30 gm.	glass/polyethylene	N/A
Isotopic Uranium	200 gm.	glass/polyethylene	90 days
Total Thorium	30 gm.	glass/polyethylene	N/A
Isotopic Thorium	40 gm.	glass/polyethylene	90 days
Radium-226	100 gm.	glass/polyethylene	180 days
Technetium-99	100 gm.	glass/polyethylene	180 days
HSL Volatiles	(2)-40ml vials	glass	7 days
HSL Semi-volatiles	4 liters	glass	7 days
HSL Inorganics	(2)-1 liter	glass	120 days*
HSL Pest/Herb/PCBs	4 liter	glass	7 days
TCLP Metals	1 pint	glass/polyethylene	180 days*
TCLP Volatiles	(2)-40ml vials	glass	14 days
TCLP Semi-volatiles	1 pint	glass	7 days
TCLP Pest/Herbs	1 pint	glass	7 days
Appendix IX Volatiles	(2)-40ml vials	glass	7 days
Appendix IX Semi-vols	4 liters	glass	7 days
Appendix IX Inorgan	(2)-1 liter	glass	120 days*
Appendix IX Pest/Herb/PCBs	4 liter	glass	7 days

* Holding times for mercury analysis shall not exceed 28 days.

Field, trip, and rinseate blanks will be shipped to the laboratory services that will be used to characterize the waste material. Environmental monitoring will be conducted in accordance with the RI/FS QAPP. Environmental Monitoring Section (EM) procedure, "Environmental Monitoring On-Site Media Sampling", EM-2-013, conforms to the QAPP for trip, field blanks, and rinseate blanks. One field/trip blank per sampling event or one per every twenty samples (whichever is greater) will be collected and accompany the samples to the laboratory. In addition, one rinseate blank per waste pit of material collected will accompany the samples to the laboratory.

5.4 Cleanup and Decontamination

All sampling equipment must be decontaminated after each sampling activity. If decontamination is not practical, the sampling equipment will be discarded consistent with the FEMP Waste Analysis Plan and FEMP Waste Determination Plan. Clean chemical resistant gloves will be used during the decontamination process, and when handling any clean equipment.

Decontamination supplies will vary based on the media being sampled and the type of contamination encountered. The following is a list of supplies typically used, but not limited to:

- Laboratory grade non-phosphate detergent solutions
- Long-handled scrapers (stainless steel, glass)
- Long-handled, soft bristled brushes
- Portable low-pressure water sprayers
- Potable tap water
- Deionized water
- Polyethylene, teflon, or other suitable sheeting
- Waste drums, cans, and heavy duty plastic bags Absorbent materials, socks, and pads
- Wash/Rinse tubs

Non-liquid wastes and waste-waters collected during the equipment decontamination will be transferred to a designated hazardous storage location. Waste analyses and determinations shall be conducted on the material following the approved FEMP Waste Analysis and Waste Determination Plans. All materials used in decontamination and cleaning of the sampling equipment used in the sample collection from Waste Pit 5 and the Clearwell will be collected in drums, labeled, and stored as RCRA hazardous wastes in accordance with plant policies and procedures. All equipment utilized in the collection of the waste from the waste pit will be decontaminated between the collection of each 55-gallon drum of material collected. This is necessary to prevent the cross-contamination of the samples and to assure that a true characteristic representative sample is collected.

5.5 Repair of Waste Pit Liner

During the collection of samples from Waste Pits 5 and 6 and from the Clearwell, every effort will be utilized to assure that neither the liner or the clay barrier is jeopardized. Efforts to assure this include utilizing mapping of the waste pits and development of maximum sample collection depths. In the unlikely event that the liner is compromised, the liner repair procedure developed as part of the Waste Pit 5 Liner Repair Work Plan will be employed.

A temporary patch will be applied to a punctured pit liner until efforts can be implemented to effect a permanent repair. The temporary patch will be applied by the following procedure:

a. Clean and dry the area around where the patch is to be applied, if possible,

b. Cut a patch from a polyvinyl chloride patching material to a size at least six inches larger than the puncture on all sides. Edges of the patch shall be rounded.

c. Apply liberal amounts of RTV (moisture-catalyzed, silicone rubber adhesive) to liner around the puncture and/or the patch.

d. Place the patch over the puncture and apply weight to the patch for 24 hours (If the puncture is below the water line, do not remove the weight. The weight will help plug the hole.)

e. Visually inspect the patch for potential leaks. Place additional patches over areas where repairs appear defective.

5.6 Storage Requirements

At the completion of the sampling activity all waste material and drummed sample material generated as a part of the sample collection activity from Waste Pit 5 and the Clearwell will be stored in the on-site RCRA storage area. This storage area is approved for the storage of containerized "mixed wastes" and hazardous wastes. The Consent Decree and 40 CFR Part 264.170 and 265.15, and the Ohio Administrative Code (OAC) 3745-65-15 and 3745-66-74, identifies specific requirements for the use and management of containers. These requirements include such items as containers kept closed, weekly inspections, etc. Since the waste material being stored will be a depleted radioactive waste, no additional storage criteria is required beyond the RCRA requirements. Other materials not associated with the sample collection activities in Waste Pit 5 and the Clearwell will be stored as radioactive waste material in accordance with site policies and procedures.

6. QUALITY ASSURANCE

Sampling of Waste Pits 5, 6, and the Clearwell will be conducted according to the requirements of the RI/FS QAPP and the overall quality assurance program at the FEMP which is described in the site Restoration QA Program Plan FMPC 2207. The Quality Assurance Plan is based on the criteria specified in ASME NQA-1, Federal EPA Guideline QAM-005/80 and DOE Orders 5600.6 and 5400.1. Specific quality assurance requirements will be incorporated into written and approved procedures and into personnel training. The WEMCO Quality Department will conduct surveillance/ inspections and/or audits to verify compliance throughout the execution of this sampling plan.

7. HEALTH AND SAFETY

The work to be performed will be consistent with the RI/FS Health and Safety Plan. The plan identifies, evaluates and controls all identified safety and health hazards. In addition, it provides for emergency response for hazardous operations. The plan is consistent with 29 CFR 1910.120 and the FMPC Site Health & Safety Plan. Safety documentation will be prepared according to FMPC-2116 Topical Manual "Implementing FMPC Policies and Procedures for System Safety Analysis." FMPC-2116 has been prepared to implement DOE Order 5481.1B, "Safety Analysis and Review System and DOE/OR-901 Guidance for Preparation of Safety Analysis Reports."

TABLES

OPERABLE UNIT 1 - WASTE PIT 5 CHARACTERISTICS

Table 1

Item No.	Description	Quantities and Units	References and/or Comments
1.	Area	161,103 ft.^{2} (3.70 acres)	
2.	Contents: Solids from neutralized raffinate, slag leach slurry, sump slurry, and lime sludge	98,841 yds.^{3}	Wastes deposited in Pit 5 are termed "wet" solid wastes
3.	Surface water	748,060 gallons	Approximate quantity, volume directly related to precipitation and evaporation
4.	Geotechnical data		
	Dry density	62.5 lbs./ft^3	
	Specific gravity	2.43	
	Moisture content	54.7%	
5.	Material consistency: This pit is still open with up to 3 ft. of standing surface water over a portion of the pit. The upper 4 ft. of the pit consists of watery material with some sand-sized grains. The remaining 25 ft. consists of a wet, semisolid material with very little cohesion.		
6.	Radioactive material concentrations		
	Radium-226	235 to 999 pCi/g	
	Uranium-235	14 to 79 pCi/g	
	Uranium-238	387 to 1,230 pCi/g	
	Thorium-230	3,080 to 20,200 pCi/g	
	Thorium-232	21 to 90 pCi/g	
	Technetium-99	423 to 2,990 pCi/g	

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OPERABLE UNIT 1 - WASTE PIT 5 CHARACTERISTICS

Table 1 continued

Item No.	Description	Quantities and Units	References and/or Comments
7.	Radioactive material quantities		
	Uranium-235	420 kg	
	Uranium	50,309 kg	
	Thorium	17,000 kg	
	Total curies	327 Ci	
8.	Volatile inorganics		
	Arsenic	139 to 2,800 mg/kg	
	Mercury	0.4 to 1.8 mg/kg	
9.	Organics		
	PCBs (Aroclor 1254)	750 ppb	
10.	HSL semivolatiles		The concentration level for HSL semivolatiles analyzed was below quantification level.
11.	HSL inorganics		
	Aluminum	6,374 to 15,400 mg/kg	
	Calcium	116,000 to 206,144 mg/kg	
	Iron	10,979 to 17,900 mg/kg	
	Magnesium	25,202 to 63,200 mg/kg	
	Arsenic	139 to 2,800 mg/kg	
	Mercury	0.4 to 1.8 mg/kg	
	Vanadium	792 to 5,380 mg/kg	

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OPERABLE UNIT 1 - WASTE PIT 5 CHARACTERISTICS[2]

Table 1 continued

Item No.	Description	Quantities and Units	References and/or Comments
12.	Hazardous materials/wastes		All samples tested were within the established limits for corrosivity, reactivity, ignitability and EP toxicity.
13.	Listed hazardous materials		The concentration level for all listed hazardous materials analyzed was below quantification level.

