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Sampling Procedures and Protocols for the National Sewage Sludge Survey

Chuck White
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SAMPLING PROCEDURES AND PROTOCOLS

FOR THE

NATIONAL SEWAGE SLUDGE SURVEY

Prepared for:

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NATIONAL SEWAGE SLUDGE STUDY

SAMPLING PROCEDURES AND PROTOCOLS

1.0 PROJECT DESCRIPTION

This document presents the sampling procedures and protocols for the National Sewage Sludge Study.

The objective of this sampling project is to visit and collect samples of sewage sludge after final processing from a variety of Publicly Owned Treatment Works (POTWs) in an effort to identify the presence and level of toxic pollutants contained in municipal sewage sludge (herein after referred to as sludge). After collection and icing, samples will be shipped to laboratories for preservation and analysis. Laboratory tests will be performed for 1) those analytes listed in The 1987 Industrial and Technology Division List Of Analytes and 2) those non-conventional pollutants listed in Table I (Page 31).

2.0 TYPE OF SAMPLING

Representative sampling may be performed using either grab samples or long-term composite samples.

2.1 Grab Samples

This method consists of collecting a grab sample for each different and segregated sludge product produced during a POTW's normal daily operations. A grab sample is a sample collected over a short period (usually less than 15 minutes) during the daily operation of a POTW. This is the quickest and least expensive way of collecting reliable sludge samples.

Grab samples are adequate to characterize most sludges because of the long sludge detention times found at POTWs which reduce the variability of the sludge characteristics. Processes that produce sludge and affect sludge detention time in a POTW include;

A. Primary Clarification: located at the head of the treatment plant, easily settleable and floatable material is removed from the wastewater. Sludge mixing is minimal until the primary sludge is pumped to digesters and thickeners for mixing with other process sludges.

B. Activated Sludge/Secondary Clarification: the constant recycling of biomass within the process generates sludges with process ages (sludge detention times) of 5 to 30 days. Sludge detention times vary dependent upon process modifications. Sludge wasted from this process is usually pumped to digesters.

C. Other Biological Treatment Processes: trickling filters, rotating biological contactors and other fixed media systems have intermittent sloughing off of biomass that causes the sludge to vary in quality and quantity. The sludge is also normally pumped to digesters.

D. Chemical Precipitation/Coagulation: after secondary treatment, where 80% to 90% of the pollutants have been removed, chemicals such as aluminum hydroxide, ferric chloride, lime and polymers are added to further treat the wastewater. Some sludge is recycled and detention times reach 1 to 2 days. These sludges are frequently difficult to dewater and are normally mixed with digested biological sludges prior to further processing.

E. Aerobic/Anaerobic Digesters: detention times of 20 to 30 days are normally found in these processes to stabilize the sludge.

F. Sludge Holding/Gravity Thickeners/Elutriation Tanks: due to process constraints such as septicity, sludge detention time is no more than 1 to 2 days.

A POTW may use one or more of the above processes to treat wastewater and to condition sludge before dewatering and final use/disposal. The combined detention times; 1) smooth out and dilute any slugs or otherwise non-representative concentrations of pollutants and 2) produce a consistently homogenous mixture of sludge. For this reason, a grab sample could adequately represent a 20 or 30 day composite sample.

The only short-term affect on sludge quality would be from process variability encountered during dewatering. Belt presses, centrifuges, vacuum filters, etc., do not generate a product of constant dryness. The percent solids (or percent moisture) may vary, dependent upon chemical feed rates, septicity of incoming liquid sludge and from machine to machine. As the percent solids of the final product vary so will the amount of water soluble pollutants. This can be avoided to some degree by only sampling during normal operating hours and never during a dewatering facilities start-up mode.

Under controlled sampling circumstances, short-term sampling will provide representative samples of sewage sludges.

2.2 Long-Term Composite Sampling

This method consists of weekly composite samples collected consecutively over a period of time and requires considerably more man-hours to accomplish. Seasonal climatic changes, POTW operating procedures, long-term industrial production cycles and the number and type of connections (domestic/industrial) which discharge into the POTW's collection system will affect long-term sludge pollutant concentrations.

2.3 Sample Method Selection

For this sewage sludge study, the quickest and most cost effective, yet representative method is short-term sampling. A grab sample will produce a composite equal in length to the detention time inherent to the POTW processes. A long-term sampling program would be best used only if it were necessary to describe the changes associated with POTW sludge production over extended periods. Grab samples will be used because composite samples are not needed to address long-term sludge pollutant variability.

3.0 SEWAGE SLUDGE SAMPLE COLLECTION

This section provides the rationale for selecting sampling locations and describes the protocols to be used for sample collection and handling.

3.1 Samples to be Collected

All samples to be collected will be grab samples of the final sludge product or products produced by the POTW. The final sludge product will be defined as sewage sludge after all conditioning, dewatering, etc., but before disposal, i.e., before land application, incineration, landfill or ocean disposal.

