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IMMEDIATE CLOSURE PLAN
FOR
INTERIM STATUS
HAZARDOUS WASTE CONTAINER FACILITY

Prepared for:

GENERAL ELECTRIC SWITCHGEAR OPERATIONS
510 E. AGENCY ROAD
WEST BURLINGTON, IA 52655

USEPA IDENTIFICATION NUMBER
IAD005272703

Project No.: 28252

November 20, 1992

FEHR-GRAHAM & ASSOCIATES
ENGINEERING AND SCIENCE CONSULTANTS

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RCRA RECORDS CENTER

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INTRODUCTION

This report was prepared for General Electric Switchgear Operations, 510 E. Agency Road, West Burlington, Iowa, by Fehr-Graham & Associates, Engineering and Science Consultants, 660 W. Stephenson Street, Freeport, Illinois.

This closure plan is being submitted for an immediate closure of the unit which was the subject of a RCRA Part B Application dated November 1, 1988. The application was withdrawn on October 8, 1991. As a result of the Part B Application, a RCRA Facility Assessment was completed by Metcalf & Eddy for USEPA Region VII on February 7, 1992. The closure plan is being submitted as a result of a September 11, 1992 request for submittal of a closure plan from USEPA. The request letter notifies that the subject unit may not be used for storage after November 8, 1992 and that a closure plan must be provided by November 23, 1992. The unit is regulated under 40 CFR 265, since the unit achieved Interim Status. This closure plan covers the sole storage unit at the facility. It is the understanding of General Electric that the facility may be subject to the provision of RCRA Corrective Action requirements for other areas, even though closure for this unit is achieved.

I. Description of Unit

The plant has only one RCRA unit and it is for the storage of containers. As originally described in the RCRA Part A documentation, the unit had capacity for 44 55-gallon drums. In 1982 the Part A was revised to increase the capacity to 100 55-gallon drums. Until 1988 the storage system was a series of metal racks

designed to hold containers. In 1988 the Part A was revised and the Part B documentation was written with a decreased the capacity of 24 55-gallon drums in a specially designed safety building with secondary containment, however, the safety building was never used to store hazardous waste for greater than 90 days, but was used only as an accumulation location. The safety building was placed adjacent to the rack storage unit. The unit to be closed is as follows:

Racks for holding 100 drums

Secondary containment drip pans under racks, including saddles

Concrete pad upon which the racks stand

The concrete pad located east of the main plant building is in good condition and abuts an asphalt paved drive area. The closure area is 53 feet long by 5.5 feet wide immediately north of the safety storage building east of the fenced "M. E." equipment storage area. No physical evidence exists at this time which suggests a spill of waste.

Photographs taken during the RFA by Metcalf & Eddy further illustrate the location and description of the unit. Copies of Photos 18, 19, and 20 from the RFA are included in the attachments section of this document.

II. Quantity/Type of Waste Managed in Unit

The capacity of the unit under Interim Status is 24 55-gallon drums, while the maximum ever potentially managed is 100 drums. The actual quantity of waste currently stored over 90 days is none. The following table lists the hazardous waste codes and hazardous constituents that have been managed at the unit.

Summary of Wastes Managed

Waste Managed Name	Waste Constituents	Waste Code
Paint Sludge, Filters		D001
Dry Booth Filters, Masking, Sludge, Thinners	Lead, Xylenes, Ethylbenzene, Methyl Ethyl Ketone, Methyl Isobutyl Ketone, Toluene	D001, D008, F003, F005
Silver Cyanide Bath, Sludge, Solids, Non-Cyanide Silver Bath	Silver, Cyanide	F006, F007, F008, D011
Spent Freon Solvent	1,1,2-trichloro-1,2,2-trifluoroethane	F002
Parts Washer Solvent	Benzene	D001, D018
Spent Degreasing Solvent	1,1,1-Trichloroethane	F001

III. Decontamination of Equipment and Structures

A. Detailed Description of Decontamination Activities

The racks used prior to 1989 for storage are not now being used for waste storage. The hazardous waste storage unit will be closed by

thoroughly and properly removing any waste residue which may be present on the rack components, the drip pans and saddles, and the concrete pad on which the racks stand and upon which the pans sit.

This work will be performed by an outside contractor familiar with this type of work who has employees who have the 40-hour HAZWOPER OSHA training. The supervisor will have had the 40-hour training as well as the additional 8 hours training for site supervisors. Before work commences, an area will be marked as the work zone and personnel not actively working on the closure will be prevented from entering the work zone. A safety meeting will be held before work commences to acquaint site workers with possible hazards. Workers performing decontamination activities will be protected by means of OSHA Level D safety and personal protective equipment.

The drip pans and saddles will first be washed with high-pressure hot water wash containing TSP soap. Immediately following the wash, each pan will be scrubbed with a brush to dislodge any possible residue. As the water is used for washing, it will be collected by vacuum from each pan. Special care will be taken to insure that no liquid is allowed to escape the pans. The racks will then be dismantled and each component part will be washed with high-pressure hot water wash containing TSP soap while it is over a drip pan. Immediately following the wash, each component will be scrubbed with a brush to dislodge any possible residue.

As the water is used, it will be collected by means of a vacuum from the drip pan. A high pressure rinse will be followed by a triple rinse with clean water. The wash and rinse material will be removed using a wet-vac and placed in 17H DOT specified 55 gallon drums.

Following the washing and rinsing of the rack components, the components will be either allowed to air dry or will be dried by other means and then be temporarily removed from the closure unit boundary. The drip pans and saddles will next be washed again following the procedure for the initial wash. A high-pressure rinse will be followed by a triple rinse with clean water. The wash and rinse waters will be collected from the pans by vacuum and the material will be placed in 55 gallon drums. Following the washing and rinsing of the drip pans and saddles, the pans and saddles will be either allowed to air dry or will be dried by other means and then be temporarily removed from the closure unit boundary. The concrete pad will then be vacuumed to remove any possible residue from the component cleaning activities. Next, the concrete pad will itself be washed with high pressure hot water and TSP soap, brushed to remove any possible residue, rinsed with high pressure water, and then triple rinsed with water as described above. All water will be collected by vacuum and will be containerized as above. Disposable personal protective equipment and cleaning equipment which cannot be decontaminated will be placed in a 55 gallon 17H drum for disposal.

B. Action Levels for Decontamination Activities

A sample of wash water will be analyzed in order to determine whether the water contains hazardous waste constituents and to accurately determine the appropriate method of disposal of the wash water. The method of disposal for the rinse water will be selected the same as the wash water.

A sample of the final rinse water from the rack components and pans and saddles will be collected to determine whether the components were successfully decontaminated. A sample of the final rinse water from the concrete pad will be collected to determine whether the pad was successfully decontaminated. If either of the samples demonstrate that the decontamination was not successful, the decontamination activity will be repeated as will follow-up sample collection.

A sample of the water to be used for washing and rinsing will be collected just prior to commencement of decontamination activities. This sample will be considered the "blank" sample. The decontamination effort will be considered successful when the sample from the rinse water is equal to or less than the higher of either the blank sample or the Drinking Water Quality level (40 CFR 141.11, 141.34, 141.61) for the parameters listed in the table below.

Decontamination Table

Constituent All Results in ug/L	Rinse Rack & Pans	Rinse Pad	Blank Sample	Drinking Water Quality
Cyanide				N/A
Lead				50
Silver				50
Xylenes, Total				10,000
Ethylbenzene				700
Methyl Ethyl Ketone				N/A
Methyl Isobutyl Ketone				N/A
Toluene				1,000
1,1,2-trichloro-1,2,2-trifluoroethane				N/A
Benzene				5
1,1,1-trichloroethane				200

IV. Soil Sampling Plan

Soil sampling is not being considered due to the nature of the wastes and the construction of the unit, and the results of the RFA inquiry. The area immediately under the storage racks was secondarily contained by drip pans and saddles which contained any spillage and precipitation. The pans were emptied from time to time and the contents were manifested for off-site disposal (a representative manifest with a 10 drum shipment is in the attachment).

According to company records, at no time did the pans overflow and allow hazardous waste, hazardous waste constituents, or contaminated rainfall to reach the concrete pad. As a tertiary barrier to soil contamination the concrete pad acted to prevent any possible migration in the event the pans had failed. No contamination is visible on the concrete or the surrounding area. There are no records of spills requiring remediation. The unit is located in an area which is subject to inspection to plant personnel frequently during each operating day. There is no suggestion in any of the records available, including the RFA, that soil investigation is necessary for this unit. The RFA wipe samples at the concrete demonstrate no constituent above action levels. The RFA wipe below action levels presumes that cored & ground up concrete samples would show even lower levels and that soil below the pavement would be even lower. Since the area is considered "low potential" under the RFA, we believe no further action is warranted as a part of this closure plan. We have included in the attachments the following:

RFI Section 4.8, A., B., C. (page 32) description of unit, exposure potential

RFI Section 6.4, .1, .2 description of wipe sample

RFI Table 4 Sample #201 results from storage racks

RFI Photographs 35, 36, 37 wipe sample collection

Drawing of Drip Pans and Saddles

Manifest of Waste and Safety Kleen Data

V. Closure Performance Standard

The target clean-up level for this site is to meet the objectives outlined above regarding detection of constituents below the higher of either the background sample or drinking water standards.

VI. Contingent Activities

The only contingent activities contemplated are possible additional rounds of washing and rinsing if the action levels are not reached at the outset. If other significant contingent activities were required, a modification to the closure plan would be in order.

VII. Management of Wastes Generated During Closure Plan Implementation

Two wastes will be generated during closure activities: Wash and rinse water will comprise approximately 490 gallons, and safety and cleaning equipment which could not be decontaminated will comprise approximately another 55 gallons. The wash water will be tested to determine whether the wash and rinse water is hazardous. Due to the storage of F-listed wastes, any F-listed constituents above reporting limits will cause the waste to be considered hazardous. The wash water will also be tested to determine whether the water can be treated in the company's on site waste water treatment facility permitted under the Clean Water Act. If the waste water is non-hazardous and can be treated on site, it will be added to the inlet system of the treatment operation and

the drums which contained the water will be triple rinsed before being considered again as RCRA empty containers.

In the event the wash water is hazardous, it and the rinse water will be manifested to an appropriate aqueous waste treatment site, such as Clean Harbors in Chicago, Illinois

The drum containing clothing and cleaning equipment will be co-disposed with the company's F006 sludge waste, unless results from the wash water indicate that other disposal is appropriate.

In no event will hazardous waste from the closure activities be allowed to remain on site for more than 90 days or be allowed to remain within the closure unit boundary.

VIII. Analytical Procedures

A water trip blank will be provided by the laboratory and will be analyzed for the non-metal and non-cyanide compounds listed in the following Sample Analysis Summary. All field samples will be collected and analyzed in duplicate to provide adequate assurance of representative sampling. Unless there is an apparent error, the average value of each duplicate sample for each constituent will be used, including the background sample. Samples will be collected by trained personnel, will be placed in appropriate containers, will have covers sealed with tamper-resistant tape, will be placed in coolers, and will be transported under chain-of-custody documentation directly to the laboratory by the

representative of the certifying engineer. Containers will be provided by the laboratory. Containers for cyanide and metals will be provided with pre-measured preservative placed in the container.

This closure plan contemplates the use of NET Midwest, Inc. Rockford, Illinois laboratory. The Quality Assurance Plan for the lab is attached at the conclusion of this closure plan. The Sample Analysis Summary below indicates the constituents which will be analyzed, the container to be used, the preservation technique, the SW846 analytical method, and the reporting limits and units of measure which will be reported from the laboratory.

Sample Analysis Summary

Container	Constituent	Preservation	SW846 Method	Reporting Limit ug/L
500 ML Plastic	Cyanide	Sodium Hydroxide	9010	10
250 ML Plastic	Lead	Nitric Acid	7421	5
250 ML Plastic	Silver	Nitric Acid	7760	10
40 ML Glass w/ Teflon Cap	Xylenes, Total	Cool to 4° C	8240	5
"	Ethylbenzene	"	"	5
"	Methyl Ethyl Ketone	"	"	5
"	Methyl Isobutyl Ketone	"	"	5
"	Toluene	"	"	5
"	1,1,2-trichloro-1,2,2-trifluoroethane	"	"	5
"	Benzene	"	"	5
"	1,1,1-trichloroethane	"	"	5

IX. Closure Schedule

The schedule for this closure is as follows:

Closure Event	Begin Day From Receipt of Approved Closure Plan	Duration in Days
Receive Approval	0	0
Review Approval Document	1	35
Schedule Contractors & Engineers	36	30
Equipment, Structure Decontamination & Sample Collection	66	5
Await Lab Results	71	30
Review & Interpret Lab Results	101	20
Arrange for Disposal	121	30
Ship Clothing Waste and (If Required) Wash & Rinse Water	151	1
Receive Return Manifest(s)	152	28
Prepare Closure Certification	180	60
Submit Closure Certification	240	0

X. Closure Certification

Supporting documentation will submitted with certification statements from both the owner and the certifying engineer. The documents that will be submitted include laboratory analysis, photography demonstrating closure activities, and a narrative of activities. Copies of the INDEPENDENT

REGISTERED PROFESSIONAL ENGINEER CLOSURE CERTIFICATION and OWNER OR OPERATOR CLOSURE CERTIFICATION forms are in the attachments.

XI. Cost Estimate for Closure

Disposal of Waste, Aqueous Treatment, 9 Drums of Rinsate	$ 2,250
Disposal of Waste, Incineration, 1 Drum clothing & debris	$ 900
Transportation Costs for 10 Drums	$ 1,000
Labor & Equipment to Decontaminate Equipment & Structure	$ 5,000
Engineer Field Costs During Closure and Rinsate Tests	$ 6,000
Certification by Registered Professional Engineer	$ 3,000
Total Closure Costs	$18,150