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[2] Reference:

IT Corporation, May 1991, "Feasibility Study Report for Operable Unit 1," prepared for Westinghouse Materials Company of Ohio, Cincinnati,OH

OPERABLE UNIT 1 - WASTE PIT 6 CHARACTERISTICS

Table 2

Item No.	Description	Quantities and Units	References and/or Comments
1.	Area	32,400 ft^2 (0.75 acres)	
2.	Contents: Depleted slag, scrap green salt, process residues, filter cake, and asbestos	11,556 $yds.^3$	
3.	Surface water	484,704 gallons	Approximate quantity, volume directly related to precipitation and evaporation
4.	Geotechnical data		
	Dry density	101.2 $lbs./ft^3$	
	Specific gravity	2.87	
	Moisture content	25.4%	
5.	Material consistency: Saturated, soft, coarse to fine, sand-sized, and clay-sized materials.		
6.	Radioactive material concentrations		
	Radium-226	16 to 30 pCi/g	
	Uranium-235	350 to 1,750 pCi/g	
	Uranium-238	12,500 to 18,700 pCi/g	
	Thorium-230	14 to 41 pCi/g	
	Thorium-232	0.2 to 1.2 pCi/g	
	Technetium-99	84 to 164 pCi/g	

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OPERABLE UNIT 1 - WASTE PIT 6 CHARACTERISTICS

Table 2 continued

Item No.	Description	Quantities and Units	References and/or Comments
7.	Radioactive material quantities		
	Uranium-235	1,740 kg	
	Uranium	843,142 kg	
	Thorium	Unknown	
	Total curies	178 Ci	
8.	Volatile inorganics		
	Arsenic	7.61 mg/kg	
	Mercury	0.03 to 0.07 mg/kg	
9.	Organics		The concentration level for all organics analyzed was below quantification level.
10.	HSL semivolatiles		The concentration level for all HSL semivolatiles analyzed was below quantification level.
11.	HSL inorganics		
	Aluminum	4,730 mg/kg	
	Calcium	22,190 mg/kg	
	Iron	2,750 mg/kg	
	Magnesium	32,101 mg/kg	
	Lead	5 to 60 mg/kg	
	Silver	158 mg/kg	

OPERABLE UNIT 1 - WASTE PIT 6 CHARACTERISTICS[3]

Table 2 continued

Item No.	Description	Quantities and Units	References and/or Comments
12.	Hazardous materials/wastes		All samples tested were within the established limits for corrosivity, reactivity, ignitability and EP toxicity.
13.	Listed hazardous materials		
	1,1,2,2-tetrachloroethane (U209)	Maximum concentrations 29,000 ppb	

[3] Reference:

IT Corporation, May 1991, "Feasibility Study Report for Operable Unit 1," prepared for Westinghouse Materials Company of Ohio, Cincinnati,OH

OPERABLE UNIT 1 - CLEARWELL CHARACTERISTICS

Table 3

Item No.	Description	Quantities and Units	References and/or Comments
1.	Area	29,450 ft.^{2} (0.68 acres)	
2.	Contents: Clarified process effluents and surface runoff	Unknown	Clearwell was being used as a final setting basin for process water from other pits and storm-water runoff
3.	Surface water	1,546,265 gallons (estimated)	
4.	Geotechnical data	Unavailable	
5.	Material consistency	Unavailable	
6.	Radioactive material concentrations		
	Cesium-137	18.0 to 450 pCi/g	
	Radium-226	21.9 to 458 pCi/g	
	Uranium-235	24 to 49 pCi/g	
	Uranium-238	548 to 670 pCi/g	
	Thorium-230	0.3 to 5,600 pCi/g	
	Thorium-232	0.1 to 39 pCi/g	
	Technetium-99	0.40 to 278 pCi/g	
7.	Volatile inorganics		
	Arsenic	8.46 to 18.46 mg/kg	
	Mercury	0.42 to 4.38 mg/kg	
8.	Organics		
	PCBs (Aroclors 1248 and 1254)	308 to 737 ūg/kg	

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OPERABLE UNIT 1 - CLEARWELL CHARACTERISTICS[4]

Table 3 continued

Item No.	Description	Quantities and Units	References and/or Comments
9.	HSL semivolatiles		The concentration level for all HSL semivolatiles analyzed was below quantification level.
10.	HSL inorganics		
	Aluminum	12,939 to 23,771 mg/kg	
	Magnesium	16,785 to 44,629 mg/kg	
	Calcium	129,305 to 183,078 mg/kg	
	Iron	19,618 to 21,067 mg/kg	
	Mercury	0.4 to 4.4 mg/kg	
	Arsenic	8 to 18 mg/kg	
11.	Hazardous materials/wastes		All samples tested were within the established limits for corrosivity, reactivity, ignitability, and EP toxicity.
12.	Listed hazardous materials		The concentration level for all listed hazardous materials analyzed was below quantification level.

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[4] Reference:

IT Corporation, May 1991, "Feasibility Study Report for Operable Unit 1," prepared for Westinghouse Materials Company of Ohio, Cincinnati,OH