Individual samples will be collected for each type of sludge that is segregated and disposed of by the POTW. Individual sludge types may be classified in two categories, liquid and solid. Liquid sludge will be defined as any sludge which has the capacity to flow and is conveyed via pump. Solid sludge will be any sludge that is mechanically dewatered or dried using drying beds.

Liquid and solid subcategories may evolve when sludges produced during various plant processes are segregated, treated and disposed of individually as opposed to the blending of all sludge streams before treatment and disposal. Each of these final sludge products will be considered as a different and

individual sample. Therefore, a POTW may have a variety of final sludge products, liquid and/or solid, combined or individual. Each type will require an individual grab sample.
In addition, when the same type sludge is dewatered through similar devices, grab samples will be collected and combined.

EXAMPLE: The following is a basic description of an imaginary POTW to show how to identify the various final sludge types and how to decide which should be treated as individual samples.

POTW "X" (refer to "Generic" POTW flow diagram, Figure 1, Page 7) consists of primary clarification, activated sludge and secondary clarification, chemical treatment/precipitation, aerobic digestion, sludge thickening and dewatering through the use of one centrifuge, two belt presses and a drying bed.

Primary clarifier sludge and secondary clarifier sludge (i.e. waste activated sludge) are sent to the aerobic digester for stabilization. Sludge from the aerobic digester is then dewatered using a centrifuge, belt press #1 and the drying bed. The solid sludge is landfilled.

Sludge produced in the chemical treatment/precipitation unit is mixed with additional aerobically digested sludge in the thickener. Half of this mixture is dewatered using belt press #2 and landfilled. The other half is hauled away as a liquid and applied to farmland.