Gene D. Fox
Project Manager

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ATTACHMENTS

A. Photos 18, 19, 20 from the RFA, identifying the unit location

B. RFI Section 4.8, A., B., C. (page 32) description of unit, exposure potential

C. RFI Section 6.4, .1, .2 description of wipe sample

D. RFI Table 4 Sample #201 results from storage racks

E. RFI Photographs 35, 36, 37 wipe sample collection

F. Drawing of Drip Pans and Saddles

G. Manifest of Waste and Safety Kleen Data.

H. Closure Certification Documents

I. Quality Assurance Plan, NET Midwest, Inc.

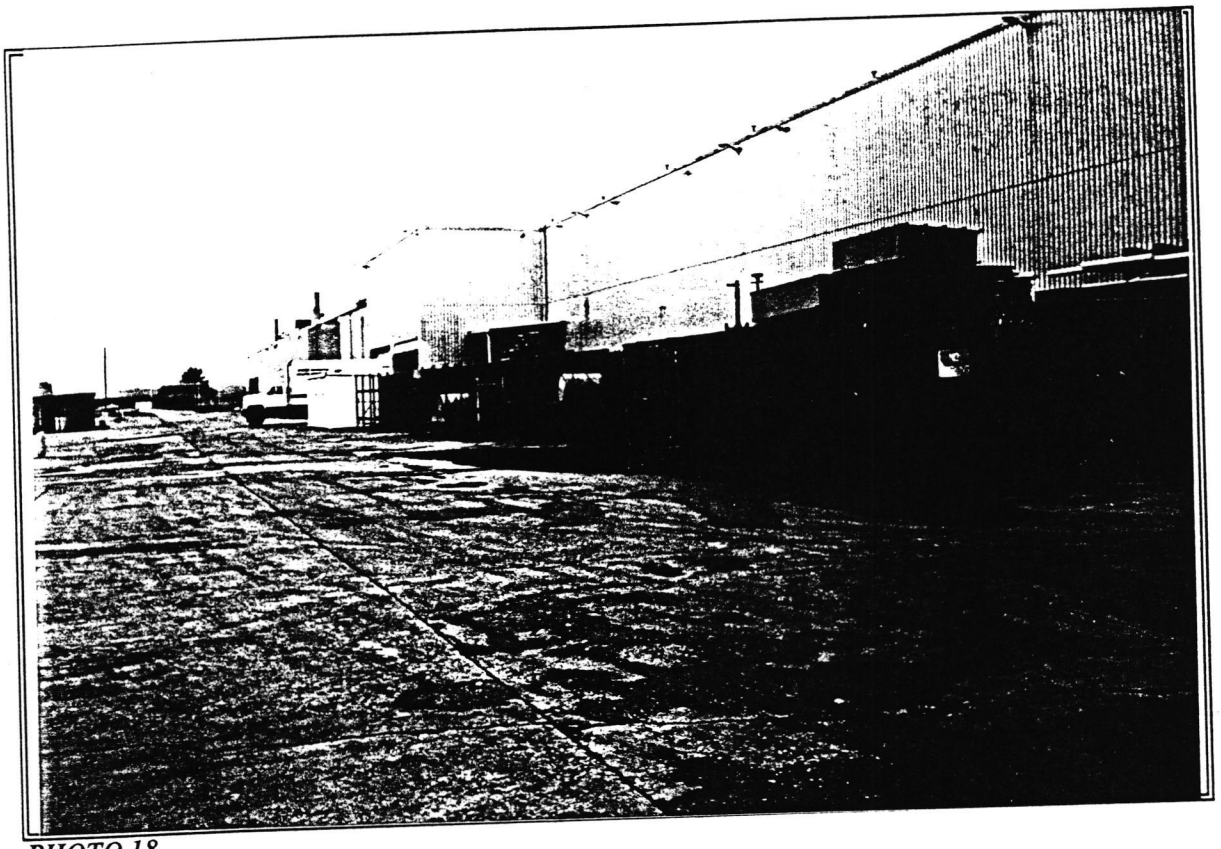


PHOTO 18

Facility: General Electric Company, ID#IAD005272703
Location: Burlington, Iowa
Date: August 21, 1990
Photographer: Pat Frey
Camera Type: Minolta Freedom 200/35 mm
Subject: Former hazardous waste storage racks.
Direction: South
Time: 11:00 a.m.
Witness: John Bryan
Film Type: Kodak Gold, 100 ASA

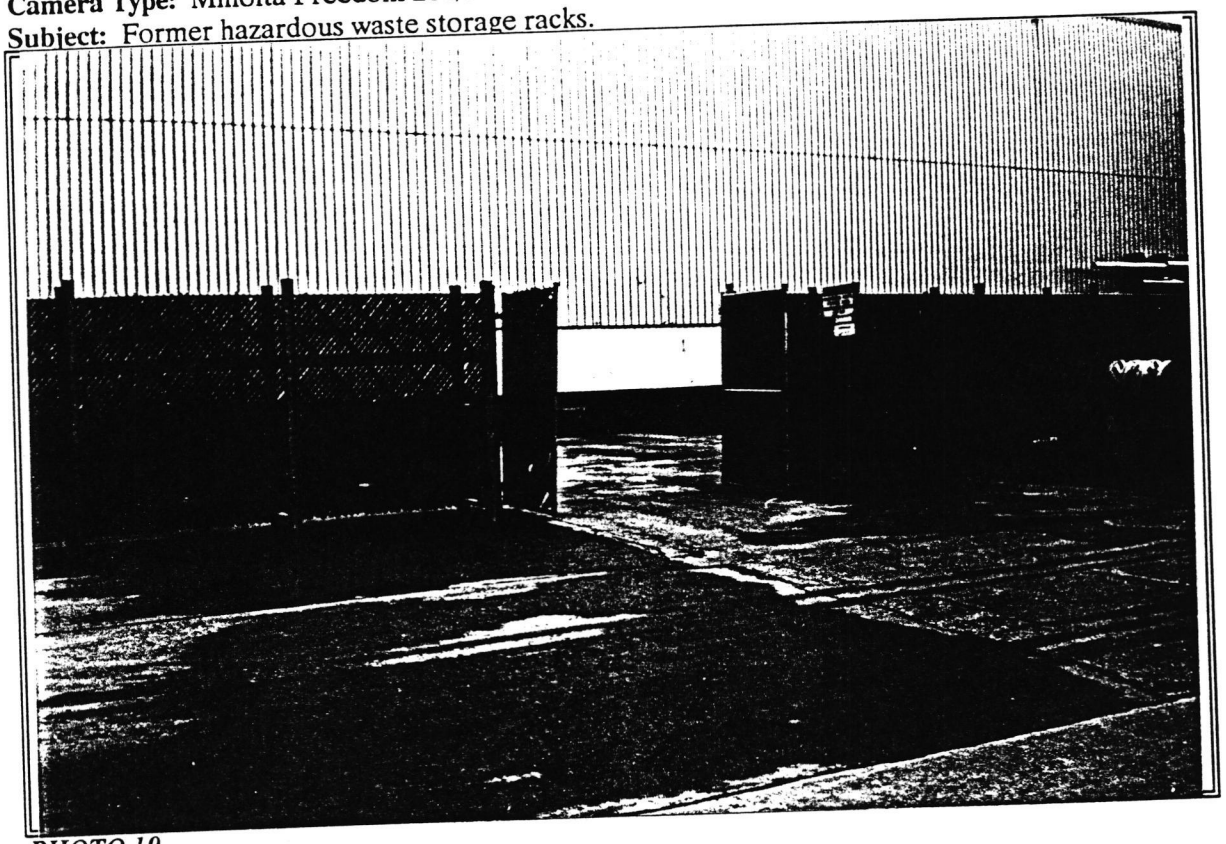


PHOTO 19

Facility: General Electric Company, ID#IAD005272703
Location: Burlington, Iowa
Date: August 21, 1990
Photographer: Pat Frey
Camera Type: Minolta Freedom 200/35 mm
Subject: Former hazardous waste storage racks.
Direction: West
Time: 11:00 a.m.
Witness: John Bryan
Film Type: Kodak Gold, 100 ASA

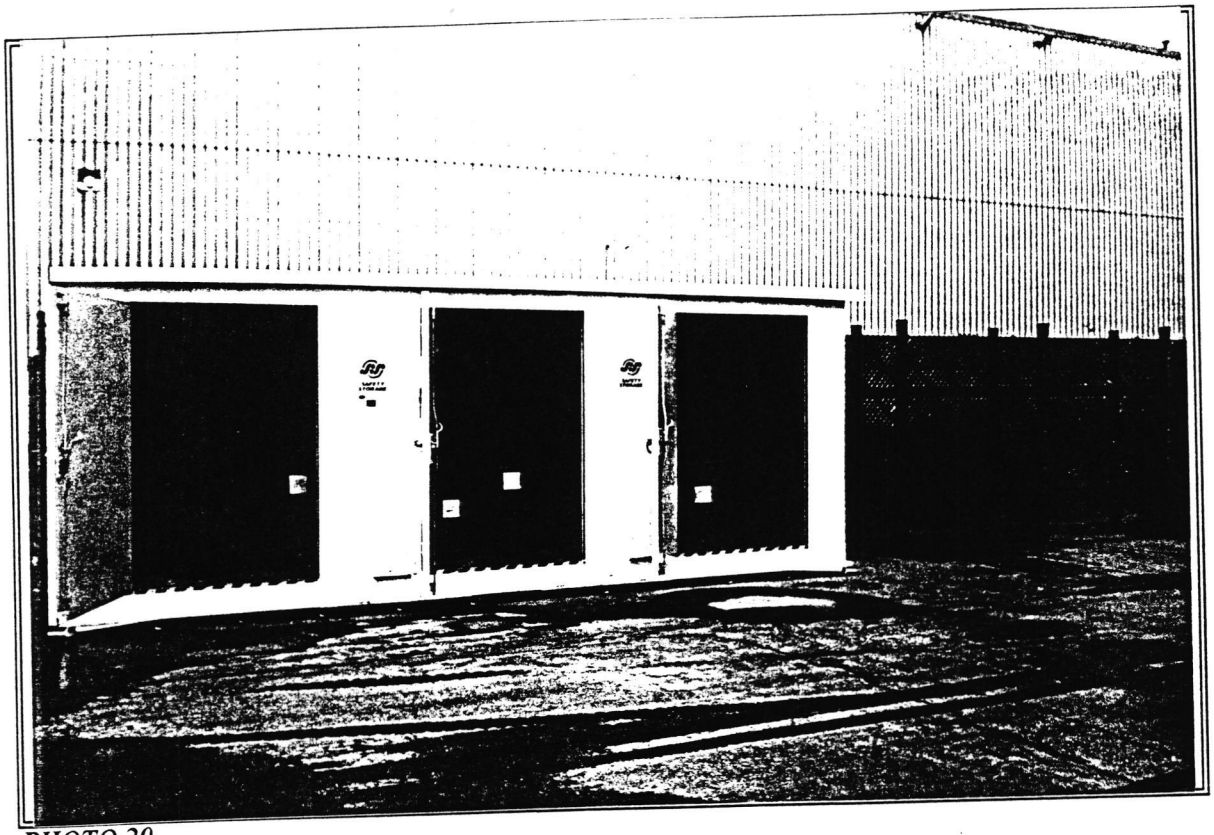


PHOTO 20

Facility: General Electric Company, ID#IAD005272703
Location: Burlington, Iowa
Date: August 21, 1990
Photographer: Pat Frey
Camera Type: Minolta Freedom 200/35 mm
Subject: Hazardous waste storage shed
Direction: West
Time: 11:00 a.m.
Witness: John Bryan
Film Type: Kodak Gold, 100 ASA

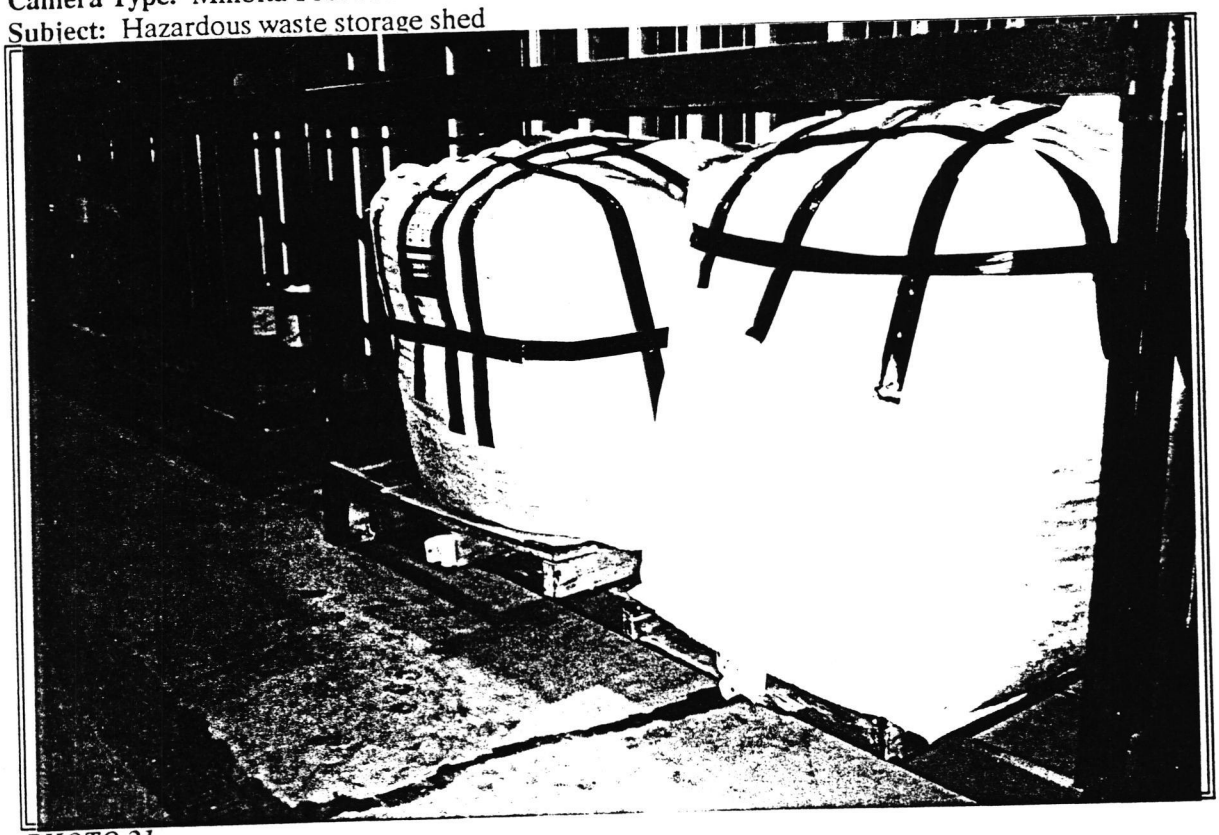


PHOTO 21

Facility: General Electric Company, ID#IAD005272703
Location: Burlington, Iowa
Date: August 21, 1990
Photographer: Pat Frey
Camera Type: Minolta Freedom 200/35 mm
Subject: Two super sacks of F006 sludge in Hazardous Materials Building.
Direction: East
Time: 11:10 a.m.
Witness: John Bryan
Film Type: Kodak Gold, 100 ASA

Soils. There is a low potential for release to soils. The units are located inside the plant and no direct pathways for release to the outside of the building exist.

Groundwater. There is a low potential for release to groundwater. The units are located inside the plant and no direct pathways for release to the outside of the building exist.

Subsurface Soil Gas. There is a low potential for release to subsurface soil gas. The units are located inside the plant and no direct pathways for release to the outside of the building exist.

Air. The release from each scrubber appears to be within the limits imposed by the permits (Appendix C).

4.8 Unit No. 8, Storage Racks
Regulatory Status: SWMU, Inactive

A. Unit Description

Until January 1989, 55-gallon drums of hazardous wastes were stored on racks located outside the east wall of the plant (Figure 8). The racks have not been used since the safety storage building was built. These racks sit on a concrete pad (Appendix A, Photographs 18 and 19).

The 55-gallon drums of hazardous waste were stored two-high on racks with stainless steel pans placed underneath to catch leaks or spills.

M&E collected one wipe sample from the concrete pad beneath the storage racks to determine whether residual contamination remained in the area (Appendix A, Photographs 35-38). The sample was analyzed for semi-VOCs and metals.

B. The following is a list of the hazardous wastes that have been stored in the unit:

Waste Description	Hazardous Waste Code
Spent 1,1,1-trichloroethane	F001
Spent Freon	F002
Spent Thinners	F003
Spent Silver Cyanide Solution	F007
Silver Cyanide Contaminated Filters and Rags	F008
E-Coat Sludge and Filters	D008
Non-Cyanide Plating Bath Solids	D011

Silver (0.0567 $\mu g/cm^2$, cadmium (0.0091 $\mu g/cm^2$), chromium (0.0940 $\mu g/cm^2$), and lead (0.351 $\mu g/cm^2$) were detected in the wipe samples collected during the SV.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Surface Water. There is a low potential for release to surface water. Hazardous wastes are no longer stored on the racks and the concrete pad appears to be clean.

Soils. There is a low potential for release to soils. Hazardous wastes are no longer stored on the racks and the concrete pad appears to be clean.

will be sealed and labeled and placed immediately into a cooler for transport to the Region VII Laboratory.

- Trip Blanks: One soil trip blank and one water trip blank will be obtained from the Region VII Laboratory.

6.4 Wipe Sample

A wipe sample will be collected from the concrete pad beneath the container storage racks located outside the east side of the building. The sample will be used to determine if any residual contamination exists.

