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CLOSURE CERTIFICATION REPORT TO THE DRUMMED HF RESIDUE/ASSOCIATED STORAGE AREA INSIDE PLANT 4 JANUARY 1994

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REPORT

CLOSURE CERTIFICATION REPORT FOR THE DRUMMED HF RESIDUE/ASSOCIATED STORAGE AREAS INSIDE PLANT 4

JANUARY 1994

Fernald Office
U. S. Department of Energy
Fernald Environmental Management Project
7400 Willey Road
Fernald, Ohio 45030

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CLOSURE CERTIFICATION REPORT FOR THE DRUMMED HF RESIDUE/ASSOCIATED STORAGE AREAS INSIDE PLANT 4

1.0 INTRODUCTION

1.1 Purpose

Clean closure has been completed for Hazardous Waste Management Unit No. 6 (HWMU No. 6) - "Drummed HF Residue/Associated Storage Areas Inside Plant 4" (HF Residues Inside Plant 4). This Closure Certification Report documents the actions taken to close the HWMU in accordance with the approved Closure Plan Information and Data (CPID). Attachment 1 to this report contains the FEMP closure certification statement (following the format in OAC 3745-50-42(d)) and a Professional Engineer's closure certification statement to document that HWMU No. 6 was closed in accordance with an approved closure plan, as required under OAC 3745-66-15.

It is noted in this report that the actions used to achieve clean closure included safety and waste minimization improvements which resulted in field changes to the procedures contained in the approved CPID. Verbal concurrence was obtained from OEPA prior to the use of newly available cleaning equipment/procedures which resulted in most of the changes detailed in this report.

1.2 Background

The original CPID was submitted October 7, 1992. On January 11, 1993, the OEPA responded with a Notice of Deficiency (NOD) which required revisions to the CPID. In response to the NOD, Revision 1 to the CPID was submitted on February 11, 1993. The OEPA issued a Closure Plan Approval for CPID, Revision 1 on May 24, 1993.

The closure of HWMU No. 6 represents a partial closure of the Fernald Environmental Management Project (FEMP), formerly known as the Feed Materials Production Center (FMPC). This Closure Certification Report was prepared using the guidance from the *OEPA Closure Plan Review Guidance for RCRA Facilities, Interim Final, dated September 1, 1993.*

1.3 Unit Description

HWMU No. 6 is a four feet wide by 17 feet long area of the concrete floor located on the first floor (ground level) in the northwest quadrant inside Plant 4 (location maps from the approved CPID are provided in Attachment 2). This HWMU was previously used to store nineteen (19),

55-gallon drums of anhydrous hydrofluoric acid (AHF) residues (drummed HF residues). The drummed HF residues were generated when the AHF storage tanks located in the Tank Farm were emptied and cleaned. As the tanks were being cleaned, lime was added to neutralize acid residues and absorb any free liquids. The final drummed HF residues consisted of lime, rust, scale, and residues from the neutralized hydrofluoric acid. Under OAC 3745-51-33(C), AHF product residues removed from a container for disposal are listed hazardous wastes (EPA Waste No. U134). Although the drummed HF residues were removed from product tanks (which are not containers as defined in hazardous waste regulations), the FEMP declared the waste residues to be hazardous (Waste No. U134) based on the (OAC) 3745-51-33(C) criteria.

The 19 drums of HF residues were moved from the Tank Farm to Plant 4 and stored in the northwest quadrant of Plant 4 on the first floor. Pursuant to OAC 3745-52-34, this area was declared a HWMU since the HF residues were stored in this area for more than 90 days.

2.0 SUMMARY OF CLOSURE ACTIONS

Closure activities for HWMU No. 6 met the following performance standards (based on OAC 3745-66-11 (40 CFR 265.111)) that were presented in the approved CPID:

- Minimize the need for further maintenance by removing all hazardous wastes from the unit and conducting sampling and analyses of rinse water from the floor surface to demonstrate that the residual contamination of the floor's surface is below the Cleanup Action Levels (CALs). See discussions in Section 2.1 of this Closure Certification Report.

- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the groundwater, surface waters, or to the atmosphere.

- Conduct and document closure activities in accordance with the approved RCRA CPID.

Clean closure was accomplished by utilizing a pressure steam wash/vacuum system (Kelly System) to clean the HWMU floor surface. The HWMU was declared clean based on a review of the rinseate analyses which demonstrated that the pH measurements were between 2.0 and 12.5 pH units and fluoride levels were less than 60 mg/L. This Closure Certification Report documents that closure actions met the CPID requirements.

2.1 Cleanup Action Levels

The CAL established in the approved CPID for rinseate pH was the range of 2.0 to 12.5 pH units. This CAL was based on the hazardous waste corrosivity characteristic set forth in OAC

3745-51-22 (40 CFR 261.22). The pH CAL was achieved in the HWMU rinse waters (see Table 1).

The CAL established in the approved CPID for fluoride in the rinse water was 1 mg/L. Based on analyses of samples of wash waters collected from the HWMU floor, the CAL of 1 mg/L for fluoride could not be achieved. However, as discussed below, a revised fluoride CAL of 60 mg/L was subsequently established in accordance with discussions between the FEMP and OEPA (see Contact Reports in Attachment 3). The revised fluoride CAL 60 mg/L of fluoride was achieved in the HWMU rinse waters (see Table 1).

The CAL for fluoride was established in the approved CPID based on criteria defined by *OEPA Closure Plan Review Guidance, dated May 1, 1991.* The fluoride CAL was determined by calculating fifteen times the public drinking water maximum contamination level (MCL) for hazardous constituents, as promulgated in OAC 3745-81-11 (40 CFR 141.11) for inorganic contaminants. The MCL listed for fluoride is 4 mg/L and fifteen times that concentration is 60 mg/L. Because the guidance establishes the clean concentration of a hazardous constituent in rinse waters to be the lesser of fifteen times the MCL or 1 mg/L, 1 mg/L was used as the CAL.

Upon review, it was noted that fluoride is not a hazardous constituent as presented in the list of hazardous constituents in the Appendix to OAC 3745-51-11 (40 CFR Part 261 Appendix VIII). Verification of decontamination using rinseate analyses, according *OEPA Closure Plan Review Guidance, dated September 1, 1993,* applies to hazardous constituents. The establishment of a revised CAL for fluoride was discussed with OEPA and it was agreed (see contact report in Attachment 3) that fluoride contamination in the rinseate below the concentration of 15 times the fluoride MCL of 4 mg/L (i.e, 60 mg/L) satisfies clean closure requirements.

2.2 Fluoride Contamination Inside Plant 4

During the implementation of the approved CPID, fluoride contamination from other sources in Plant 4 was evaluated. Two known sources of fluoride are the tap water and fluoride contamination on the concrete floor from previous the Plant 4 operations. When in production, Plant 4 converted uranium trioxide to uranium tetrafluoride UF_4 using anhydrous hydrofluoric acid (AHF). Two test areas (see Test Areas 1 and 2 on Figure 1) were cleaned to evaluate other sources of fluoride contamination. These sources included fluoride in the tap water and fluoride contamination on the concrete floor as a result of the use of AHF during Plant 4 operations and historical and ongoing storage of UF_4 materials.

Based on the results of rinseate analyses from two test areas, it was confirmed that there are other sources of fluoride contamination in the area that are unrelated to the hazardous wastes managed inside the HWMU. The results of the analyses in the two test areas are provided in Table 2. When cleaning the floor areas inside the HWMU and the two test areas, a sample of the tap water was collected at the beginning of each day. The results of tap water analyses are

reported with the results on Table 1 (from inside the HWMU) and Table 2 (from the test areas).

After washing, the test areas had a polished appearance and the HWMU floor surface did not. It was subsequently determined that the floor inside the HWMU boundary was the only area that had not been repeatedly waxed and sealed over the past several years as part of the general maintenance of Plant 4. According to maintenance personnel, general maintenance of the floor in Plant 4 has included weekly waxing for many years. Frequently, a sealant was also applied to control dust and maintain a clean work area. Because the HWMU floor area was not waxed and sealed, the results from the polished floor in the two test areas did not adequately represent the HWMU. Although discussed in the October 25, 1993 contact report in Attachment 3, the data from the analyses of test area rinseates were not be used in evaluating the results of rinseate analyses from the HWMU decontamination efforts.

