

Attachment FF-1

Sampling and Analysis for Clean Closure

1. **Objectives**: Sampling will be conducted to determine whether decontamination operations are necessary and to verify that clean closure performance standards have been met. Initial sampling during closure of the storage area will be conducted to determine if any contaminants of concern are present in detectable levels (phase one). If contaminants are detected, follow-up sampling will be performed to measure the magnitude and extent of the contamination (phase two). If follow-up sampling identifies contamination levels in excess of the levels specified in Table 3 of this attachment, decontamination will be performed. If decontamination of the area is performed, final sampling (phase two) will be performed to determine the effectiveness of the decontamination and to verify that the clean closure performance standards have been met.

2. **Responsibilities**: The overall administration of this sampling plan will be the responsibility of the Radiological Engineering Division. Actual performance of the sampling will be done by the Environment, Safety and Health Office (air samples) and the Nuclear Facilities and Support Shop (wipe and solid samples). All samples will be analyzed by the Laboratory Division.

3. **Sampling Schedule**: The sampling plan will be performed in one to three phases, depending on the results of actual sampling. Phase one consists of confirmatory wipe and air samples performed within the MWSF. Phase two will direct solid samples for quantification of contaminant levels and to determine effectiveness of any decontamination procedures used. Phase three will be used to sample any wastes generated by decontamination operations to determine their disposition. The following is an overview of each phase.

a. *Phase 1*: Prior to sampling, the floor of the MWSF will be evaluated for chemical contamination. Since all waste is containerized within the MWSF, this phase will consist of confirmatory sampling to verify that the clean closure performance standards have been met. If contaminants are detected, phase two sampling will be implemented. The phase one confirmatory sampling will consist of two types of sampling. Wipe samples will be taken to determine if any applicable metals are present at detectable levels. Air samples adjacent to the surface will be taken to determine if any of the volatile organics of concern are present at detectable levels. All sampling and analysis will be performed using National Institute of Occupational Safety and Health (NIOSH) approved procedures. Any sample result which exceeds the level of detection (LOD) for wipe samples or the minimum measurable level (MML) for air samples will initiate phase two sampling. If all results are less than the LOD or MML (as applicable), the clean closure performance standard (based on

the spill history) will be confirmed and no further sampling will be performed (see Table 1 of this attachment).

b. *Phase 2:* Phase two sampling will be used to quantify contaminants if phase one sampling detects contamination. If any contaminants are found above the phase one LOD, phase two sampling will direct the taking of solid samples from the floor. The samples will be analyzed using the procedures of EPA's publication "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) to determine the concentration of the contaminants within the concrete. If all results are less than the clean closure levels listed in Table 3 of this attachment, then the clean closure performance standards will be met and no further sampling will be performed. The clean closure levels of Table 3 of this attachment are based on the Model Toxics Control Act (MTCA) Method B. The actual levels are from the CLARC II database. If the analysis results show concentrations that exceed the levels in Table 3 of this attachment, the decontamination procedures of this closure plan will be implemented. Following each decontamination procedure, the phase two sampling will be repeated until contaminant levels have been reduced to below the clean closure requirements of Table 3 of this attachment.

c. *Phase 3:* Phase three sampling will only be done if decontamination procedures are performed to clean up detected constituents. Phase three directs sampling and analysis of the wash water and/or debris which may result from decontamination. Phase three sampling is used to determine the appropriate treatment and disposal method for the waste generated during decontamination.

4. **Selection of Sample Types and Amounts:**

a. *Phase 1:* Sampling during phase one will consist of surface wipes and air samples using a solid sorbent tube. All waste stored in the MWSF is containerized. This leads to the conclusion that no residual contamination is present in the MWSF. Phase one confirmatory sampling will use NIOSH developed procedures to sample for the presence of any of the contaminants of Table 1 of this attachment above the LOD or MML (as applicable).

(1). Metals: Sampling for the presence of dangerous metals is based on the assumption that a spread of waste containing metal contamination will leave metal residues on the concrete surface. Wipe samples from an area of 100 cm² will be taken at the sample locations and analyzed for the presence of the metals listed in Table 1 of this attachment. To verify the validity of this wipe sample, the case of one gram of lead regulated solid waste spilled over 100 cm² can be evaluated. If this waste contained 100 ppm lead, which is the lowest level which could result in RCRA regulation, one gram of waste would contain 100 µg of lead. If a wipe pick-up efficiency of only 20% is assumed, this would

result in a wipe lead content of 20 µg, which is 10 times the LOD for this test. The purpose of the wipe samples is to qualify the presence of the metals above clean closure levels, not to quantify the concentrations in the floor.