6.4.1 Wipe Sample Collection

The wipe sample from the concrete pad beneath the storage racks will be collected by thoroughly wiping a 100 cm^2 of the pad with a sterile gauze pad soaked with distilled dionized water. A paper template will be used to mark the designated area to be sampled. The sampler will then put on a pair of clean, chemical-protective, disposable gloves. The 3 inch by 3 inch sterile gauze pad will be removed from its package, held by one corner and sprayed with distilled dionized water until thoroughly wet. Wiping will begin at one edge of the partitioned area and progress in a systematic pattern making sure that all areas are thoroughly and equally wiped. Maximum pressure will be firmly and evenly applied to the gauze pad while wiping. After wiping is complete, the gauze pad will be folded in half with the exposed side in, then folded over again without allowing it to contact any other surface. The wipe will then be placed into an 8-ounce glass jar. This procedure will be used to collect semi-volatile and metal fractions of the wipe sample. Separate gauze pads will be used for each fraction. Separate areas of the concrete pad will be wiped for each fraction. Gloves will be changed between each fraction or if one of the gloves touches the surface being wiped. All the sample containers will be labeled and sealed following the procedures outlined in Section 9.0.

6.4.2 Wipe Sample Quality Assurance/Quality Control Samples

The following Quality Assurance/Quality Control (QA/QC) samples will be collected by TES X personnel. These samples are needed to verify the validity of the analytical results of the samples collected by TES X personnel and to assess if the samples may have been contaminated as a result of container contamination, field methods, preservative contamination, contamination during transportation to and from the site, or laboratory contamination. All QA/QC samples will be submitted with the original samples to the laboratory for analysis. QA/QC samples will be labeled in accordance with EPA Region VII SOP 2130.3A. Specifically, replicate samples will be labeled "D" along with their unique sample number. Descriptions of QA/QC samples will be recorded in the site logbook.

Replicate Samples: A replicate wipe sample will be collected to evaluate the precision of the sample collection, management, and analysis procedures and environmental variability. Replicate sample fractions will be taken from areas adjacent to each wipe sample fraction location. The replicate sample will be collected using the same method as the wipe sample. The replicate sample will be submitted with the original sample to the laboratory for analysis.

Field Blank: A field blank will be collected to identify potential introduction of contaminants via the sampling methods, the pad, solvent or sample container. The field blank sample will consist of a sterile gauze pad, soaked with dionized distilled water and placed in an 8-ounce jar. Field blank fractions will be collected for semi-volatile and metals analysis. The fraction containers will be sealed and labeled following the procedures outlined in Section 9.0.

7.0 REQUIRED EQUIPMENT

The equipment required for the proposed sampling activities is outlined in Table 3 at the end of this document.

8.0 CALIBRATION PROCEDURES AND PREVENTATIVE MAINTENANCE OF FIELD EQUIPMENT

Required calibration and preventive maintenance of field equipment is summarized in Table 4 at the end of this document.

9.0 SAMPLE HANDLING AND CUSTODY PROCEDURES AND DOCUMENTATION PROCEDURES

This section describes the procedures to be followed to prepare the samples for shipment and to document the sample collection activities.

9.1 Sample Handling, Shipment, and Custody Procedures

Sample handling, shipment, and custody procedures that will be followed are outlined below.

a. Sample identification labels will be completed in accordance with U.S. EPA Region VII protocol as specified by U.S. EPA Region VII SOP-2130.3A and will be attached to the sample containers. The completed labels will be covered with clear label tape.

b. Following the filling of the sample containers and the addition of applicable preservatives, the containers will be wiped clean with a kim-wipe to remove any liquids on the container surface. The water level in each bottle will be marked with a grease pencil. The sample container caps will be checked and taped with electrical tape to assure that they are properly secured.

c. Chain-of-custody forms and U.S. EPA Region VII field data sheets will be completed in accordance with U.S. EPA Region VII protocol as specified by Region VII SOP-2130.2A and SOP-2130.3A.

d. The white and yellow copies of the chain-of-custody form and the original U.S. EPA Region VII field data sheets will be placed in a zip-lock bag and taped to the inside of the cooler lid. (Note: one copy of each form will be retained.)

e. Foam packing materials will be placed on the bottom and sides of the cooler to prevent sample container breakage. The cooler will then be lined with a large plastic bag.

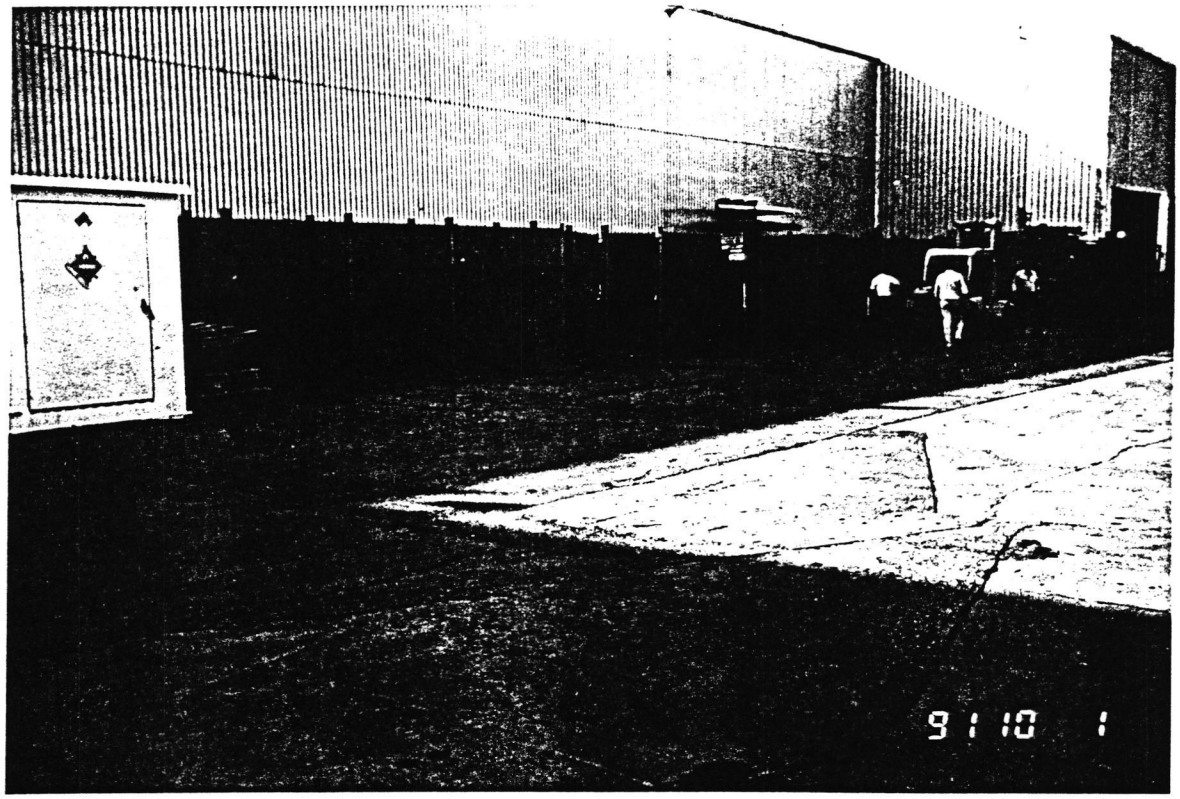
f. Glass sample containers will be wrapped with foam packing material and the foam ends will be taped so that the foam does not unravel. This prevents the containers from falling sideways and breaking.

TABLE 4

WIPE AND SURFACE WATER SAMPLE ANALYTICAL RESULTS FROM RFA SAMPLING VISIT
OCTOBER 1, 1991
METAL COMPOUNDS
GENERAL ELECTRIC COMPANY
WEST BURLINGTON, IOWA

Sample Description	Silver	Arsenic	Barium	Cadmium	Chromium	Copper	Nickel	Lead	Selenium	Zinc	Cyanide
201 Wipe Sample Storage Racks	0.0567 ug/cm2	-	-	0.0091 ug/cm2	0.094 ug/cm2	-	-	0.351 ug/cm2	-	-	-
101 Surface Water Outlet	<10.0 ug/l	<50.0 ug/l	24.8 ug/l	<5.0 ug/l	<10.0 ug/l	20.6 g ug/l	<20.0 ug/l	<50.0 ug/l	<50.0 ug/l	42.7 ug/l	<0.003 mg/l

PHOTO 35



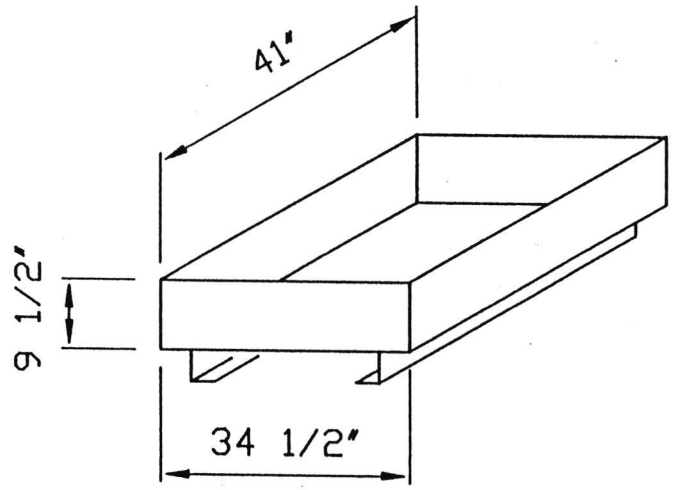
Facility: General Electric Company, ID# IAD005272703
Location: Burlington, Iowa **Photographer:** John Bryan **Witness:** Mark Otten **Date:** October 1, 1991
Direction: North **Camera Type:** Minolta 35 mm **Film Type:** 200 ASA **Time:** 4:20 p.m.
Subject: Container storage racks.

PHOTO 36

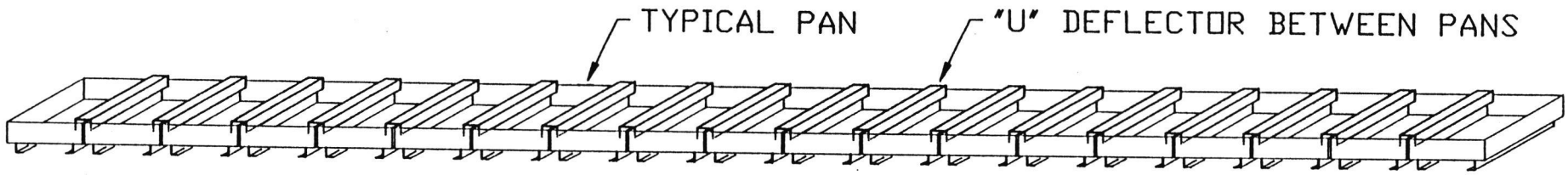
Facility: General Electric Company, ID# IAD005272703
Location: Burlington, Iowa **Photographer:** John Bryan **Witness:** Mark Otten **Date:** October 1, 1991
Direction: West **Camera Type:** Minolta 35 mm **Film Type:** 200 ASA **Time:** 4:30 p.m.
Subject: Member of M&E sampling team dampening gauze pad for wipe sample.

PHOTO 37

Facility: General Electric Company, ID# IAD005272703
Location: Burlington, Iowa
Direction: West
Date: October 1, 1991
Time: 4:31 p.m.
Photographer: John Bryan
Witness: Mark Otten
Camera Type: Minolta 35 mm
Film Type: 200 ASA
Subject: Member of M&E sampling team collecting wipe sample.



TYPICAL PAN DETAIL



GENERAL ELECTRIC
DRIP PANS

G28252AA

11/19/92

5-047-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: IAD 005272703
Manifest Document No.: 36115
2. Page 1 of 1
Information in the shaded a[illegible] is not required by Federal l[illegible]

3. Generator's Name and Mailing Address
GENERAL ELECTRIC
SWITCH GEAR OPERATIONS PO BOX 488
W BURLINGTON, IA 52655
4. Generator's Phone (319) 753-8400

A. State Manifest Document Number
B. State Generator's ID

5. Transporter 1 Company Name: SAFETY-KLEEN CORP
6. US EPA ID Number: ILD 051060408
C. State Transporter's ID: 11[illegible]
D. Transporter's Phone: (319) 386-30[illegible]

7. Transporter 2 Company Name: Schneider Tank Lines
8. US EPA ID Number: LID 1980904742
E. State Transporter's ID
F. Transporter's Phone: 800 558-50[illegible]

9. Designated Facility Name and Site Address
SAFETY-KLEEN CORP 0-006-58
STATE HIGHWAY 146
NEW CASTLE KY 40050
10. US EPA ID Number: KYD 053348108
G. State Facility's ID
H. Facility's Phone: (502) 845-2453

GENERATOR

	11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No
a.	RQ HAZARDOUS WASTE, LIQUID, N.O.S. ORM-E NA9189 (F001) (ERG #31)	X	10	D M	4500	P	F001
b.	RQ WASTE COMBUSTIBLE LIQUID, N.O.S. NA1993 (D001) (ERG #27)	X	7	D M	~~3850~~ 350	P	D001
c.	RQ HAZARDOUS WASTE, SOLID, N.O.S. ORM-E NA9189 (D001) (ERG #31)	X	2	D M	200	P	D001
d.							

J. Additional Descriptions for Materials Listed Above
11a - SAMPLE #069726, CONTROL #0063064-2
11b - SAMPLE #070317, CONTROL #0044639-9
11c - SAMPLE #083857, CONTROL #0051759-3

K. Handling Codes for Wastes Listed Above
11a - S02/T50
11b & 11c - S01/S02/T50

15. Special Handling Instructions and Additional Information 9026 836115 X 5-047-01-9024 0416
EMERGENCY RESP #1-708-888-4660
SKDOT# A: 1063 B: 1011 C: 1035 D: 176095

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name a[illegible] are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and natio[illegible] government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: CHRISTOPHER A. BOEHM
Signature: Christopher A. Boehm
Date: Month Day Y[illegible] 10 12 19[illegible]

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Lynn Claussen
Signature: Lynn Claussen
Date: Month Day Y[illegible] 10 21 19[illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: JAMES R CRANK
Signature: James R. Crank
Date: Month Day Y[illegible] 06 30 19[illegible]

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DONNA S. PALMER
Signature: Donna S. Palmer
Date: Month Day Y[illegible] 10 10 19[illegible]

Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment, storage and disposal facilities. This includes (in reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

PREQUALIFICATION EVALUATION
CUSTOMER SURVEY

safety-kleen

new

COMPLETE: 06/19/90
CONTROL#: 0063064-2
SAMPLE# : 069726

ACCEPT

FLUID RECOVERY

** FLUID RECOVERY **

CUSTOMER INFORMATION:

CONTAINMENT PAN
WATER

GENERAL ELECTRIC
510 AGENCY RD
W BURLINGTON IA 52655

ATTN: CHRISTOPHER A. BOEHM

BRANCH: 504701 DAN JENNINGS SR COUNTY: DES MOINES
NATURE OF BUSINESS: SWITCHGEAR MFG
FEDERAL EPA ID: IAD005272703 STATE EPA: IL. ID: 9190575100 . ID:
MANIFEST ADDRESS IS BILLING MANIFEST TO SAFETY-KLEEN SIC #: 3613
MATERIAL: RAINWATER FROM HAZ. WASTE, STORAGE PAN PROCESS: FROM DRAIN PANS
VOLUME: 550 GALS PER YEAR VOLUME ON HAND: 550
STORAGE CAPACITY: 2000 IN DRUMS SHIPPING FREQUENCY: 1 YR IN DRUMS
COLOR: CLEAR/YELLOW LAYERS: TWO PHYSICAL STATE: LIQUID VISCOSITY: LOW

MATERIAL COMPOSITION(VOL%):

	CODE	MIN	MAX	TYPICAL
WATER	W	0.0	99.0	
TRICHLOROETHANE, 1,1,1-	111	0.0	1.0	

RF ICTED SUBSTANCES: NONE
D. . HAZARDOUS MATERIAL: CUSTOMER REQUEST ASSISTANCE
EPA HAZARDOUS WASTE: CUSTOMER REQUEST ASSISTANCE
P.O. NO: 551192-218669 BRANCH: 504701 DATE: 05/14/90
TYPE OF SAMPLE: GRAB NUMBER OF DRUMS SAMPLED: 2 TAKEN BY: SALESREP
CONTACT: CHRISTOPHER A. BOEHM TITLE: MGR. SHOP SUPPORT PHONE: 319-753-8508

CORPORATE REVIEWS:

	DISPOSITION	REVIEWER	DATE
TECHNICAL:	ACCEPT	EJE	06/18/90
REGULATORY:	ACCEPT	CAP	06/18/90
OPERATING:	ACCEPT	JWH	06/19/90

HANDLING CODES: S02/T50 PRICING CODE: F2

APPROVED FACILITIES:
(658) SAFETY-KLEEN CORP
STATE HWY 146
NEW CASTLE KY 40050
FED EPA#: KYD053348108
STATE EPA#:
TELEPHONE: 502/845-2453
IL. AUTH#:

APPROVED 0001063 DRUM OR BULK
DOT-EPA RQ HAZARDOUS WASTE, LIQUID, N.O.S.
DESC. ORM-E NA9189 (F001)(ERG #31)

0000888 SPECIAL NOTICE
PROPER SHIPPING DESCRIPTION WAS BASED ON SURVEY INFORMATION RATHER THAN ANALYSIS. SEE COMMENTS FOR DETAILS AND NOTICES.