2.3 Changes to Procedures from Approved CPID

To achieve clean closure while enhancing the worker safety and minimizing wastes, field changes to the CPID procedures were made and implemented. As discussed below, most of the changes resulted from conducting pressure steam/vacuum cleaning using the Kelly System. The FEMP discussed the use of the Kelly System with the OEPA prior to using it in the field (see contact report in Attachment 3).

2.3.1 Kelly System Operations

The FEMP approved the Kelly System operating procedures after the CPID had been submitted and approved. The Kelly System is a pressurized steam unit equipped with a HEPA-filtered wet vacuum system. Normal system output pressure is between 250 and 300 psi with water temperatures of up to 300° F. The pressure output met the requirement in the CPID to apply a pressure wash between 0 and 10,000 psi.

The Kelly System was used because it is safer to operate and generates less waste than the pressure washing procedures discussed in the approved CPID. There is marked increased risk of accidents and serious bodily injury as the pressure is increased when using pressure water sprays. The temperature and pressure delivered by the Kelly System was determined (as confirmed by analytical results) to be sufficient to achieve clean closure of this HWMU.

Consistent with the objectives of FEMP Waste Minimization Plan, use of the Kelly System reduced the volume of waste water generated by 58.3%. The volume of wash/rinse water that was generated from the Kelly System was approximately 50 gallons per cycle. Based on previous uses, a wash/rinse cycle using a pressure water washing system generates 120 gallons.

2.3.2 Cleaning Equipment Decontamination Procedures

The CPID specified decontamination procedures for cleaning equipment and called for a final triple rinse using deionized water, daily collection, and analyses of the final rinse waters. The deionized water rinse was specified for QA/QC purposes to prevent cross-contamination between sampling events. Daily samples of the final rinseates were proposed to confirm that adequate decontamination was being achieved.

The procedures used provided a much more comprehensive basis to evaluate cross-contamination and did not require the use of deionized water. A baseline sample of the tap water was collected and analyzed each day. The length of the equipment rinse cycle was calculated to provide a triple rinse of the system prior to each washing event. Samples of the system rinse (reported as equipment blanks on Table 1) were collected and analyzed for each wash cycle as opposed to once a day for final rinseate analyses as indicated in the CPID.

2.3.3 Sample Collection and Sample Equipment Decontamination

The CPID allowed for modification of sampling equipment by a trained, qualified sampling supervisor or manger. The direct collection of samples from the discharge line eliminated the need for all sampling equipment except for sample bottles. This also eliminated the need for sampling equipment decontamination procedures. Because deionized water was not used, laboratory blanks specified in the approved CPID for deionized water were not collected and analyzed.

2.4 Kelly Decontamination System Operating Procedure

Attachment 4 contains a copy of the standard operating procedures (SOP 20-C-015: Operating the Kelly Decontamination System), for reference. A flow diagram for the Kelly System is provided in Figure 2. For this closure, a floor washing cycle consisted of the following steps:

1) Prior to each wash, the cyclone discharge was opened, the spray applicator was placed on a clean drum lid, and the Kelly System was flushed with tap water, in lieu of deionized water, for 15 minutes. The 15 minute flush was calculated to provide an equivalent of a triple rinse of the system prior to collection of an equipment rinse to be used for QA/QC evaluations of potential cross-contamination. The tap water was selected over the deionized water because it was readily available and concerns for cross-contamination were evaluated by laboratory and/or field analyses of fluoride and pH for each wash cycle and daily field and laboratory analysis of the tap water supply (see Table 1).

2) After 15 minutes samples of the rinse water exiting the cyclone unit were collected as equipment blanks.

3) The cyclone discharge line was closed and the floor area was washed/cleaned using slow sweeps until the entire floor area was sprayed and vacuumed. The wash water generated was collected in the cyclone.

4) After the final sweep, the cyclone discharge was opened and rinseate samples from the wash water exiting the cyclone unit were collected directly from the discharge line to verify/evaluate decontamination. This completed one cycle.

2.5 Closure Methodology

The following summarizes the actions taken to accomplish clean closure:

1) The FEMP provided notification to the OEPA and informed the registered Professional Engineer (PE) prior to initiation of closure activities for floor cleaning and rinseate sample collection.

NOTE: OEPA was contacted on October 25, 1993 (see Contact Report in Attachment 3) to discuss the proposed changes in cleaning equipment and obtain OEPA concurrence before the HWMU was washed with the Kelly System (cleaning started on October 29, 1993 and completed on November 2, 1993).

2) Prior to washing the floor, a thorough inspection of the floor was conducted. No evidence of spills, cracks, or expansion joints with loose sealing material that needed repair were observed. The areas around the HWMU and in and around Test Areas 1 and 2 were cleared of stored materials and drums.

NOTE: The CPID called for the area to be vacuumed with a HEPA-filtered unit before washing. This was not necessary because the Kelly System uses a HEPA-Filtered wet vacuum system to contain and collect the wash/rinse waters.

3) Impervious temporary dikes to control and collect potential wash water lost during the cleaning of the floor were constructed around the boundaries of the HWMU and around the area containing the Kelly System cyclone (see Figure 1). Rinseate samples were collected directly from the waste waters as they were discharged into waste water collection drums.

NOTE: The temporary dikes were faced with polyethylene sheeting and secured with PVC piping. PVC piping was used in place of weighted blocks or sand bags (referenced in the CPID) because it was readily available and served the same function.

4) After all the site preparations were made, the floor surface in the HWMU was washed on October 29 through November 2, 1993 using the Kelly System.

5) The waste waters generated while washing the floor were collected in the cyclone. When the floor wash was completed, the waters were discharged from the Kelly System cyclone into drums located within the diked area around the cyclone. Wash water samples were collected directly from the discharge line to evaluate decontamination (see description of a Kelly System wash cycle in Section 2.4 and discussions of analytical results in Section 2.6).

NOTE: The CPID indicated a separate rinse would be conducted after each wash to verify decontamination. The purpose for a separate rinse was to collect a discrete sample from a clean sampling drum (or other suitable container) for each wash cycle. By using the Kelly System, each wash was collected separately in the cyclone unit and samples were collected directly from the cyclone discharge. This provided discrete samples for each wash and eliminated the need for a separate decontamination verification rinse.

6) Following each wash cycle (as described in Section 2.4), the Project Engineer reviewed the results of field pH and fluoride measurements to determine if further washes were needed. Field measurements for pH and fluoride were confirmed by laboratory analyses of eight duplicate samples (see Table 1).

7) Steps 5 and 6 were repeated eighteen times.

NOTE: The CAL for pH ($2.0 < pH < 12.5$) was achieved on the first wash. Further washes were stopped when it was determined that fluoride contamination levels were no longer being reduced. Based on a review of the results it was determined that the fluoride levels were fluctuating around 8 mg/L (see Table 1 and Figure 3 and discussions in Section 2.7) and it was concluded that the HWMU floor area could not be clean below the CAL of 1 mg/L of fluoride.

8) All wastes generated during closure of the unit were containerized and managed as hazardous waste pending waste characterization and determinations in accordance with the approved FEMP Waste Analysis and Waste Determination Plans. Management of waste waters is discussed further in the following Section 2.7 of this report.

2.6 Review of Analytical Data

The analytical data demonstrates that clean closure has been achieved. As previously discussed, the pH concentrations in rinseate samples from the HWMU were within the range of 2.0 to 12.5

(i.e., the CAL established for pH). All fluoride measurements in rinseates within the HWMU (Table 1) were below the revised CAL of 60 mg/L of fluoride. As indicated in the CPID, the results of uranium analyses taken for radiological waste characterizations are also provided in Tables 1 and 2.

Based on a review of analyses of the equipment blanks in comparison to the decontamination rinseate analyses, there was no cross-contamination from the Kelly System components between wash cycles.