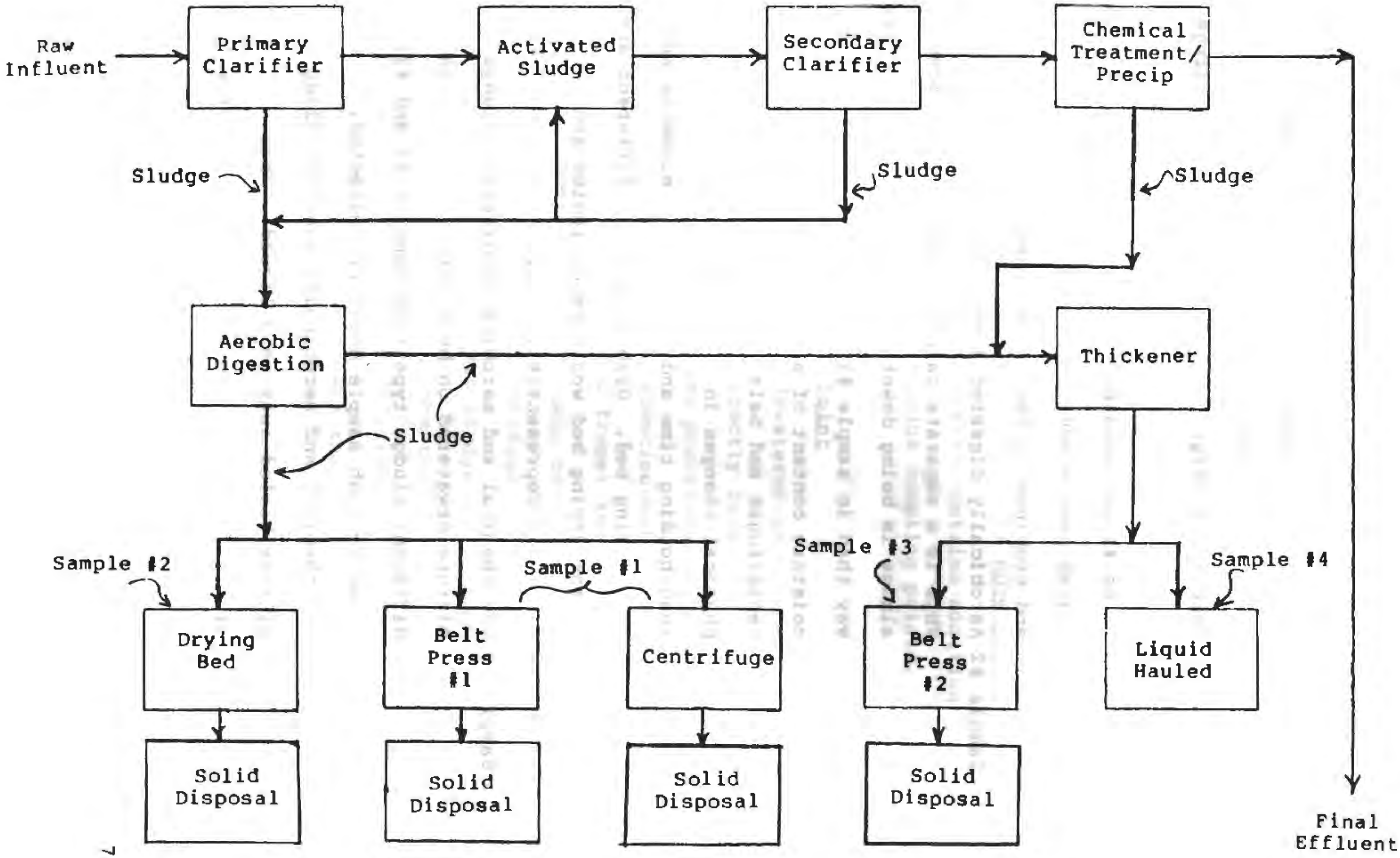

Figure 1. POTW "Generic" Flow Diagram

The individual sludge samples that would be collected at this imaginary POTW are explained below:

Sample #1 Aerobically digested sludge from the centrifuge and belt press #1; Both the centrifuge and belt press #1 are dewatering the same type of sludge. A grab sample would be collected from each machine and combined to form a representative sample.

Sample #2 Aerobically digested sludge from the drying bed; This is a separate sample. Aerobically digested sludge is being dewatered in a radically different way than in sample #1. Drying beds reduce the moisture content of a sludge much more than centrifuges and belt presses. Also chemical and physical changes in the sludge occur due to the long holding time and exposure to elements while on a drying bed. Grab samples of different areas of the drying bed would be collected and combined to form a representative sample.

Sample #3 The chemical and aerobically digested sludge mixture dewatered on belt press #2; This is a different sludge type from samples #1 and #2. A separate grab sample would be collected.

Sample #4 The chemical and aerobically digested sludge mixture hauled away as a liquid. This is the same sludge as in sample #3 except in liquid form. The liquid is treated as a different sludge type and a grab sample is collected.

Sampling points for the above samples are shown in Figure 1.

3.2 Sample Point Selection

The following section describes the procedures for selecting the appropriate point for collection of representative grab samples. Appendix A, taken from the USEPA POTW Sludge Sampling and Analysis Guidance Document, also contains additional information on commonly used sludge sampling points.

3.2.1 Solid Sludge Collection Point

Samples of solid sludge (dewatered mechanically or by gravity) should be collected directly from the final sludge treatment processes. Dewatering processes include, but are not limited to; belt filter press (continuous), centrifuge, vacuum filter, sludge press (plate and frame) and drying bed. Sludge may also be composted after dewatering, but before final disposal.

A. Belt Filter Press/Centrifuge/Vacuum Filter:
   Each process dewaters sludge continuously. The sample should be collected from the sludge discharge chute.

B. Sludge Press (plate and frame):
   This is a batch process and discharges sludge cake intermittently. Sludge is dewatered in the press until plates are full. The unit is then opened and sludge cake is scraped off the plates into a bin. Samples

should be collected directly from the storage bin.

C. Drying Beds:

Drying beds are also a batch process. The bed should be divided into quarters. Collect one grab sample from the center of each quarter and combine to form a grab sample of the total bed. Sludge should not be sampled until ready for removal from beds. This is apparent when the sludge develops cracks over its surface. Drying beds are normally encountered at smaller POTW's, where sludge production is variable. Therefore, sample scheduling must be coordinated to take place when sludge is available and ready for removal as determined by the POTW manager.

D. Compost Piles:

This is an additional conditioning process in which the dewatered sludge (from one of the previous processes) is mixed with a dryer such as wood chips, aerated in large piles and allowed to stabilize. This process takes a few weeks. The sample should be collected from sludge which has completed its composting and is ready for disposal. The easiest method would be to collect a sample directly from a front-end loader as the sludge is being loaded into trucks to be hauled away. The sample location should be determined through discussions with the compost facility manager.

3.2.2 Liquid Sludge Collection Point

Liquid sludge is normally transported off the POTW site in tank trucks. The sampling point should be as close to the truck loading point as possible. The ideal liquid sludge sample point would be at the end of the hose or pipe that is used to fill the tank truck. If this is unacessable, optional sampling points such as taps on sludge process piping should be used. When locating a sampling point within the process piping the following procedures should be followed to assure that representative samples are obtained.

A. In sludge treatment process trains the most representative sample is typically obtained from taps on the discharge side of sludge pumps. Flow at this point in the system is turbulent and the sludge is well mixed.

B. If a sample is drawn from a tap on a pipe containing sludge which is distant from the sludge pump, the average flow velocity of the sludge in the pipe should be determined. Average velocities of less than 2 feet per second are likely to result in solids separation and settling, with an attendant effect on sample solids content, depending on the location of the tap (top, side or bottom of the pipe). Given a choice, a tap on the side of the pipe is preferable.

3.3 Sample Collection Procedures

The following are the steps to be taken by the sampling team for proper sample collection. Basic information on the POTW, such as expected sample locations and types of sludges will be gathered through preliminary phone contact.