COMMENTS: OK FOR HAZARDOUS WASTE WATER ONLY AT NEW CASTLE. FRS CAT II. SHOW 111 ON LAND BAN.

THIS SERVES AS NOTICE PER, 40CFR264.12(B), THAT THE FACILITY(IES) NOTED ABOVE HAS THE APPROPRIATE PERMITS AND IS WILLING TO RECEIVE THE MATERIAL DESCRIBED.

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 4

To ~~[illegible]~~ Gene	From Beth
Co. GE	Co. GE
Dept.	Phone # 319-753-8508
Fax # 815-235-4632	Fax # 319-753-8633

SAFETY-KLEEN CORP.
PREQUALIFICATION EVALUATION
MATERIAL ANALYSIS

COMPLETE: 06/19/90
CONTROL#: 0083084-2
SAMPLE# : 069726

CONTAINMENT PAN WATER

ACCEPT

NO ATTACHMENT

FLU RECOVERY
GENERAL ELECTRIC

** FLUID RECOVERY **

GENERAL ANALYSIS OF TOTAL SAMPLE

COLOR	: LT. YELLOW
WATER CONTENT	: 98.9 WT%
NON-VOLATILE RESIDUE	: 0.5 WT% DESCRIPTION: SOLID
FLAMMABILITY	: NO FLASH AT 142 F BY SETAFLASH
FLAMMABILITY	: NO FLASH AT 102 F BY SETAFLASH
PH	: DIRECT BY PAPER 6.0
RADIOACTIVITY	: NONE DETECTED

GENERAL COMPOSITION:

	SPECIFIC GRAVITY	VISCOSITY (CENTIPOISE)	GENERAL COMPOSITION BY: APPEARANCE (VOL%)	TOTA (WT %
AQUEOUS PHASE (FREE WATER)			100.0	100.(
ORGANIC PHASE (FEEDSTOCK)			0.0	0.(
BOTTOM SLUDGE (SEMISOLIDS)			0.0	0.(
BOTTOM SOLID (SETTLED SOLIDS)			0.0	0.(
TOTAL	1.000	< 50 CPS	100.0	100.(

SPECIFIC COMPOSITION OF TOTAL SAMPLE

COMPOSITION OF:	TOTAL SAMPLE (WT%)	TOTAL SAMPLI (WT%
WATER CONTENT	98.9	98.9
NON-VOLATILE RESIDUE DESCRIPTION: SOLID	0.5	0.5
VOLATILE ORGANICS BY DIFFERENCE	0.6	0.6
TOTAL	100.0	100.0

VOLATILE ORGANIC COMPOSITION OF TOTAL SAMPLE BY GAS CHROMATOGRAPHY

SAMPLE PREPARATION METHODS: NEAT
DETECTION METHODS : FID, FID

COMPOUND NAME	CODE	CAS NUMBER	COMPOSITION OF: VOLATILE ORGANICS (WT%)	VOLATILE ORGANICS (WT%)	TOTAL SAMPLE (WT%)
NO VOLATILE ORGANICS DETECTED (<0.1% EACH)	NONE	0-62-4	100.0	100.0	0.6
TOTAL			100.0	100.0	0.6

SUMMARY OF VOLATILE ORGANIC COMPOSITION BY COMPOUND CHEMICAL CLASS WT%:

ALCOHOLS	0.0	ALIPHATIC HYDROCARBONS	0.0
AROMATIC HYDROCARBONS	0.0	CHLORINATED SOLVENTS	0.0
ESTERS	0.0	ETHERS	0.0
GLYCOL ETHERS	0.0	INHIBITORS	0.0
KETONES	0.0	NITROGEN COMPOUNDS	0.0

SPECIFIC ORGANIC COMPOSITION

POLYCHLORINATED BIPHENYLS (PCBS): NONE DETECTED <

LABORATORY REVIEW: R
LEVEL: SEG CODE: RELEASED: 06/19/90
LAB REVIEWERS: CR CR ANALYZED: 06/19/90
HIGH WATER

TRACKING INFORMATION:	DATE	FACILITY
SURVEY RECEIVED :	06/12/90	SK TECHNICAL C
SAMPLE RECEIVED :	06/12/90	
RESAMPLE SHIPPED :		
RESAMPLE RECEIVED:		

NOTICE OF LAND DISPOSAL RESTRICTION OF WASTE IS REQUIRED UNDER 40 CFR PART 268.

NOV 19 '92 17:14 BURL S&IT 8*6736633 319-753633 P.4/4

BRANCH	ENVIROSYSTEMS
☒ FRS ☐ DC	☐ FUEL
☐ PC ☐ PR	☐ RECYCLE
☐ IC ☐ QC	☐ TOLLING
☐ BRESLUBE	☐ QC
OTHER	

Safety-Kleen ®

RAIN WATER

SK Sample No: 69726

SK USE ONLY
SK Control No:
Date Received:

MATERIAL SURVEY

A. Company Name GENERAL ELECTRIC

EPA ID No. (Federal) IAD005472703 County DES MOINES

Billing Address Street 510 AGENCY RD.
City W. BURLINGTON State IA Zip 52655

Facility Address Street 510 AGENCY RD.
City W. BURLINGTON State IA Zip 52

Nature of Business SWITCHGEAR MFG S.I.C. Number 361

State ID Numbers: Illinois ID ____ Missouri ID ____ State ____ ID ____

Manifest Address: ☐ Billing Address ☐ Facility Address Manifest to: ☒ Safety-Kleen ☐ Other ____

B. Material Description RAINWATER FROM HAZ. WASTE, STORAGE PAD.

Process Description

Volume (gal.) 550 / ☐ Wk ☐ Mth ☐ Qtr ☒ Yr ☐ Once

Volume on Hand (gal.) 550

Storage Capacity (gal.) 2000 In ☒ Drums ☐ Bulk

Shipping Frequency 1/yr. In ☒ Drums ☐ Bulk

C. Physical Description Color CLEAR/YELLOW

Layers ☒ One ☒ Two ☐ Three

Physical State ☒ Liquid ☐ Semisolid ☐ Solid

Liquid Viscosity ☒ Low ☐ Medium ☐ High

D. Material Composition (vol%)

	Min	Max	Typ
Water		99.2	
SOLVENTS		1.2	
Water			
Non-volatile Material			
Settled Solids			

E. Attach material safety data sheets for material components requiring employee communication under OSHA (Ref. 29 CFR 1910.120
Attach any current analysis of the material. ☐ MSDS attached ☐ Analysis attached ☒ No attachments

F. Check all of the following substances which may be in the material.

	Identify if present	Amount	Units
☐ DOT Corrosives, Poisons, Forbiddens, Radioactives, Explosives, or Gases.			
☐ TSCA regulated materials (PCB, PBB, Chlorinated dibenzodioxins or furans).			
☐ Materials used exclusively as pesticides, herbicides, insecticides, etc.			
☐ OSHA carcinogens above exclusion levels (Ref. 29 CFR 1910.1001-).			
☐ Toxic components with OSHA PEL or ACGIH TLV less than 2 ppm or 8 mg/m³.			
☐ Toxic metals (Arsenic, Beryllium, Cadmium, Mercury, Selenium).			
☐ Reactive components (Sulfides, Cyanides, Shock Sensitives, Pyrophorics, etc.).			
☐ Water reactive components (Isocyanates, Acid Chlorides, Anhydrides, etc.).			
☐ Biological hazards (Pathogenics, Infectious agents, Etiologic agents, etc.).			

☒ **None of the above** ☐ Special Handling Required

G. DOT Hazardous Material Description (Ref. 49 CFR 172.101)
Proper Shipping Name
Hazard Class Number
☐ Not DOT Hazardous Material ☒ Need assistance to determine

H. EPA Hazardous Waste Description (Ref. 40 CFR 261)
Waste Number(s) ☐ D001 ☐ D002 ☐ F001 ☐ F002 ☐ F0
☐ F004 ☐ F005
Hazard Code(s) ☐ I ☐ T ☐ C ☐ R ☐ E ☐ H
☐ Not EPA Hazardous Waste ☒ Need assistance to determ

I. Safety-Kleen requires a sample and charges a fee for the qualification of all new material. Purchase Order No.
Type of sample: ☒ grab ☐ tank ☐ composite of ____ #drums Sample taken by ☐ Customer ☒ Safety-Kleen Representat

J. To the best of my knowledge, this is an accurate material description and the sample submitted is representative of the material

Name CHRISTOPHER A. BOEHM Title MGR. SHOP SUPPORT

Signature Christopher A. Boehm Date 5/14/90 Phone (319) 753-85

Comments

Sales Representative Name DENNIS SHANNON Representative # 6337 Branch # 5-12

FORM 200-08-10 CUSTOMER 39572 REV 2-2-90

INDEPENDENT REGISTERED PROFESSIONAL ENGINEER
CLOSURE CERTIFICATION

I, _____(Name)_____, a Professional Engineer registered pursuant to the Professional Engineers Registration Law, _____, hereby certify that I have reviewed the Closure Plan for the _____(Type of Facility)_____ at _____(Name of Hazardous Waste Facility)_____ ("facility"), located at _____(Location)_____, that I am familiar with the rules and regulations of (regulatory citation) pertaining to closure of such facility, and that I personally have made visual inspection(s) of the aforementioned facility, and that the closure plan of the aforementioned facility has been performed in full and complete accordance with the facility's closure plan approved in writing by the U. S. Environmental Protection Agency (EPA) on _____, 19__, and the rules and regulations of (regulatory citation).

_____ _____
(Signature) (Date)

_____
(Professional Engineering License Number)

_____
(Business Address) (Seal)

_____
(Telephone Number)

OWNER OR OPERATOR CLOSURE CERTIFICATION

The undersigned, _____(Name of Owner or Operator_____, a (1) Corporation, incorporated under the laws in the State of _____ and licensed to do business in _____. or (2) (Partnership, Individual, Municipality or Other Entity), with its principal place of business at _____(Address)_____, which formerly owned or operated a hazardous waste (Description of Hazardous Waste Activity) (hereinafter "Facility") known as _____(Name of Hazardous Waste Facility)_____ and located at _____(Location)_____, in _____ County, _____(State)_____, has completed and permanently ceased the active operation of the facility and has fully implemented all measures relating to the closure of the facility as set forth in the Closure Plan approved by the U. S. Environmental Protection Agency (EPA) for said facility.

NOW, THEREFORE, I(we)_____(Name of Owner/Operator)_____ hereby swear and affirm that the above-named hazardous waste facility has been closed in accordance with the facility's Closure Plan approved in writing by EPA on _____, 19__, that all measures relating to the closure of the facility required by the Closure Plan and the rules and regulations of (regulatory citation) have been fully implemented, and that to the best of my (our) knowledge, no been fully implemented, and that to the best of my (our) knowledge, no violations continue to exist that may have arisen prior to closure.

_____
(Signature)

_____
(Title)

_____
(Address)

Taken, sworn and subscribed before me, this _____day of _____ 19__

_____

_____
(Notary)

QUALITY ASSURANCE PLAN

NET Midwest, Inc. - Rockford Division
3548 35th Street
Rockford, Illinois 61109

Approved by:

Brian Wanner
Division Manager

Mary Pearson
Quality Assurance
Coordinator

Deborah Bass
Regional Quality
Assurance Manager

This is copy No. 73 of 100 copies.

Specific project plans may vary.

All information contained in this manual is property
of NET Midwest, Inc. and is subject to revision.

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SECTION 3. QUALITY ASSURANCE PLAN DESCRIPTION

National Environmental Testing, Inc. (NET) goal is to be the leader in Environmental Services, achieved in part, through its quality assurance plan. The following sections describe various laboratory operations and our efforts to assure the highest quality in each area. Each operation is critical for the success of our lab. Section 5, Quality Assurance Objectives, is the cornerstone of this document in its description of internal quality control checks, frequency and corrective action.

The following important information is included in the laboratory's Statement of Qualifications and will not be found in this Quality Assurance Plan:

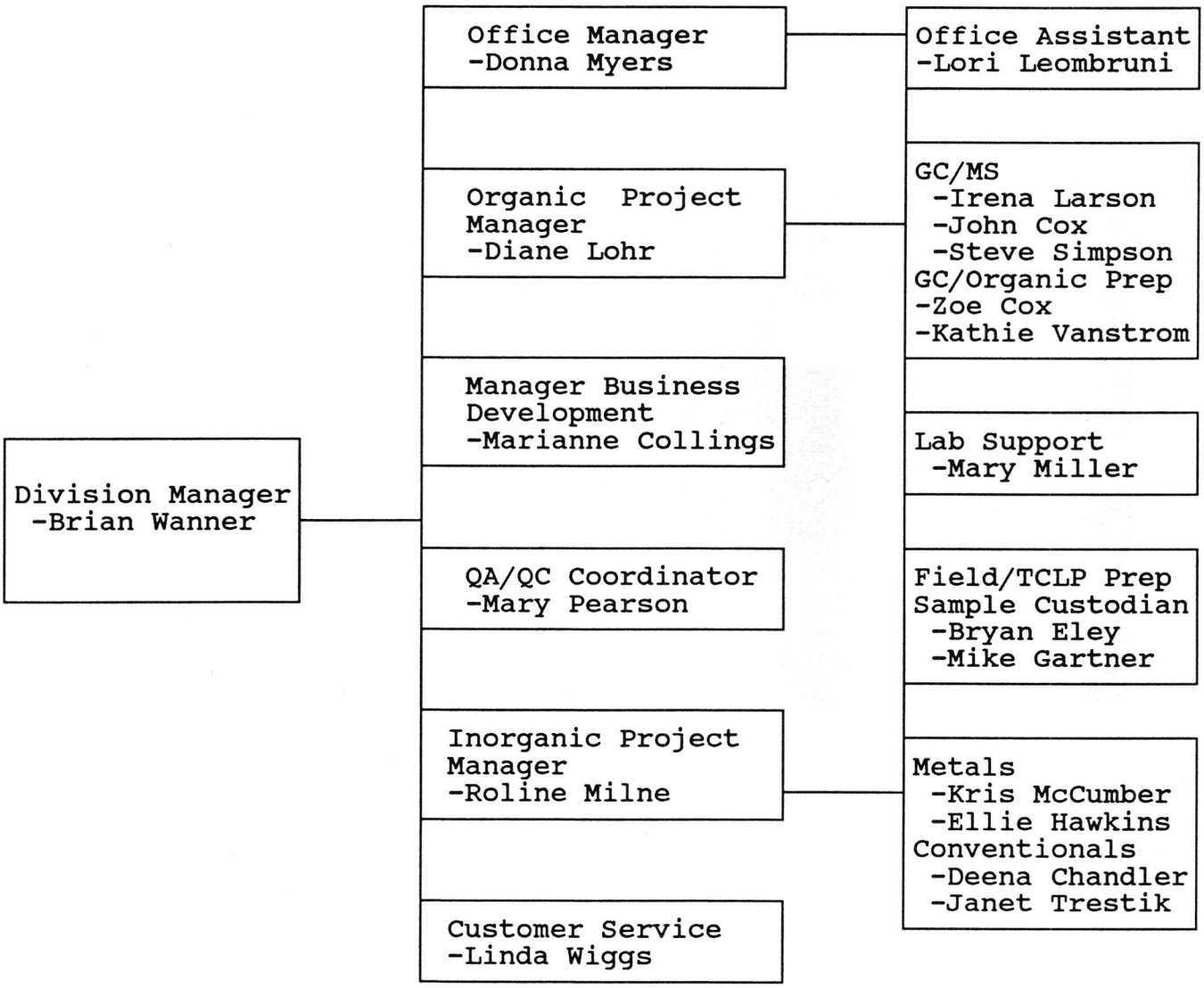
- Instrumentation List
- Methodology List
- Reporting Limits
- Resumes of Key Personnel
- Federal, State and Local Certifications

