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PROPOSED MANAGEMENT OF LABORATORY GENERATED HAZARDOUS WASTE IN CENTRALIZED SATELLITE ACCUMULATION AREA

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LETTER

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Mr. Paul D. Pardi
Hazardous Waste Group Leader
Ohio Environmental Protection Agency
Southwest District Office
40 South Main Street
Dayton, OH 45402-2086

Dear Mr. Pardi:

PROPOSED MANAGEMENT OF LABORATORY GENERATED HAZARDOUS WASTE IN CENTRALIZED SATELLITE ACCUMULATION AREAS

The purpose of this letter is to inform you of our proposed policy for the management of satellite accumulation areas (SAAs) in an environmental laboratory. Guidance for the management of SAAs in industrial processes and research laboratories is provided in 49 FR 49568. However, clear guidance for application to environmental analytical laboratory operations has not yet been provided.

The Fernald Environmental Management Project (FEMP) is proposing to establish SAAs for four different wastestreams generated in its Analytical Laboratory Building (Building 15). The proposed location for the SAAs is the Laboratory Flammable Storage Facility (Building 15B), located directly behind Building 15. The laboratory performs a variety of analytical techniques on environmental samples for the purpose of waste characterization. The analytical techniques use a variety of solvents that are dependent on the contaminant(s) of interest. Many solvents used in the laboratory are compatible due to similarities in characteristics and health and safety hazards. Therefore, the FEMP is proposing to accumulate compatible solvents of similar characteristics in SAAs for a more efficient hazardous waste management practice.

This approach will use individual small 1- to 2-gallon transfer containers, each labeled with its spent solvent content and managed within the hood space of lab areas where solvent wastes are generated. Containers for solids (e.g., resins, kimwipes, filter paper) would not be placed within hoods but in appropriate locations where hazardous solid waste is generated. After the first shift of each working day, designated employees, trained in hazardous material management procedures, will collect the containers and take them to the centralized SAAs for accumulation of their contents in the appropriate 55-gallon drum. This will hereinafter be described as daily collection. Within Building 15B, four separate SAAs of one 55-gallon drum each will be established to accumulate the spent solvents into the wastestreams identified

established to accumulate the spent solvents into the wastestreams identified below:

1) solids (resins, kimwipes, filter paper)

2) nitric acid/cyclohexane mixture

3) halogenated solvents (methylene chloride, chloroform, methanol/chloroform mixture, freon-113, etc.)

4) non-halogenated solvents (methanol, xylene, acetone, methanol/cyclohexane mixture, etc.)

The Laboratory Flammable Storage Facility, Building 15B, located directly behind the Laboratory Building (Building 15), has been designated as the location for the laboratory SAAs because the building was specifically designed to store solvents. In addition, the air system for Building 15B is separate from the air system used for the rest of the laboratory facility, thereby reducing the risk of worker exposure and cross-contamination to other laboratory areas.

Each accumulation drum will be labeled with its contents (e.g., halogenated solvents, non-halogenated solvents), rather than the generic "Hazardous Waste", serving as an additional quality control measure to ensure the waste materials are being transferred to the appropriate SAA. Each drum also will be properly marked with labels identifying the hazards (e.g., flammable labels, corrosive labels, etc.) associated with its contents.

Additional information on this approach, including a brief regulatory analysis, which also addresses safety and administrative measures, are presented in the enclosed briefing paper.

This letter is for your information. We intend to implement this policy within 30 days of the date of this letter, unless we receive objections or questions regarding this policy from you or your staff. If you or your staff have any objections or questions on this matter, please contact Wally Quaider of my staff at 513-648-3137.

Sincerely,

for Raymond J. Hansen
Acting Manager

FN:Skintik

Enclosure: As Stated

cc:

K. L. Alkema, FERMCO/65
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RCRA Operating Record Coordinator

bcc:

~~W. J. Quaider, DOE-FN~~
D. Rast, DOE-FN

ATTACHMENT

BRIEFING PAPER ON MANAGEMENT OF HAZARDOUS WASTE GENERATED AT THE FEMP ANALYTICAL LABORATORY

CURRENT SITUATION

The FEMP laboratory currently generates the following spent solvent wastes: acetone, xylene, chloroform, methanol/cyclohexane mixture, methanol/chloroform mixture, and nitric acid/cyclohexane mixture. In addition, hexane, methylene chloride, petroleum ether, and freon-113 will be generated once the semivolatile organic extraction lab is in operation. Table 1 provides an overview of the types of solvents commonly used in the laboratory and the areas of the laboratory in which they are used. All of these solvents are non-acutely hazardous. Table 2 provides LDR treatment requirements for these spent solvents.

