ADEQ Arizona Department of Environmental Quality
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azdeq.gov

FACT SHEET

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Shredder Residue Sampling

Shredder residue determined to be hazardous waste shall be managed in accordance with A.R.S. § 49-921 et seq. and R18-8-260 et seq.

Definitions

Shredder Residue:
Waste from the shredding of motor vehicles.

Motor Vehicle:
Any automobile, motor cycle, truck, trailer, semitrailer, truck tractor and semitrailer combination or other vehicle operated on the roads of Arizona used to transport persons or property and propelled by power other than muscular power. Motor vehicle does not include traction engine, vehicles that run only on a track, bicycles or mopeds.

Choosing a Sampling Protocol:

Sampling requirements for shredder residue are contained in A.A.C. R18-13-1307. Sampling collection must be done using one of the two collection procedures established in the A.A.C. or by submitting an alternative sampling plan to ADEQ for review and approval. The plan must be submitted at least two weeks prior to the sampling event and must be consistent with "Test Methods for Evaluating Solid Waste" (EPA SW-846, 3rd addition, Volume II, Chapter Nine).

Sampling Procedures

Sampling procedures 1 and 2 described in the A.A.C. R18-13-1307 are depicted in the Flow Diagrams 1 and 2. These diagrams should be used in conjunction with the special waste rules to ensure that sampling is conducted properly. The diagrams are intended to provide a visual representation of the sampling process to better assist you with understanding each of the sampling procedures. They are not intended to be used as a replacement for sampling procedures described in the special waste rules.

The samples shall be analyzed for the constituents and at the frequencies listed in Table 1.

Sample Procedure 1

The generator collects samples from a shredder residue sampling pile, which consists of the average amount of shredder residue from eight hours of operation of the shredder.

The shredder residue sampling pile is formed into a square shape for sampling processes. One 2,000 gram sample is collected from each sample point as indicated in Attachment B. The seven 2,000 gram samples are numbered consecutively. Three of the seven samples are chosen at random by selecting numbers from a calculator programed to generate random numbers and are analyzed for the constituents and at frequencies listed in Table 1.

- Samples from sample points A-1, B-1, and C-1 are collected from the top of the pile.
- Samples from sample point A-2, B-2, and C-2 are collected from the base of the pile.
- Sample from sample point C-3 is collected from the vertical midpoint at the center of the pile.

See Flow Diagram 1

Sample Procedure 2

Step 1: The generator collects seven 2,000 gram samples during or immediately following the normal generation of shredder residue. For each sample, shredder residue is collected for 8 to 12 minutes, during which a minimum of 500 pounds is generated. This process is preformed seven times to create seven 500 pound amounts. Each 500 pound amount is formed into a square shape for sampling purposes. Refer to Attachment B.

Step two: Twenty 100 gram samples are collected from throughout each of the seven 500 pound piles generated. Upon completion of collection, all 20 samples from each of the seven piles are combined together into seven separate 2,000 gram samples and numbered consecutively. Three of the seven 2,000 gram samples are chosen at random by selecting numbers from a calculator programed to generate random numbers and are analyzed for the constituents and at frequencies listed in Table 1.

See Flow Diagram 2

Additional sampling requirements for Sample Procedure 1 and Procedure 2 (Attachment A)