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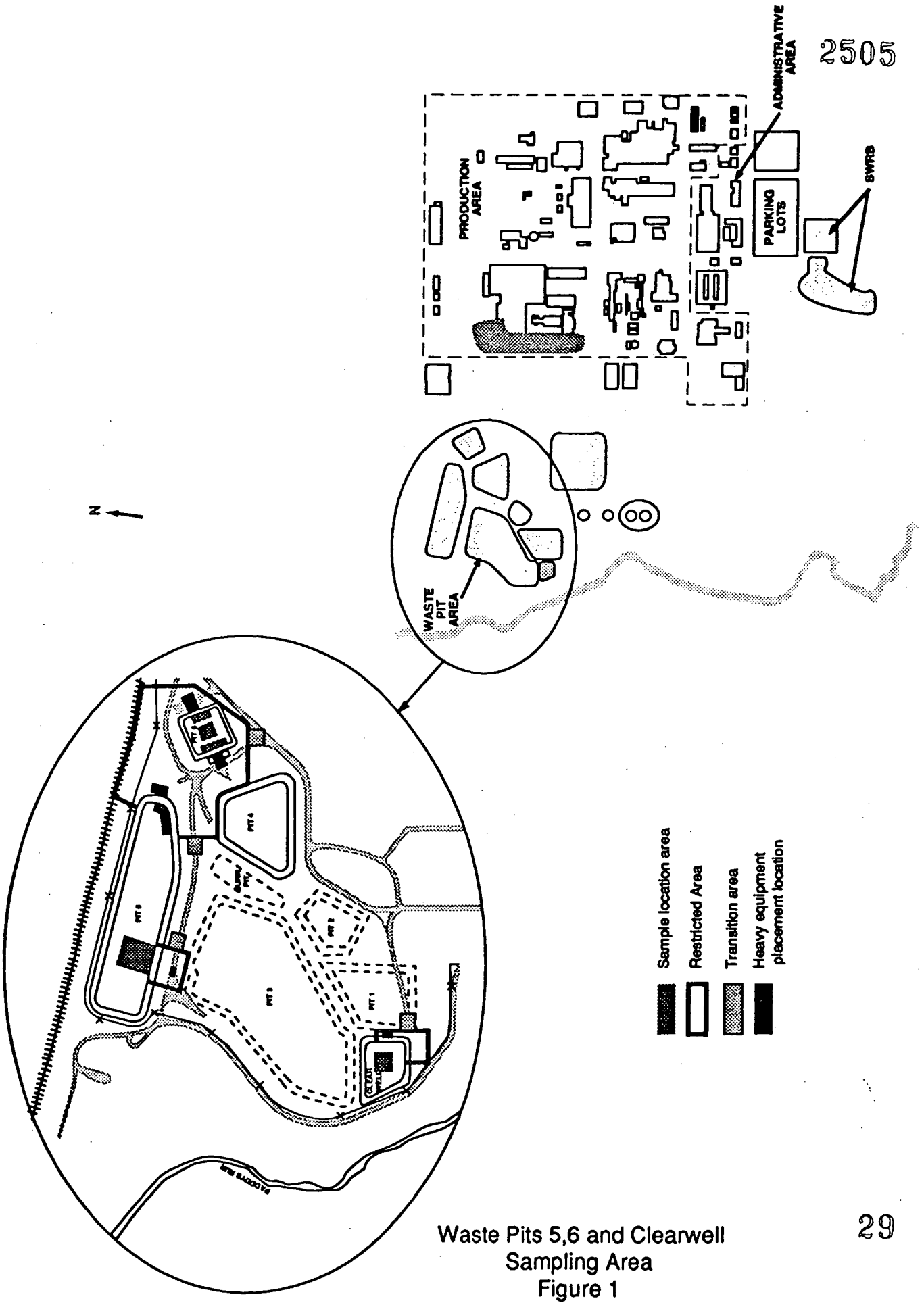
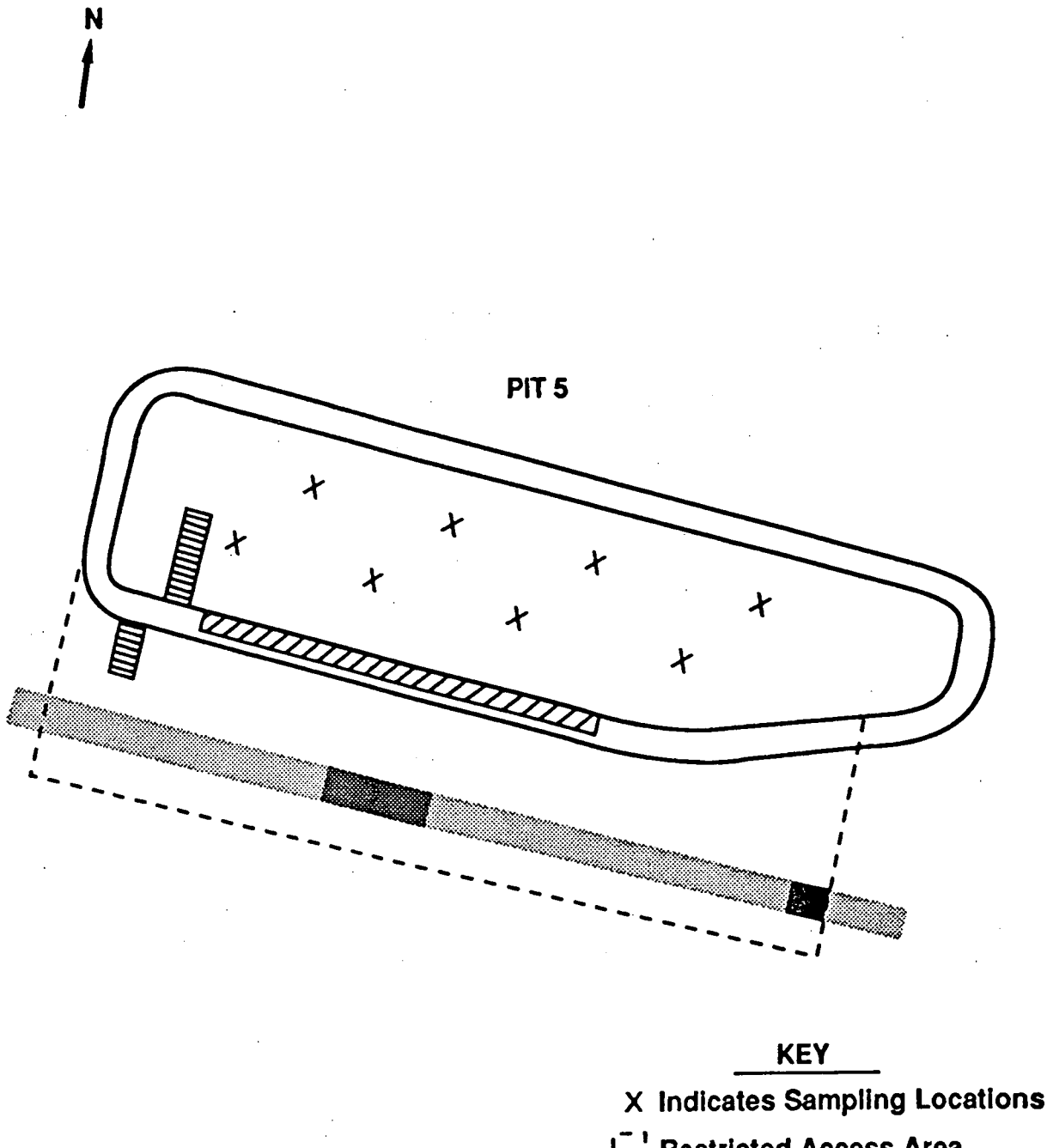
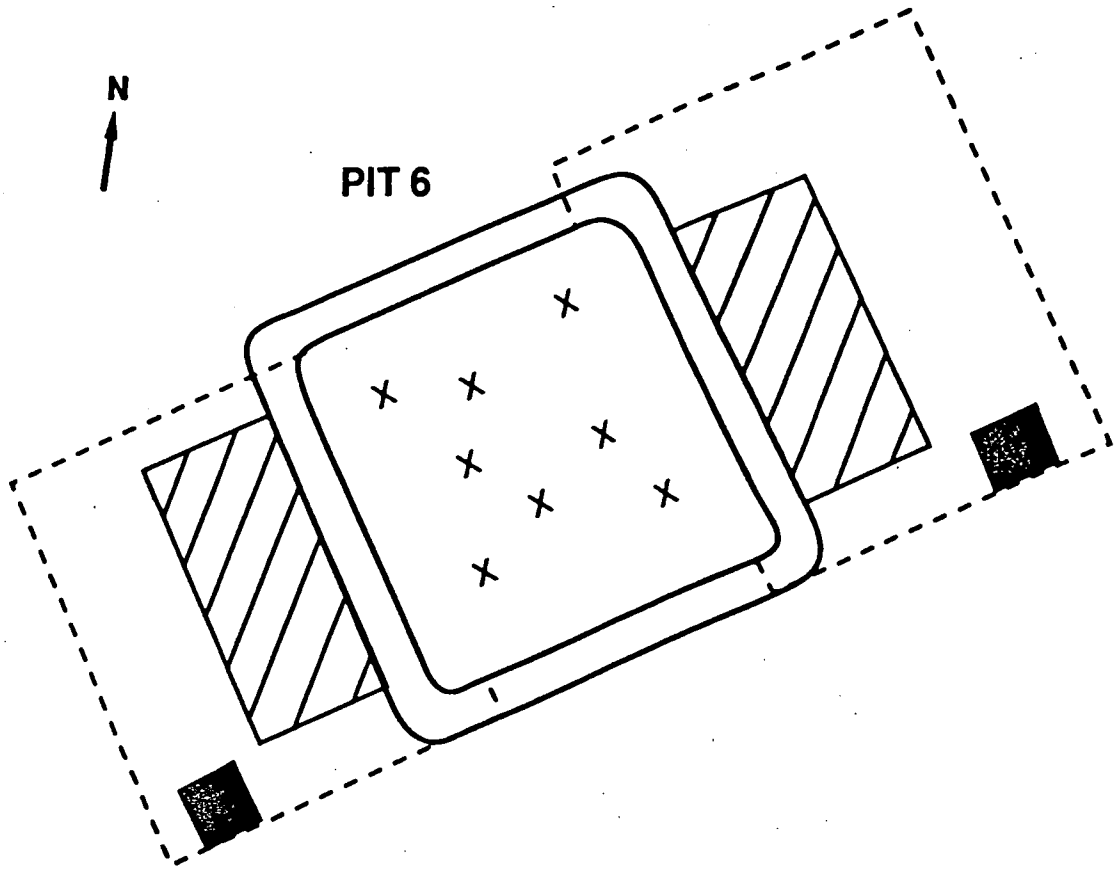
FIGURES