The current sitewide practice is to have a separate container for each type of spent solvent generated and to establish SAAs in each individual area where the waste is being generated. If this were applied to the laboratory, at least 11 individual SAAs could be established in the laboratory. This is a conservative number because more than one laboratory area may generate the same spent solvent waste. Establishing multiple SAAs in the laboratory building (Building 15) creates health and safety problems, potential sample contamination, and adequate space issues.

Currently, spent solvent wastes are collected in safety cans that are placed in flammable storage cabinets within the laboratory areas. This practice conflicts with the intent of the OSHA housekeeping provisions for flammable wastes and residues in the employee emergency plan and fire prevention plan implemented pursuant to 29 CFR 1910.38. In addition, flammable storage cabinets are not vented to keep oxygen from getting in to fuel a fire and to keep flames from escaping and spreading the fire. Since the cabinets are not vented, vapors can collect in the cabinet and become a possible health hazard to laboratory personnel opening the cabinet.

The vapors also pose a problem during analyses for organic contaminants. Most organic analyses rely on detection limits in the part per billion range. Since the whole laboratory building (Building 15) operates on the same air system, vapors collecting in one area will eventually find their way to another laboratory. Laboratory solvents such as acetone, methylene chloride, and toluene are typically detected in analytical blanks used for volatile organic analysis. By allowing vapors to accumulate without proper ventilation, the possibility of contaminant concentrations in blanks exceeding allowable levels increases,

resulting in increased costs due to reanalysis of the affected samples or in extreme cases resampling.

RECOMMENDED LABORATORY SAA APPROACH

Centralization of the laboratory SAAs in Building 15B is consistent with OSHA requirements for handling flammable and combustible material. The requirements for employee emergency plans and fire prevention planning under 29 CFR 1910.38(b)(3) state "The employer shall control accumulation of flammable and combustible waste materials and residues so that they do not contribute to a fire emergency. The housekeeping procedures shall be included in the fire prevention plan." Furthermore, the proposal is consistent with the OSHA standards applicable to processing plants which contain chemical operations. 29 CFR 1910.106(h)(8)(iii) for waste and residues states "Combustible wastes material and residues in a building or operating area shall be kept to a minimum, stored in closed metal waste cans, and disposed of daily."

40 CFR 262.34(c)(1) and OAC 3745-52-34(c)(1) allow a generator to accumulate up to 55 gallons of non-acutely hazardous waste, or 1 quart of acutely hazardous waste, in containers at a satellite accumulation area (SAA). To qualify for this, a generator must mark the containers with the words "hazardous waste" or with words that identify the contents of the container. In addition, the containers must be in good condition (i.e., no leaks, dents, rust, etc.), the container must be compatible with its contents, and the container must be closed unless wastes are being added. Finally, the area must be under the control of the operator of the process generating the waste (e.g., the Laboratory Manager).

The preamble to the SAA ruling (49 FR 49568) states the "rule is intended to allow accumulations [sic] to set a limit that can be safely accumulated and removed, thus alleviating more frequent movement of smaller quantities of hazardous waste within the generator's facility." In addition, the "USEPA believes that the accumulation of <u>up to 55 gallons of non-acutely hazardous waste</u> [emphasis added] is reasonable and safe and does not pose a threat to human health or the environment."

The recommended approach is to use individual small 1- to 2-gallon transfer containers, each labeled with its spent solvent content and managed in the hood space of lab areas where solvent wastes are generated. Containers for solids (e.g., resins, kimwipes, filter paper) would not be placed in hoods but in appropriate locations in areas where hazardous solid waste is generated. After the first shift of each working day, designated employees, trained in hazardous material management procedures, would collect the containers and take them to the centralized SAAs for accumulation of their contents in the appropriate 55-gallon drum. This will hereinafter be described as daily collection. Within Building 15B, four separate SAAs of one 55-gallon drum each would be established

to accumulate the spent solvents into the waste streams identified below:

1) solids (resins, kimwipes, filter paper)

2) nitric acid/cyclohexane mixture

3) halogenated solvents (methylene chloride, chloroform, methanol/chloroform mixture, freon-113, etc.)

4) non-halogenated solvents (methanol, xylene, acetone, methanol/cyclohexane mixture, etc.)