SECTION 4. ORGANIZATION - LABORATORY, REGIONAL AND CORPORATE

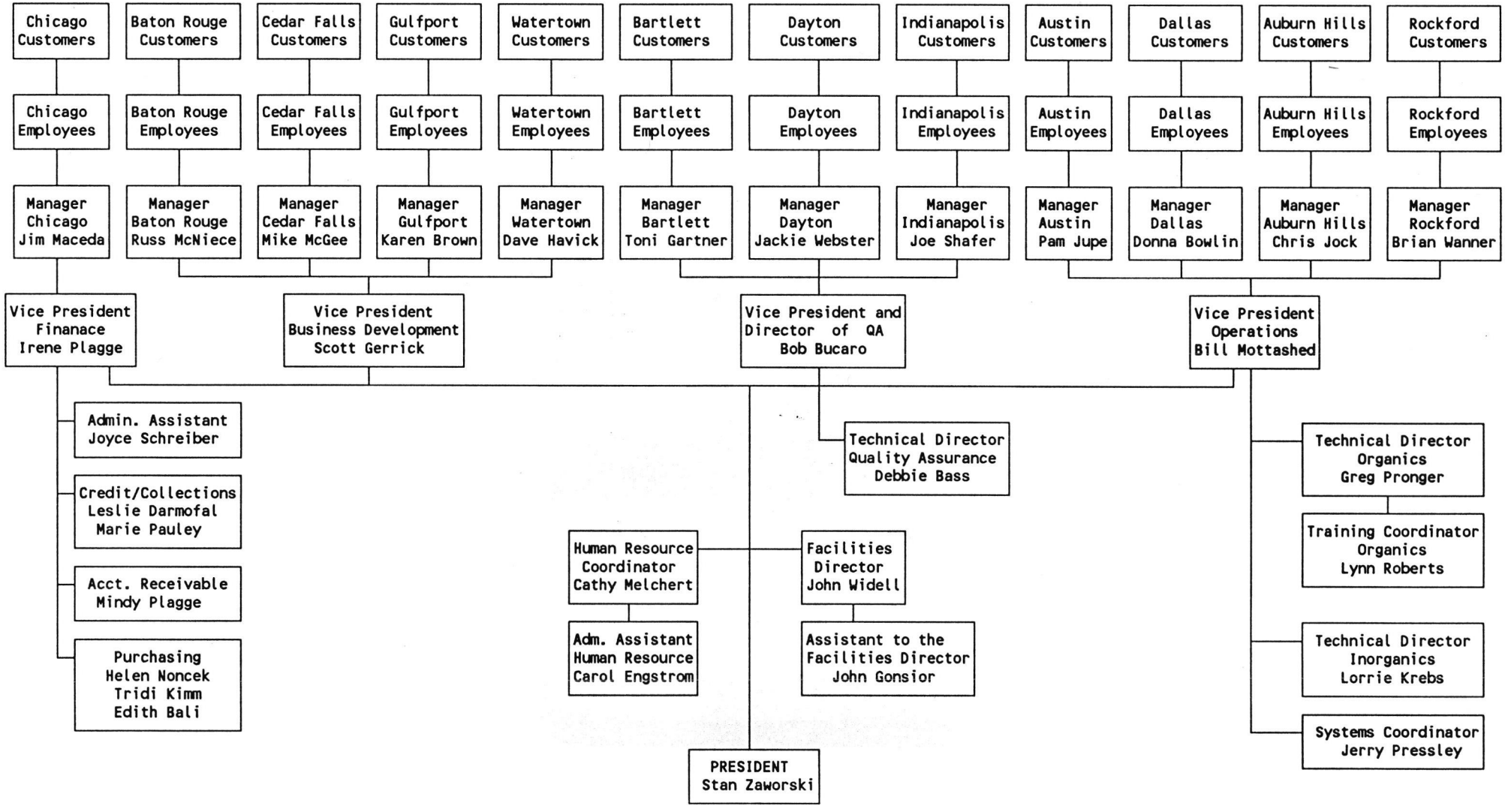
Organizational charts:

NET Midwest, Inc. - Rockford Division
NET Gulf Coast/Midwest Regional
NET Corporate

ROCKFORD DIVISION
ORGANIZATIONAL CHART



Gulf Coast/Midwest Group
Organizational Structure



National Environmental Testing, Inc.
Organizational Chart

NET Corporate
Cherry Hill, NJ
Graham Russell, President

NET Corporate Staff
Barbara Askinas, VP-Hum. Res.
Chris Mallios, VP-Finance
Steve Smith, VP-Corp. Devel.
Al Tordini, VP-Quality
Marilyn Melton, Data Quality
Jean O'Neill, Health/Safety

NET Systems Group
Dave Lloyd, Director

NET Atlantic
Thorofare, NJ
Keith Hausknecht, General Manager

- Cambridge, MA — Deborah McGrath, Division Manager
- Syracuse, NY — Rich Balamut, Division Manager
- Thorofare, NJ — Bob Maxfield, Division Manager

NET Gulf Coast/Midwest
Bartlett, IL
Stan Zaworski, General Manager

- Auburn Hills, MI — Chris Jock, Division Manager
- Austin, TX — Pam Jupe, Division Manager
- Bartlett, IL — Toni Gartner, Division Manager
- Baton Rouge, LA — Russell McNiece, Division Manager
- Cedar Falls, IA — Mike McGee, Division Manager
- Chicago, IL — Jim Maceda, Division Manager
- Dallas, TX — Donna Bowlin, Division Manager
- Dayton, OH — Jackie Webster, Division Manager
- Gulfport, MS — Karen Brown, Division Manager
- Indianapolis, IN — Joe Shafer, Division Manager
- Rockford, IL — Brian Wanner, Division Manager
- Watertown, WI — Dave Havick, Division Manager

NET Pacific
San Bruno, CA
Dick Swenson, General Manager

- Burbank, CA — Greg Anderson, Division Manager
- Pleasanton, CA * — Troy Mikell, Division Manager
- Portland, OR — Kent Patton, Division Manager
- San Diego, CA — Joe Arlauskas, Division Manager
- Santa Rosa, CA — Jules Skamarack, Division Manager

* mobile lab

NET ATLANTIC, INC.

100 Grove Road, Thorofare, NJ 08086 (609) 848-2255

Laboratory Operations:

Cambridge Division/MA Phone: (617) 232-2207	Syracuse Division/NY Phone: (315) 446-8795	Thorofare Division/NJ Phone: (609) 848-3939

NET PACIFIC, INC.

435 Tesconi Circle, Santa Rosa, CA 95401 (707) 526-7200

Laboratory Operations:

Burbank Division/CA Phone: (213) 849-6591	Santa Rosa Division/CA Phone: (707) 526-7200	Pleasanton/CA (Sales) Phone: (415) 462-4004

NET MIDWEST/GULF COAST, INC.

850 West Bartlett Road, Bartlett, IL 60103 (708) 289-7333

Laboratory Operations:

Austin Division/TX Phone: (512) 928-8905	Auburn Hills Division/MI Phone: (313) 391-2050	Bartlett Division/IL Phone: (708) 289-3100
Baton Rouge Division/LA Phone: (504) 293-1085	Cedar Falls Division/IA Phone: (319) 277-2401	Chicago Division/IL Phone: (312) 666-4469
Dallas Division/TX Phone: (214) 406-8100	Dayton Division/OH Phone: (513) 294-6856	Gulfport Division/MS Phone: (601) 863-3036
Houston/TX (Sales) Phone: (713) 681-5496	Indianapolis Division/IN Phone: (317) 842-4261	Rockford Division/IL Phone: (815) 874-2171
Watertown Division/WI Phone: (414) 261-1660		

SECTION 5. QUALITY ASSURANCE OBJECTIVES

5.1. Introduction

5.2. Level of QA Efforts
5.2.1. Accuracy and Precision
5.2.2. Completeness
5.2.3. Representativeness
5.2.4. Comparability
5.2.5. Performance Evaluation Samples
5.2.6. Quality Control Charts

5.3. Method Detection Limits, Limits of Quantitation and Reporting Limits

5.4. Method of Standard Additions

5.5. References

5.1. INTRODUCTION

The Quality Assurance Objective of NET, Inc. is to be the leader in providing analytical data of known, high quality.

In general, each method specifies the use and frequency of blanks, standards and spike samples.

Inorganic Quality Control (QC) Indicators are outlined in Table 5.1. A suggested analytical sequence is outlined in Table 5.2. Corrective action for outlying QC Indicators is addressed in Table 5.3.

Organic Quality Control (QC) Indicators are outlined in Tables 5.4. and 5.7. A suggested analytical sequence is outlined in both Tables 5.5. and 5.8. Corrective action for outlying QC Indicators is addressed in Tables 5.6. and 5.9.

As stated, the objective of the NET Quality Assurance Program is to provide data of known, high quality. To accomplish this, NET will:

- Maintain an effective, ongoing QA/QC program that measures and verifies laboratory performance.
- Provide sufficient flexibility to allow controlled changes in routine methodology to meet project specific data requirements.
- Recognize, as soon as possible, and provide corrective action for any factors which adversely affect quality.
- Monitor operational performance of the laboratory on a routine basis and provide corrective action as needed.
- Maintain complete records of chain of custody, raw data, laboratory performance, and completed analyses to support reported data.

5.2 LEVEL OF QA EFFORTS

5.2.1. Accuracy and Precision

Accuracy is a measure of the degree of agreement between an analyzed value and the true or expected reference value. Accuracy is usually expressed as Percent Recovery (%R).

Precision is a measure of the mutual agreement among individual measurements of the same parameter under similar conditions. Precision is usually measured as Relative Percent Difference (RPD).

An accurate archer will hit the bull's eye with an arrow. A precise archer may not hit the bull's eye, but will group the arrows, landing them in the same area of the target. An accurate and precise archer, provided with a good bow and high quality arrows, will land all of the arrows on the bull's eye.

Excellent Precision + Excellent Accuracy + The Highest Quality Stock Solutions = The Highest Quality of Data.

Accuracy and Precision, in the laboratory are assessed by the regular analysis of standard, spike, and duplicate samples.

5.2.2. Completeness

Completeness is the measure of the amount of valid data obtained from the analytical measurement system. It is defined as the total number of samples taken for which acceptable analytical data is generated, divided by the total number of samples collected, multiplied by 100.

$$\text{Completeness} = \frac{\text{Number of Samples w/ Acceptable Data}}{\text{Number of Samples Collected}} \times 100$$

Every attempt will be made to generate completely valid data. However, it is recognized that some samples may be invalidated in the laboratory and that some results may be deemed questionable based on internal QC results.

5.2.3. Representativeness

Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the sample. Sample handling protocols (ie: storage, preservation and transportation) been developed to preserve the representativeness of the collected samples. Proper demonstration will establish that the protocols have been followed and sample identification and integrity have been assured. Every attempt will be made to ensure that the aliquots taken for analyses are representative of the samples received.

5.2.4. Comparability

The generation of comparable data is the goal of any analytical program. This characteristic implies strict adherence to published analytical protocols and use of standard reporting units. NET's QA/QC program is structured to ensure adherence to the proper analytical protocols and to fully document these procedures. The QA objective is that all data resulting from these analyses be comparable with other measurements made by NET or other organizations.

5.2.5. Performance Evaluation Samples

Blind performance evaluation (PE) samples are evaluated semi-anually, by all NET labs, as part of NET's Internal Testing Program. Any result that is out of control for a parameter (greater than +/- 2.1 standard deviations from the recovered mean) is flagged and corrective action is taken.

As well as internal PEs, NET is able to test its abilities on external performance samples: PEs from public certifying agencies such as USEPA WP and WS studies, Illinois EPA, state DNRs, and various round-robin performance samples for private certification.

5.2.6. Quality Control Charts

A Quality Control Tabular Chart shall be maintained for inorganic parameters where the QC Chart applies. This chart is a daily record of QC sample performance. When a parameter has been run enough times to fill twenty points on the daily control chart, the Mean and Standard Deviation (SD) are calculated:

Control Limits are set at three times the SD about the Mean.
Warning Limits are set at two times the SD about the Mean.

Next, a new page for that parameter is started with the control limits in place from the previous twenty points. Until the twenty points are established, interim criteria are used.

When the statistical limits are established they will replace the interim control limits. The interim control limits are listed in the following tables.

5.3. METHOD DETECTION LIMITS, LIMITS OF QUANTITATION (LOQ) AND REPORTING LIMITS

Method Detection Limit (MDL) - The minimum concentration of a substance that can be qualitatively measured with 99% confidence that the analyte concentration is greater than zero, as compared to DI water, and is determined from analysis of a sample in a given matrix containing the analyte (40 CFR, part 136, Appendix B - Federal Register, Vol. 49, No. 209 - 10/26/84).

Upon addition of a new instrument or method, MDLs shall be verified according to 40 CFR, part 136, Appendix B, before that instrument is put into use.

Limit of Quantitation (LOQ) - The level above which quantitative results may be obtained with a specified degree of confidence. The value for LOQ of 10 times the standard deviation is recommended.

NET Gulf Coast/Midwest Reporting Limits (RL) are based on Limits of Quantitation.

A listing of all NET - Rockford Division Reporting Limits is available in the Rockford Division - Statement of Qualifications.

A Method Detection Limit bulletin is available, upon request, from the NET Gulf Coast/Midwest Regional Office.

Located: 850 W. Bartlett Road
Bartlett, Illinois 60103

phone: (708) 289-3100
fax: (708) 289-5445

5.4. METHOD OF STANDARD ADDITIONS (MSA)

The following procedures will be incorporated into MSA analyses:

5.4.1. Data from MSA calculations must be within the linear range as determined by the calibration curve generated at the beginning of the analytical run.

5.4.2. The sample and three spikes must be analyzed consecutively for MSA quantitation (the "initial spike run data is specifically excluded from use in the MSA quantitation). Only single injections are required for MSA quantitation.

5.4.3. Spikes should be prepared such that:

Spike 1 is approximately 50% of the sample absorbance.
Spike 2 is approximately 100% of the sample absorbance.
Spike 3 is approximately 150% of the sample absorbance.

5.4.4. The data for MSA quantitation should be clearly identified in the raw data documentation along with the slope, intercept , correlation coefficient for the least square fit of the data, and the results reported to the client. Reported values obtained by the MSA shall be flagged as such.

5.4.5. If the correlation coefficient for a particular analysis is less than 0.995, the MSA analysis must be repeated once. If the correlation coefficient is still less than 0.995, the result must be flagged.