Waste Pits 5,6 and Clearwell
Sampling Area
Figure 1



Waste Pit 5 Sampling Locations
Figure 2



KEY

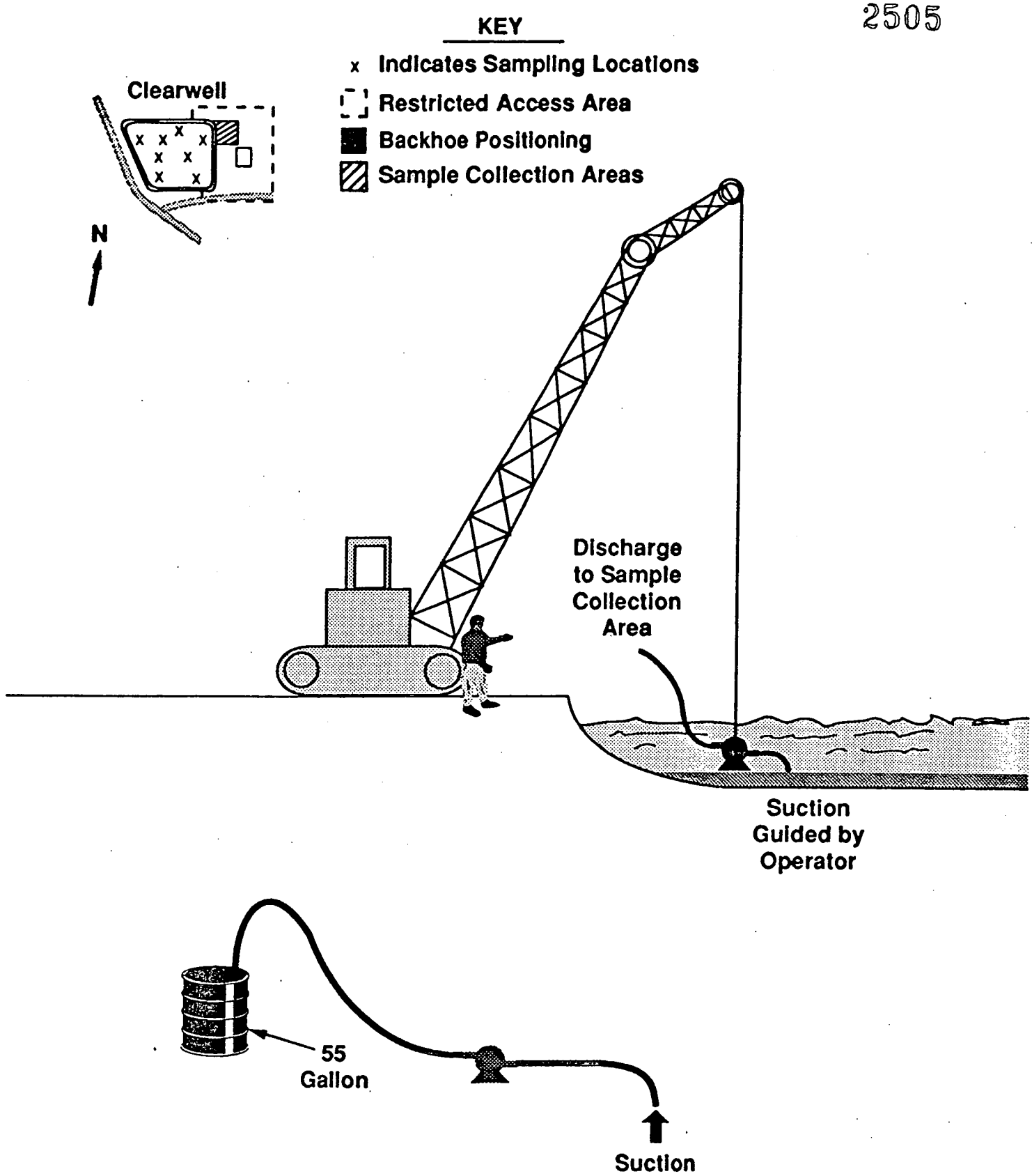
X Indicates Sampling Locations

Restricted Access Area

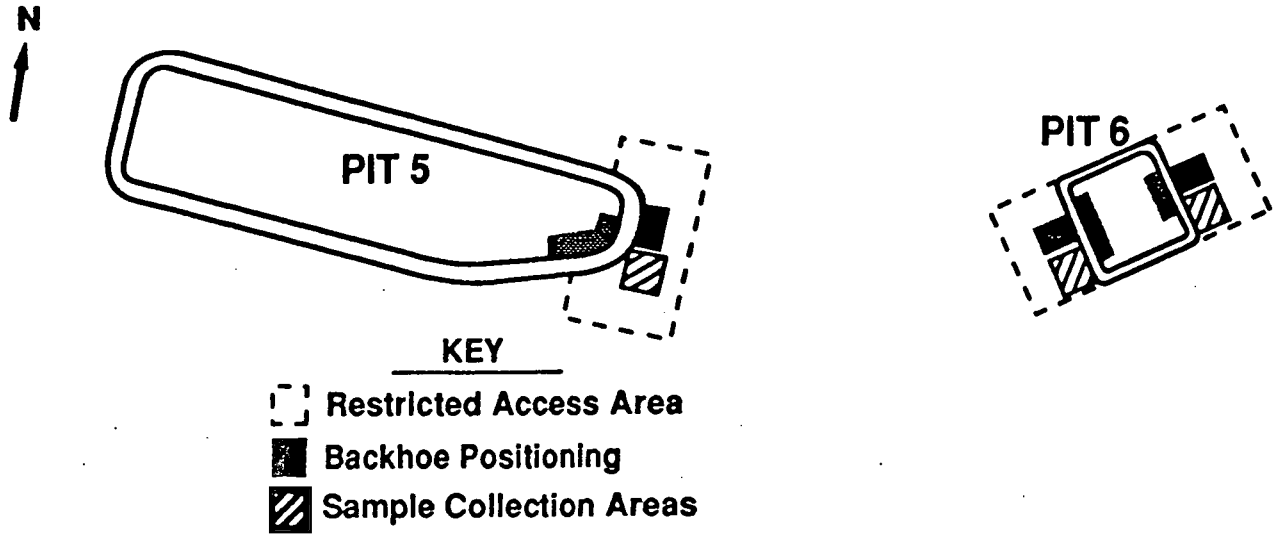
Transition Zone

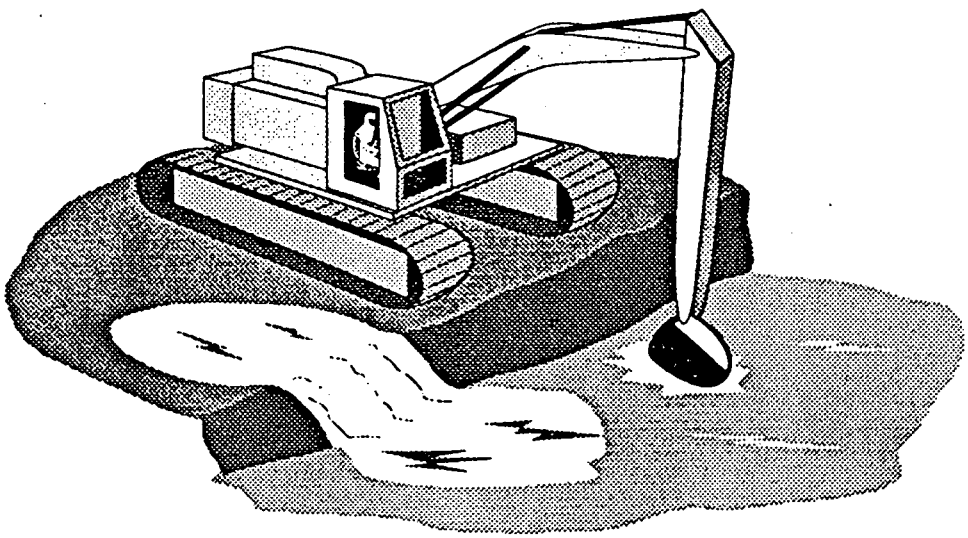
Sample Collection Areas

Waste Pit 6 Sampling Locations
Figure 3

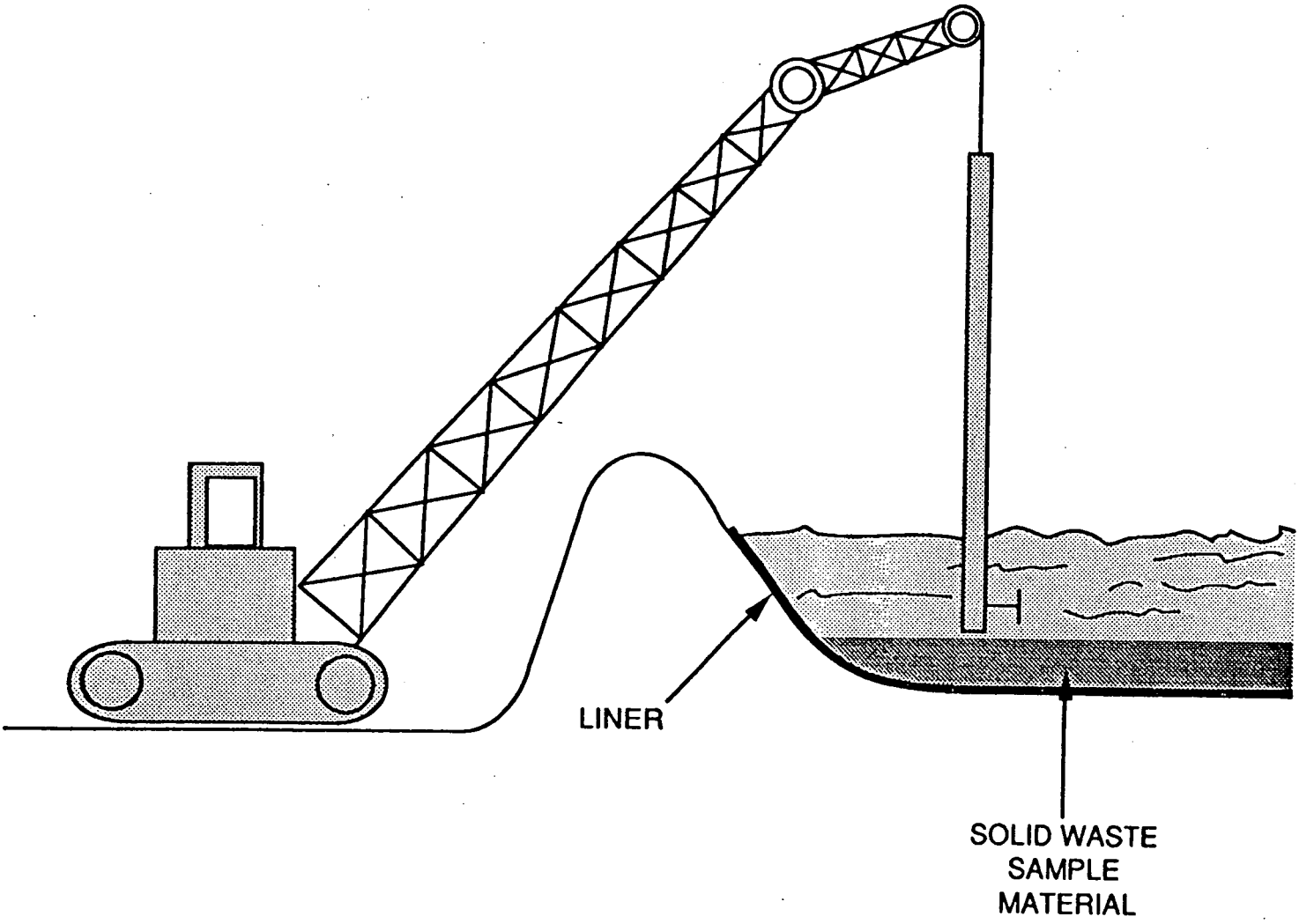


Slurry Pump Sampling Operation
Figure 4

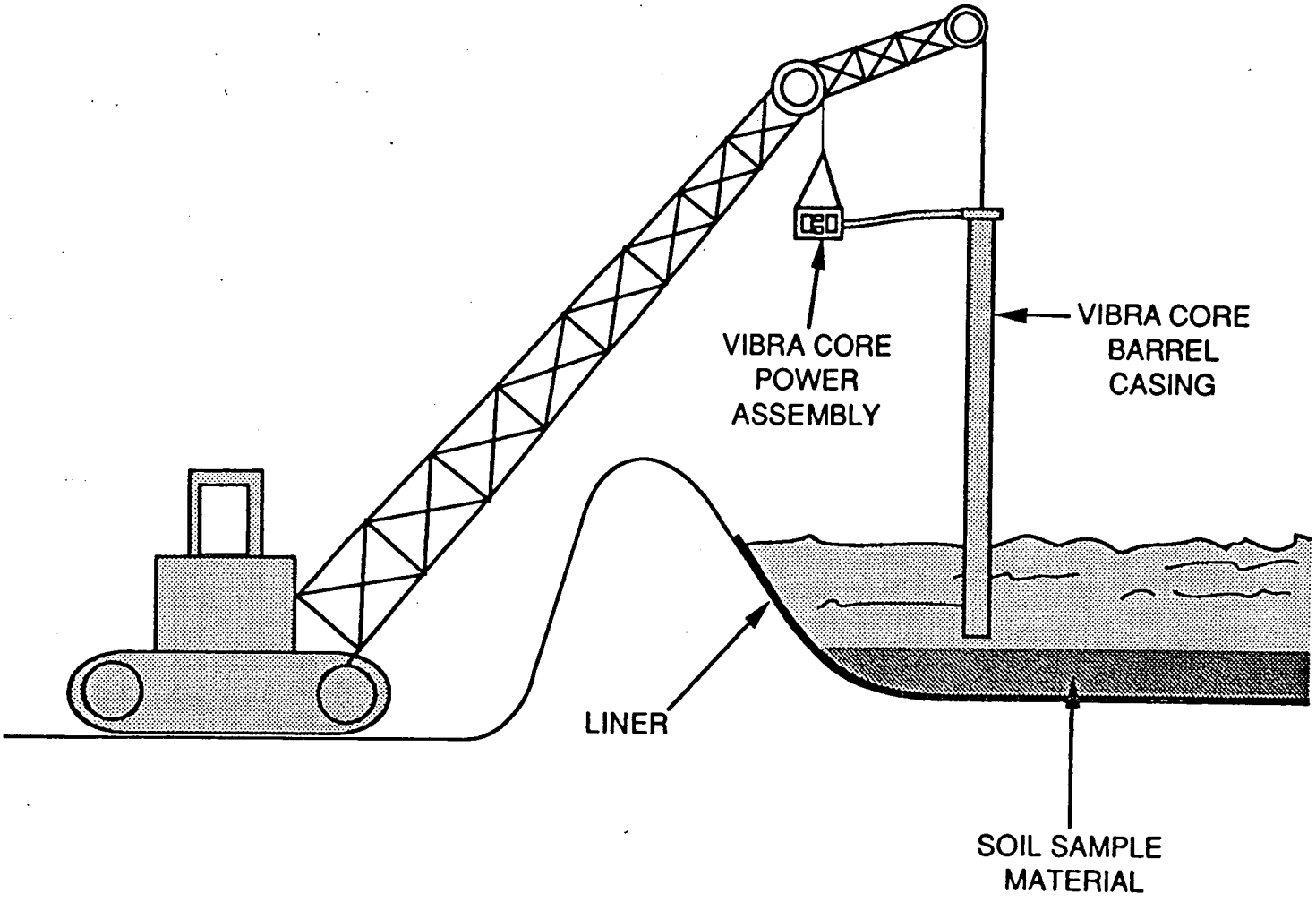




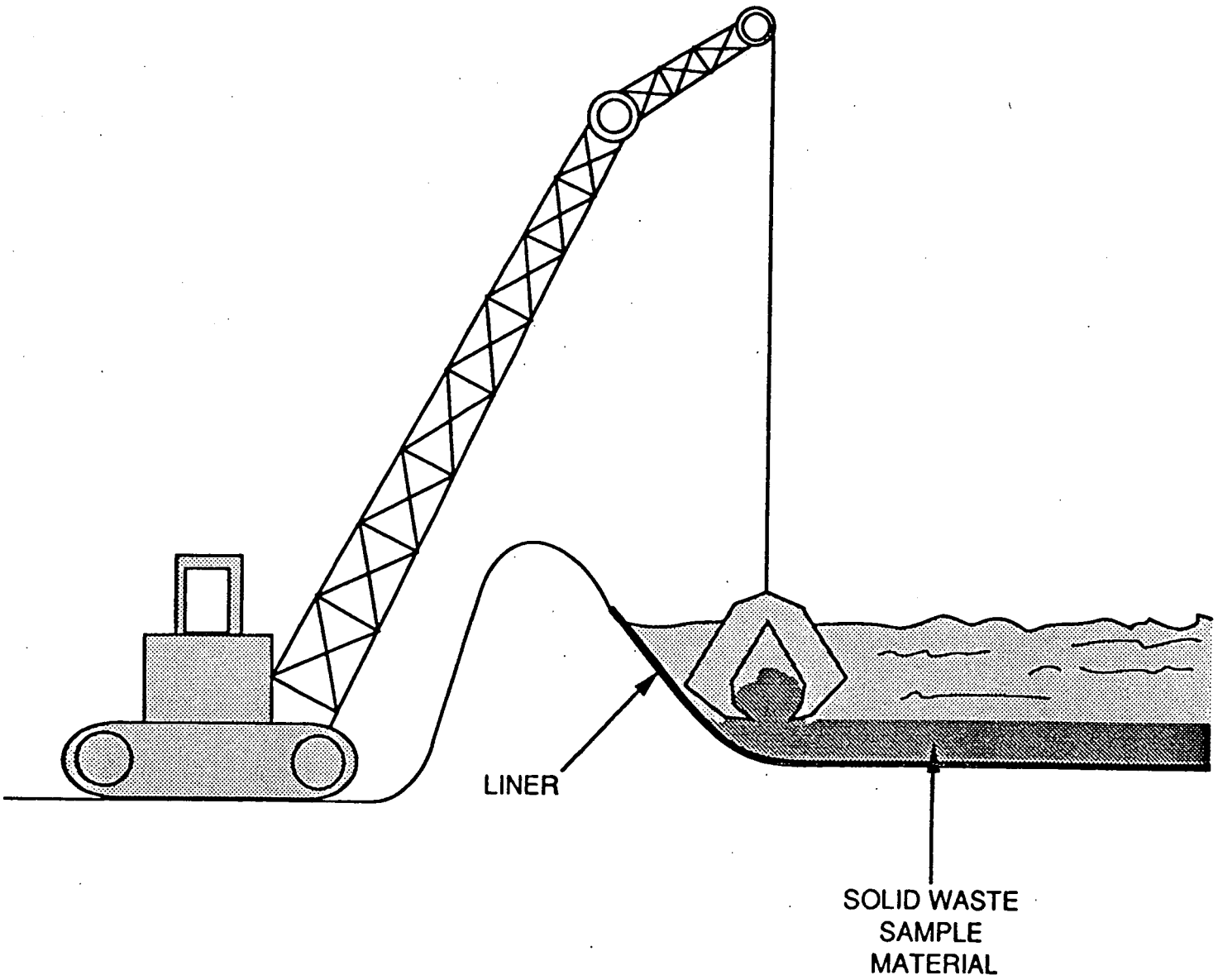
Backhoe Sampling Operation
Figure 5



Baler Crane Sampling Operation
Figure 6



Vibra-Core Sampling Operation
Figure 7



Clamshell-Crane Sampling Operation
Figure 8

APPENDIX A

General Sampling Requirements

GENERAL SAMPLING OPERATION REQUIREMENTS

General Requirements

The purpose of this procedure is to outline the general requirements and identify the operations necessary to perform the sampling activities in the Waste Pits 5, 6 and the Clearwell irrelevant of the type of equipment or procedure used. The following requirements must be satisfied for all sampling operations.

- All personnel shall have successfully completed the required training as identified in the Project Specific Health and Safety Plan and as required otherwise. All requirements identified in the Project Specific Health and Safety Plan shall be adhered to at all times.

- All personnel will receive training in the use of all personnel protective equipment required to perform the sampling. All personnel shall be provided with the necessary personnel protective equipment to perform the sampling.

- All personnel shall be properly trained in the use of the equipment specifically required to perform the sampling.

Responsibilities