(2). Volatile Organics: No wipe sampling technique exists for volatile organics since the constituents will not remain on the surface exposed to air for any length of time and the friction of wiping would dissipate any volatiles which may be present. For the purpose of qualifying the presence of volatile organics above clean closure levels, the presence of the constituents in the air near the surface of the floor will be evaluated. In the case of a spill of waste containing volatile organics, the volatile contaminants on or very near the surface of the floor will volatilize quickly. However, a percentage of the organic contaminant may penetrate below the surface of the floor and remain for a longer period of time. These volatile constituents will slowly migrate to the surface and volatilize due to the partial pressure gradients for the constituents. Over time, this will result in a slowly changing quasi-equilibrium between volatile organic concentrations in the floor and in the air at the surface. In still air, the air along the surface of the floor will contain a level of any volatile organics which may be present under the surface of the floor. NIOSH procedures developed to detect very small concentrations of the organic constituents listed in Table 1 of this attachment will be used to determine if any of these volatile organics are present at detectable levels. All of these procedures draw air through a solid sorbent tube which collects the organic constituent being sampled for. Air sample sizes will be as listed in Table 1 of this attachment. These sample volumes are based on the maximum sample size for the procedure, or the maximum air flow allowed by the method for a fifteen minute sample. This will optimize the time spent sampling as well as providing an adequate MML. All samples will be drawn from the air within six inches of the floor surface.

b. *Phase 2*: Phase two quantification sampling will consist of grab samples taken of the floor at designated locations. A concrete coring tool will be used to collect samples of the floor to a depth of approximately 1.5 inches. From this core, ten grams of material will be used for total metals analysis and another ten grams will be used to analyze for volatile organics. The quantities and methods are based on EPA's SW-846 procedures, as listed in Table 3 of this attachment.

c. *Phase 3*: Phase three sampling will use solid and/or liquid samples to determine the concentrations of dangerous constituents in decontamination waste to determine proper management. Waste water from water wash decontamination will be sampled using grab liquid samples taken from the collection bottles. Each sample location will

include two 40 ml samples to be analyzed for volatile organics and one 500 ml sample to be analyzed for total metals. Debris resulting from concrete removal will be grab sampled from the roll-off box. Each sample location will include one 10 gram sample to be analyzed for volatile organics and one 110 gram sample to be analyzed for TCLP metals.

5. **Selection of Sampling Locations:**

a. *Phase 1:* Confirmatory sampling of the MWSF will consist of area-wide random grid sampling and focused sampling of suspect areas. The area within the MWSF is gridded, using four foot grid, spacing into 131 nodes. A total of 25 sampling nodes were randomly selected plus the MWSF sump, for a total of 26 sampling nodes. Within the sampling nodes, the wipe samples will be taken at the center of the node. Air samples in a node location will be taken by moving the sampler tube over the entire node area. The entire floor will also be visually inspected for signs of spills and stains. All suspect areas found during the visual inspection will be recorded (described and located) in the field log book. Photographs will also be taken of the suspect areas. These suspect areas will be sampled in addition to the random grid samples.

b. *Phase 2:* Quantification sampling in the MWSF will consist of area-wide random grid sampling and focused sampling of suspect areas. The area within the MWSF is gridded using a four foot grid spacing into 131 nodes. A total of 25 sampling nodes were randomly selected. Within the sampling nodes, the core samples will be taken at the center of the node. In addition to the random sampling locations, any nodes with detected contaminants found during phase one sampling will be sampled as well as the suspect areas found during the phase one visual inspection.

c. *Phase 3:* Decontamination waste will be sampled based on its physical form. Waste water from washing will be sampled by taking one sample from each collection bottle near the mid-depth. Concrete debris will be sampled using four samples from each roll-off box. The samples from the roll-off boxes will be taken near the center of each side if the box is full, or evenly spaced about the debris if the box is partially full.

6. **Sampling Procedure**

a. *Phase 1:*

(1) Sampling locations: The floor shall be marked with a grid pattern consisting of four foot grid sizing (see Figure 1-A). The last row and column will be somewhat larger due to the MWSF dimensions not being evenly divisible by four. The grid may be marked using tape, string, or markers approved by C/105.2A. Do not use markers, paint, or other materials with solvents or metal

particulates which may contaminate sample results. Number the first row nodes one through ten and the first column nodes with the letters A-M. The entire floor surface shall then be inspected for signs of spills and staining to determine suspect areas. Record the results of the visual inspection along with the grid location and description of any suspect area in the field log book. Table 2 of this attachment lists the location of each random sampling node to be used for the MWSF. Each suspect area and the sump will be sampled in addition to the random nodes. The point within a node to be sampled is in the center of the node or suspect areas. Photographs will be taken of the gridded floor and any suspect areas.