5.4.6. The X-intercept is the quantified MSA result.

5.5 REFERENCES

1. EPA SW-846. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA, SW-846, 3rd Edition, September 1986.

2. USEPA Contract Laboratory Program, Statement of Work No. 788, for Inorganic Analysis. June 1989.

3. Illinois Contract Lab Program QAPP, Scope of work for State. 1989.

4. NET Gulf Coast QAP (Dallas Division). August 1989.

5. Aqualab Training Manual. Bartlett, Il. May 1986.

6. NET Bartlett Division Quality Assurance Plan. May 1991.

7. 40 CFR, Part 136, Appendix B - Federal Register Vol. 49, No. 209 - 10/26/84.

TABLE 5.1. INORGANIC QC INDICATORS

QC SAMPLE	ACCEPTANCE CRITERIA	FREQUENCY
5.1.1. CALIBRATION		
Flame AA: 3 standard calibration or per manufacturer's suggestions.	Correlation Coefficient cc = > 0.995. Back calculation of the calibration standards: High Conc. 90-110 % of true value. Mid Conc. 90-110 % of true value. Low Conc. 80-120 % of true value	Analyzed once at the beginning of each run.
Wet Chemistry: 3 standard daily calibration or a 5 point curve on file that is verified daily.	Correlation Coefficient cc= > 0.995. Back calculation of the calibration standards: High Conc. 90-110 % of true value. Mid Conc. 90-110 % of true value. Low Conc. 90-110 % of true value.	Analyzed once at the beginning of each run. 5 point curve run when necessary. (change in analyst, reagents, instrument) The 5 point curve must be verified daily.

TABLE 5.1. INORGANIC QC INDICATORS
(continued)

QA SAMPLE	ACCEPTANCE CRITERIA	FREQUENCY
5.1.2. BLANKS		
Calibration Blank or Reagent Blank (RB)	Absolute Value of the Reagent Blank must be < Reporting Limit.	One RB at the beginning of an analysis. One RB after every tenth sample. One RB at the end of every analysis.
Procedure Blank (PB): A reagent blank that is subjected to the same conditions as a prepared sample.	Absolute Value of the Procedure Blank must be < Reporting Limit. The Procedure Blank is not subtracted out of the samples.	One PB per sample batch. Sample batch shall contain no more than 20 samples of a similar matrix.
Trip Blank or Field Blank	Field or trip blanks are analyzed as requested.	

TABLE 5.1. INORGANIC QC INDICATORS
(continued)

QC SAMPLE	ACCEPTANCE CRITERIA	FREQUENCY
5.1.3. STANDARDS		
Initial Calibration Verification (ICV): Also known as a Standard Reference Material (SRM) - An independent std. purchased from an outside source.	+/- 10% of the true value. If the result exceeds this +/- 10%, the acceptance range established according to the statistics reported by the agency supplying the standard are taken into consideration.	Immediately following a calibration curve. The ICV is used to verify the curve.
Reporting Limit Verification Standard (RLVS) : A standard at the Reporting Limit.	75 - 125% of the true value. Warning only.	One RLVS at beginning of an analysis. Applies only to metals.
Continuing Calibration Verification Standard (CCV) : Mid-range standard.	90 - 110% of the true value.	One CCV at the beginning as part of the calib. curve. After every 10 samples. One at the end of the analysis.
Laboratory Control Standard (LCS) : A standard subjected to the same conditions as a prepared sample.	80 - 120% of the true value.	One LCS per sample batch. A sample batch shall contain no more than twenty samples of a similar matrix.

TABLE 5.1. INORGANIC QC INDICATORS
(continued)

QC SAMPLE	ACCEPTANCE CRITERIA	FREQUENCY
5.1.4. SPIKES		
Matrix Spike (MS) and Matrix Spike Duplicate (MSD): Subjected to the same conditions that a prepared sample undergoes.	75 - 125% of the true value for MS: Warning <20% Relative Percent Difference (RPD) for MSD: Warning	MS/MSD run with every sample batch. A batch shall contain no more than 20 samples of similar matrix.

TABLE 5.2. SUGGESTED ANALYTICAL SEQUENCE - INORGANICS

1. Calibration Blank = Reagent Blank (RB)
2. Calibration Curve
3. Initial Calibration Verification (ICV) - External Standard
4. Reporting Limit Verification Standard (RLVS) - Metals
*5. Procedure Blank (PB)
*6. Laboratory Control Standard (LCS) - May be the same as a digested or distilled ICV: If the digestion/distillation is a requirement for all samples per the methodology.

*Steps 5 and 6 apply if the samples have been prepped.

7. Sample #1 - 10
8. Reagent Blank (RB)
9. Continuing Calibration Verification (CCV)
10. Samples # 11 - 20
11. Matrix Spike (MS)
12. Matrix Spike Duplicate (MSD)
13. Reagent Blank (RB)
14. Continuing Calibration Verification (CCV)
15. Repeat steps 5 and 6 - if applicable
16. Samples #21 - 30
17. Reagent Blank (RB)
18. Continuing Calibration Verification (CCV)
19. Samples #31 - 40
20. Matrix Spike (MS)
21. Matrix Spike Duplicate (MSD)
22. Reagent Blank (RB)
23. Continuing Calibration Verification (CCV)
24. Repeat steps 5 and 6 - if applicable

repeat the cycle .....

TABLE 5.3. CORRECTIVE ACTION FOR OUTLYING QC INDICATORS INORGANICS

QC SAMPLE	ACTION TO TAKE IF OUTSIDE CONTROL LIMITS
Calibration Curve	Solve the problem. Restart analysis. Recalibrate.
Reagent Blank (Calibration Blank)	Solve the problem. Reanalyze the blank. Run the Procedure Blank.
Initial Calibration Verification Standard (ICVS)	Solve the problem. Reanalyze ICVS. Recalibrate if necessary.
Reporting Limit Verification Standard	See your supervisor. Warning limit only.
Procedure Blank	Rerun the Procedure Blank. If still out of control, check prep. procedure for possible errors. Reprepping may be required. See your supervisor. Cross-reference any reanalyses.
Laboratory Control Standard (LCS) (Procedure Standard)	Rerun the Laboratory Control Standard. If still out of control, check prep. for possible errors. Reprepping may be required. See your supervisor. Cross-reference any reanalyses.
Matrix Spikes (MS)/ Matrix Spike Duplicates (MSD)	If LCS is also out, reprepping may be required. See your supervisor. Cross-reference any reanalyses. If LCS is in, may be matrix interference. See your supervisor.
Continuing Calibration Verification (CCV)	Rerun CCV once. If still out of range, attempt to solve the problem. Rerun the batch of ten samples to which this standard applies. Cross-reference any reanalyses.
Continuing Calibration (Reagent) Blank	Rerun Blank once. If still out of range, attempt to solve the problem. Rerun the batch of ten samples to which this blank applies. Cross-reference any reanalyses.

TABLE 5.4. VOLATILE AND SEMI-VOLATILE QC INDICATORS - GC/MS

QC SAMPLE	ACCEPTANCE CRITERIA	FREQUENCY
Tune Check - BFB for Volatiles - DFTPP for Semi-Volatiles	Ions must pass USEPA criteria. See SOP and CLP Form 5.	Once every 12 hours.
Continuing Calibration Verification Compounds (CCCs)	Per the SOP. CCC and SPCC compounds. See CLP Form 6 or 7.	After Tune Check. Compare CCCs with 5 - point standard calibration curve that is on file.
Preparation Blank or Method Blank	No target compounds present, except common laboratory solvents at less than 5 times the reporting limit.	Once per 12 hour sequence, or per matrix type, or as provided by extraction protocol.
Matrix Spikes (MS) and Matrix Spike Duplicates (MSD)	Advisory USEPA criteria for spike recovery ranges. See CLP Form 3.	Once per 20 samples of similar matrix.
Surrogate Spike	Must meet USEPA Control Limits as required by the specific method. See CLP Form 2.	Surrogate Spike is included with every sample.
Internal Standards	Must meet USEPA criteria Internal for Internal Standard Standards Area Range. See CLP Form 8.	Internal Standards are included with every sample.
Laboratory Control Standard (LCS) (Procedure Standard)	Analyzed only if MS or MSD is out. Must be within USEPA criteria.	One per prep batch.

TABLE 5.5. SUGGESTED ANALYTICAL SEQUENCE FOR GC/MS
(also see specific SOPs)

VOLATILES

1. BFB Check **
2. Continuing Calibration Standard
3. Method Blank
4. Matrix Spike and Matrix Spike Duplicate
   (Laboratory Control Standard if MS or MSD fails)
5. Samples

** Samples must be analyzed within 12 hours of the BFB tune.

SEMI-VOLATILES

1. DFTPP Check **
2. Continuing Calibration Standard
3. Method Blank
4. Matrix Spike and Matrix Spike Duplicate from extraction
   (Laboratory Control Standard if MS or MSD fails)
5. Samples

** Samples must be analyzed within 12 hours of DFTPP Check.

TABLE 5.6. CORRECTIVE ACTION FOR OUTLYING QC INDICATORS - GC/MS VOLATILES AND SEMI-VOLATILES

QC SAMPLE		ACTION TO TAKE IF OUTSIDE CONTROL LIMITS
Tuning Check		Retune Mass Spectrometer and repeat.
Continuing Calibration Compounds (CCCs)		Rerun 5-standard calibration curve.
Method Blank	VOA -	Prepare new blank. Re-run Method Blank. If still out of control, see your supervisor.
	Semi-VOA -	Re-inject blank extract. out of control, see your supervisor.
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)		No corrective action outlined by USEPA criteria. Monitor for long term accuracy and precision problems. Analyze Laboratory Control Standard.
Surrogate Spike	VOA -	Re-analyze sample. If still out of control, see your supervisor.
	Semi-VOA -	Re-inject sample. If still out of control, see your supervisor.
Internal Standards		Same as for Surrogate Spikes.
Laboratory Control Standard (LCS)		Reprep entire batch of samples.

TABLE 5.7. PESTICIDES/PCBs QC INDICATORS- GC

QC SAMPLE	ACCEPTANCE CRITERIA	FREQUENCY
Breakdown Check DDT and Endrin (for runs with pesticides)	< 30% breakdown total < 20% for DDT or Endrin See CLP Form 8.	Every analytical batch.
Initial Calibration of Single Component Pesticides at five levels. (Reference Curve)	15% Relative Standard Deviation (RSD) for: aldrin, g-BHC, DDT & heptachlor. 30% RSD for all others.	As needed
Multi-Component Pesticides and PCBs at single level. (Quantitation Standard)	Acceptance Criteria is not applicable.	Every analytical batch.
Continuing Calibration INDA-M + INDB-M PCB 1016 PCB 1221/1260 Other PCBs as required by SOP 8080 6.3.3.	aldrin, DDT, dieldrin heptachlor, and lindane < 15% RSD. See CLP Form 9.	Every analytical batch
Surrogate Spike	Advisory Control Ranges are: 24-150% Soil 24-154% Water See CLP Form 2.	Every sample, blank and MS/MSD

TABLE 5.7. PESTICIDES/PCBs QC INDICATORS- GC
(continued)

QC SAMPLE	ACCEPTANCE CRITERIA	FREQUENCY
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	Listed on CLP Form 5 and SOP 8080.	Once per matrix batch of 20 samples.
Procedure Blank or Method Blank	No target compound detected above the reporting limit.	With each extraction.
Laboratory Control Standard (LCS)	Must meet the acceptance criteria set by the supplying agency.	One per matrix batch of 20 samples.

TABLE 5.8. SUGGESTED ANALYTICAL SEQUENCE FOR GC

1. INDA-M
2. INDB-M
3. PCB 1016
4. PCB 1221/1260
5. Other PCBs, as required per SOP 8080 6.3.3.
6. Method Blank
7. Matrix Spike and Matrix Spike Duplicate
   (Laboratory Control Standard if MS or MSD fails)
8. Samples

TABLE 5.9. CORRECTIVE ACTION FOR OUTLYING QC INDICATORS - GC - PESTICIDES/PCBs

QC SAMPLE	ACTION TO TAKE IF OUTSIDE CONTROL LIMITS
Linearity Check	Perform GC maintenance and repeat.
Continuing Calibration	Perform Initial Calibration - 5 point Calibration Curve.
Surrogate Spikes	No corrective action outlined by USEPA criteria. See your supervisor. Reanalyze/Reevaluate method if necessary. Monitor for long term precision and accuracy.
Matrix Spikes (MS) and Matrix Spike Duplicates (MSD)	Same as for Surrogate Spikes. Analyze Laboratory Control Standard.
Method Blank	Reanalyze extract. If still out of control, see your supervisor.
Laboratory Control Standard (LCS)	Reprep entire batch of samples. See your supervisor.

SECTION 6. SAMPLING PROCEDURES

6.1. Introduction

6.2. NET Standards of Procedure
6.2.1. NET Field SOP
6.2.2. Field Survey Forms
6.2.3. Field Log Book

6.3. Initial Set Up

6.4. Quality Control Samples

6.5. On-Site Analysis

6.6. Sample Flow - Sample Stream

6.7. References

6.1. INTRODUCTION

Field sampling techniques are designed so the sampler is able to retrieve a sample which is representative of the field area being tested. This sample needs to be of sufficient volume or amount to support the parameters requested. Under some conditions, a client may request a specific point sample which may not be representative of the general area - (ie: an industrial discharge point suspected of contaminating a broader area). This type of judgemental sampling shall be decided upon between the client's and lab's field officers. Otherwise, a sampling site shall be chosen to provide a portion representative of the general test area.

6.2. NET STANDARDS OF PROCEDURE

Analysts shall follow NET Field Standards of Procedure when sampling in the field. This field SOP addresses five major sampling types: Grab, Composite, Groundwater, Drum, and Soil Sampling. Methods are referenced in Table 6.1. As other types of field sampling occur, a standard field procedure will be written and approved before sampling begins.

6.2.1 NET FIELD SOP

The field SOP covers twelve main points:

1. Scope and Application
2. Summary of Procedures
3. Sample Preservation - Table 6.2. outlines preservation techniques and holding times, and indicates which parameters should be analyzed immediately in the field. This assures good sample and parameter integrity.
4. Approved Apparatus
5. Reagents Needed
6. Interferences - Chemical and Physical

6.2.1. NET FIELD SOP (continued)

7. QA/QC - Methods for assuring that the samples are representative of the area being tested and that these samples contain no possibility of contamination from field, trip, equipment, or other cross-contamination sources.

8. Procedure - Includes techniques for sample site selection.

9. Calculations

10. Clean Up/Waste Disposal/Safety - Field sampling equipment, at a minimum, shall be cleaned with laboratory detergent, parameter specific solvent or acid rinses, and deionized water. Further equipment clean up, or disposal, shall correspond with the procedure, assuring that equipment should not be a contamination source. Waste disposal procedures shall assure that no waste will fall on a sampling area causing possible contamination of that area.

11. Helpful Hints

12. Deviations from Referenced Method

6.2.2. FIELD SURVEY FORMS

Field SOP's shall include forms used to survey the sample area; and, checklists used to assure that proper equipment and reagents are on hand.

6.2.3. FIELD LOG BOOK

The field analyst shall carry a log book to record sample area information. Log books shall contain the date and time of day, sample area location and sample site selected, reasons for sampling, weather conditions, sample appearance, calculations, on-site analysis, and any other additional field observations or recommendations. The log book is a diary of events at a sample site. It should be organized neatly so others can look at the log book and derive information that may be deemed vital at a later date.

6.3. INITIAL SET UP

The lab's field officer, if possible, shall meet on-site with the client to determine sampling areas, number of samples, equipment used, and quality control samples to be performed.

6.4. QUALITY CONTROL SAMPLES

Field QC samples include blanks, duplicates, field spikes and background samples.

Trip Blanks - Used to determine existing container and/or deionized water contamination, or any contamination that may have occurred during transport. Trip blanks are prefilled sample jars carried into the field that remain unopened and are sent to the laboratory after the sampling along with the samples. Trip blanks should be supplied by the laboratory if it is supplying deionized water for the blanks and sample jars. If jars are supplied separately from the water, trip blanks should be prepared by the sampling team prior to leaving the office.