A. The sampling team leader, through consultation with the POTW Manager, will establish the number of sludge types that leave the plant for final disposal and the sample points for each sludge type as designated in Section 3.2. If unexpected difficulties are encountered on site in locating sludge samples points or if sampling is impossible, the project manager will be notified immediately and sampling modifications made.

B. To remove any contamination potential, all sampling equipment will be made of polyethylene or polypropylene, used only once and discarded. Polyethylene gloves will be worn to prevent sample contamination and to provide worker safety.

C. At each sampling point, collect the required amount of sample (refer to Table I, Page 31) with the polypropylene scoop and dump into polyethylene pail. Refer to the process specific sampling procedures as explained in the following sections 3.3.1 through 3.3.4.

D. The sampling team will attach identifying labels to the containers. The container lids will be sealed with tape. The sample will be iced, packed and shipped promptly via overnight shipping service.

E. Sample duplicates will also be collected at 15 percent of the sites.

F. Organic volatile trip blanks will be used to determine the extent of contamination, if any, that arises from sample container handling and field conditions which will be encountered during the POTW visits. Trip blanks are organic-free samples of reagent water that are prepared by a designated laboratory before the sampling trip. These blanks will be handled and shipped with the collected sludge samples to a laboratory for analysis. These blanks should not be opened until arrival at the laboratory. One set of 2 trip blanks will be used at 15 percent of the sites.

G. The sampling team will also record site information. These data will be recorded on a preprinted log sheet and will include; date, POTW name and address, sample points and type of sample collected at each point, basic descriptions of POTW sludge treatment processes and final destination of sludge. Also any other pertinent information discovered while at sampling site will be recorded.

3.3.1 Solid Sludge Sample Collection

At the sample point or points, a sample of solid sludge will be collected using a polyethylene pail and polypropylene scoop.

A. Belt Press/Centrifuge/Vacuum Filter:

These sludge dewatering processes are continuous. When one or a combination of dewatering devices are encountered and used to dewater the same sludge type, then only one sample is collected.

1. If just one dewatering unit is present, collect a sufficient amount of solid sludge (refer to sample amounts in Table I, Page 31) in the polyethylene pail directly from the sludge discharge chute. Thoroughly mix the sample with the polypropylene scoop. Transfer the sludge to the required sample containers by means of the polypropylene scoop as described in Section 3.3.2.
2. If two or more dewatering units (any combination) machines are present (dewatering the same sludge type), collect equal amounts of solid sludge from each discharge point and combine in the polyethylene pail. Thoroughly mix the sample with the polypropylene scoop. Transfer sludge to the required sample containers by means of the polypropylene scoop as described in Section 3.3.2.

B. Sludge Press (plate and frame):

To collect a representative sample, select four points within the sludge bin. Collect an equal amount of sample (refer to Table I, Page 31) from each point and combine in the polyethylene pail. Thoroughly mix the sample with the polypropylene scoop. Transfer sludge to the required sample containers by means of the polypropylene scoop as described in Section 3.3.2.

C. Drying Beds:

The sludge must be of sufficient dryness before sampling may take place. The sludge is dry enough when cracks form along its surface. The sampling visit will be scheduled to coincide with a POTW's decision that a drying bed is dry enough and ready for removal. The POTW Managers assistance should be used for scheduling.

1. To collect the sample, divide the bed into quarters and grab equal amounts of sample from the center of each quarter using the coring device (Figure 2). Enough sample should be collected to fill the sample containers (refer to Table I, Page 31). The sample should include the entire depth of sludge on the bed. Be careful not to include large amounts of the drying bed sand when the sample is collected. A small amount of sand is allowable though, this will be representative of the fact that during normal sludge removal from a

drying bed, small amounts of sand are usually taken. Combine the four grabs in the polyethylene pail. Thoroughly mix the sample with the polypropylene scoop. Transfer sludge to the required sample containers by means of the polypropylene scoop as described in Section 3.3.2.

2. If more than one drying bed is used to dewater the same sludge type, use the above sampling technique on each bed. Combine all the samples in the polyethylene pail. Thoroughly mix the sample with the polypropylene scoop. Transfer sludge to the required sample containers by means of the polypropylene scoop as described in Section 3.3.2.

D. Compost Pile

Collect a grab sample from the front-end loader using the polyethylene pail and scoop. Refer to Table I, Page 31 for total amount of sample needed. Thoroughly mix the sample with the polypropylene scoop. Transfer sludge to the required sample containers by means of the polypropylene scoop as described in Section 3.3.2.