The Laboratory Flammable Storage Facility, Building 15B, located directly behind the Laboratory Building (Building 15), has been designated as the location for the laboratory SAAs because the building was specifically designed to store solvents: solvent storage and handling within the building are in compliance with National Fire Protection Association (NFPA) 30, Flammable/Combustible Liquids Code; its electrical systems are per NFPA 70, the National Electrical Code for classified electrical locations; its separation from other facilities (e.g., Building 15) is per NFPA 80A, Protection of Buildings from Exterior Fire Exposures; its air system is separate from the air system used for the rest of the laboratory facility, thereby reducing the risk of worker exposure and cross-contamination to other laboratory areas; and it is provided with explosive venting through the roof of the facility.

To ensure a safe working environment is maintained, the following safety measures will be implemented:

1) Establish and identify SAAs per Figure 1 (ref. SSOP-0035, "Accumulating Hazardous Waste in Satellite Accumulation Areas and Interim Containers"). This will act to segregate SAAs from other storage activities in Building 15B.

2) Segregate the four SAAs to ensure the four wastestreams are not commingled and do not pose an environmental safety or health hazard to authorized personnel entering the area.

3) Place secondary containment (e.g., SAA tubs or spill accumulation containers) around each individual drum to contain any spills/leaks and reduce the possibility of mixing different wastestreams. Secondary containment also would act as a physical barrier between SAAs again preventing the four wastestreams from being commingled.

4) Implement appropriate mechanisms to reduce the risk of

sparks and igniting flammable solvents during the transfer of transfer container contents to the drums (e.g., non-sparking tools and implements, grounding the drums, etc.).

5) Place splash guards on containers or drums for liquids to reduce the risk of splashing and spills when transferring liquid waste from transfer container to drum.

Each accumulation drum will be labeled with its contents (e.g., halogenated solvents, non-halogenated solvents), rather than the generic "hazardous waste", thus serving as an additional quality control measure to ensure the waste materials are being transported to the appropriate SAA. Each drum also will be properly marked with labels identifying the hazards (e.g., flammable labels, corrosive labels, etc.) associated with its contents.

In addition to the safety measures, the following administrative procedures will be implemented under this approach:

1) Consistent with 29 CFR 1910.38, include the SAAs in the laboratory's contingency plan (SOP 9114, "Laboratory Emergency Procedure").

2) Revise existing analytical laboratory operating procedure (ANL-01-0053) for managing SAAs to incorporate proposed management procedures.

3) Document waste removal from the SAAs including quantity of waste removed.

RATIONALE FOR RECOMMENDED APPROACH

The recommended approach is intended to increase lab worker health and safety and to maintain the purity of laboratory samples and analyses. It is consistent with the OSHA standards applicable to safe handling and management of flammable and combustible material [29 CFR 1910.38(b)(3) and 1910.106(h)(8)(iii)] and NFPA requirements for flammable/combustible liquids storage. As proposed, the wastes will be maintained in metal safety cans (transfer containers) with daily transfer of laboratory spent solvent waste for accumulation in the centralized SAAs. Although this will involve daily transfer of materials, the minimization of flammable and toxic waste solvents in occupied areas and additional control provided by the daily overview of the centralized SAAs will increase protection of human health and the environment.

In addition, daily transfer of hazardous waste solvents out of the main laboratory building (Building 15) reduces the risk of analytical results being compromised by the volatilization of the accumulated solvent waste. The placement of the small transfer containers within the hoods provides for ventilation of vapors that

might otherwise pose a health risk to laboratory personnel or contaminate analyses.

Furthermore, any potential spills from small containers within the hood will be easier to manage and pose less of a threat to human health and the environment. Laboratory hoods are typically constructed to prevent leaks out of the hood space and onto the floor. Vapors coming off the spill would be vented up the hood rather than through the laboratory area.

The use of centralized SAAs for the laboratory building would be more practicable than having large containers, including 5-10 gallon containers currently used, in each laboratory area. Daily movement of small quantities of spent solvent waste to centralized SAAs would remove hazards from the individual laboratory areas. Therefore, exposure risk to laboratory personnel and contamination risk to samples would be reduced by accumulating the waste in a sparsely populated section of the laboratory facility which has been designed specifically to deal with solvents.

Laboratories have been recognized as presenting a unique challenge. See 48 FR 118 (Section III, Laboratory Wastes). Both the small containers and the 55-gallon drums would be under the security and control of the Laboratory Manager, and under further control of designated laboratory personnel knowledgeable in the analytical techniques generating the waste, as well as hazards associated with each individual solvent. Only authorized laboratory personnel would be given access to Building 15B. This approach is not inconsistent with the rules regarding SAAs which allows non-acutely hazardous wastes to be accumulated in 55-gallon drums at or near the point of generation.