Figure 3 provides a graphic representation of the fluoride data from the HWMU. The graph shows that the fluoride concentrations in the rinseate were fluctuating around the mean of 8.14; therefore, no additional cleaning would be achieved by continued washing of the floor using the Kelly System. As a result, no further floor decontamination was attempted and clean closure was achieved based on a comparison to the revised CAL of 60 mg/L for fluoride.

Figures 4 and 5 provide a graphic representation of the fluoride data from Test Areas 1 and 2. Where both laboratory and field analyses were available, only the laboratory analyses were graphed, otherwise field measurements were used. A comparison of the three graphs demonstrates that, with the exception of the first wash which removed surface deposits, there is little correlation between the results in Test Areas 1 and 2 and the HWMU.

2.7 Waste Management

As discussed below, the wastes generated during closure have been determined to be non-hazardous. The non-hazardous rinseates will be treated through the FEMP Waste Water Treatment System (WWTS) and the solid debris (personnel protective equipment and diking materials) will be disposed of as low level radioactive wastes (LLW). The 19 drums of hazardous waste originally managed in the HWMU will continue to be stored in an approved RCRA Storage Facility at the FEMP.

2.7.1 Decontamination Rinse Waters

The rinse waters generated during floor decontamination are not listed hazardous wastes and do not exhibit characteristics of a hazardous waste for the reasons provided below:

- The concentration of fluoride in the rinse waters is below the OEPA approved CAL of 60 mg/L (See Tables 1 and 2 and Attachment 3).

- Visual observations made during the preliminary area inspection on September 24, 1993 revealed no evidence (e.g., acid etching, residues, or bleaching of concrete) of leaks or spills of hazardous waste previously managed in the HWMU. This was supported by the results of pH measurement of 6.8 in the initial wash (the pH of drummed residues was 3).

- The fluoride concentrations in the rinse waters are attributable to production sources and not from management of hazardous waste in the HWMU (Section 2.2 of this report).

- Fluoride is not a hazardous constituent by definition in the Appendix to OAC 3745-51-11 (40 CFR Part 261 Appendix VIII).

- The pH level of the rinse waters is within the CAL range of 2.0 to 12.5 pH units as stated in the approved CPID (See Tables 1 and 2).

Ten 55-gallon drums of decontamination waste waters were generated during closure. The FEMP has confirmed that the decontamination waste waters can be processed in the WWTS. Although fluoride was deleted from the FEMP National Pollution Discharge Elimination System (NPDES) Permit, it is still being analyzed in the discharge. The Ohio Water Quality Standard (WQS) for fluoride in the "all other segments" section of the Great Miami River is the 2.0 mg/l, 30-day average outside the mixing zone for agricultural water supply (OAC Rule 3745-1-07). It has been determined that the treatment of the decontamination waste waters through the FEMP WWTS will reduce the fluoride concentrations well below the 2.0 mg/l concentration.

2.7.2 Low Level Radiologically Contaminated Trash

Two bags containing radiologically contaminated personnel protective equipment (i.e., gloves, booties, coveralls, etc.) and temporary diking wastes (i.e., plastic sheeting) and a third bag containing plastic sample bottles were generated during closure. These wastes have been determined to be LLW and are being stored and managed in accordance with LLW waste storage requirements pending final disposition.

2.7.3 Drummed HF Residues

The original hazardous wastes (nineteen drums of HF residues) were removed from the unit in 1989 and are currently being stored as mixed wastes on the Plant 1 Pad, a designated RCRA storage area (see Section 1.3 for additional discussion of the original waste determinations), pending identification or development of additional permitted treatment or disposal facilities.

3.0 CONCLUSIONS

This Closure Certification Report has demonstrated that HWMU No. 6 - HF Residues Inside Plant 4 - has been clean closed. The rinse waters and radiologically contaminated trash (i.e., personnel protective clothing, diking materials, and used sample bottles) have been characterized and determined to be low level radiological wastes which do not contain a RCRA hazardous waste component. This conclusion is based on the fact that the HWMU rinseate analyses met the clean up action levels for pH (2.0 to 12.5) and fluorides (<60 mg/L). In addition, investigations of the surrounding area (Test Areas 1 and 2) confirmed fluoride contamination

from other sources in Plant 4 (see discussions in Section 2.2). Since fluoride is not a hazardous constituent by definition in the appendix to OAC 3745-51-11 (40 CFR Part 261 Appendix VIII), the wastes generated during closure do not contain a RCRA hazardous constituent derived from the wastes that had been managed in the HWMU. A review of the analytical data is provided in Section 2.4 and tabulated in Tables 1 and 2.

3.1 Closure Certifications

Attachment 1 to this Closure Certification Report contains the FEMP closure certification statement (following the format in OAC 3745-50-42(d)) and a Professional Engineer's (PE) certification statement which documents that HWMU No. 6 was closed in accordance with the approved closure plan, as required under OAC 3745-66-15.

This report details the procedures used to achieve clean closure including field changes resulting from the use of the Kelly System. Verbal concurrence was obtained from OEPA prior to the use of the Kelly System. The PE Certification is based on the approved CPID as modified by these changes.

3.2 Supporting Documentation

In addition to the information provided in this report, the following supporting documentation for this HWMU closure will be maintained at the FEMP and made available if requested for OEPA review:

- A copy of the approved Closure Plan Information and Data
- The Safe Shutdown Program and Task-Specific Implementation Plans (Including applicable FEMP Standard Operating Procedures identified)
- Task-Specific Training and Health and Safety Plans
- Copies of Safe Shutdown Supervisor's Logs
- Copy of Site Media Sampling's Field Logs
- Copy of Project Engineer's Log
- Professional Engineering Field Notes and Memorandum
- Sampling Field Logs
- Completed Sample Chain-of-Custody/Analytical Request Forms
- Laboratory Analytical Results
- Waste Material Evaluation Forms

TABLE 1: DECONTAMINATION RINSEATE ANALYSES FOR HWMU NUMBER 6

HWMU AREA

	Fluoride Analysis (mg/L)				pH Analysis (pH units)				Total U Analysis (mg/L)	
Rinse Cycle	RINSE SAMPLE Field	Lab	EQUIP. BLANK Field	Lab	RINSE SAMPLE Field	Lab	EQUIP. BLANK Field	Lab	RINSE SAMPLE	EQUIP. BLANK
10/29 SW1	0.16	0.15	---	---	9.5	9.1	---	---	0.1	---
FB	NA	0.03	---	---	NA	5.6	---	---	0.2	---
1	18.64	24.33	0.41	0.43	6.8	6.8	8.7	7.6	12.1	0.2
Duplicate-1	17.72	22.84	---	---	6.8	NA	---	---	15.1	---
2	11.04	NA	3.65	NA	7.6	NA	8.1	NA	NA	NA
3	9.39	NA	2.73	NA	7.8	NA	8.3	NA	NA	NA
4	5.11	NA	1.32	NA	7.6	NA	8.6	NA	NA	NA
5	8.40	NA	2.74	NA	8.3	NA	8.2	NA	NA	NA
Duplicate-5	---	---	2.74	NA	---	---	8.3	NA	---	NA
6	7.74	NA	2.54	NA	7.8	NA	8.3	NA	NA	NA
7	7.64	7.76	2.46	2.80	7.8	7.3	8.3	7.4	1.3	0.7
Duplicate-7	---	---	1.70	2.12	---	---	8.3	7.5	---	0.6
11/01 SW2	NA	0.13	---	---	NA	9.0	---	---	0.2	---
8	4.88	5.75	0.54	0.77	9.5	7.0	8.3	7.6	1.7	0.6
9	9.13	NA	0.86	NA	7.7	NA	8.3	NA	NA	NA
10	9.19	NA	1.07	NA	7.6	NA	8.4	NA	NA	NA
11	3.66	NA	0.98	NA	7.9	NA	8.4	NA	NA	NA
12	7.87	NA	0.74	NA	7.6	NA	8.3	NA	NA	NA
13	7.87	NA	0.85	NA	7.6	NA	8.3	NA	NA	NA
14	7.12	NA	0.89	1.51	7.6	NA	8.2	7.7	NA	0.4
15	6.72	7.38	0.86	1.60	7.6	7.3	8.3	7.9	1.4	0.4
11/02 SW3	NA	0.13	---	---	NA	9.3	---	---	0.2	---
16	NA	4.79	0.86	0.92	NA	7.1	NA	NA	1.1	NA
17	NA	1.01	NA	NA	NA	NA	NA	NA	NA	NA
18	NA	8.91	NA	1.55	NA	7.3	NA	7.5	0.9	0.4