1. Each 2,000 grams of shredder residue collected will include both small and large partials, in proportion to shredder residue generated. The generator will use a container large enough to hold the entire amount of shredder residue collected from each sample point.
2. Requirements for sample preservation, temperature, and holding time must be followed, as set forth in "Test Methods for Evaluating Solid Waste" (EPA SW-846, 3rd addition, Volume II, Chapter Nine).
3. Each one of the three randomly selected 2,000 gram samples are divided into four equal 500 gram portions and 200 gram samples are taken from each. Each subsample is passed through a 9.5 mm screen. All particles that do not pass through the screen are hand cut until they are small enough to pass through the screen. All four 200 gram samples are then mixed together and re-divided into four equal 200 gram portions (Attachment A). The following amounts are taken for constituent sampling:
   a. 10-15 grams per 200 gram subsample for a total of 40-60 grams per 2,000 gram sample for Polychlorinated Biphenyls (PCB) analysis per number 9 below.
   b. 25 grams per 200 gram subsample for a total of 100 grams per sample for toxicity characteristic leaching procedure extractions for contaminants per 40 CFR 261.24, Table 2 (incorporated by reference in R18-8-261(A)), per number 6 below.
   c. 1.25 grams per 200 gram subsample for a total of 5 grams per 2,000 gram sample for extraction fluid determination.
4. Each constituent sample is put into a container. Container labeling and chain-of-custody documentation must be consistent with the requirements in "Test Methods for Evaluating Solid Waste" (EPA SW-846, 3rd addition, Volume II, Chapter Nine).
5. Analysis must be conducted by a laboratory licensed by the Arizona Department of Health Services (ADHS).
6. Of the three randomly selected samples, one sample per number 3(b) must be analyzed for the extractable heavy metals, arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver in 40 CFR 261.24 (Table 2).The remaining two samples must be analyzed for extractable cadmium and lead.
7. If the results of all three of the analyses for any extractable heavy metal in number 3 are below the Regulatory Level of the Maximum Concentration of Contaminants for the Toxicity Characteristic in 40 CFR 261.24 (Table 2), the simple arithmetic mean of the extractable cadmium and lead and the single analysis for the remaining six extractable heavy metals must be used to determine if the sampled shredder residue will be classified as a hazardous waste.
8. If any of the analyses of any one of the three selected samples exceeds the regulatory level established in 40 CFR 261.24, Table 2, the remaining four of the original seven samples must be analyzed for those extractable heavy metals which exceed the regulatory level in 40 CFR 261.24 (Table 2). The simple arithmetic mean of the results of all seven samples must be used to determine if the sampled shredder residue will be classified as hazardous waste.
9. The three randomly selected samples must be analyzed for PCBs per number 3(a). If the samples contain concentrations of PCB less than 50mg/kg, the simple arithmetic mean of the three samples must be used for reporting to ADEQ. If any one of the three samples contains concentrations of PCB greater than 50 mg/kg, an additional subsample from the sample in question must be subjected to confirmation analysis. If the PCB concentration for that sample exceeds 50 mg/kg, the remaining four of the seven samples must be analyzed for PCB per number 3(a). The simple arithmetic mean of all the samples must be used to determine if the sampled shredder residue will be classified as hazardous waste.

Contact information

For questions, please contact the Solid Waste Unit at 602-771-4673.

Table 1. Target Analyses and Sampling Frequency

Constituents	Frequency
TCLP* Metals	Quarterly
TCLP Volatiles	Annually
TCLP Semi-volatiles	Annually
Polychlorinated Biphenyls (PCB)	Quarterly