(2) Sample labeling and chain of custody: Samples shall be placed in sealed containers and labeled with an identification label and security seal in accordance with the Shipyard MWMP. A Sample Analysis Report (SAR) or equivalent document shall be completed after each sample is taken to establish the chain-of-custody documentation. In addition to this, all samples taken will be logged into the field log book.

(3) Installation of sampling devices: A template is used to take the wipe samples for metals analysis. The template has a 10 cm by 10 cm opening in the center. The template will be placed such that the opening is near the center of the node. When sampling suspect areas, the template shall be centered over the suspect area. Air samples for volatile organics shall be taken using a sampling pump connected to a sampler sorbent tube by flexible tubing. A new sorbent tube will be used for each sample. The sorbent tube shall be attached to a rigid rod to allow sampling the sample area without requiring personnel to physically enter the sample area. This is to minimize air disturbance during sampling, which could affect sample results.

(4) Procedures for sample collection and handling: Collect a wipe and air sample at each node specified in Table 2 of this attachment and at any suspect areas identified in the field log book. Collection of wipe samples shall be in accordance with NIOSH Procedure 9100. Following installation of the sampling template, a sampling pad will be used to wipe the area within the template. The surface shall be wiped in both dimensions as specified in the NIOSH procedure. The pad shall be folded with the exposed side in and placed in a new sealable container. The container shall be sealed, and labeled as described above. Each sample will be taken using a new pair of disposable latex gloves. Air samples shall be taken using the applicable NIOSH procedure as listed in Table 1 of this attachment. Break the ends of the sampler sorbent tube immediately before sampling. Attach the sampler sorbent tube to the sampling pump using the flexible tubing. Sample the air just above the floor at an accurately known flow rate as specified in the applicable NIOSH procedure until the total sample size is reached as specified in Table 1 of this attachment. During the sampling, slowly move the sampler sorbent tube over the entire area within the sample node,

keeping the sampler sorbent tube within six inches of the floor at all times. During sampling, minimize activities which may cause air disturbances in the sample area. Do not walk in the sample area during sampling. Use a rigid rod attached to the sampler sorbent tube to move the sampler over the area. Following sample collection, cap both ends of the sampler sorbent tube and place in a new bag. Seal and label the bag. Repeat procedure for each volatile constituent that requires a different type or size of sorbent tube.

(5) Personnel and equipment decontamination: Decontamination of personnel is not necessary due to the use of disposable gloves and disposable templates for wipe samples. The only equipment which will be reused is the pump and the flexible tubing. Since the pump and tubing are down stream of the sampler sorbent tube, no decontamination is necessary for these items.

(6) Management of sampling waste: All waste generated by sampling (e.g. gloves, templates, and decontamination materials) which show visual indications of potential contamination shall be collected in a sealable plastic bag or metal drum. The sampling waste shall be kept in an dangerous waste satellite accumulation area pending receipt of the sample results. If any of the wipe samples analyzed are found to contain hazardous constituents, the sampling waste shall be managed as a dangerous waste. If all sample results from the floor sampling are negative for hazardous constituents, then the sampling waste shall be disposed of as solid waste.

(7) Quality assurance and quality control (QA/QC) samples: The following QA/QC samples shall be used or taken: trip blanks, field blanks, and field duplicates. All QA/QC samples shall be marked with the appropriate description and location and recorded in the field log book.

(a) *Wipe sample QA/QC*: A wipe sample trip blank (also known as a transportation blank) shall be prepared by sealing a moistened sample pad in a bag prior to the sample materials arrival at the MWSF. All materials used for the trip blank shall be from the same source as those used in the field. The trip blank shall accompany the sample materials to the MWSF, and be returned with the completed samples to the laboratory. One wipe sample field blank shall be taken during the phase one sampling following sampling of the fifth node. The field blank shall be taken by preparing a pad for sampling, then bag the sample pad without wiping any surfaces. One wipe sample equipment blank shall be taken following sampling of the twelfth node. A wipe sample field duplicate shall be taken during sampling of the twentieth node. The field duplicate shall be prepared by moving the template 10 cm from the sample location and repeating the sampling procedure.