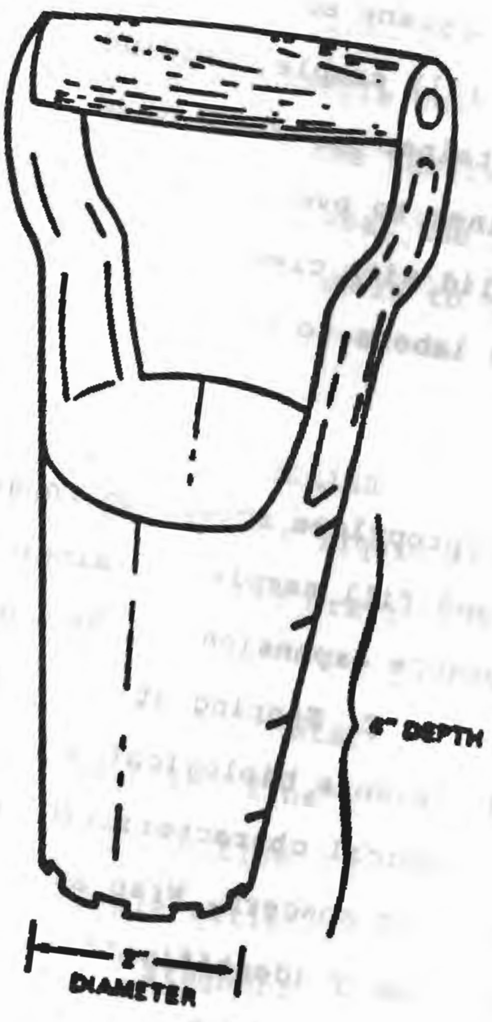

FIGURE 2. Coring Device

3.3.2 Solid Sludge Handling

The following describes the procedures for the handling of solid sludge samples and filling of sample containers. Refer to Table, Page 31 for sample volumes.

A. Organic Volatiles/Semi-volatiles:

Using the polypropylene scoop, thoroughly mix sludge in sample pail and fill sample container. Carefully pack sludge into container so as to avoid air spaces. Fill the container to overflowing and screw on lid. Wrap and seal lid with clear tape. Apply identification labels to container and cover with clear tape.

B. Dioxin/Furan:

Using the polypropylene scoop, thoroughly mix sludge in sample pail and fill sample container to 4/5 full. This is to enable expansion of the samples when they are stored at <0°C. Storing at <0°C preserves the samples and prevents biological activity that may change the chemical characteristics of the sludge. Air spaces are of no concern. Wrap and seal the lid with clear tape. Apply identification labels to container and cover with clear tape.

C. Pesticides/PCBs/Herbicides, Metals and Non-Conventionals:

Using the polypropylene scoop, thoroughly mix sludge in sample pail and fill sample containers. Fill each sample container to within 1/2 inch of top. This provides room for expansion should there be any gas production between sample collection and when the container is open at the laboratory. Air spaces are of no concern. Wrap and seal the lid with clear tape. Apply identification labels to container and cover with clear tape.

3.3.3 Liquid Sludge Sample Collection

At the sample point, collect liquid sludge directly into the 14 quart polyethylene pail. When drawing the liquid sludge from;

A. Completely Mixed Tank:

1. Have POTW operator start and run pump for five minutes to clear line of stagnant sludge.
2. Allow sludge to flow for several seconds from the tap (or sample outlet) prior to sampling in order to flush out stagnant sludge and solids that may have accumulated in the tap.
3. Fill polyethylene pail.

B. Unmixed Tank:

1. An unmixed tank will have a sludge layer and supernatant layer. Make sure that the sludge pump

is drawing from the sludge layer.

2. Have POTW operator start and run pump for five minutes to clear line of stagnant sludge.

3. Allow sludge to flow for several seconds from the tap (or sample outlet) prior to sampling in order to flush out stagnant sludge and solids that may have accumulated in the tap.

4. Fill polyethylene pail.

Before transferring liquid sludge into sample containers (Section 3.3.4), manually agitate liquid sludge in pail with a polyethylene ladle until thoroughly mixed.

3.3.4 <u>Liquid Sludge Handling</u>

The following describes the procedures for the handling of liquid sludge samples and filling of sample containers.

A. Organic Volatiles/Semi-volatiles:

Using the polyethylene ladle thoroughly mix sludge in polyethylene pail. Using ladle, carefully pour sludge into container so as to avoid entrapping air within sample. Fill container to overflowing and screw on lid. Check sample for air bubbles. To do this, turn container up-side-down and tap lid. If air bubbles rise up, open container and fill with additional sample. Wrap and seal the lid with clear tape. Apply identification labels to container and cover with clear tape.

B. Dioxin/Furan:

Using the polyethylene ladle thoroughly mix sludge in polyethylene pail. Then using the ladle, fill the sample container to 4/5 full. This enables expansion of the samples when they are stored at <0°C. Storing at <0°C will preserve the samples and prevent any biological activity. Air spaces in the sample container are of no concern. Wrap and seal the lid with clear tape. Apply identification labels to container and cover with clear tape.

C. Pesticides/PCBs/Herbicides, Metals and Non-Conventionals:

Using the polyethylene ladle thoroughly mix sludge in the polyethylene pail. Then using the ladle, fill each sample container to within 1/2 inch of the top. This is to provide room for expansion should there be any gas production during sample shipment. Air spaces in the sample containers are of no concern. Wrap and seal the lid with clear tape. Apply identification labels to container and cover with clear tape.