Field Blanks - Prepared in the field during sampling, field blanks are used to determine container contamination and/or contamination that may have resulted from existing field conditions when the samples were collected. Deionized water is poured from the stock containers into sample jars. The field blank must be collected, preserved and labelled as an aqueous sample.

Equipment Blanks - These blanks are used to determine equipment contamination and /or contamination that may have resulted from existing field conditions when the samples were taken. Equipment blanks should be taken after the equipment has been decontaminated on-site in order to match the conditions of actual sample collection closely. Deionized water should be poured through or over equipment, such as bailers and/or filters that may come in contact with the samples. Each piece of equipment must have a unique equipment blank sample.

Duplicate Samples - Duplicate samples are used to check laboratory precision and should not be identified to the laboratory.

Duplicates, which normally require one extra volume of sample, should be taken in an area of suspected or known contamination and given a unique sample number. They must be collected at the same time, from exactly the same location, using the same sampling equipment. Variability is expected in duplicate samples due to nonhomogenous sample media.

Matrix Spike Samples - Used by the laboratory to determine the effects of the sample matrix on the accuracy of analytical results. Matrix spike samples typically require two to three additional volumes of sample. For the best analytical results, an uncontaminated background location is required. Matrix spike percent recoveries are used to judge the accuracy of sample results only if the indigenous samples do not interfere with spike recovery results. Additional volumes should be collected for all matrices sampled.

Background Samples - Collected for all matrices sampled, to determine those parameters indigenous to the area. Background samples are used for comparative purposes when determining the type, amount and extent of contamination present and attributable to the site. In order to attribute contamination to the site, background samples need to be collected from undisturbed areas, but should include off-site influences. Avoid taking background samples near railroads, fence lines, roadways, driveways, telephone poles, and, if possible in active areas of the site. If these potential contamination sources are an integral part of the site, the sampler should identify them as discrete target locations.

Types of QC samples performed will vary according to sampling types, referenced in the NET Field SOP, site, and client sampling requests. For a sampling process, one may wish to make all three types of blanks and analyze only the field blank on a laboratory run as a screening procedure. If a problem is seen in the field blank, then other blanks can be analyzed to pinpoint the problem.

6.5. ON-SITE ANALYSIS

On-site analyses shall be performed in conjunction with the method referenced. Equipment calibrations, external standards, method blanks, method duplicates and spikes as well as any appropriate QA, shall be performed in the field, just as they would in the lab, according to the method and section 5 of this manual. Parameters tested in the field are dying parameters that may change in concentration or be altered rapidly. The following parameters are immediately tested in the field: pH, Specific Conductivity, Dissolved Oxygen, Free and Total Chlorine and Temperature. Methods an appropriate QA for these on-site parameters are included in the NET Field SOP, as well as methods for Flow Measurements.

6.6. SAMPLE FLOW - SAMPLE STREAM

The complete field process, from choosing the sampling site to handling the sample in the lab, is flowcharted in the following "sample stream".

Meet or confer with the client, on-site if possible. Choose the sampling sites.

|

Site assessment. Planning for the equipment, containers, preservatives needed, and QA sampling to be performed. Initiate Field Survey and Chain of Custody Forms with known information.

Before Sampling Begins

After Sampling Begins

Set up on-site. Sample staging area.

|

Samples collected, filtered for dissolved parameters, contained and preserved.

|

6.6. SAMPLE FLOW - SAMPLE STREAM (continued)

Field Survey and Log Book information recorded.

On-site analyses performed.

Chain-of-Custody Form filled out.

Receipt in the laboratory.

Chain of Custody completed.

Responsibility of Field Personnel

Responsibility of Lab Personnel

Sample receipt and storage.

Review the established holding times. Prioritize analyses.

6.7. REFERENCES

1. "NET Field Standards of Procedure"

2. Environmental Lab. "Sampling in the Field". Mediacom, Inc., Vol. 2, No. 3, June/July 1990.

3. BFI Sampling and Analysis Plan. "Sampling Groundwater Monitoring Wells". BFI - P.O. Box 3151. Houston, Texas 77253.

4. Standard Methods for the Examination of Water and Wastewater. 1989. 17th Edition, Part 1060. "Collection and Preservation of Samples".

5. USEPA. Test Methods for Evaluating Solid Waste. November 1986. SW-846, 3rd Edition. Volume II: Field Manual.

6. NET Bartlett Division - Quality Assurance Plan. May 1991.

TABLE 6.1. RECOMMENDED CONTAINERIZATION AND PRESERVATION

Parameter	Sample Container*/ Preservative	Preferred Volume(ml)*	Holding Time*
Acidity	P,G / A	250	14 Days
Alkalinity	P,G / A	250	14 Days
Bacteria, Total Coliform	Sterile / F	250	6 Hours
Bacteria, Fecal Coliform	Sterile / F	250	6/30 Hours
BOD, 5 Day	P,G / A	500	48 Hours
Boron	P,G / A	100	28 Days
Bromide	P,G / G	100	28 Days
Chloride	P,G / G	250	28 Days
Chlorine, Total	P,G / G	100	Immediately
COD	P,G / C	100	28 Days
Color, True	P,G / A	100	48 Hours
Conductivity	P,G / A	250	28 Days
Cyanide, Total	P,G / D	500	14 Days
Cyanide, Amenable	P,G / D	500	14 Days
Fluoride	P / G	250	28 Days
Hardness	P,G / B	250	6 Months
MBAS	P,G / A	500	48 Hours
Nitrogen, Ammonia	P,G / C	500	28 Days
Nitrogen, Kjeldahl	P,G / C	500	28 Days
Nitrogen, Nitrate	P,G / C	250	28 Days
Nitrogen, Nitrite	P,G / A	100	48 Hours
Oil & Grease	G / C	1000	28 Days
pH	P,G / G	100	Immediately
Phenol	G / C	500	28 Days
Phosphorus, Total	P,G / C	250	28 Days
Phosphorus, Ortho	P,G / A	100	48 Hours
Silica	P / A	100	28 Days
Sulfate	P,G / A	250	28 Days
Sulfide	P,G / E	500	7 Days
Sulfite	P,G / G	500	Immediately
Turbidity	P,G / A	100	48 Hours
Total Organic Carbon (TOC)	P,G / C	100	28 Days
Total Organic Halogen (TOX)	GA / B	500	28 Days
Total Solids	P,G / A	100	7 Days
Total Dissolved Solids	P,G / A	100	7 Days
Total Suspended Solids	P,G / A	100	7 Days
Total Volatile Solids	P,G / A	100	7 Days
Metals (except Mercury and Hexavalent Chromium)	P,G / B	250	6 Months
Mercury	P,G / B	250	28 Days
Hexavalent Chromium	P,G / A	100	24 Hours

* Section No. 6, page 11 of 11

Parameter	Sample Container*/ Preservative	Preferred Volume(ml)*	Holding Time*
Volatile Organics	VOA / A	80	14 Days
Base Neutrals	GA / A	1000	7 Days Pre-extraction 40 Days Post-extraction
Acid Extractables	GA / A	1000	7 Days Pre-extraction 40 Days Post-extraction
Pesticides	GA / A	1000	7 Days Pre-extraction 40 Days Post-extraction
PCB's	GA / A	1000	7 Days Pre-extraction 40 Days Post-extraction
Herbicides	GA / A	1000	7 Days Pre-extraction 40 Days Post-extraction

Sample Container: P = Plastic G = Glass GA = Glass Amber Bottle with Teflon Lined Cap
VOA = Volatile Organic Analyte requires 40 ml Glass Vial with Teflon Septum

Sample Preservation:

A - Cool Only, 4°C
B - HNO_3
C - H_2SO_4
D - NaOH (Sodium Hydroxide) pH>12
E - Zinc Acetate + NaOH pH>9
F - $Na_2S_2O_3$ (0.008%) (Sodium Thiosulfate)
G - None

With the exception of samples not requiring preservation (G), all samples are kept at 4 degrees centigrade.

*Sample container, preferred volume, and holding time are for water matrix. Consult laboratory for other matrix sampling recommendations.

SECTION 7. SAMPLE CUSTODY AND LOG-IN PROCEDURES

7.1. Chain of Custody

7.2. Sample Flow

7.3. Paper Flow

7.4. Interlaboratory Shipment

7.1. CHAIN OF CUSTODY

Each sample batch submitted shall be tracked by a Chain of Custody (COC). The COC starts at sample collection. It records appropriate sample information and is the client's opportunity to document project requirements. Instructions for completion of the COC are on the reverse side of that document.

Every time the sample passes hands, that transaction is described and the COC is signed by both parties.

The COC is a final statement of request to describe the client's needs for that sampling event. If a question arises at a future date, the COC is a description of the sample and parameters requested. The COC is required for audit compliance and certification.

When the sample analyses are complete, and results are reported, a copy of the COC will accompany the client's report.

A copy of the NET Gulf Coast/Midwest COC is provided here. A client may use specific COCs approved by their firm.

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest Inc
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CHAIN OF CUSTODY

Client	Project Name
Send Report to:	
Address Telephone #	Collected by:

Collection Information								Parameters														
Sample ID	Sampling Location	Date	Time	G R A B	C O M P	Sample Type	No. of Con-tainer															

Remarks: _____

Relinquished by:	Date	Time	Received by:	Date	Time
Shipping Notes/Lab Comments			Received for NET Midwest by:		

Samples Field Filtered: ___ Yes ___ No
Seals Intact Upon Receipt: ___ Yes ___ No ___ N/A

7.2. SAMPLE FLOW

Sample Collection - COC started.

↓

Sample received at NET - COC signed at the laboratory.

↓

Sample logged into NET computer system with a unique sample #.

↓

Sample and paperwork given to the Sample Custodian. Proper preservation techniques and holding times are monitored.

↓

If necessary, the sample is split; then distributed to the appropriate areas of the lab for analysis. Access sample is sent to a holding area. This holding area is restricted to analytical personnel and the Sample Custodian only.

↓

Sample analysis.

Sample collection and results reported.

Samples kept in storage or returned to the client.

Sample disposal - after a waiting period of at least one month from the analytical report date. Special handling if the samples are found to be hazardous.

7.3. PAPER FLOW

COC signed by the receptionist.

Sample logged into NET computer system. Any special circumstances are noted for reference by analysts.

The log-in sheet and COC, with complete sample information, go to the Sample Custodian for storage and tracking.

The log-in sheet then goes to the appropriate Project Manager to ensure the sample was logged-in according to the customers needs.

The paperwork is filed and matched with the report when the results are complete. The original COC is sent with the report. Copies are kept on file.

7.4. INTERLABORATORY SHIPMENT OF SAMPLES

1. Discuss and arrange the following with the NET laboratory that will receive the samples:

   a. Price
   b. Turnaround time
   c. What analyses are required
   d. Number of samples
   e. How samples will be shipped and when they will arrive
   f. Any special methods, detection limits, or certifications
   g. Any special chain-of-custody requirements
   h. Any holding time concerns
   i. Any special information on the nature of the sample
   j. Any special report requirements

2. Fill out the interlaboratory purchase order. Fill in all of the information provided on the purchase order as communicated above and additional information as required.

3. Chain-of-custody is required. Retain a photocopy of the original. Send the original with the samples.

4. Next, HIGHLIGHT your appropriate sample number(s) on the LABSYS logsheet. This will be the receiving labs sample identification for the report.

5. Next, HIGHLIGHT the appropriate analytes that you are requesting the receiving lab to analyze.

6. Send the completed original purchase order along with the samples. Do not FAX this sheet, as the highlighted information will be obliterated in the process.

7. Next, carefully pack the samples into the appropriate container for shipment. Include the pertinent paperwork. Use an appropriate method of shipment to insure sample integrity and timeliness of receipt.

8. Upon receipt of the samples, log-in using the sending Division's Sample Number and Client Name as "Sample Description".

9. Maintain chain-of-custody and sample control as normal.

10. Return original signed chain-of-custody document with the Analytical Report.

11. Do not Interlab any samples or projects that specify analysis only at the Rockford Division.

SECTION 8. CALIBRATION PROCEDURES AND FREQUENCY

8.1. Quantifying Results and Linear Range

8.2. Traceability of Standards

Table 8.1 Analysis Type and Calibration Procedure

Volatiles by GC/MS

Semi-Volatiles by GC/MS

Pesticides by GC

PCBs by GC

Metals by Flame AA
Hydride Generation
Cold Vapor

Conventionals

8.1. QUANTIFYING RESULTS AND LINEAR RANGE

Any result shall be quantified at a point less than the highest concentration of standard used to construct the calibration curve, or at a point less than the highest standard analyzed and shown to be in control for that run. If the original run is above the highest standard, the sample must be diluted to such a point within that curve. Therefore, the calibration curve or the high standard (linear range standard) indicates the practical linear range for that parameter.

8.2. TRACEABILITY OF STANDARDS

Standards for GC/MS and GC are purchased with traceability papers, tracing the reliability of that standard to a reference value at the National Bureau of Standards, Washington D.C.

All standards and reagents are logged into a materials receipt book, with the date received, manufacturer, lot number, and expiration date recorded. All standards and reagents are labelled with date received, date opened, and expiration date.

All standards and reagents are assigned a unique number as to trace the item through any preparation stage.

TABLE 8.1. ANALYSIS TYPE AND CALIBRATION PROCEDURE

Analysis Type	Calibration Procedure
Volatiles by GC/MS	1. 5-standard calibration curve on file: The Calibration Check Compounds (CCCs) - Percent Relative Standard Deviation (%RSD) must be < 30.0 %. The System Performance Check Compounds (SPCC) - minimum mean Response Factor (RF) must be > 0.05. 2. 1-standard daily calibration - analyzed to verify the 5-standard curve on file: The Calibration Check Compounds (CCCs) - Percent Relative Standard Deviation (%RSD) must be < 25.0 %. The System Performance Check Compounds (SPCC) - minimum mean Response Factor (RF) must be > 0.05. 3. 5-point standard calibration curves are regenerated when CCC and SPCC criteria are not met.
Semi-Volatiles by GC/MS	1. 5 - standard calibration curve on file: CCC: %RSD < 30.0 % SPCC: mean RF > 0.25 (exception: Bromoform - mean RF > 0.30) 2. 1 - standard daily calibration - analyzed to verify the 5 - standard curve. CCC: % Difference < 25.0 % SPCC: RF > 0.25 (Bromoform > 0.30) 3. 5 - standard calibration curves are regenrated when CCC and SPCC criteria are not met.

Analysis Type	Calibration Procedure
Pesticides by GC/ECD	1. 5 - standard calibration curve on file: CCC: %RSD < 20. % other compounds: %RSD < 30. % 2. 1 - standard daily calibration: CCC: %Difference <20. %
PCBs by GC/ECD	1. 5 - standard calibration curve on file: %RSD < 30. %, warning 2. 1 - standard daily calibration: %RSD <20. %, warning
Metals by Flame AA, Cold Vapor, and Hydride Generation	1. 3 - standard calibration curve with each run: correlation coefficient: > 0.995. Back calculated standards must agree within 90 - 110 % of the true value. The low-range standard must agree within 80 - 120 % of the true value.
Conventionals	1. 3 - standard daily calibration curve: correlation coefficient: > 0.995. Back calculated standards must agree within 90 - 110 % of the true value.

SECTION 9. DATA REDUCTION, VALIDATION AND REPORTING

9.1. Data Reduction

9.2. Data Validation

9.3. Data Reporting

9.4. Quality Control Summaries

Table 9.1 NET Analytical Data Reporting Scheme

9.1. Data Reduction

Analytical results will be reduced to appropriate concentration units using appropriate methods given in the analytical procedure.

9.2. Data Validation

Data validation is the process of examining data and accepting or rejecting it based on pre-defined criteria. NET supervisory and analytical personnel use the following criteria to validate laboratory data:

- Use of approved analytical procedure,
- Use of properly operating and calibrated instrumentation, and
- All Quality Control Indicators (QCIs), specifically discussed in section 5, must be in control. If any of the QCIs are outlying, appropriate measures must be taken to bring the QCI in control. No data shall be reported with out all QCIs in control, unless signed by the appropriate project manager.