(b) *Air sample QA/QC*: An air sample trip blank shall be prepared by sealing an unopened sampler sorbent tube in a bag prior to the sample materials arrival at the MWSF. All materials used for

the trip blank shall be from the same source as those used in the field. The trip blank shall accompany the sample materials to the MWSF, and be returned with the completed samples to the laboratory. Two air sample field background samples shall be taken within the MWSF following sampling of the fifth and eighteenth nodes. The field background samples shall be taken by taking an air sample over the applicable node, but at a height of approximately ten feet. No air sample equipment blank will be taken since no decontaminated equipment is used. An air sample field duplicate shall be taken after sampling of the eighth node. The field duplicate shall be prepared by repeating the sampling procedure on the eighth node.

(8) Splitting samples: This sampling procedure does not provide samples which can be split.

(9) Confirmation sampling: If any sampling results indicate contaminants listed in Table 1 of this attachment are present, the phase two sampling procedures shall be implemented to quantify the contamination present.

b. *Phase 2:*

(1) Sampling locations: The floor shall be marked with a grid pattern consisting of four foot grid sizing (see Figure 1-A). The last row and column will be somewhat larger due to the size not being evenly divisible by four. The grid may be marked using tape, string, or markers approved by C/105.2A. Do not use markers, paint, or other materials with solvents or metal particulates which may contaminate sample results. Number the first row nodes one through ten and the first column nodes with the letters A-M. Table 4 of this attachment lists the location of each random sampling node to be used for the MWSF quantification sampling. The point within the node to be sampled is the center of the node. Any suspect areas identified during the phase one visual inspection and any nodes which had sample results above LOD or MML shall also be sampled. Sampling after decontamination shall use the nodes listed in Table 4 of this attachment and any prior phase two sample locations which detected contaminants above the clean closure levels.

(2) Sample labeling and chain of custody: Samples shall be placed in sealed bottles and labeled with an identification label and security seal in accordance with the Shipyard MWMP. A Sample Analysis Report (SAR) or equivalent document shall be completed after each sample is taken to establish the chain of custody documentation. In addition to this, all samples taken will be logged into the field log book.

(3) Installation of sampling devices: The sampling device will be a concrete coring saw (1.5-2.5 inch diameter) attached to a drill. Installation consists of attaching the saw securely to the drill.

(4) Procedures for sample collection and handling: Collect a concrete core sample at each node specified in Table 4 of this attachment and at any suspect areas identified in the field log book. Wear a new pair of disposable latex gloves for all samples. Using the drill and core saw, bore into the concrete floor to a depth of approximately two inches. Remove the core saw. If the core is in the saw, use the chisel to dislodge the sample onto a disposable surface and separate the core into two samples of at least ten grams each. If the core does not remain in the core saw, use the steel chisel to remove the core and split into two samples of at least ten grams each. Place one sample (use large chunks only) into a 120 ml amber coated bottle for volatile organics analysis. Place the second sample in a 500 ml plastic bottle for total metals analysis. Seal each bottle and label as describe above. Place the volatile organics sample in a cooler with ice packs immediately after sampling. Personnel performing or observing sampling operations shall wear safety glasses, respirators and protective clothing.

(5) Personnel and equipment decontamination: Decontamination of personnel is not necessary due to the use of disposable gloves for sampling. The equipment which may be reused are the concrete core saw, the drill and a steel chisel. To decontaminate the concrete core saw and/or chisel, submerge the tool in clean container containing soap (any kind is acceptable) and water. The cleaning water should be very soapy before use. Use a wire or bristle brush to thoroughly clean all surfaces of the tool. Rinse the tool with de-ionized water. Catch rinse water in a collection bucket. Visually inspect the tool. If any residue remains on the tool, repeat the above procedure until no residue is observed. Next, submerge the tool in a solution of 5% nitric acid. Use a clean plastic bucket to contain the acid. Immediately remove tool and rinse with de-ionized water. The drill does not contact the sample and does not require decontamination.

(6) Management of sampling waste: All solid waste generated by sampling (e.g. gloves and cloths) which show visual indications of potential contamination shall be collected in a sealable plastic bag or metal drum. The sampling waste shall be kept in an dangerous waste satellite accumulation area pending receipt of the sample results. If any of the concrete samples analyzed are found to contain hazardous constituents above regulatory levels, the sampling waste shall be managed as dangerous waste. If all sample results from the floor sampling are negative for hazardous constituents, then the sampling waste shall be disposed of as solid waste. Liquid wastes generated as a result of cleaning tools shall be segregated between acid waste and non-acid waste. Dispose of the acid waste in accordance with the Shipyard hazardous waste management plan as dangerous waste. Non-acid liquid waste will be managed similarly to the solid waste as described above.