4.0 SAMPLE CUSTODY

This section describes the procedures for sample handling and shipment.

4.1 Sample Handling

Besides mixing of samples in the sample pail, no modifications to the structure or content (removal of plastics, paper, etc.) of the samples will be performed. Sample transfer will be kept to a minimum. The sludge will placed in polyethylene or glass sample containers which have been quality control analyzed by the supplier and which are certified to meet USEPA cleanliness specifications.

4.2 Sample Preservation

Once a sample is collected, steps will be taken to preserve the chemical and physical integrity of the sample during transport and storage prior to analysis. All samples will be immediately cooled to a temperature of four degrees Centigrade or less using wet ice (which will be packed in zip-lock bags) or blue ice (which will be frozen prior to sampling visit) and shipped promptly to the designated laboratories. Upon arrival at the laboratories, samples will be preserved or analysis begun as appropriate within 48 hours of the sample collection.

4.3 Sample Shipment

All samples will be shipped from the field on the day of collection using an overnight commercial delivery service unless circumstances do not permit this. In that event, samples will be shipped in the most expedient method available.

The shipment box will be of sturdy construction and insulated to provide the proper environment for preserving the samples at <4°C. Each sample container will be sealed with clear tape to prevent lid removal or leakage. All containers will be enclosed in bubble wrap and securely packed in the shipment box with ice. Other packing materials, such as packing peanuts may be used. On the outside of the shipment container place the following: 1) a shipping label with the complete address of the receiving laboratory including the responsible laboratory person to receive the samples, 2) a designated box number to indicate to the receiver exactly how may sample boxes are included in the shipment and 3) a Fragile and This End-Up label.

4.4 Field Custody Procedures

Each sample will have a label attached to it (Figure 3) and covered with clear plastic tape to prevent solvent attack. Shipment record forms will be written for each group of samples shipped to a particular laboratory. These forms will be the standard Sample Control Center Organics Traffic Report, Metals Traffic Report and (Generic) Sample Traffic Report shown in Figures 4, 5 and 6. At least one copy of each form will accompany sample shipment to a laboratory. One copy of each form will remain in the custody of the sample team. Additional detail is provided in Appendix B.

EXAMPLE OF SAMPLE NUMBER LABELS

16272-C Composite	16272
16272-CB Composite Blank	16272
16272-G Grab	16272
16272-V1 VOA Preserved	16272
16272-V2 VOA Preserved Dup	16272
16272-V3 VOA Unpreserved	16272
16272-V4 VOA Unpreserved Dup	16272
16272-VB1 VOA Trip Blank	16272
16272-VB2 VOA Trip Blank Dup	16272
16272-Other	16272

16272-M1 Metals ICP	16272
16272-M2 Metals AA	16272
16272-Other	16272

Figure 3.

EPISODE NO:
RANGE OF SAMPLE NOS: —

ORGANICS TRAFFIC REPORT

INDUSTRIAL FIRM SAMPLED: ____________	SAMPLING DATE BEGIN: ____________	[redacted]
CITY: ____________	END: ____________	
STATE: ____________	SHIPPING INFORMATION	
INDUSTRIAL CATEGORY: ____________	SHIP TO: ____________	
	ATTN: ____________	
CONFIDENTIAL: ____ YES ____ NO		
SAMPLING OFFICE: ____________	CARRIER: ____________	
	AIRBILL NO: ____________	
SAMPLER: ____________	DATE SHIPPED: ____________	

SAMPLE NUMBER	SAMPLE POINT DESCRIPTION: RAW WATER (CITY, RIVER, WELL)	IN LINE PROCESS	UNTREATED EFFLUENT (RAW WASTE WATER)	TREATED EFFLUENT	OTHER (SPECIFY)	ADDITIONAL SAMPLE DESCRIPTION	PH LEVEL	SAMPLE POINT FLOW UNITS: ____	SAMPLE TYPE: C COMPOSITE (EXTRACTABLE ORGANICS)	CB COMPOSITE BLANK	G GRAB (EXTRACTABLE ORGANICS)	V1 VOA PRESERVED	V2 VOA PRESERVED (DUPLICATE)	V3 VOA UNPRESERVED	V4 VOA UNPRESERVED (DUPLICATE)	VB1 VOA TRIP BLANK	VB2 VOA TRIP BLANK ((DUPLICATE)	OTHER SPECIFY:

WHITE — SCC COPY YELLOW — SAMPLER COPY PINK — LAB COPY FOR RETURN TO SCC GOLD — LAB COPY

Figure 4.