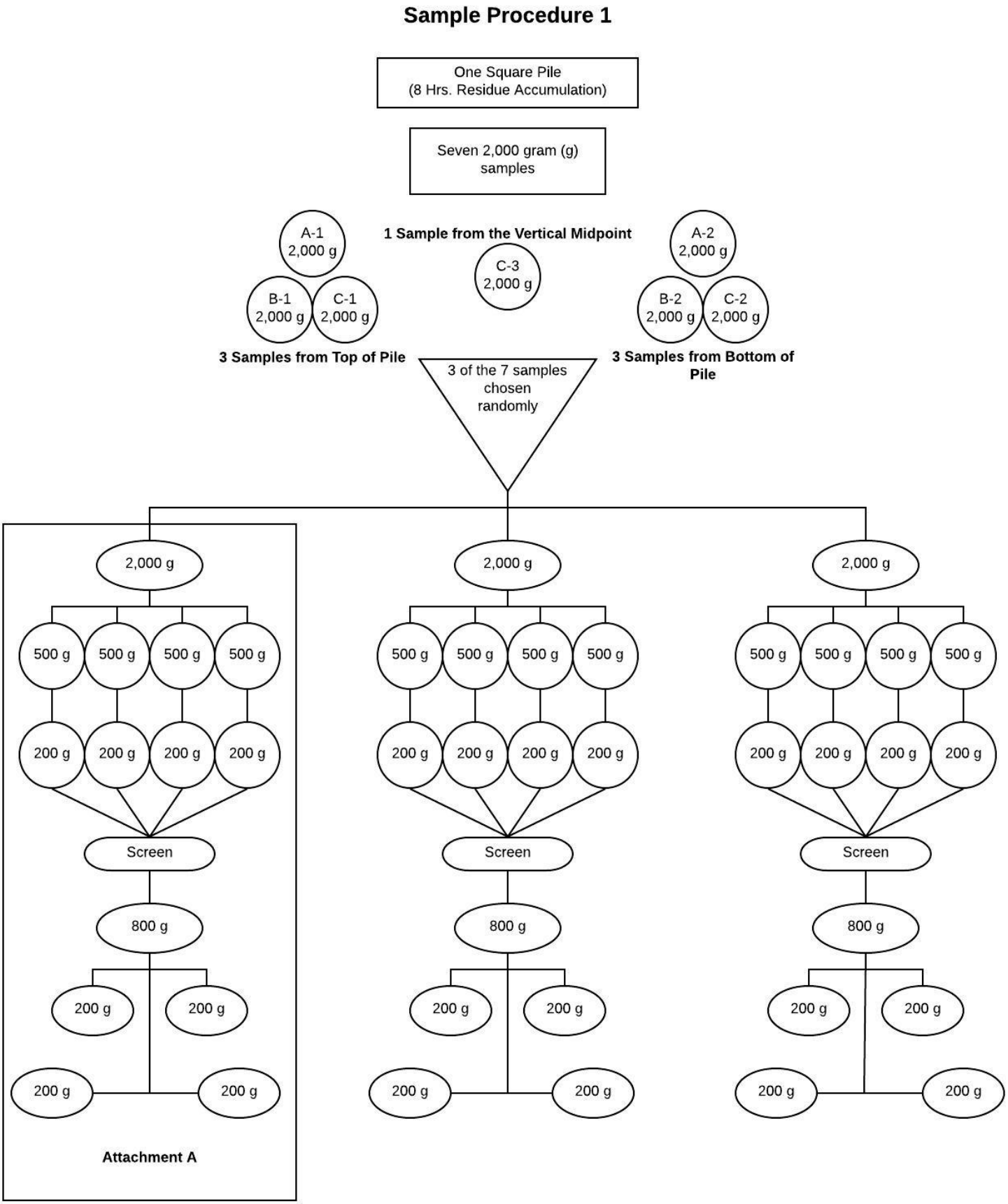
**Toxicity Characteristic Leaching Procedure*

Table 2: Maximum Concentrations of Contaminants for the Toxicity Characteristic in 40 CFR 261.24