SW – Supply Water
NA – Not Analyzed
"---" – No Sample Collected

TABLE 2: DECONTAMINATION RINSEATE ANALYSES FOR TEST AREAS 1 AND 2

TEST AREA 1

	Fluoride Analysis (mg/L)				pH Analysis (pH units)				Total U Analysis (mg/L)	
Rinse Cycle	RINSE SAMPLE Field	Lab	EQUIP. BLANK Field	Lab	RINSE SAMPLE Field	Lab	EQUIP. BLANK Field	Lab	RINSE SAMPLE	EQUIP. BLANK
10/27 SW1	0.15	0.14	---	---	9.4	9	---	---	0.2	---
1	20.98	21.29	0.27	0.23	6.7	6.8	8.4	6.9	25.4	0.8
2	4.45	NA	1.56	NA	7.6	NA	8.1	NA	NA	NA
3	2.81	NA	1.40	NA	7.9	7.9	7.9	NA	NA	NA
4	3.64	NA	1.20	NA	7.8	7.8	7.9	NA	NA	NA
5	2.59	NA	1.33	NA	8	7.1	7.9	8.3	NA	NA
10/28 SW2	0.15	NA	---	---	9.4	NA	---	---	NA	---
6	2.61	NA	0.80	NA	8.3	NA	8.6	NA	NA	NA
7	2.65	2.66	0.65	0.69	8.4	7.2	8.7	7.4	1.1	0.7

TEST AREA 2

	Fluoride Analysis (mg/L)				pH Analysis (pH units)				Total U Analysis (mg/L)	
Rinse Cycle	RINSE SAMPLE Field	Lab	EQUIP. BLANK Field	Lab	RINSE SAMPLE Field	Lab	EQUIP. BLANK Field	Lab	RINSE SAMPLE	EQUIP. BLANK
11/23 SW1	0.13	0.11	---	---	9.4	9.5	---	---	0.1	---
1	5.25	5.60	0.70	0.72	7.7	7.0	8.2	7.2	3.2	0.2
2	3.70	NA	2.43	NA	7.9	NA	7.9	NA	NA	NA
3	2.78	NA	0.92	NA	8.2	NA	8.3	NA	NA	NA
4	2.53	NA	0.69	NA	8.1	NA	8.3	NA	NA	NA
5	2.30	2.76	0.77	0.84	8.2	7.1	8.4	8.3	0.6	0.2
6	1.28	1.56	0.47	0.46	8.1	7.2	8.4	7.6	0.6	0.2
7	1.79	1.99	0.63	0.67	8.1	7.2	8.2	7.4	0.6	0.4