FIELD SUPERVISOR- The sampling activities will be done under the supervision of the Field Supervisor. The Field Supervisor or designated alternate shall ensure that all work performed is performed in accordance with the Radiation Work Permit (RWP) and the Project Specific Health and Safety Plan. The Field Supervisor shall also be responsible for (1) Promptly notifying the AEDO of abnormalities or unforseen situations, (2) maintaining a daily log of operations, (3) generating and maintaining an approved access list to the restricted areas, (4) conducting a daily pre-shift briefing of planned activities, and (5) maintaining a copy of all checklists and information required by this Sampling Plan or the Project Specific Health and Safety Plan.

RADIOLOGICAL SAFETY AND INDUSTRIAL HYGIENE TECHNICIANS - Shall be responsible for (1) monitoring personnel exposure and equipment contamination, (2) performing and documenting the required surveys and air monitoring, and (3) notifying the Heath and Safety Officer and supervisor of monitoring results or anomalies.

Procedure

Sampling Set-up

- Establish an restricted area for the waste pit where the samples will be collected as shown in Figure 1. A list of personnel certified to enter the restricted areas will be developed by the Facility owner and posted. The restricted area will be roped off and clearly identified.

- Clearly identify and mark the locations where the samples will be collected for the waste pits or Clearwell. The location of all sampling collections will be clearly identified on the site available Waste Characterization maps.

- Establish a sample collection area. The sample collection area will be where the 55-gallon drums will be

situated. The area immediately surrounding the sample collection area will be situated on a double layer of 6-mil leakproof tarp with a 6" berm placed to ensure that water and debris are collected. The area directly in line between the sampling equipment and the sampling collection area will be required to have a leakproof bermed tarp to ensure the containment of all water and debris. A clean wooden pallet will be placed on the sample collection area to hold the drums to prevent the potential for rip or tear of the leakproof tarp.