Records of all data will be maintained. If any of the above criteria are not met, corrective action must take place before the data is validated.

9.3. Data Reporting

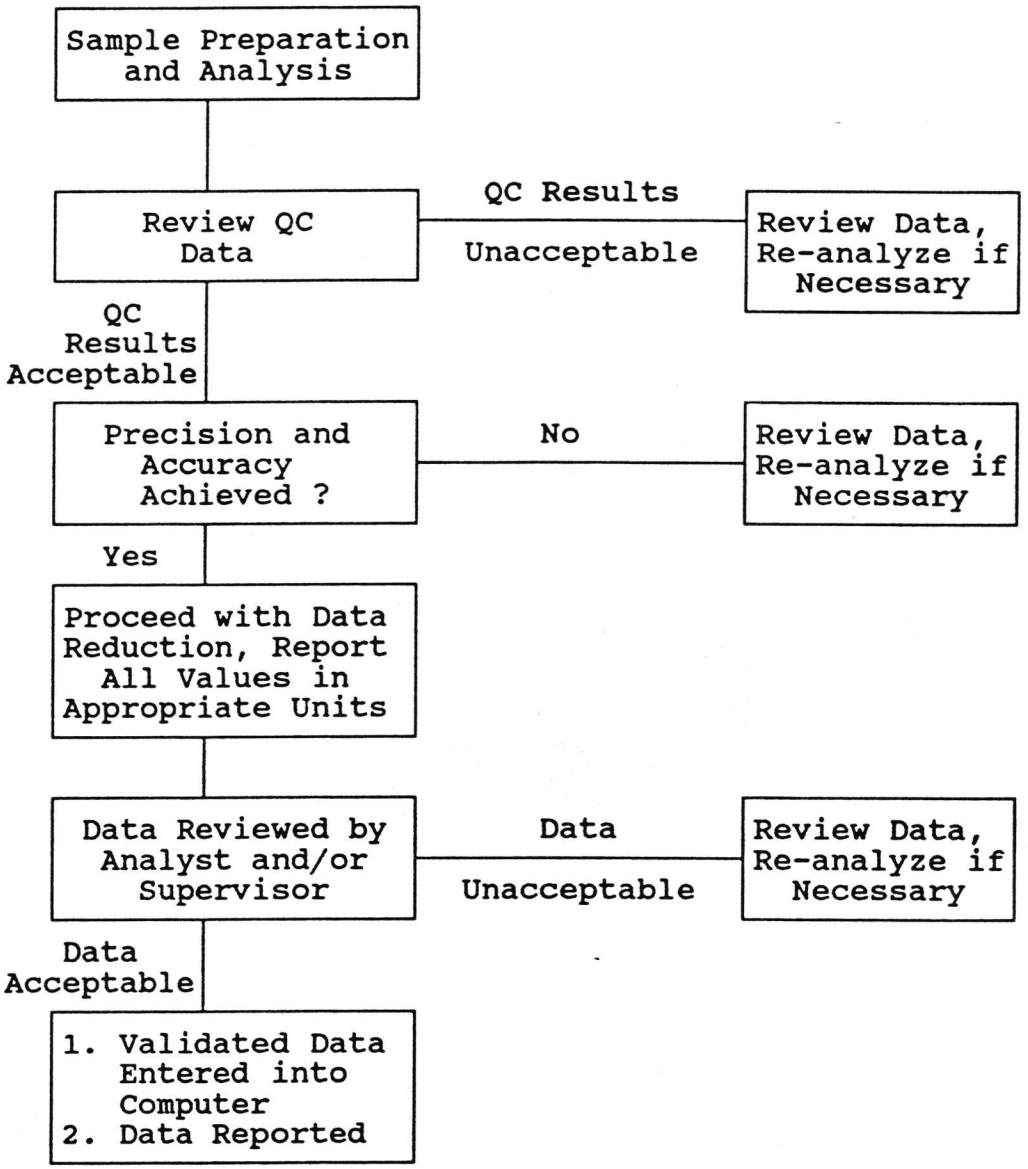
Analytical results will be reported on formats acceptable to the customer. These reports will be assembled by the project manager and delivered to the customer within the time frame specified by the customer and agreed to by the laboratory.

If, for any reason, requirements for data validation are not met, the appropriate result will be flagged on the analytical report - if agreeable to the client.

9.4. Quality Control Summaries

The QC Indicators data, from QC indicators listed in Section 5, are recorded for each analytical run. This data is kept on file. If a client should need any information from these QC samples, the information is available at different reporting levels and at different charges. There is no charge for the most basic QC information. The QC data is reportable with the analysis or at a later date, this is dependant upon agreement between the laboratory and client.

TABLE 9.1. NET Analytical Data Reporting Scheme



SECTION 10. PERFORMANCE AND SYSTEM AUDITS

10.1. Performance Audits

10.2. System Audits

10.3. Corrective Action Reports

10. PERFORMANCE AND SYSTEM AUDITS

NET - Rockford Division maintains a schedule of both external and internal performance and system audits. The following describes external audits.

10.1. PERFORMANCE AUDITS

NET - Rockford Division is audited, in the form of performance evaluation samples (PEs), by the following agencies at the following frequencies:

Federal Government

- Water Pollution (WP) and Water Supply (WS) performance samples are analyzed approximately quarterly, between the two studies. Results from these samples are avaliable to the client upon request.

- National Pollution Discharge Elimination System (NPDES) performance samples are analyzed annually for NPDES permitting.

State Government

- Annual performance samples are submitted by the State of Illinois for its Safe Drinking Water Act Certification.

- Annual performance samples are analyzed for Wisconsin Department of Natural Resources certification.

Local Agencies

- The types and frequency of PE samples analyzed for local industries varies.

Private Agencies

- Chemical Waste Management submits quarterly PE samples as part of the Chemical Waste Management Certification Program.

For all of the listed programs, reports are sent from our lab to the existing agency. That agency reports data back to NET - Rockford Division in the form of the true value of analytes tested, the recovered mean, standard deviation, and acceptance ranges. The latter three values are statistically calculated from results supplied by participating laboratories.

Any parameter that falls outside the given acceptance window is flagged. At NET, these parameters undergo a rigorous corrective action report. Additional performance samples are submitted to monitor progress of that method.

A blank Corrective Action Report is supplied in Section 10.3.

10.2. SYSTEM AUDITS

System audits are in the form of a visit to our lab by a professional auditor(s). On the government level, state audits are performed periodically by the State of Illinois, and the State of Wisconsin, in order to maintain our certification.

We are audited annually by Chemical Waste Management as part of that certification program.

Private industries perform system audits more frequently. NET Rockford is audited by private firms approximately once every other month.

A system audit will consist of a visit, usually one day. In this time, the auditor makes recommendations from the audit findings. Generally, excellent information is exchanged during the audit. The professional auditors are typically highly experienced and knowledgeable.

The laboratory will review the recommendations, and respond to the findings in the form of changes or future plans.

Detailed files and follow-up are kept for every system of performance audit.

NATIONAL ENVIRONMENTAL TESTING, INC.

Corrective Action Report

DATE:
cc:

TO: QA Director

RE: Out-of-Control ITP Value Reported

FR: _____

Division: _____ Dept: _____

Analysis: _____ ITP#: _____

True value: _____ Reported value: _____ Units: _____

Control limits (CLs): _____ CL ref: APG; 2*stdev

Method reference & #: _____

Instrument ID and type: _____

Problem Identification - Check ALL Boxes That Apply

- [ ] Training
- [ ] Supervision
- [ ] Method not followed
- [ ] Login
- [ ] QC not performed
- [ ] Reporting
- [ ] QC CLs ignored
- [ ] Laboratory contamination
- [ ] Detection limits problems
- [ ] Instrument or service problem
- [ ] Dilution or calculation
- [ ] Standards supplier problem
- [ ] Other _____
- [ ] Unknown

Corrective Action Taken: 1. _____

_____

_____

_____

Date: _____

_____
Section Supervisor

_____
QA Manager

_____
Division Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

Corrective Action Report Part Two

DATE:

TO: QA Director

cc:

RE: Regionally Administered PE Results

FR: Regional Quality Assurance Manager

ITP#:_____ Analysis:_____ Division:_____

PE Sample Source: _____

PE True Value: _____ PE Control Limits: _____

Control Limit reference: _____

Laboratory Result: _____

Date of PE Analysis: _____

Was the PE Single Blind? _____ Double Blind? _____

Is the Analysis now in Control: _____

Comments: _____

_____

_____

_____

_____

_____

_____

Regional Quality Assurance Manager

Corrective Action Report - Quality Control Indicators

ITP#:_____ Anaylsis:_____ Division:_____

DETECTION LIMIT (DL)		METHOD BLANK		
Date run	Measured DL	Date	Concentration	Control Limit(CL)
Detection Limit Reference		Method Blank CL Reference		

EXTERNAL STANDARD VERIFICATION - INDEPENDENT REFERENCE

Date run	True Concentration	Measured Concentration	CLs
External Standard Control Limit Reference			

CONTINUING CALIBRATION VERIFICATION-ON-GOING CALIBRATION CHECK

Date run	True Concentration	Measured Concentration	CLs
LCS Control Limit Reference			

ACCURACY CHECK - SAMPLE SPIKE

Date run	Sample Conc.	Spike Conc. Added	Total Conc. Observed	Percent Recovery
Accuracy CLs	Accuracy Control Limit Reference			

PRECISION CHECK - SPIKE & SPIKE DUPLICATE OR SAMPLE & DUPLICATE

Date run	True Conc.	Relative % Difference (RPD)	RPD CL	RPD CL Reference

CALIBRATION

Date run	# of standards	Lowest standard Concentration	Highest standard Concentration
Calibration CL	Observed	Calibration CL Reference	

SIGNATURE _____ DATE _____

CORRECTIVE ACTION CHECKLIST

Try to identify the real problem, not just the symptoms
Conduct the investigation of items in the order presented

____1) Transcription Errors
- raw data result vs PE result?
- lab notebook result vs computer result?
- between any of the raw data?

____2) Calculation Errors
- are correct raw data values used?
- were dilutions, if made, accounted for?
- back calculate to check calculation.
- was result in correct units?

____3) Log-In Errors
- was correct sample used?
- were correct parameters analyzed?
- check chain of custody, if appropriate.
- was preservation correct?
- was container correct?

____4) Batch QC Errors
- were proper QC indicators analyzed?
- were control limits met?
- is result greater than MDL?
- does blank show contamination?
- is calibration valid?
- was ICVS in control and consistent?
- did CCVS verify calibration?
- was LCS in control?
- were MS/MSD or Dup results appropriate?
- check QC chart trends.

____5) Standards Errors
- were standards within shelf life?
- are they the right standards?
- were they made correctly?
- do standards show signs of concentrating?
- was standardization necessary?
- were new standards compared to old?
- was new curve verified with an ICVS?

____6) Reagent Errors
- were reagents within shelf life?
- are they the right reagents?
- were they made correctly?
- were they obtained from new source?
- are reagents contaminated?
- check DI water, any problems with system?

____7) Instrument Errors
- when was instrument last serviced?
- is maintenance or cleaning needed?
- did instrument malfunction during test?
- was response normal?

____8) Method Errors
- was proper method used?
- was an approved SOP available?
- was SOP followed?
- is there known problem with method?
- was holding time met?
- was good lab techniques used?
- was the analyst properly trained?
- were interferences considered?
- were prep steps proper & complete?
- were dilutions at proper concentration?
- review all raw data.

____9) PE Sample Errors
- reason to question validity of PE sample?
- was sample reanalyzed to verify result?
- was PE sample prepared per instructions?

11. PREVENTATIVE MAINTENANCE PROCEDURES AND SCHEDULE

Every instrument and pipet has a maintenance schedule of (at a minimum) once per month. Maintenance files include information on routine maintenance steps, frequencies, and provides space for a diary of work done to that instrument.

For major instrumentation (GC/MS, GC, AA) a maintenance log book is kept next to the instrument. Any work done to that instrument is logged into this book.

Service contracts are maintained for GC/MS, GC, and AA.

12. QUALITY ASSURANCE REPORTS TO MANAGEMENT

The laboratory's Quality Assurance Coordinator reports directly to the Division Manager. A weekly meeting is held where both short term and long term progress and goals are discussed.

The laboratory's Quality Assurance Coordinator also reports indirectly to the Regional Quality Assurance Manager. The Regional QA Manager is kept up to date on all QA related activities at the Division, and is able to provide support when necessary.

13. LISTING OF ACRONYMS

AA - Atomic Absorption
BFB - Bromofluorobenzene (volatile tuning compound)
CAR - Corrective Action Report
CB - Calibration Blank
CCC - Continuing Calibration Compound
CCV - Continuing Calibration Verification
CFR - Code of Federal Regulations
CL - Control Limit
CLP - Contract Lab Program
COC - Chain of Custody
DFTPP - Decafluorotriphenylphosphate (semi-volatile tuning compound)
GC - Gas Chromatograph
GC/MS - Gas Chromatograph/Mass Spectrophotometer
ICP - Inductively Coupled Plasma
ICV - Initial Calibration Verification
INDA-M - Individual Mix A (pesticide standard)
INDB-M - Individual Mix B (pesticide standard)
ITP - Internal Testing Program
LCS - Laboratory Control Standard
LOQ - Limit of Quantitation
MDL - Method Detection Limit
MSA - Method of Standard Addition
MS/MSD - Matrix Spike/Matrix Spike Duplicate
NET - National Environmental Testing
NPDES - National Pollution Discharge Elimination System
PB - Procedure Blank
PCB - Polychlorinated biphenyl
PES - Performance Evaluation Sample
QA - Quality Assurance
QAP - Quality Assurance Plan
QAPP - Quality Assurance Project Plan
QC - Quality Control
r - Correlation Coefficient
cc - Correlation Coefficient
%R - Percent Recovery
RF - Response Factor
RL - Reporting Limit
RLVS - Reporting Limit Verification Standard
%RSD - Percent Relative Standard Deviation (standard deviation divided by the mean X 100)
RPD - Relative Percent Difference (difference divided by the average X 100)

SD - Standard Deviation
SOP - Standard Operating Procedure
SOQ - Statement of Qualifications
SPCC - System Performance Check Compound
SRM - Standard Reference Material
SW-846 - Solid Waste Manual; USEPA
USEPA - United States Environmental Protection Agency
VOA - Volatile Organic Analysis
VOC - Volatile Organic Compounds
WP - Water Pollution; PE study
WS - Water Supply; PE study

Erwin D. Toerber
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FEHR-GRAHAM
& ASSOCIATES
Engineering and Science
Consultants

CERTIFIED MAIL NO. P-949 586 220
RETURN RECEIPT REQUESTED

RECEIVED
NOV 23 1992
IOWA SECTION

November 20, 1992

Mr. Don Lininger, RCRA/IOWA
Unites States Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, KS 66101

RE: Submittal of Closure Plan
General Electric Company - Switchgear Operation
West Burlington, Iowa
EPA ID No. IAD005272703

Dear Mr. Lininger:

Enclosed are two copies of the referenced plan. This plan is being submitted pursuant to the September 11, 1992 letter from James V. Callier of your agency notifying General Electric to provide the plan.

Should you need a contact for the plant, it is:

Elizabeth McBee
General Electric Company
Switchgear Operation
510 E. Agency Road
West Burlington, IA 52655
319/753-8508

Recycled Paper

We believe the submittal is complete and all required data has been submitted, however should you have technical questions or require clarification, please contact us by telephone at 815/235-7643.

Very truly yours,

Gene D. Fox

Gene D. Fox
Project Manager

GDF:bl
Enclosure
CC: Beth McBee, GE
Chris Boehm, GE

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