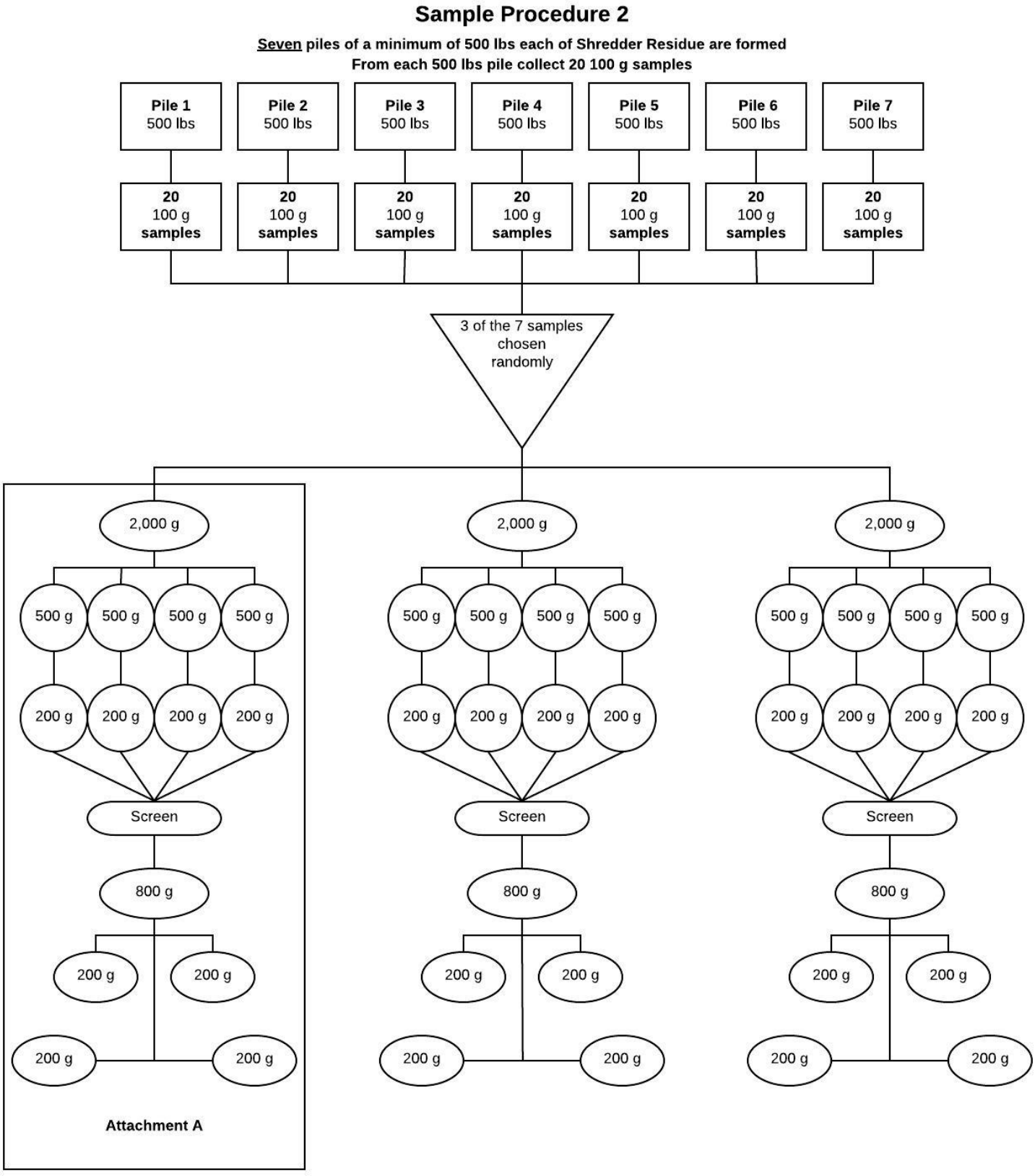
EPA HW No.[1]	Contaminant	CAS No.[2]	Regulatory Level (mg/L)
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100.0
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-66-3	6.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-48-7	[4]200.0
D024	m-Cresol	108-39-4	[4]200.0
D025	p-Cresol	106-44-5	[4]200.0
D026	Cresol		[4]200.0
D016	2,4-D	94-75-7	10.0
D027	1,4-Dichlorobenzene	106-46-7	7.5
D028	1,2-Dichloroethane	107-06-2	0.5
D029	1,1-Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrotoluene	121-14-2	[3]0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide).	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	[3]0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentrachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1	[3]5.0
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D015	Toxaphene	8001-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	95-95-4	400.0
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2

[1] Hazardous waste number.
[2] Chemical abstracts service number.
[3] Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.
[4] If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/l.