- Establish a sample and equipment laydown area. The laydown area will be designated as the area where all equipment (excluding large heavy equipment) will be decontaminated and where contaminated PPE will be collected for disposal. The laydown area will be situated on a double layer of 6-mil leakproof tarp with a 6" berm placed to ensure that water and debris are collected. Wooden pallets will be placed on the tarp in the laydown area to prevent the rip or tear of the leakproof liner. Three steel drums will be placed on the pallets for the decontamination of the sampling equipment and materials.

- Establish a transition area through which personnel accessing the restricted area will be required to pass.

- A chain-of-custody procedure shall be established by the Project Engineer to ensure proper tracking of samples. The chain-of-custody procedure will outline the (1) identification and markings required for the samples collected, (2) requirements for the chain-of custody record, (3) requirements for a sample collection log, and (4) laboratory request analysis protocol requirements. This procedure shall be consistent with the existing RI/FS QAPP chain-of-custody procedure.

Sampling Pre-Operational Requirements

- Prior to the start of any sampling, the Field Supervisor or designated representative shall ensure that all personnel to be performing the sampling have received the proper training.

- Prior to the start of any sampling, the Facility Owner (or designated representative) shall ensure that all required PPE as identified by the Radiological Safety Technician, Industrial Hygiene Technician, and/or the Project Specific Health and Safety Plan are available for all personnel.

- Prior to the start of any sampling, the Field Supervisor or designated representative shall ensure that all equipment required to perform the sampling is available for all personnel.

- At the start of each work day and prior to the start of the collection of waste material from the pit, the depth of the water in the pit will be measured from a predetermined location. This will be correlated with the depth and location that the sample will be collected to assure that a minimum of 5-feet clearance is provided from the maximum penetration of the sampling equipment and the pit liner.

- All work will not be performed during adverse weather conditions. If thunder, rain, show, or other weather conditions are present which could effect the safety of the operation or the quality of the sample material, then the sample collection operation will be delayed.

APPENDIX B

Slurry Pump Sampling Operation Procedure

SLURRY PUMP SAMPLING OPERATION

Requirements

The purpose of this procedure is to outline the specific requirements and identify the operations necessary to perform the sampling activities in the Waste Pits 5, 6 and the Clearwell using the slurry pump equipment. This procedure will apply for the sampling that is performed in any of the three locations identified. The general requirements identified in Appendix A must be met prior to any specific sampling.

Waste Pits and Clearwell Sampling

- Position the 55-gallon sampling drum on a pallet in the sampling collection area on the wooden pallet as identified. Assure that all sampling collection equipment is located completely within the collection area so that water and debris does not overflow the tarp and spill onto the ground.

- Position a metering pump inside the tarped sample collection area. The discharge from the metering pump will discharge back to the waste pit where the sample will be collected. The suction of the metering pump will be controlled manually to prevent the potential for water overflow of the sample collection area.

- Position the crane in a predetermined location. The crane will not be situated any closer than 5 feet from the liner to prevent the potential for liner damage. Connect the submersible slurry pump to the crane boom and slowly lower the pump into the waste pit to the predetermined location until rests firmly on the surface of the waste material to be pumped (care should be used to assure that the pump is not lowered too quickly). The submersible slurry pump will be controlled by an operator positioned on the side of the waste pit area.

- Secure the discharge of submersible slurry pump to the top of the 55-gallon sample collection drum. The suction of the pump will be controlled by an operator positioned on the edge of the waste pit.

- Turn on the submersible slurry pump and slowly move the suction line over the bottom of the waste pit. As the sample collection drum fills up, the solids will collect in the bottom. Continue to fill the 55-gallon drum until it is completely filled and then deactivate the slurry pump. Continue collected samples from the sample location until approximately four 55-gallon drums of material are collected. This will be necessary because a substantial amount of the material in the drum will be liquids which will not be collected as part of this operation.

- Allow the four 55-gallon drums to sit for approximately 24-hours to allow the excess water to decant from the waste material. Utilizing a metering or hand pump, remove the excess material from each drum and collect the decant water or return it to the waste pit of origin. It the decant water is collected from either Waste Pit 5 or the Clearwell, it will be collected, stored, and labeled as a hazardous waste material.

- Continue this operation until a minimum of eight 55-gallon drums of solids are collected from the waste pit.

Decontamination and Clean-up

- All sampling equipment must be decontaminated between the collection of sample drums from each waste pit to prevent the potential for cross-contamination and assure that a true characteristic sample is attained. If decontamination is not practical, the sampling equipment will be discarded consistent with the FEMP Waste Analysis Plan and FEMP Waste Determination Plan. Clean chemical resistant gloves will be used during the decontamination process, and when handling any clean equipment.

- Decontamination supplies will vary based on the media being sampled and the type of contamination encountered. The following is a list of supplies typically used, but not limited to:

  a. Laboratory grade non-phosphate detergent solutions
  b. Long-handled scrapers (stainless steel, glass)
  c. Long-handled, soft bristled brushes
  d. Portable low-pressure water sprayers
  e. Potable tap water
  f. Deionized water
  g. Polyethylene, teflon, or other suitable sheeting
  h. Waste drums, cans, and heavy duty plastic bags Absorbent materials, socks, and pads
  i. Wash/Rinse tubs

- Establish a decontamination area in a location that is protected from potential contamination. Use a double thickness of 6-mil polyethylene or other suitable sheeting to line the decontamination area.

- Provide appropriate containers for containment, handling, and collection of wastes. Non-liquid wastes shall be collected in a lined 55-gallon drum. Liquid wastes will be collected in buckets and/or placed into lined 55-gallon drums or other suitable liquid storage container.

- Remove visible residues and stains by scraping, scrubbing, and washing with an aqueous detergent solution.

- Rinse with tap water.

- Move equipment to the next bucket/tub and wash and rinse a second time.

- Move the equipment to the last bucket/tub for the final rinse with deionized water.

- After the equipment has been properly decontaminated, place it on a clean sheet of plastic, Teflon or other suitable material to air dry. While air drying, loosely cover the equipment with another clean piece of sheeting to minimize the potential for contamination.

- Non-liquid wastes and waste-waters collected during the equipment decontamination will be transferred to a designated hazardous storage location. Waste analyses and determinations shall be conducted on the material following the approved FEMP Waste Analysis and Waste Determination Plans.

- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.

APPENDIX C

Backhoe Sampling Operation Procedure

BACKHOE SAMPLING OPERATION

Requirements

The purpose of this procedure is to outline the requirements and identify the operations necessary to perform the sampling activities in the Waste Pit 5 using the backhoe equipment. This procedure may also be applied for the sampling that is performed in Waste Pit 6. The general requirements identified in Appendix A must be met prior to any specific sampling.

Waste Pits and Clearwell Sampling

- A backhoe bucket with a minimum bucket size of greater than 1/3 cubic yard but not greater than 1/2 cubic yard will be affixed to the backhoe arm. The backhoe operator will be required to have successfully completed 3 mock trial runs prior to the start of any actual sampling. The mock trial runs will consist of the placement of clean soil or mud into 55-gallon drums under conditions simulating those which the samples will be taken. A polyethylene chute will be positioned on the top of the drum to facilitate the transfer of the waste material into the drum. This chute will have a 4 ft. x 4 ft. square opening at the top to and a round opening at the bottom alleviate the concern over spillage of material during the sample collection. Trial runs will simulate the backhoe reach and conditions expected for the collection of the samples from the waste pits.

- Position the 55-gallon sampling drum on the pallet in the sampling collection area as identified. Assure that all sampling collection equipment is located completely within the collection area so that water and debris does not overflow the tarp and spill onto the ground.

- Position a metering pump inside the tarped sample collection area. The discharge from the metering pump will discharge back to the waste pit where the sample will be collected. The suction of the metering pump will be controlled manually to prevent the potential for water overflow of the sample collection area.

- Position the backhoe at a predetermined location where the samples will be collected. The backhoe footings will be positioned as close to the liner as possible without resting on it. Rubber tires will be placed under the front footers of the backhoe to prevent any damage of the liner. Precautions must be taken to assure that the liner is not damaged.

- Extend the arm of the backhoe to its fullest extent and lower the arm until the bucket touches the top of the solids.

- Once the bucket touches the top of the solids, do not flex the elbow or shoulder joints while collecting the samples. Samples shall be collected by flexing the bucket joint and "pawing" the sample material into the bucket. Care must be taken to assure that the bucket is not extended more than 6" below the surface of the solids to assure sufficient clearance from the liner.

- Place the sample material in the drums. Allow the 55-gallon drum to sit for approximately 24-hours to allow the excess water to decant from the waste material. Utilizing a metering or hand pump, remove the excess material from each drum and collect the decant water or return it to the waste pit of origin. It the decant water is collected from either Waste Pit 5 or the Clearwell, it will be collected, stored, and labeled as a hazardous waste material. The end of each work day return all excess soils and solids to the waste pits.

- Continue this operation until a minimum of eight 55-gallon drums of solids are collected from the waste

pit.

- After each drum is filled with solids, seal the top on the drum, clean the exterior, and transport the drum to the appropriate location for final decontamination and packaging. This must be performed in accordance with all acceptable practices and RI/FS QAPP chain-of-custody procedures.

Decontamination and Clean-up

- All sampling equipment must be decontaminated between the collection of sample drums from each waste pit to prevent the potential for cross-contamination and assure that a true characteristic sample is attained. If decontamination is not practical, the sampling equipment will be discarded consistent with the FEMP Waste Analysis Plan and FEMP Waste Determination Plan. Clean chemical resistant gloves will be used during the decontamination process, and when handling any clean equipment.