(7) Quality assurance and quality control (QA/QC) samples: The following QA/QC samples shall be used or taken: trip blanks, field blanks, equipment blanks and field duplicates. All QA/QC samples shall be marked with the appropriate description and location and recorded in the field log book. A trip blank (also known as a transportation blank) shall be prepared by filling one 500 ml plastic bottle and two 40 ml bottles with de-ionized water prior to sample materials arrival at the MWSF. All materials used for the trip blank shall be from the same source as those used in the field. The trip blank shall accompany the sample materials to the MWSF, and be returned with the completed samples to the laboratory. One field blank shall be taken following sampling of the fifth node. The field blank shall be taken by filling one 500 ml plastic bottle and two 40 ml bottles with de-ionized water within the MWSF. One equipment blank shall be taken following sampling of the twelfth node. The equipment blank shall be prepared by pouring de-ionized water over the decontaminated core saw into a 500 ml bottle and two 40 ml bottles immediately following decontamination of the saw. A field duplicate shall be taken during sampling of the eighth node. The field duplicate shall be prepared by separating the core into four samples (minimum 10 grams) instead of two.

(8) Splitting samples: If requested by Ecology in advance, any sample can be split for analysis by Ecology.

(9) Confirmation sampling: If any sampling results indicate contaminants are above the clean closure performance standards of Table 3 of this attachment, the decontamination procedures of this closure plan shall be implemented. Following decontamination, this phase three sampling plan shall be used to determine if the clean closure performance standards have been met. Sample locations used following decontamination will be the applicable post-decontamination sampling nodes in Table 4 of this attachment.

c. *Phase 3:*

(1) Sampling locations: Phase three sampling will use solid and/or liquid samples to determine the concentrations of dangerous constituents in decontamination waste to determine proper management. Waste water from water wash decontamination will be sampled using grab liquid samples taken from each collection bottle. Debris resulting from concrete removal will be grab sampled using four samples from each roll-off box. The samples from the roll-off boxes will be taken near the center of each side if the box is full, or evenly spaced about the debris if the box is partially full. The location of each sample will be recorded in the field log book.

(2) Sample labeling and chain of custody: Samples shall be placed in sealed bottles and labeled with an identification label and security seal in accordance with the Shipyard MMMP. A Sample Analysis Report (SAR) or equivalent document shall be completed after

each sample is taken to establish the chain of custody documentation. In addition to this, all samples taken will be logged into the field log book.

(3) Installation of sampling devices: The sampling devices will be a pump connected to flexible tubing for liquid sampling and a steel scoop for sampling the debris.

(4) Procedures for sample collection and handling: Collect a liquid sample from each bottle of decontamination waste water at a depth of one half of the level below surface. Collect the samples using a suction pump connected to a sampling container with flexible tubing. The sampling container shall be located upstream from the pump such that liquid is drawn into the sampling hose into the sampling container. Use a new sampling container and new sampling tube for each sampling event. Pour samples from the sampling container into two 40 ml glass bottles for organics analysis and a one liter plastic bottle for metals analysis. The wastewater samples shall be evaluated using the Clean Water Act (CWA) and SW-846 methods listed in Table 5 of this attachment. Using a steel scoop, sample the concrete debris at the locations described above. Place a minimum of ten grams of material each in a 120 ml glass bottle for organics analysis and a 500 ml plastic bottle for metals analysis. Seal and label the bottles and place the organics samples in a cooler with ice packs immediately after sampling. The debris samples shall be evaluated using the methods listed in Table 5 of this attachment. Wear a new pair of disposable latex gloves for all samples. Waste disposition shall be in accordance with the decontamination procedure of Attachment 2.

(5) Personnel and equipment decontamination: Decontamination of personnel is not necessary due to the use of disposable gloves for sampling. The equipment which may be reused are the pump, pump tubing and metal scoop. Since the pump and tubing are down stream of the sampler sorbent tube, no decontamination is necessary for these items. To decontaminate the metal scoop, submerge the scoop in clean container containing soap (any kind is acceptable) and water. The cleaning water should be very soapy before use. Use a wire or bristle brush to thoroughly clean all surfaces of the tool. Rinse the tool with de-ionized water. Catch rinse water in a collection bucket. Visually inspect the tool. If any residue remains on the tool, repeat the above procedure until no residue is observed. Next, submerge the tool in a solution of 5% nitric acid. Use a clean plastic bucket to contain the acid. Immediately remove tool and rinse with de-ionized water.