SW – Supply Water
NA – Not Analyzed
"---" – No Sample Collected

LOCATED IN PLANT 4, NW CORNER

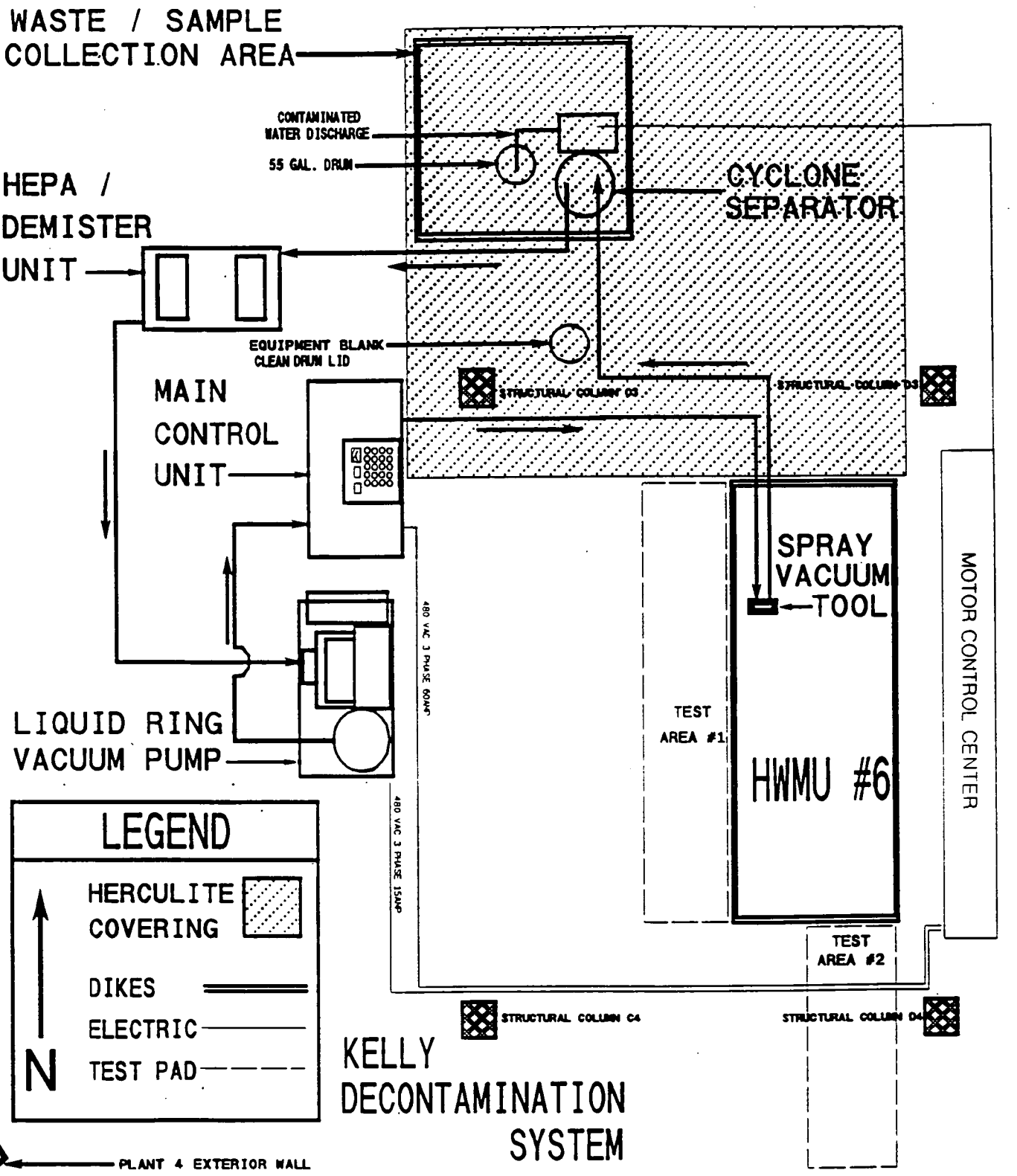

FIGURE 1: LAYOUT FOR HWMU NUMBER 6 DECONTAMINATION

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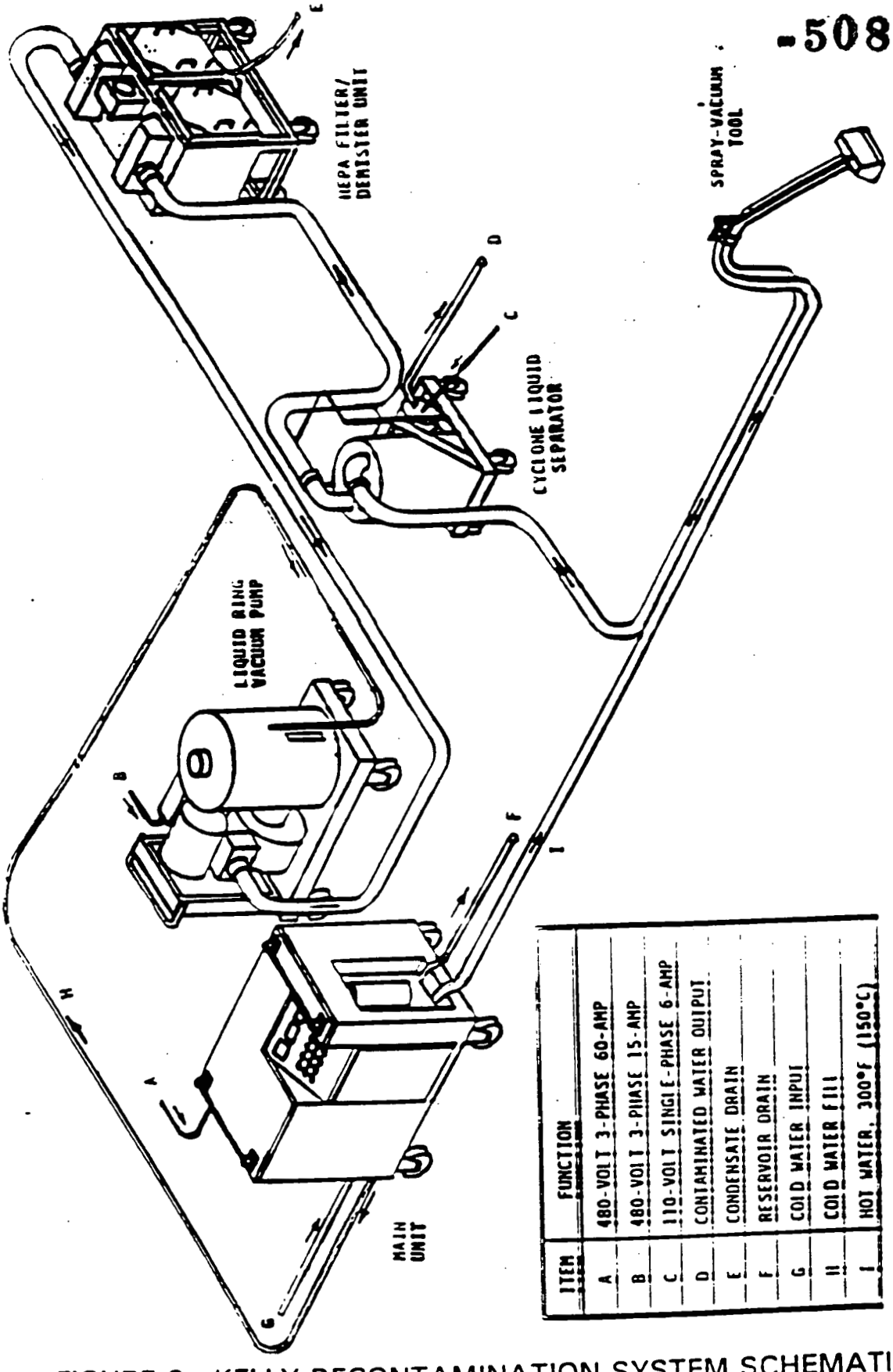

ITEM	FUNCTION
A	480-VOLT 3-PHASE 60-AMP
B	480-VOLT 3-PHASE 15-AMP
C	110-VOLT SINGLE-PHASE 6-AMP
D	CONTAMINATED WATER OUTPUT
E	CONDENSATE DRAIN
F	RESERVOIR DRAIN
G	COLD WATER INPUT
H	COLD WATER FILL
I	HOT WATER, 300°F (150°C)

FIGURE 2: KELLY DECONTAMINATION SYSTEM SCHEMATIC

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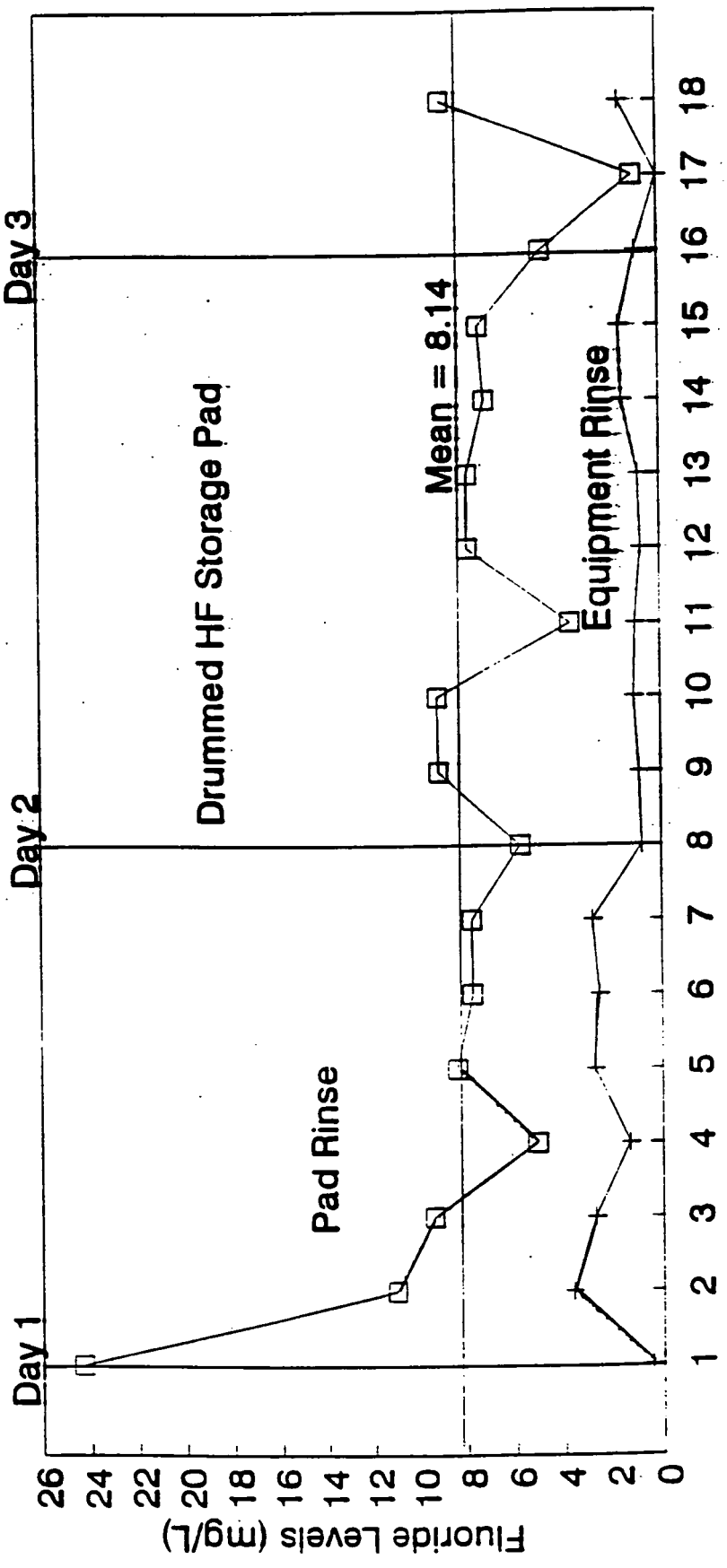