The mixing of like solvents, such as non-halogenated solvents or halogenated solvents, would not be performed for the purpose of treatment by dilution. They are being mixed solely for space efficiency. The solvents of major concern will be in percent levels -- e.g., 20% methanol (11 gallons), 20% toluene (11 gallons), 60% acetone (33 gallons). In addition, the solvents as mixed would not pose a compatibility problem, since the solvents are designated for accumulation based upon their similar physical and chemical properties and LDR treatment requirements (see Table 2).

The current practice of having 11 or more 5-gallon SAAs in the laboratory areas, transferring them to the 90-day storage area in the laboratory, and finally transporting them to RCRA storage, provides only minimal protection to human health and the environment. Due to the management of flammable and toxic wastes volumes in individual laboratory areas, if viewed in the most pessimistic sense, the current approach may even increase potential fire hazards in occupied areas, increase potential for exposure, increase impact of potential spills, and jeopardize the analyses

designed to provide data necessary to protect human health and the environment. For these reasons, it is recommended that the practice of having SAAs in each individual laboratory area be discontinued.

Although the current practice is fully cognizant of the accumulation standard which allows accumulation of up to 55 gallons of non-acutely hazardous wastes for more than 90 days, it is not fully aligned with the OSHA requirements for handling flammable and combustible material so that they "... do not contribute to a fire emergency ..." and be "... kept to a minimum, stored in closed metal waste cans, and disposed of daily." The proposed approach is more conservative in that it requires daily removal of the materials from the laboratory areas to a building specifically designed to manage solvents and their attendant hazards.

The alternative approach of using the small transfer containers under hoods in the laboratory and daily transfer of their contents to the appropriate four drums maintained in Building 15B, but managed as a 90-day storage area rather than as SAAs, does not provide any additional human-health or environmental protection benefits. The distinction between this approach and that proposed is the trigger for disposal, or management in a designated HWMU until disposal; it is triggered at 90 days regardless of volume under the "90-day storage area approach," whereas it is triggered by accumulated volume (i.e., when the 55-gallon drum is filled) under the "SAA approach." As indicated in the preamble to the SAA ruling, "the USEPA believes that the accumulation of up to 55-gallons of non-acutely hazardous waste is reasonable and safe and does not pose a threat to human health and the environment" (49 FR 49568).

Table 1
FEMP LABORATORY USAGE OF COMMON SOLVENTS

	Wastestream	Use Points Within Building 15
1	Solids	Multiple Locations
2	Nitric acid/Cyclohexane Mixture	Colorimetric Uranium and Thorium Analyses – Inorganic Lab
3	Halogenated Solvents	Chloroform – Isotopic Analyses Methylene Chloride – SVOC Preparation Freon–113 – O&G Analyses Methanol/Chloroform Mixture – TOX Analyses
4	Non–halogenated Solvents	Acetone – Multiple Locations Xylene – Isotopic Analyses Methanol – Organic Labs Hexane – SVOC Preparation Petroleum ether – SVOC Preparation Methanol/Cyclohexane Mixture – Organic Labs

Table 2
LDR NON–WASTEWATER
TREATMENT REQUIREMENTS
FOR SOLVENT WASTE
GENERATED IN THE FEMP LABORATORY

Waste–stream No.	Wastestream Name	Solvent	EPA Waste Code	CCWE[a] (mg/L)	CCW[b] (mg/L)	Treatment Technology Code[c]
2	Nitric acid/Cyclohexane Mixture	Nitric acid/Cyclohexane	D002/D001			DEACT/INCIN,FSUBS,RORGS
3	Halogenated Solvents	Chloroform	D022			INCIN
3	Halogenated Solvents	Freon–113	F001,F002		28	[d] TS
3	Halogenated Solvents	Methylene Chloride	F002		33	[d] TS
3	Halogenated Solvents	Methanol/Chloroform	F003	0.75		INCIN
4	Non–halogenated Solvents	Acetone	F003		160	[d] TS
4	Non–halogenated Solvents	Xylene	F003		28	[d] TS
4	Non–halogenated Solvents	Methanol/Cyclohexane	F003/D001	0.75		INCIN,FSUBS,RORGS
4	Non–halogenated Solvents	Hexane	D001			INCIN,FSUBS,RORGS
4	Non–halogenated Solvents	Petroleum Ether	D001			INCIN,FSUBS,RORGS