(6) Management of sampling waste: All solid waste generated by sampling (e.g. gloves and cloths) which shows visual indications of potential contamination shall be collected in a sealable plastic bag or metal drum. The sampling waste shall be kept in an dangerous waste satellite accumulation area pending receipt of the sample

results. If any of the liquid or debris samples analyzed are found to contain hazardous constituents above regulatory levels, the sampling waste shall be managed as dangerous waste. If all sample results are negative for hazardous constituents, then the sampling waste shall be disposed of as solid waste. Liquid wastes will be managed similarly to the solid waste as described above.

(7) Quality assurance and quality control (QA/QC) samples: The following QA/QC samples shall be used or taken for phase three: trip blanks and equipment blanks. All QA/QC samples shall be marked with the appropriate description and location and recorded in the field log book. A trip blank (also known as a transportation blank) shall be prepared by filling a one liter plastic bottle and two 40 ml bottles with de-ionized water prior to the sample materials arrival at the MWSF. All materials used for the trip blank shall be from the same source as those used in the field. The trip blank shall accompany the sample materials to the MWSF, and be returned with the completed samples to the laboratory. One equipment blank shall be taken following sampling of the decontamination waste water and the concrete debris. The equipment blanks shall be prepared by drawing de-ionized water up a new tube into a new sample bottle and filling a 500 ml bottle and two 40 ml bottles and by pouring de-ionized water over the scoop into a 500 ml bottle and two 40 ml bottles. A field duplicate shall be taken during sampling of the tenth node.

(8) Splitting samples: If requested by Ecology in advance, any sample can be split for analysis by Ecology.

(9) Confirmation sampling: Not applicable.

7. Analysis of samples and reporting of results:

a. Selection of the laboratory: All samples will be analyzed by the PSNS Chemistry Laboratory. The PSNS Analytical lab is accredited by the State of Washington under WAC 173-50 (LAN number F001) and by the American Association of Laboratory Accreditation.

b. Identification of sampling and analysis parameters: Two parameters are of interest, total metals and volatile organics. The following chemical constituents will be evaluated by sampling and analysis: lead; chromium; cadmium; barium; copper; selenium; acetone; methanol; methyl ethyl ketone; methylene chloride (dichloromethane); toluene; and n-butyl alcohol (butanol-n). The selection of these parameters is based on the regulated constituents of all the waste stored in the MWSF over it's active life.

c. Properties of waste: Wastes to be sampled are those that may result from decontamination. These consist of two types, waste water from washing the floor and/or equipment and concrete debris from surface removal.

d. Analytical techniques and procedures: Phase one sampling will use the NIOSH procedures listed in Table 1 of this attachment. Phase two and three sampling will use SW-846 methods as listed in Table 3 of this attachment.

e. Detection or quantitation limits: The detection limits for phase one sampling are given in Table 1 of this attachment. The practical quantitation levels for phase two and three sampling are listed in Tables 3 and 5 of this attachment.

f. Laboratory QA/QC: All laboratory QA/QC will be in accordance with the PSNS Laboratory Division Quality Control Manual. For Phase 1 Volatile Organics, one set of desorption efficiency samples and one set of media blanks shall be analyzed for each analyte and each lot of sampling tubes.

g. Data reporting: All data and analysis reports will be reviewed and signed by the PSNS Laboratory Division. Copies of all reports will be sent to the Radioactive Engineering Division for inclusion in the field log book and final closure certification report and the Shipyard history files.

Table 1
Phase one Sampling Parameters

Constituent	Sample Method	NIOSH Method	LOD/MML
Lead	Wipe	9100	2 µg /100 cm ²
Chromium	Wipe	9100	2 µg /100 cm ²
Cadmium	Wipe	9100	2 µg /100 cm ²
Barium	Wipe	9100	2 µg /100 cm ²
Copper	Wipe	9100	2 µg /100 cm ²
Mercury	Wipe (dedicated)	9100	2 µg /100 cm ²
Silver	Wipe	9100	2 µg /100 cm ²
Acetone	Air (3L)	1300	9 ppm
Methanol	Air (3L)	2000	25 ppm
Methyl Ethyl Ketone	Air (3L)	2500	17 ppm
Methylene Chloride	Air (2.5L)	1005	4 ppm
Toluene	Air (3L)	1500	100 ppm
n-Butyl Alcohol	Air (3L)	1401	165 ppm

Table 2
MWSF Phase One Random Sample Nodes

#	NODE
1	A-2
2	A-6
3	A-7
4	B-7
5	C-4
6	C-10
7	E-2
8	F-1
9	G-1
10	G-3
11	G-7
12	G-9
13	H-1
14	H-3
15	H-4
16	I-1
17	I-9
18	J-5
19	J-9
20	J-10
21	L-1
22	L-5
23	L-7
24	M-4
25	M-10
26	SUMP