Flow Diagram 1

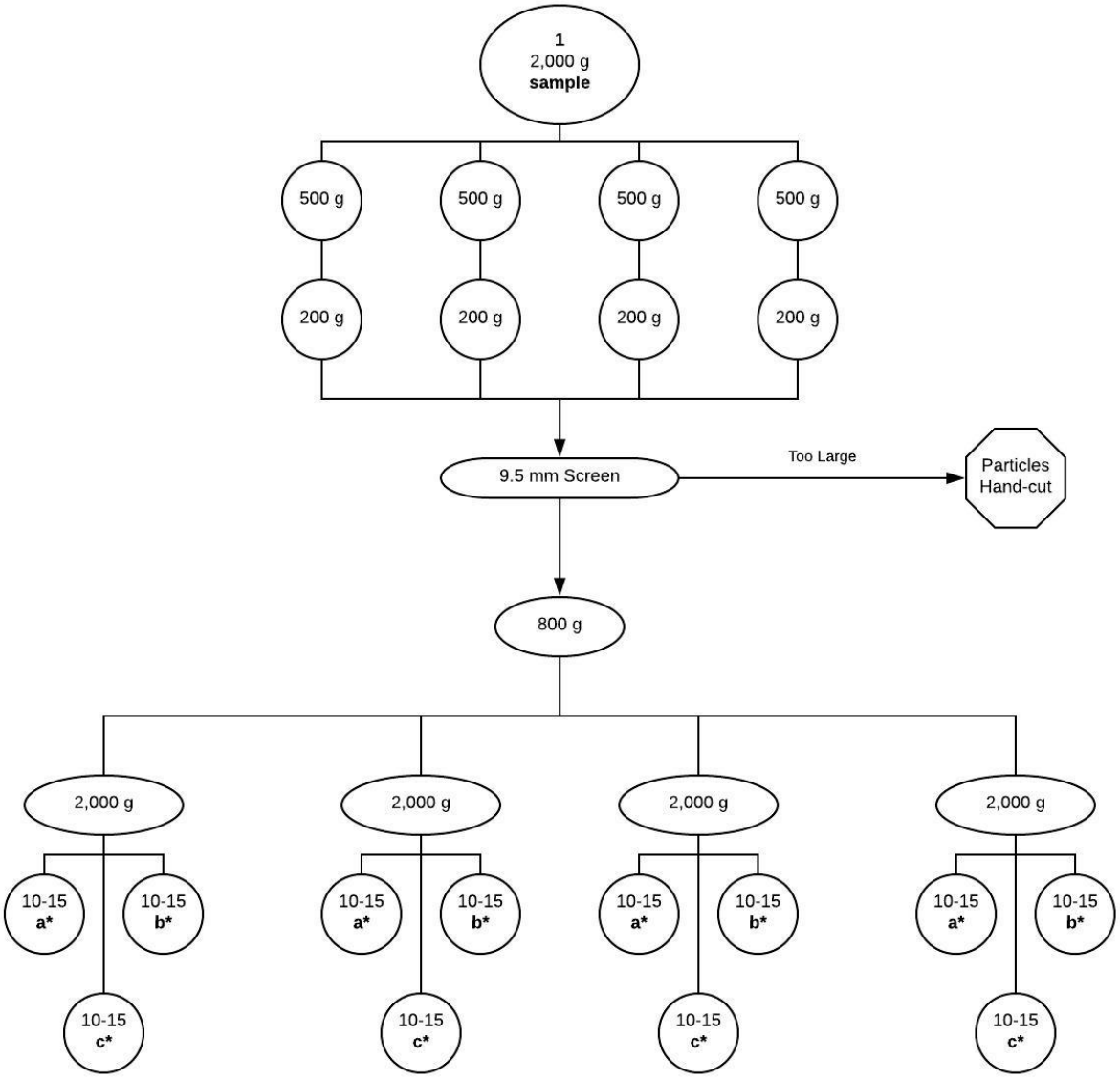


Flow Diagram 2



Attachment A

Note: **Attachement A** represents <u>one</u> of three 2,000 g samples.
Therefore, sampling and analysis procedures below must be conducted a totla of <u>3</u> times.