FIGURE 3: GRAPH OF FLUORIDE MEASUREMENTS FROM HWMU NO. 6 RINSEATES

018

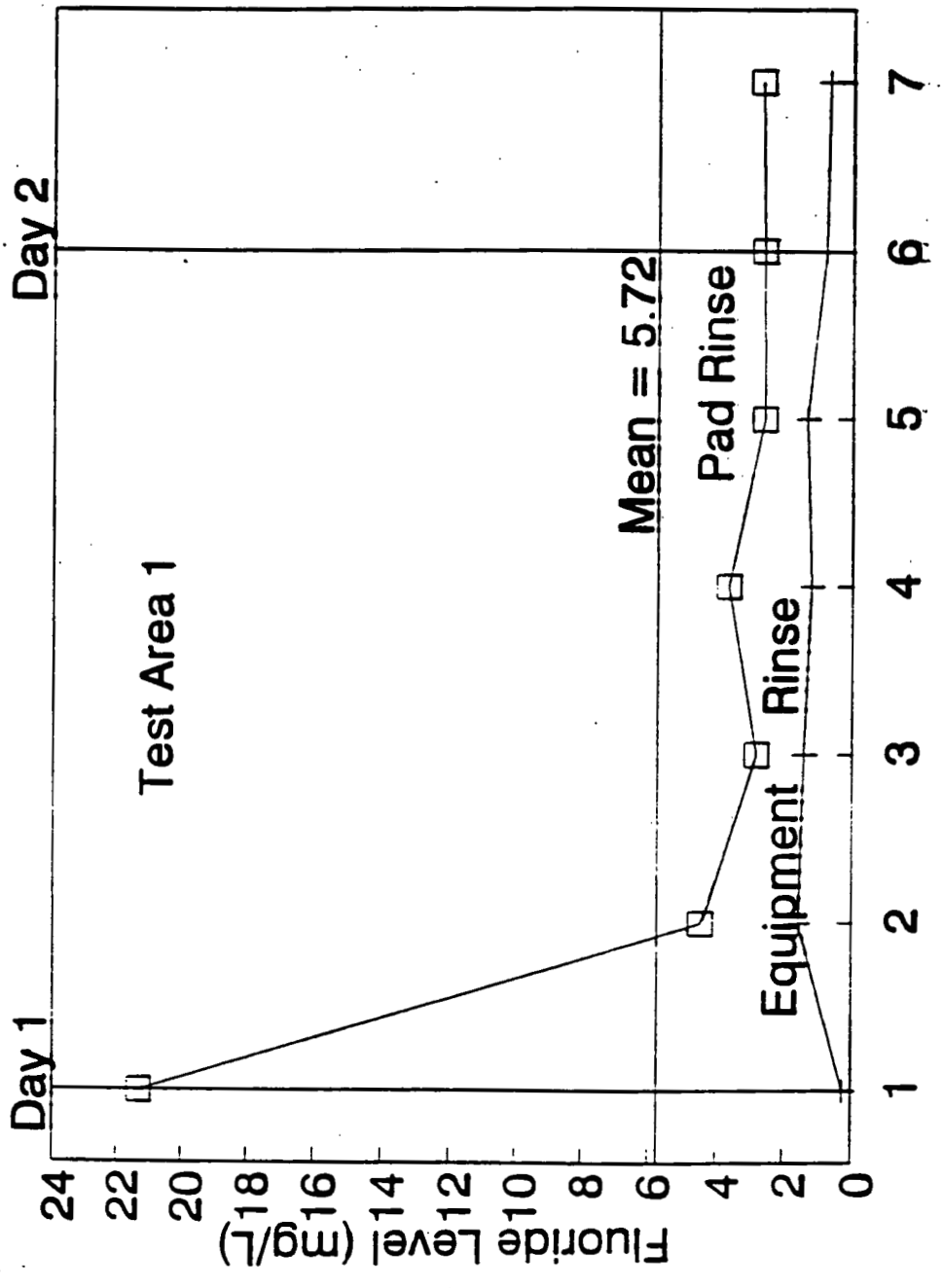


FIGURE 4: GRAPH OF FLUORIDE MEASUREMENTS FROM TEST AREA 1 RINSEATES

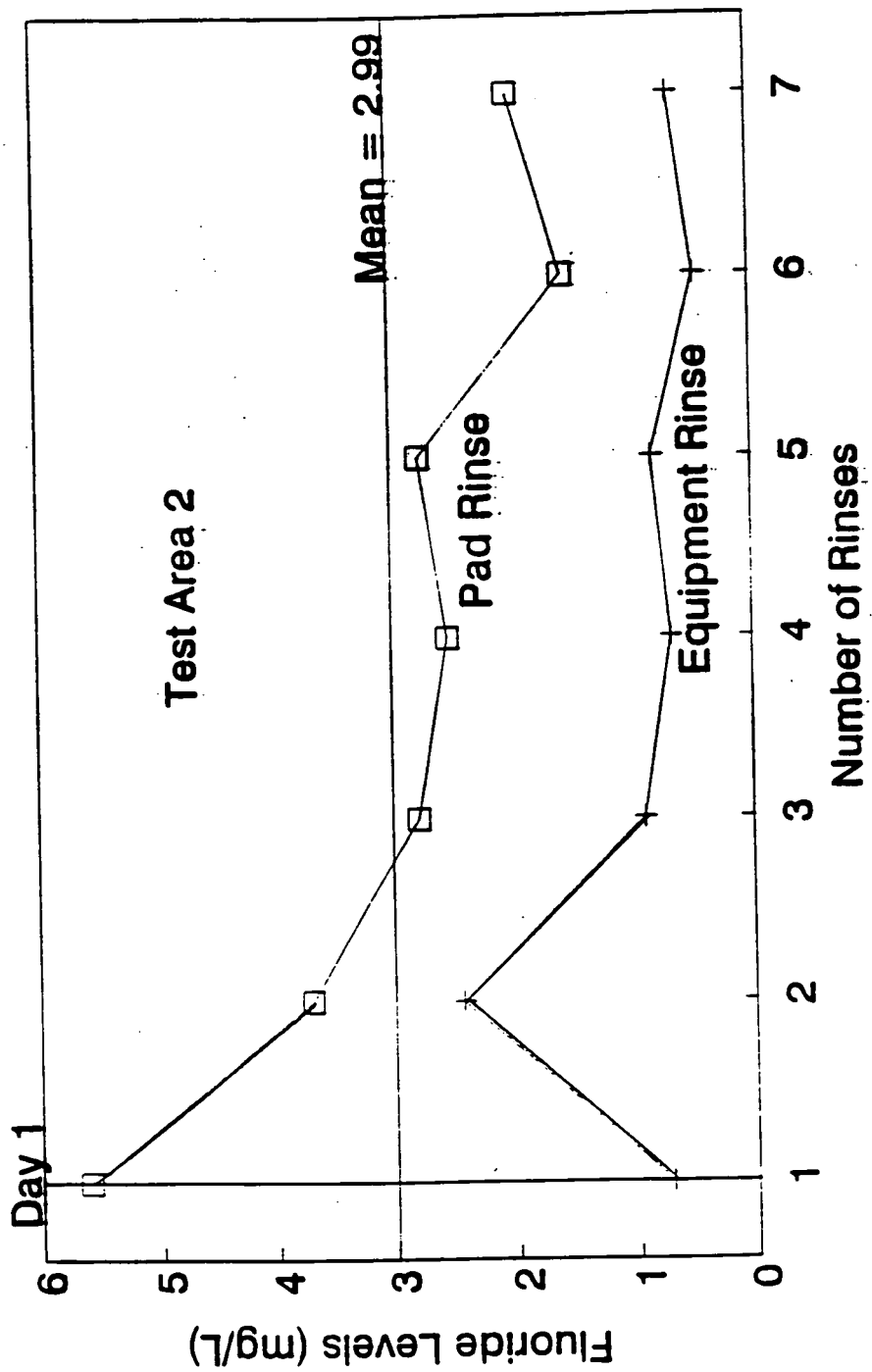


FIGURE 5: GRAPH OF FLUORIDE MEASUREMENTS FROM TEST AREA 2 RINSEATES

ATTACHMENT 1: CLOSURE CERTIFICATION STATEMENTS

CERTIFICATION OF INDEPENDENT REGISTERED PROFESSIONAL ENGINEER

Based on the information made available to me through review of field notes from and discussions with designated field representatives, I, David G. Uetrecht, Jr., P. E., do hereby state that to the best of my knowledge and belief, Hazardous Waste Management Unit #6 (HWMU #6) at 7400 Willey Road, Fernald, Ohio has been closed in accordance with the Closure Plan Information and Data (CPID) for the Drummed HF Residue/Associated Storage Areas Inside Plant 4 as approved by the Ohio Environmental Protection Agency (OEPA) on May 24, 1993, except for the deviations outlined below and documented in the Certification Report.

1. A steam generated power washer (Kelly Decontamination System) was used rather than the type power washer unit described in the CPID. The use of the Kelly Decontamination System was discussed with the OEPA. The discussion is documented in a contact report from Tom Walsh (Fernald Environmental Restoration Management Corporation [FERMCO]) to Robin Fisher (OEPA) dated October 25, 1993.