Table 3
Phase Two Clean Closure Requirements

Constituent	Clean Closure Level (a)	SW-846 Method	Required PQL(f)	Known Toxic Effects [Hazard Quotient](d)
Lead (CAS 7439-92-1)	250 mg/kg (a)	3050A 6010	20 mg/kg	neurotoxicity
Chromium (CAS 18540-29-9)	400 mg/kg (b)	3050A 6010	20 mg/kg	None Listed
Cadmium (CAS 7440-43-9a)	80 mg/kg	3050A 6010	20 mg/kg	None Listed
Barium (CAS 7440-39-3)	5.6×10^3 mg/kg	3050A 6010	20 mg/kg	cardiovascular toxicity
Copper (CAS 7440-50-8)	2.96×10^3 mg/kg	3050A 6010	20 mg/kg	gastrointestinal toxicity
Selenium (CAS 7782-49-2)	4.0×10^2 mg/kg	3050A 6010	20 mg/kg	Clinical Selenosis
Acetone (CAS 67-64-1)	8.0×10^3 mg/kg	8260B	250 mg/kg	nephrotoxicity, hepatotoxicity
Mercury (CAS 7439-97-6)	24 mg/kg	7471	0.2 mg/kg	Neurotoxicity, nephrotoxicity
Silver (CAS 7440-22-4)	400 mg/kg	3050A 6010	20 mg/kg	skin
Methanol (CAS 67-56-1)	4.0×10^4 mg/kg	NIOSH 2000 (e)	500 mg/kg	hemotoxicity, neurotoxicity
Methyl Ethyl Ketone (2-Butanone) (CAS 78-93-3)	4.8×10^4 mg/kg	8260B	250 mg/kg	developmental toxicity
Methylene Chloride (Dichloromethane) (CAS 75-09-2)	133 mg/kg (c) 4.80×10^3 mg/kg	8260B	10 mg/kg	hepatotoxicity
Toluene (CAS 108-88-3)	1.6×10^4 mg/kg	8260B	250 mg/kg	Hepatotoxicity, nephrotoxicity
n-Butyl Alcohol (butanol-n) (CAS 71-36-3)	8.0×10^3 mg/kg	8260B	250 mg/kg	hemotoxicity

- Notes:
- (a) Based on MICA Method A value
 - (b) Hexavalent chromium level
 - (c) Carcinogenic (cancer) clean closure level
 - (d) Based on Ecology's CLARC II (Feb 96) cleanup level database
 - (e) An SW-846 procedure cannot be directly applied to methanol, therefore a modification of NIOSH Procedure 2000 will be used.
 - (f) Practical Quantitative Limit for laboratory analysis use