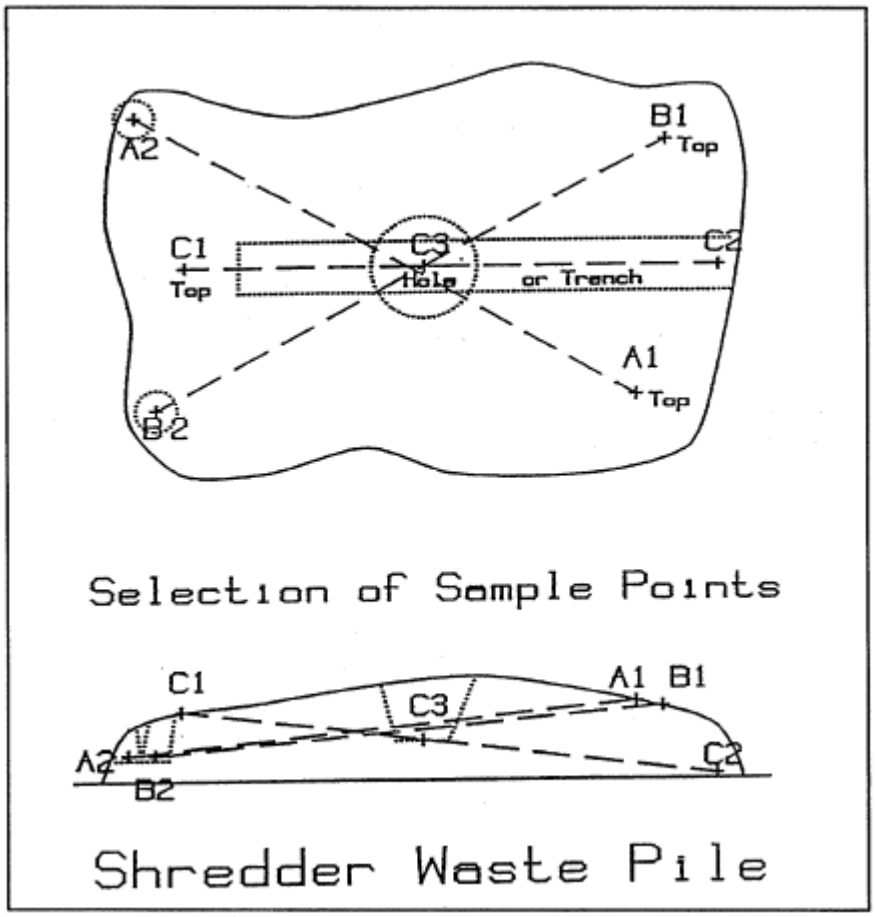
a* - PCB analysis: All four 10-15 g samples from each 2,000 g sample will be analyzed for PCBs

b* - TCLP analysis for constituents of 40 CFR 261.24, Table 1 (Metals, Volatiles, Semivolatiles)
<u>Volatiles & Semivolatiles:</u> <u>All four</u> 25 g samples <u>from each</u> 2,000 g samples will be analyzed for these constituents

<u>Metals Analysis</u>: Of the three 2,000 g samples selected at random:
1) Analyze <u>one</u> 2,000 g sample for arsenic, barium, cadmium, chromium, lead, mercuty, selemium and silver
**That means four 25 g samples will be collected from <u>one of the</u> 2,000 g samples
2) Analyze the remaining <u>two</u> 2,000 g samples for extractable cadmium and lead
**That means <u>four</u> 25 g samples from each of the <u>remaining two</u> 2,000g samples for total of eight 25 g samples

c* - Extraction Fluid Determination

Attachment B: Selection of Sample Points, Shredder Waste Pile



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