- Decontamination supplies will vary based on the media being sampled and the type of contamination encountered. The following is a list of supplies typically used, but not limited to:

  a. Laboratory grade non-phosphate detergent solutions
  b. Long-handled scrapers (stainless steel, glass)
  c. Long-handled, soft bristled brushes
  d. Portable low-pressure water sprayers
  e. Potable tap water
  f. Deionized water
  g. Polyethylene, teflon, or other suitable sheeting
  h. Waste drums, cans, and heavy duty plastic bags Absorbent materials, socks, and pads
  i. Wash/Rinse tubs

- Establish a decontamination area in a location that is protected from potential contamination. Use a double thickness of 6-mil polyethylene or other suitable sheeting to line the decontamination area.

- Provide appropriate containers for containment, handling, and collection of wastes. Non-liquid wastes shall be collected in a lined 55-gallon drum. Liquid wastes will be collected in buckets and/or placed into lined 55-gallon drums or other suitable liquid storage container.

- Remove visible residues and stains by scraping, scrubbing, and washing with an aqueous detergent solution.

- Rinse with tap water.

- Move equipment to the next bucket/tub and wash and rinse a second time.

- Move the equipment to the last bucket/tub for the final rinse with deionized water.

- After the equipment has been properly decontaminated, place it on a clean sheet of plastic, Teflon or other suitable material to air dry. While air drying, loosely cover the equipment with another clean piece of sheeting to minimize the potential for contamination.

- Non-liquid wastes and waste-waters collected during the equipment decontamination will be transferred to a designated hazardous storage location. Waste analyses and determinations shall be conducted on the material following the approved FEMP Waste Analysis and Waste Determination Plans.

- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.

- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.

APPENDIX D

Baler Crane Sampling Operation Procedure

BALER CRANE SAMPLING OPERATION

Requirements

The purpose of this procedure is to outline the requirements and identify the operations necessary to perform the sampling activities in the Waste Pits 5 and 6 using the baler and crane equipment. The general requirements identified in Appendix A must be met prior to the start of any specific sampling effort.

Waste Pits and Clearwell Sampling

- The crane operator will be required to have successfully completed several mock trial runs prior to the start of any actual sampling. The mock trial runs will consist of the collection and placement of clean soil or mud into 55-gallon drums under conditions simulating those which the samples will be taken. A polyethylene chute will be positioned on the top of the drum to facilitate the transfer of the waste material into the drum. This chute will have a 4 ft. x 4 ft. square opening at the top to and a round opening at the bottom alleviate the concern over spillage of material during the sample collection. The trial runs will simulate the baler crane reach and conditions expected for the collection of the samples from the waste pits.

- Position the 55-gallon sampling drum on the pallet in the sampling collection area as identified. Assure that all sampling collection equipment is located completely within the collection area so that water and debris does not overflow the tarp and spill onto the ground.

- Position a metering pump inside the tarped sample collection area. The discharge from the metering pump will discharge back to the waste pit where the sample will be collected. The suction of the metering pump will be controlled manually to prevent the potential for water overflow of the sample collection area.

- Position the baler crane in a predetermined location where the samples will be collected. The crane will be positioned on a flat surface with the boom extending over the waste pit berm towards the center of the waste pit. If the area immediately adjacent to the waste pit is of proper contour and accessible, then the crane footings will be positioned on the side of the waste pit but no closer than 5 feet to the edge of the liner to prevent any potential for damage. Precautions must be taken to assure that the liner is not damaged.

- Extend the boom of the crane to its fullest allowable extent and identify where in the waste pit the samples will be collected. Based upon the sample location and from the waste pit design drawings, determine the maximum depth from the water line to the liner. Providing for a 5-foot clearance to the waste pit liner, place a mark on the crane cable identifying the maximum that the baler can be lowered into the waste pit.

- Connect the baler assembly onto one crane cable while connecting the baler counterweight and guide sleeve to the other crane cable. Extend the crane boom over the predetermined sample area. Slowly lower the baler into the waste pit until it rests firmly on the bottom of the pit to assure that the marking on the crane cable is not below the water level. If the marking falls below the water line, remove the baler and identify another location as the sample point.

- Raise the baler counterweight 5 feet above the top of the baler and allow it to free-fall onto the baler assuring that the mark on the crane cable does not fall below the water level in the waste pit. Remove the baler from the waste pit and move the boom to the sample collection area to collect any material. The baler height may be raised in 5 foot increments when no sample material is collected.

- Place the sample material in the drums. Allow the drummed material to stand for approximately 24-hours

to allow the excess water to decant from the waste material. Utilizing a metering or hand pump, remove the excess material from each drum and collect the decant water or return it to the waste pit of origin. It the decant water is collected from either Waste Pit 5 or the Clearwell, it will be collected, stored, and labeled as a hazardous waste material. At the end of each work day return all excess soils and solids to the waste pits.

- Continue this operation until a minimum of eight 55-gallon drums of solids are collected from the waste pit.

- After each drum is filled with solids, seal the top on the drum, clean the exterior, and transport the drum to the appropriate location for final decontamination and packaging. This must be performed in accordance with all acceptable practices and chain-of-custody procedures.

Decontamination and Clean-up

- All sampling equipment must be decontaminated between the collection of sample drums from each waste pit to prevent the potential for cross-contamination and assure that a true characteristic sample is attained. If decontamination is not practical, the sampling equipment will be discarded consistent with the FEMP Waste Analysis Plan and FEMP Waste Determination Plan. Clean chemical resistant gloves will be used during the decontamination process, and when handling any clean equipment.

- Decontamination supplies will vary based on the media being sampled and the type of contamination encountered. The following is a list of supplies typically used, but not limited to:

  a. Laboratory grade non-phosphate detergent solutions
  b. Long-handled scrapers (stainless steel, glass)
  c. Long-handled, soft bristled brushes
  d. Portable low-pressure water sprayers
  e. Potable tap water
  f. Deionized water
  g. Polyethylene, teflon, or other suitable sheeting
  h. Waste drums, cans, and heavy duty plastic bags Absorbent materials, socks, and pads
  i. Wash/Rinse tubs

- Establish a decontamination area in a location that is protected from potential contamination. Use a double thickness of 6-mil polyethylene or other suitable sheeting to line the decontamination area.

- Provide appropriate containers for containment, handling, and collection of wastes. Non-liquid wastes shall be collected in a lined 55-gallon drum. Liquid wastes will be collected in buckets and/or placed into lined 55-gallon drums or other suitable liquid storage container.

- Remove visible residues and stains by scraping, scrubbing, and washing with an aqueous detergent solution.

- Rinse with tap water.

- Move equipment to the next bucket/tub and wash and rinse a second time.

- Move the equipment to the last bucket/tub for the final rinse with deionized water.

- After the equipment has been properly decontaminated, place it on a clean sheet of plastic, Teflon or other

suitable material to air dry. While air drying, loosely cover the equipment with another clean piece of sheeting to minimize the potential for contamination.

- Non-liquid wastes and waste-waters collected during the equipment decontamination will be transferred to a designated hazardous storage location. Waste analyses and determinations shall be conducted on the material following the approved FEMP Waste Analysis and Waste Determination Plans.

- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.

- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.

APPENDIX E

Vibra-Core Sampling Operation Procedure

VIBRA-CORE SAMPLING OPERATION

Requirements

The purpose of this procedure is to outline the requirements and identify the operations necessary to perform the sampling activities in the Waste Pits 5 and 6 using the Vibra-Core Sampling equipment. The general requirements identified in Appendix A must be met prior to any specific sampling.

Waste Pits and Clearwell Sampling

- The crane operator will be required to have successfully completed several mock trial runs prior to the start of any actual sampling. The mock trial runs will consist of the collection and placement of clean soil or mud into 55-gallon drums under conditions simulating those which the samples will be taken. A polyethylene chute will be positioned on the top of the drum to facilitate the transfer of the waste material into the drum. This chute will have a 4 ft. x 4 ft. square opening at the top to and a round opening at the bottom alleviate the concern over spillage of material during the sample collection. The trial runs will simulate the use of the Vibra-Core sampling equipment utilizing the crane reach and conditions expected for the collection of the samples from the waste pits.

- Position the 55-gallon sampling drum on the pallet in the sampling collection area as identified. Assure that all sampling collection equipment is located completely within the collection area so that water and debris does not overflow the tarp and spill onto the ground.

- Position a metering pump inside the tarped sample collection area. The discharge from the metering pump will discharge back to the waste pit where the sample will be collected. The suction of the metering pump will be controlled manually to prevent the potential for water overflow of the sample collection area.

- Position the Vibra-Core crane in the predetermined location where the samples will be collected. The crane will be positioned on a flat surface with the boom extending over the waste pit berm towards the center of the waste pit. If the area immediately adjacent to the waste pit is of proper contour and accessible, then the crane footings will be positioned on the side of the waste pit but no closer than 5 feet to the edge of the liner to prevent any potential for damage. Precautions must be taken to assure that the liner is not damaged.

- Extend the boom of the crane to a predetermined area over the waste pit and identify where in the waste pit the samples will be collected. Based upon the sample location and from the waste pit design drawings, determine the maximum depth from the water level in the waste pit to the pit liner. Providing for a 5-foot clearance to the waste pit liner, place a mark on the crane cable identifying the maximum that the Vibra-Core casing can be lowered into the waste pit.

- Connect the LEXAN® tube and insert it into the sampling barrel casing. Connect the cutter assembly onto the barrel casing, if desired or required (depending upon the consistency of the material to be sampled). Attach the crane lines to the sampling barrel tube and the Vibra-Corer Head.