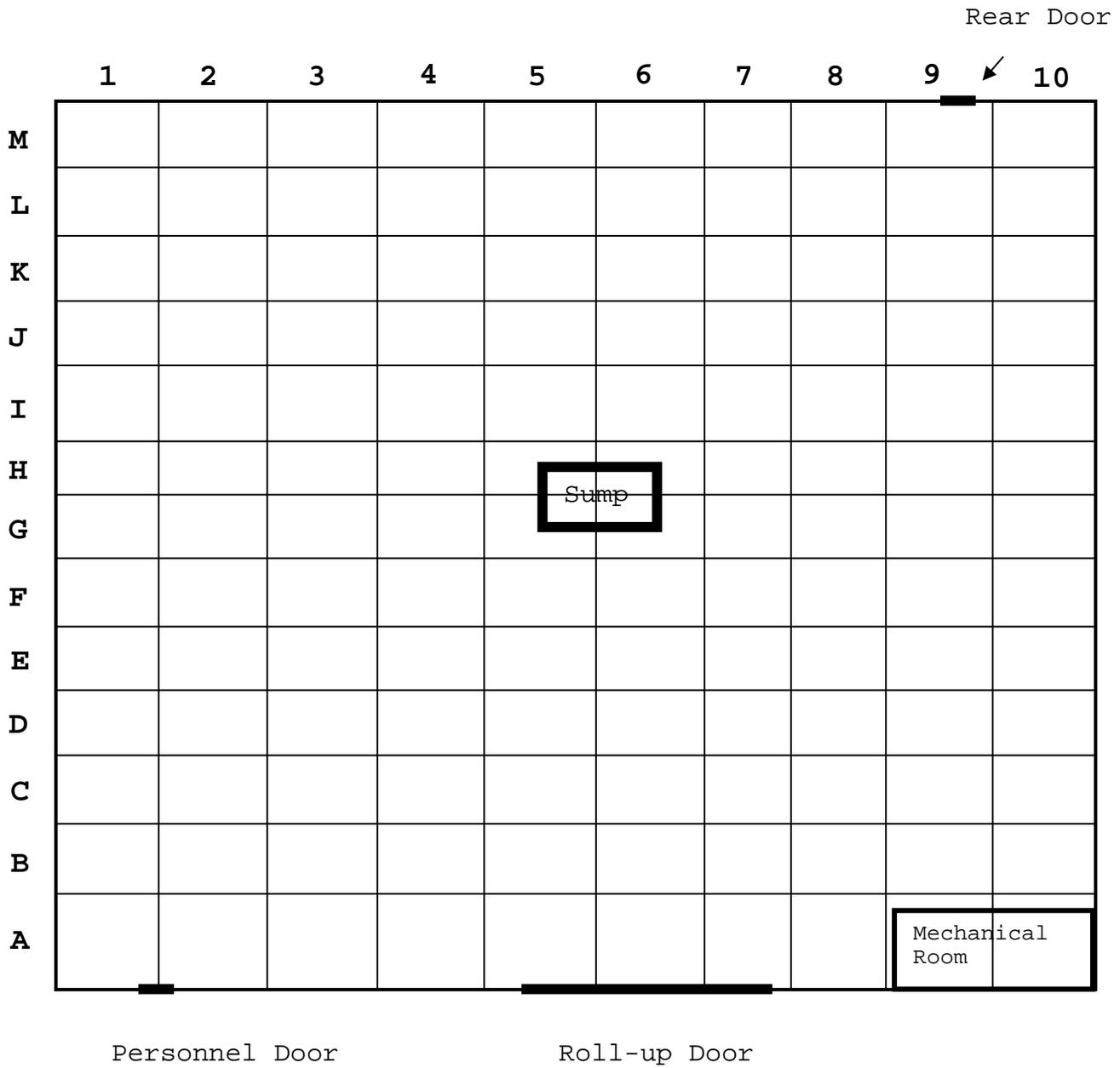
Table 4
MWSF Phase Two & Three Random Sample Nodes

#	Quantification Sample Nodes	After Wash Decontamination	After Concrete Removal
1	A-1	A-4	A-1
2	A-2	B-2	A-7
3	A-7	B-5	B-1
4	B-4	B-7	B-3
5	C-5	C-1	B-4
6	C-6	C-4	B-6
7	D-1	D-6	C-1
8	D-9	D-8	C-7
9	D-10	E-2	D-2
10	E-2	E-5	D-8
11	F-1	E-10	E-6
12	F-8	F-2	E-8
13	G-8	F-3	E-10
14	G-9	F-8	F-1
15	H-5	G-8	F-10
16	I-2	G-9	G-2
17	I-6	H-5	I-4
18	I-10	H-8	I-5
19	J-1	I-5	J-3
20	J-7	I-10	K-1
21	J-8	J-4	L-1
22	K-1	J-6	L-4
23	M-2	K-8	L-6
24	M-6	L-8	L-7
25	M-8	M-2	M-9

Table 5
Phase Three Debris and Waste Water Sample Requirements

Constituent	Debris (SW-846 Method)	Waste Water		PQL	
		SW-846	CWA Method	SW-846	CWA
Lead	1311, 3015B, 6010	3010A, 6010	200.7	5 mg/L	0.2 mg/L
Chromium	1311, 3015B, 6010	3010A, 6010	200.7	5 mg/L	0.1 mg/L
Cadmium	1311, 3015B, 6010	3010A, 6010	200.7	1 mg/L	0.1 mg/L
Barium	1311, 3015B, 6010	3010A, 6010	200.7	100 mg/L	0.1 mg/L
Copper	NA	NA	200.7	NA	0.1 mg/L
Acetone	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA
Methyl Ethyl Ketone (2-Butanone)	1311, 8260B	8260B	NA	100 mg/L	NA
Methylene Chloride	NA	NA	624	NA	5 mg/L
Toluene	NA	NA	624	NA	5 mg/L
n-Butyl Alcohol (butanol-n)	NA	NA	NA	NA	NA
Oil & Grease	NA	NA	413.1	NA	5 mg/L
PCB's	NA	NA	608	NA	1 µg/L
Selenium	1311, 3015B, 6010	3010A, 6010	200.7	1 mg/L	0.2 mg/L
Mercury	1311, 7470	7470	245.1	0.2 mg/L	0.1 mg/L
Silver	1311, 3015B, 6010	7760	200.7	5 mg/L	0.1 mg/L
PH	9045	9040	150.1	NA	NA

Figure 1-1
MWSF Floor Sampling Grid



not to scale