2. Fluorides in the area were not reduced to the Cleanup Action Levels (CAL) originally stated in the CPID. The presence of higher than anticipated fluoride concentrations was discussed with OEPA. The discussion is documented in the contact report from John Sattler (Department of Energy [DOE]) to Robin Fisher/Phil Harris (OEPA) dated November 23, 1993.

3. Equipment decontamination during wash operations was done with tap water rather than with deionized water as specified in the CPID. Field samples of the tap water supply were collected at the start of each day of sampling.

4. Laboratory blanks for deionized water were not taken as required by the CPID for QA/QC. This is the result of using tap water for decontamination rather than deionized water.

5. Samples were collected from the discharge line on the cyclone unit of the Kelly Decontamination System for both slab rinseate and equipment decontamination rinseate instead of from a sample collection pump or approved sample collection drum. This method of sampling is considered part of the Kelly Decontamination System operation.

David G. Uetrecht, Jr., P. E.
Adena Utilities Engineering, Inc.
E-47837

1-21-94
Date

CERTIFICATION OF OWNER/OPERATOR

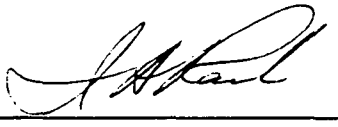
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. Phil Hamric, Manager
U. S. Department of Energy, Fernald Office
Owner and Operator

1/21/94
Date Signed

CERTIFICATION OF OWNER/OPERATOR

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



1/21/94

John A. Rasile, Vice-President
Fernald Environmental Restoration
Management Corporation, Co-Operator

Date Signed

ATTACHMENT 2: HWMU No. 6 LOCATION MAPS FROM APPROVED CPID

DRUMMED HF RESIDUE/ASSOCIATED STORAGE AREAS INSIDE PLANT 4

WESTINGHOUSE MAT'LS CO. OF OHIO

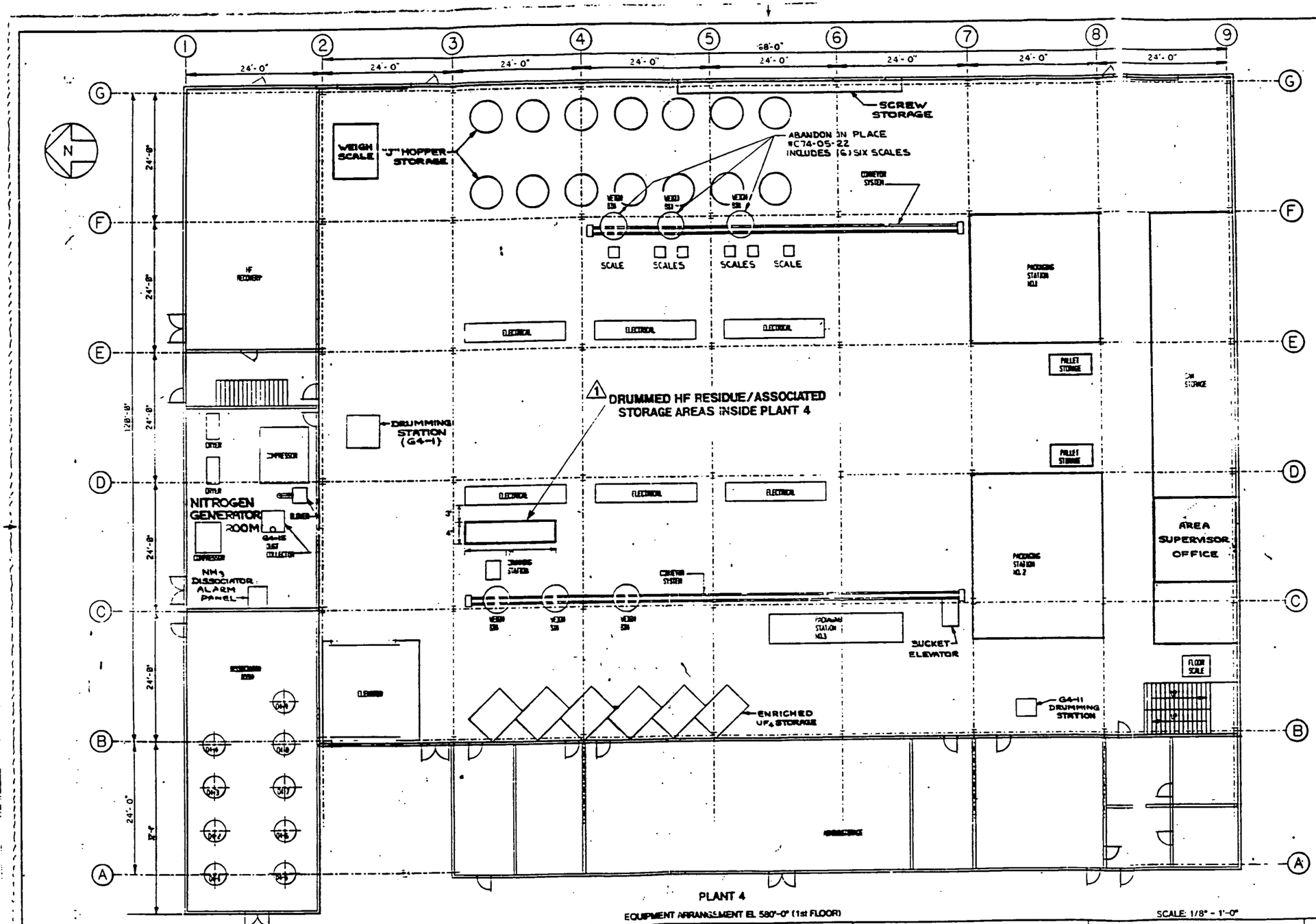
FERNALD, OHIO

FEED MATERIALS PRODUCTION CENTER
U.S. DEPARTMENT OF ENERGY

FIGURE 2

DRUMMED HF RESIDUE/ASSOCIATED STORAGE AREAS INSIDE PLANT 4

-5082



NOTE:
1 HAZARDOUS WASTE MANAGEMENT UNIT TO BE CLOSED SHOWN IN BOLD.

PLANT 4

EQUIPMENT ARRANGEMENT EL 580'-0" (1st FLOOR)

SCALE: 1/8" = 1'-0"

NO.	REVISIONS	DATE DWN	BY	APPD
1	UPDATED			
0	IDENTIFIED A.I.P. PER RES 558		GBJ	LAM

APPROVALS

WESTINGHOUSE MATLS CO OF OHIO
FERNALD, OHIO
FEED MATERIALS PRODUCTION CENTER
U.S. DEPARTMENT OF ENERGY

FIGURE 3
DRUMMED HF RESIDUE/ASSOCIATED STORAGE AREAS INSIDE PLANT 4

PROJ NO. —
SITE ID NO. C-61
DRAWING NO. MAINS

027

ATTACHMENT 3: OEPA/FEMP CORRESPONDENCE AND CONTACT REPORTS SINCE CPID APPROVAL

DOE Fernald Field Office

CONTACT REPORT

Date of Contact:	January 18, 1994
Agency/Organization Contacted:	Ohio EPA
Agency/Organization Representative:	Robin Fisher
Subject:	HF Storage Area Inside Plant 4

I contacted Robin Fisher to get clarification on the regulatory status of the rinse waters generated in the Plant 4 HF Storage Area closure. Specifically, I asked Ms. Fisher if the rinse waters were considered by Ohio EPA to not be listed wastes, based on their previous approval of the treatment of these wastewaters in the FEMP wastewater treatment system. She said that the rinse waters are not listed hazardous wastes for the following reasons: the fluoride concentrations were below the rinseate standard for this closure, there were alternate sources of fluoride (i.e. in the wash water and from production operations) that could not be distinguished from any fluoride that would have been from the HF drums, and the fact that fluoride is not a hazardous constituent and therefore could not cause the rinse waters to be a hazardous waste.