KEY:

[a] CCWE = Constituent Concentration in Waste Extracts
[b] CCW = Constituent Concentration in Waste
[c] INCIN = Incineration
[c] FSUB = Fuel Substitution
[c] RORGS = Recovery of Organics
[c] DEACT = Deactivation
[d] TS = These wastestreams have "Treatment Standards" expressed as Concentrations in Treated Waste rather than Technology–Based Standards

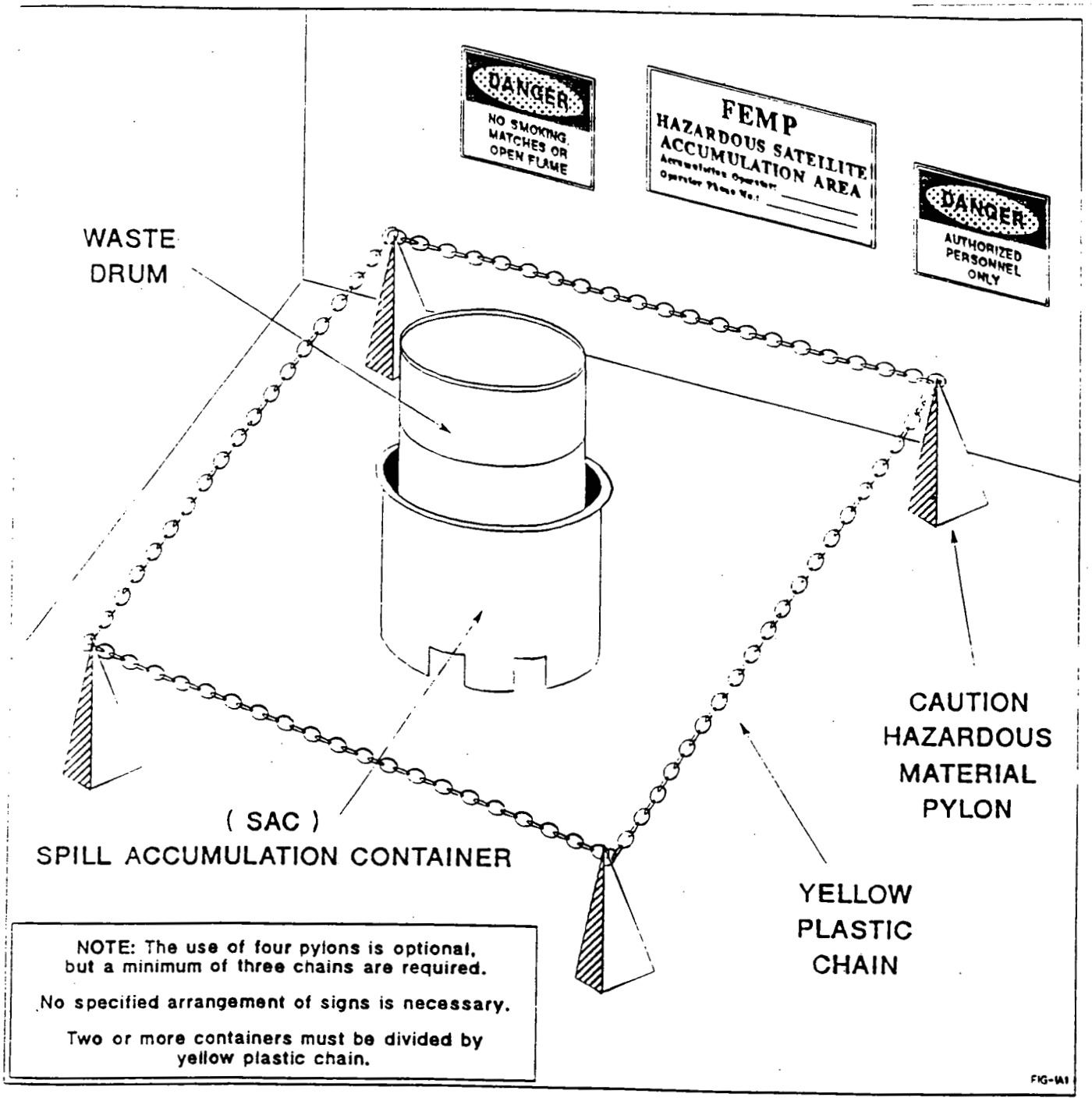

DIAGRAM OF SAA FOR 55 GALLON CONTAINERS
Figure 1