EPISODE NO:
RANGE OF SAMPLE NOS: —

METALS TRAFFIC REPORT

INDUSTRIAL FIRM SAMPLED: ____________	SAMPLING DATE	[redacted]
CITY: ____________	BEGIN: ____________	
STATE: ____________	END: ____________	
INDUSTRIAL CATEGORY: ____________	SHIPPING INFORMATION	
CONFIDENTIAL: ____ YES ____ NO	SHIP TO: ____________	
SAMPLING OFFICE: ____________	ATTN: ____________	
SAMPLER: ____________	CARRIER: ____________	
	AIRBILL NO: ____________	
	DATE SHIPPED: ____________	

SAMPLE NUMBER	SAMPLE POINT DESCRIPTION: RAW WATER (CITY, RIVER, WELL)	IN LINE PROCESS	UNTREATED EFFLUENT (RAW WASTE WATER)	TREATED EFFLUENT	OTHER (SPECIFY)	ADDITIONAL SAMPLE DESCRIPTION	PH LEVEL	SAMPLE POINT FLOW UNITS: ____	SAMPLE TYPE: M1 METALS TASK I (ICP ONLY)	M2 METALS TASK II (AA)	METALS OTHER (SPECIFY)

WHITE — SCC COPY YELLOW — SAMPLER COPY PINK — LAB COPY FOR RETURN TO SCC GOLD — LAB COPY

Figure 5.

EPISODE NO:

RANGE OF SAMPLE NOS: —

TRAFFIC REPORT

INDUSTRIAL FIRM SAMPLED: ____	SAMPLING DATE BEGIN: ____	[redacted]
CITY: ____	END: ____	
STATE: ____	SHIPPING INFORMATION	
INDUSTRIAL CATEGORY: ____	SHIP TO: ____	
	ATTN: ____	
CONFIDENTIAL: ____ YES ____ NO		
SAMPLING OFFICE: ____	CARRIER: ____	
	AIRBILL NO: ____	
SAMPLER: ____	DATE SHIPPED: ____	

SAMPLE NUMBER	SAMPLE POINT DESCRIPTION: RAW WATER (CITY, RIVER, WELL)	IN LINE PROCESS	UNTREATED EFFLUENT (RAW WASTE WATER)	TREATED EFFLUENT	OTHER (SPECIFY)	ADDITIONAL SAMPLE DESCRIPTION	PH LEVEL	SAMPLE POINT FLOW UNITS ____	SAMPLE TYPE					

WHITE — SCC COPY YELLOW — SAMPLER COPY PINK — LAB COPY FOR RETURN TO SCC GOLD — LAB COPY

Figure 6.

5.0 SAMPLING EQUIPMENT

This section lists the sampling supplies and equipment to used by the sampling team in the field to collect samples.

5.1 Sampling Equipment

-Sample kit (to be prepared prior to sampling visits)

-Disposable 14 quart polyethylene pails

-Disposable polyethylene gloves

-Disposable polypropylene scoops

-Disposable stainless steel corers

-Disposable polyethylene ladles

5.2 Miscellaneous

-Clear tape (to seal sample containers)

-Packing tape

-Writing tools

-Clear plastic zip-lock bags

-Shipping materials

-Shipping instructions and appropriate shipping forms

-Trash bags

6.0 SAMPLING KITS

Sampling kits will be prefabricated and ready for use before sampling begins. The kits will contain;

-High impact plastic coolers with lids

-sample containers (refer to Table I)

all sample containers will be certified to meet USEPA cleanliness specifications and will have been quality control analyzed by the supplier

-packing materials (bubble wrap, peanuts, etc.)

TABLE I
SAMPLE CONTAINER DESCRIPTIONS

SAMPLE TYPE	VOLUME REQUIRED	TYPE OF CONTAINER
GC/MS for:		
Semi-volatile Org	500ml	G
Volatile Organics	2 each 4oz	G
GC/MS for:		
Dioxin/Furan	500ml	P
GC for:		
Pesticides/PCBs	2 each 500ml	G
Herbicides	500ml	G
ICP & AA for:		
27 IFB metals	500ml	P
Non-conventionals: Fluoride, TKN, Nitrate, Nitrite, Phosphorous, % Solids, Cyanide	4 each 500ml	P