- Test the Vibra-Core Head power assembly prior to lowering the sample tube into the waste pit. Move the crane boom over the sample area and SLOWLY lower the sample collection tube into the waste pit. Slowly lower the sample tube into the waste pit until it rests firmly on the surface of the pit waste sample material to assure that the marking is not below the water line (a spotter will assist the crane operator in performing this operation). If the marking falls below the water line, remove the baler and identify another location as the sample point.

- Start the throttle mechanism and slowly lower the sampling barrel into the pit but no closer than 5-feet from the waste pit liner. Sample material will be collected in the sample tube. Remove the sample barrel from the waste pit and lower it into the laydown or sample collection area.

- If stratified samples are to be collected, the length of the tube will be measured, cut, and samples will be collected from a specific location. The tube will be sampled and the material collected will be analyzed in accordance with the requirements identified in the Sampling Plan.

- If bulk material samples are to be collected, then place the sample material in the drums. Allow the drummed material to stand for approximately 24-hours to allow the excess water to decant from the waste material. Utilizing a metering or hand pump, remove the excess material from each drum and collect the decant water or return it to the waste pit of origin. It the decant water is collected from either Waste Pit 5 or the Clearwell, it will be collected, stored, and labeled as a hazardous waste material. At the end of each work day return all excess soils and solids to the waste pits.

- Continue this operation until a minimum of eight 55-gallon drums of solids are collected from the waste pit.

- After each drum is filled with solids, seal the top on the drum, clean the exterior, and transport the drum to the appropriate location for final decontamination and packaging. This must be performed in accordance with all acceptable practices and chain-of-custody procedures.

Decontamination and Clean-up

- All sampling equipment must be decontaminated between the collection of sample drums from each waste pit to prevent the potential for cross-contamination and assure that a true characteristic sample is attained. If decontamination is not practical, the sampling equipment will be discarded consistent with the FEMP Waste Analysis Plan and FEMP Waste Determination Plan. Clean chemical resistant gloves will be used during the decontamination process, and when handling any clean equipment.

- Decontamination supplies will vary based on the media being sampled and the type of contamination encountered. The following is a list of supplies typically used, but not limited to:

  a. Laboratory grade non-phosphate detergent solutions
  b. Long-handled scrapers (stainless steel, glass)
  c. Long-handled, soft bristled brushes
  d. Portable low-pressure water sprayers
  e. Potable tap water
  f. Deionized water
  g. Polyethylene, teflon, or other suitable sheeting
  h. Waste drums, cans, and heavy duty plastic bags Absorbent materials, socks, and pads
  i. Wash/Rinse tubs

- Establish a decontamination area in a location that is protected from potential contamination. Use a double thickness of 6-mil polyethylene or other suitable sheeting to line the decontamination area.

- Provide appropriate containers for containment, handling, and collection of wastes. Non-liquid wastes shall be collected in a lined 55-gallon drum. Liquid wastes will be collected in buckets and/or placed into lined 55-gallon drums or other suitable liquid storage container.

- Remove visible residues and stains by scraping, scrubbing, and washing with an aqueous detergent solution.
- Rinse with tap water.
- Move equipment to the next bucket/tub and wash and rinse a second time.
- Move the equipment to the last bucket/tub for the final rinse with deionized water.
- After the equipment has been properly decontaminated, place it on a clean sheet of plastic, Teflon or other suitable material to air dry. While air drying, loosely cover the equipment with another clean piece of sheeting to minimize the potential for contamination.
- Non-liquid wastes and waste-waters collected during the equipment decontamination will be transferred to a designated hazardous storage location. Waste analyses and determinations shall be conducted on the material following the approved FEMP Waste Analysis and Waste Determination Plans.
- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.
- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.

APPENDIX F

Clamshell-Crane Sampling Operation Procedure

CLAMSHELL-CRANE SAMPLING OPERATION

Requirements

The purpose of this procedure is to outline the requirements and identify the operations necessary to perform the sampling activities in the Waste Pits 5, 6 and the Clearwell using the Clamshell-Crane sampling equipment. This procedure will apply for the sampling that is performed in any of the three locations identified. The general requirements identified in Appendix A must be met prior to any specific sampling.

Waste Pits and Clearwell Sampling

- The crane operator will be required to have successfully completed several mock trial runs prior to the start of any actual sampling. The mock trial runs will consist of the collection and placement of clean soil or mud into 55-gallon drums under conditions simulating those which the samples will be taken. A polyethylene chute will be positioned on the top of the drum to facilitate the transfer of the waste material into the drum. This chute will have a 4 ft. x 4 ft. square opening at the top to and a round opening at the bottom alleviate the concern over spillage of material during the sample collection. The trial runs will simulate the crane reach and conditions expected for the collection of the samples from the waste pits.

- Position the 55-gallon sampling drum on a pallet in the sampling collection area as identified. Assure that all sampling collection equipment is located completely within the collection area so that water and debris does not overflow the tarp and spill onto the ground.

- Position a metering pump inside the tarped sample collection area. The discharge from the metering pump will discharge back to the waste pit where the sample will be collected. The suction of the metering pump will be controlled manually to prevent the potential for water overflow of the sample collection area.

- Position the crane in the location identified in Figure 6. The crane will be positioned on a flat surface with the boom extending over the waste pit berm towards the center of the waste pit. If the area immediately adjacent to the waste pit is of proper contour and accessible, then the crane footings will be positioned on the side of the waste pit but no closer than 5 feet to the edge of the liner to prevent any potential for damage. Precautions must be taken to assure that the liner is not damaged.

- Extend the boom of the crane to its fullest allowable extent and identify where in the waste pit the samples will be collected. Based upon the sample location and from the waste pit design drawings, determine the maximum depth from the water line to the liner. Providing for a 5-foot clearance to the waste pit liner, place a mark on the crane cable identifying the maximum that the clamshell bucket can be lowered into the waste pit.

- **CLOSE THE CLAMSHELL BUCKET AND** move the crane boom over the sample area. Slowly lower the clamshell bucket into the waste pit until it rests firmly on the bottom of the pit to assure that the marking is not below the water line. If the marking falls below the water line, remove the clamshell bucket and identify another location as the sample point.

- Raise the clamshell bucket 5-feet above the water surface and allow it to free-fall into the waste pit assuring that the mark does not fall below the water line (a spotter will assist the crane operator in performing this operation). Remove the clamshell from the waste pit and move the boom to the sample collection area to collect any material. The clamshell bucket height may be raised in 5 foot increments when no sample waste material is collected.

- Place the sample material into the drum. Allow the drummed material to stand for approximately 24-hours to allow the excess water to decant from the waste material. Utilizing a metering or hand pump, remove the excess material from each drum and collect the decant water or return it to the waste pit of origin. It the decant water is collected from either Waste Pit 5 or the Clearwell, it will be collected, stored, and labeled as a hazardous waste material. At the end of each work day return all excess soils and solids to the waste pits.

- Continue this operation until a minimum of eight 55-gallon drums of solids are collected from the waste pit.

- After each drum is filled with solids, seal the top on the drum, clean the exterior, and transport the drum to the appropriate location for final decontamination and packaging. This must be performed in accordance with all acceptable practices and chain-of-custody procedures.

Decontamination and Clean-up

- All sampling equipment must be decontaminated between the collection of sample drums from each waste pit to prevent the potential for cross-contamination and assure that a true characteristic sample is attained. If decontamination is not practical, the sampling equipment will be discarded consistent with the FEMP Waste Analysis Plan and FEMP Waste Determination Plan. Clean chemical resistant gloves will be used during the decontamination process, and when handling any clean equipment.

- Decontamination supplies will vary based on the media being sampled and the type of contamination encountered. The following is a list of supplies typically used, but not limited to:

  a. Laboratory grade non-phosphate detergent solutions
  b. Long-handled scrapers (stainless steel, glass)
  c. Long-handled, soft bristled brushes
  d. Portable low-pressure water sprayers
  e. Potable tap water
  f. Deionized water
  g. Polyethylene, teflon, or other suitable sheeting
  h. Waste drums, cans, and heavy duty plastic bags Absorbent materials, socks, and pads
  i. Wash/Rinse tubs

- Establish a decontamination area in a location that is protected from potential contamination. Use a double thickness of 6-mil polyethylene or other suitable sheeting to line the decontamination area.

- Provide appropriate containers for containment, handling, and collection of wastes. Non-liquid wastes shall be collected in a lined 55-gallon drum. Liquid wastes will be collected in buckets and/or placed into lined 55-gallon drums or other suitable liquid storage container.

- Remove visible residues and stains by scraping, scrubbing, and washing with an aqueous detergent solution.

- Rinse with tap water.

- Move equipment to the next bucket/tub and wash and rinse a second time.

- Move the equipment to the last bucket/tub for the final rinse with deionized water.

- After the equipment has been properly decontaminated, place it on a clean sheet of plastic, Teflon or other suitable material to air dry. While air drying, loosely cover the equipment with another clean piece of sheeting to minimize the potential for contamination.

- Non-liquid wastes and waste-waters collected during the equipment decontamination will be transferred to a designated hazardous storage location. Waste analyses and determinations shall be conducted on the material following the approved FEMP Waste Analysis and Waste Determination Plans.

- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.

- At the end of each work day, all waste in the sample collection area will either be returned to the waste pit or sealed in the drum and transferred to a designated storage area. All tarps and other disposable materials used in the sample collection area will be collected and disposed of or retained for future use in accordance with accepted practices.