G - glass
P - polyethylene

APPENDIX A

COMMONLY USED SEWAGE SLUDGE SAMPLING POINTS

Sludge Type	Sampling Point
Primary Sludge -	Most frequently sampled from taps on the discharge side of positive displacement pumps. Difficult to sample from wells or pits due to solids separation.
Activated Sludge -	Sampled from taps on lines or from open channel flows. Open channel flow can be considered an acceptable sample point if the flow is well mixed.
Trickling Filter Humus -	Sampled at taps on discharge lines from pumps or from wells, pits or channels. Care should be taken to assure adequate mixing, since humus has a greater tendency for solids separation than activated sludge.
Anaerobically Digested Sludge -	Typically sampled from taps on the discharge side of positive displacement pumps.
Aerobically Digested Sludge -	Frequently sampled from taps on discharge lines from pumps. In some cases, particularly where batch digestion is used, sludge may be sampled directly from the digester. Two cautions are in order concerning this practice: (1) If aerated during sampling, significant air will be entrained in the sample. Depending on parameters to be analyzed, this may affect sample integrity. (2) If aeration is shut off, solids separation will occur rapidly in well digested sludge, affecting sample representativeness.
Thickened Sludges -	Typically sampled from taps on the discharge side of positive displacement pumps.
Heat Treatment Sludge -	Generally sampled from taps on the discharge side of positive displacement pumps <u>after</u> decanting. Particular care should be taken when sampling heat treatment sludge due to: (1) High tendency for solids separation, and (2) High temperature of sample (frequently 60°C+ as sampled) can cause problems with certain sample containers due to cooling and subsequent contraction of entrained gases.
Dewatered Sludges (Cake) -	Generally sampled from the conveyors on which dewatered sludge is collected. If sampled from bulk containers, sample should be taken from several locations within the sludge mass.

APPENDIX B

October 1987

USEPA INDUSTRIAL TECHNOLOGY DIVISION
SAMPLE CONTROL CENTER
SAMPLE SCHEDULING AND SHIPMENT INSTRUCTIONS

Sample Scheduling

To schedule a sampling site, an authorized requestor should call the Sample Control Center (SCC) with the following information:

- o Name and affiliation and the telephone number of the individual requesting the analysis
- o The analyses requested
- o Facility name and location
- o Industrial Category
- o Industrial Sub Category
- o Scheduled sampling and shipping dates
- o Sampling organization, contact, and telephone number
- o Number and types of samples to be collected

When an authorized requestor schedules the sampling site, the SCC assigns an Episode number for the site (an Episode refers to a group of samples collected at a given plant or location within the same calendar week) and prepares a packet of materials to send to the Sampler. The packet normally contains the following:

- o Episode Number assignments
- o Laboratory assignments
- o Traffic Report(s)
- o Adhesive Sample Number Labels

SCC then creates a hardcopy Episode file and enters the scheduling information in the SAMTRAC (Sample Tracking) System.

Instructions for Completing Traffic Report

A separate Traffic Report (TR) (see Attachment 1), is to be completed for each shipment of samples to a laboratory. For samples going to EPA Contract laboratories use the TR provided by the SCC.

First, enter the Episode number on the top right corner of the TR form, where indicated. The Episode number is the identifying number that was assigned by SCC at the time the sampling was scheduled. This is followed by the Range of Sample numbers, which are assigned by the sampler when samples are packed for shipment to the laboratory(s).

Next, complete header information, excluding the grey areas on the top right of the form.

Along with the TR forms, the sampler will receive sequentially numbered sample labels from SCC. In order to protect the labels from water or solvent attack, labels on the sample container should be covered with clear, waterproof tape.

Enter the Sample numbers (from the labels) on the lower left side of the TR where indicated. Record all Sample numbers for samples included within the shipment. Extra numbered labels should be discarded and new strips of labels should be used for the next Episode of samples.

For each sample, indicate sample point description by checking the appropriate box. If additional sample point information is required enter it in the box labeled "Additional Sample Description" located in the center of the TR. Next record the physical parameters of the site at the time of sampling (i.e. pH, effluent flow, etc.). In the remaining boxes indicate what type of analysis the laboratory is to perform on a sample. Note: Analyses must be approved by EPA and requested through SCC at the time sampling is scheduled, to ensure that proper arrangements can be made in advance to accommodate the request.

The bottom two copies of the completed TR (pink and gold copies) must be included with the sample shipment to the laboratory. The TR should be enclosed in a clear plastic bag and securely taped to the underside of the lid of the shipping cooler.

Following sample shipment, distribute remaining TR copies as follows:

- o Mail the top (white) copy to SCC at the address shown on the top of the TR form.
- o The second (yellow) copy of TR form is retained by the sampler as the Region's file copy.

Procedures for Coordinating Sample Shipment

Immediately following sample shipment, call SCC and provide the following information:

- o Sampler name and phone number
- o Episode number
- o Sampling date
- o Sample numbers for samples included in each shipment
- o Number of coolers per shipment
- o Date of shipment
- o Courier name and airbill number
- o Type of shipment (e.g., overnight, two-day)
- o Laboratory samples shipped to
- o Any irregularities or anticipated problems with the samples
- o Status of sampling project (e.g., final shipment, update of future shipping schedule)

SCC notifies the laboratory that samples are in transit and confirms arrival of the samples at the receiving laboratory. SCC assists in resolution of any problems concerning the samples, coordinating with the appropriate sampling personnel.

Upon sample receipt, the laboratory completes designated sections of the TR, recording date of sample receipt and sample condition, signs the TR, and returns the copy to SCC. SCC retains the laboratory-signed TR as written confirmation of sample receipt.

If you have any questions or comments regarding this information please call or write the Sample Control Center.

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Sample Control Center
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