J. C. Sattler — 1-21-94

John Sattler,
Technical Support
Environmental Compliance

Date

distribution:

W. Quaider
T. Walsh
K. Kolthoff

DOE Fernald Field Office

CONTACT REPORT

Date of Contact: December 20, 1993

Agency/Organization Contacted: Ohio EPA

Agency/Organization Representative: Robin Fisher, Phil Harris

Subject: HF Tank Car/HF Storage Area Inside Plant 4

Robin Fisher and Phil Harris called me to follow up on the conversation we had on December 17 concerning the HF Tank Car movement and the disposition of the drums of rinseate from the Plant 4 HF Storage Area Closure. The following information was provided by Ms. Fisher and Mr. Harris:

HF Tank Car: Moving the tank car is not prohibited but must be described an amended closure plan. Also, if the tank car is moved as part of the closure activities, then the area where it will be moved to will not become a HWMU even if the car must sit there for a period of time greater than 90 days. However, the FEMP must address how to verify in an amended closure plan that the area is clean. For example, daily inspections reveal no contamination of the area from the tank car contents, the sump area is thoroughly cleaned by some process, etc.

Rinseate Drums: It is OK to disposition the rinseate form the Plant 4 HF Storage Area closure action into the wastewater treatment system because the rinse waters contain concentrations of fluorides less than the revised clean rinseate standard of 60 mg/L. This assumes that treatment of this wastewater is consistent with the NPDES permit. The certification letter must discuss the treatment of these wastewaters.

J C Sattler 1-21-94

John Sattler, Date
Technical Support
Environmental Compliance

distribution:

W. Quaider
T. Walsh
K. Kolthoff

DOE Fernald Field Office

CONTACT REPORT

Date of Contact: November 23, 1993

Agency/Organization Contacted: Ohio EPA

Agency/Organization Representative: Robin Fisher, Phil Harris

Subject: HF Storage Area Inside Plant 4, rinseate standard; N/S Solvent Tank Contaminants of Concern; T5 & T6 amended CPID format;

During a meeting with Phil Harris and Robin Fisher at OEPA, Dayton, I discussed the following closure issues:

HF Area Inside Plant 4.

In the approved CPID the clean rinseate standard for the floor scrubbing was set at 1 mg/L fluoride. This limit was based on the closure guidance which establishes a clean concentration of contaminant in the rinse waters to be the lesser of 15 times the MCL or 1 mg/L (MCL of fluoride is 4 mg/L). After approximately 17 floor rinsings, the 1 mg/L concentration could not be met, the last five or six rinses were all about 7 ppm. The FEMP proposed, and OEPA agreed, that although fluoride is the contaminant of concern, because it is not a hazardous constituent, the Ohio closure guidance standards do not strictly apply. It was agreed that a limit of 15 times the MCL (60 mg/L) for fluoride is acceptable. This deviation from the approved plan must be noted in the closure certification letter, along with any other such changes (e.g. the use of the Kelly scrubber instead of the high pressure spray).

N/S Solvent Tank.

In response to an earlier inquiry from OEPA, I informed Phil and Robin that the FEMP will steam clean and rinse the tanks to 15 x MCL for toluene and xylene. These two COC's were selected based on a review of the MSDS of the tanks contents. A limited amount of soil will be removed if both xylene and toluene are present, if only one is detected the soil will not be removed as part of this closure. This is based on the presumption that if only one contaminant is present, the source of that material is other than the tank contents. If one contaminant is found, then the other would be expected, too. Phil suggested that we make sure that this is consistent with the relative concentrations of toluene and xylene in tank mixture. The containment structures will be rinsed but not sampled because of no evidence of leaks due to hazardous waste management. Phil and Robin said that they would review the CPID and possibly comment on this last point at that time.

T5 & T6 amended CPID.
They will review the recently submitted document and let us know if the format is OK.

J. Sattler 12-23-93

John Sattler, Date
Technical Support
Environmental Compliance

distribution:

W. Quaider
T. Walsh
K. Kolthoff

-5082

FILE: KL NWAI

Fernald Environmental
FERMCO
Restoration Management Corporation

FERMCO
P. O. Box 398704
Cincinnati, OH 45239-8704

FACSIMILE LEAD SHEET

No. of Pages: 5
Including Lead Sheet

DATE: October 25, 1993

TO: Robin Fisher

COMPANY NAME: OEPA/SWDO/DHWM

LOCATION: Dayton, Oh

FAX NO. TO BE CALLED: 513-285-6404 TELEPHONE NO.: 513-285-6357

FROM: Tom Walsh TELEPHONE NO.: (513-)738-6912

PROJECT NAME: FERNALD ENVIRONMENTAL MGMT CONTRACT NO.: DE-AC05-920R21972

MESSAGE

SUBJECT: USE OF PRESSURE SPRAYER

Robin, Attached is the information I discussed with you this morning.

TJW
Attachment

c: Ken Alkema, MS 65-2
Ken Kolthoff, MS 76
John Sattler, DOE-FN, MS 45

File Record Storage Copy 106.4.

To: Robin Fisher, OEPA/SWDO/DHWM

From: Tom Walsh, FERMCO

Subject: Use Of Pressure Sprayer In Plant 4 Drummed HF Residue/Associated Storage Area (HWMU #6)

Date: October 25, 1993

Attachment I is the description of the pressure sprayer which the FEMP proposes to use in the cleanup of the floor surface of HWMU #6. Note that the first paragraph of the attachment states that a berm will not be necessary. Since this paragraph was written, the FEMP has decided to use a berm during the cleanup activity. The use of a berm is consistent with the approved closure plan. I have also attached the appropriate section of the closure plan previously approved by OEPA which discusses the cleanup of the floor surface of HWMU #6 for your information (Attachment 2). The FEMP believes that the use of the Kelly Decontamination System is a more effective cleanup method and is consistent with the intent of the approved plan.

As we discussed, the FEMP will transmit a formal letter to OEPA/SWDO discussing the use of the Kelly Decontamination System. Upon review of the attached information, please contact me at (513)-738-6912 to discuss any concerns. Thanks for your help.

Tom Walsh

Tom Walsh, FERMCO

ATTACHMENT 1

PERFORMANCE STANDARDS

The pressure sprayer to be used for HF inside Plant 4 is the Kelley Decontamination system. The Kelly Decontamination System is a pressurized spray, HEPA -Filtered wet vacuum system. Normal system output pressure is between 250 and 300 psi with water temperatures of up to 300 F. The system is equipped with it's own collection system, therefore, a berm will not be necessary. A berm will be used around the drums used to collect rinse water.

The Kelly Decontamination system uses pressure jet streams of steam. We will evaluate the effectiveness of this system through sampling. The sampling and testing in the field will be conducted using ion electrodes for pH and fluoride. A verification sample rinse of the water going through the system will be collected for lab analysis.

A test area will be cleaned to confirm the ability to decontaminate for fluoride. This will insure that there is no fluoride interference from other fluoride sources such as tap water, concrete, and the possible presence of uranium fluoride in Plant 4. If Img/L of fluoride can not be achieved, the clean up level will be established based on the test area results.

ATTACHMENT 2

2) The floor area of the unit will be cleared, and any loose debris vacuumed from the floor. The vacuum device will be fitted with a High Efficiency Particulate Air (HEPA) filter to control the release of particulates. All residue removed from the unit will be drummed and managed as hazardous waste pending waste characterization.

3) Prior to washing the floor, a through inspection of the floor will be conducted. Any cracks and expansion joints with loose sealing material, or greater than 1/8 inch wide in the floor of the unit will be filled with expanding Portland cement grout. Sealing of the joints and cracks will prevent any water and/or potential contamination from migrating through the floor and into the underlying soil. The grout will be allowed to set at least 96 hours to cure and harden prior to washing.

4) An impervious temporary dike will be constructed around the boundaries of the unit to control and collect wash water created during the cleaning of the floor. The temporary dikes will be faced with polyethylene or other suitable sheeting and secured with weighted blocks or sand bags.

5) ONCE ALL THE PREPARATIONS HAVE BEEN MADE, WASH THE FLOOR SURFACE USING A POWER WASHER. THE POWER WASHER IS SIMILAR IN APPEARANCE AND USE TO A LAWN MOWER. THE OPERATOR WILL PUSH THE POWER WASHER ALONG WHILE THE SURFACE IS WASHED USING A REGULATED PRESSURE SPRAY (BETWEEN 0 AND 10,000 PSI) OF TAP WATER. THE PRESSURE OF THE SPRAYER IS REGULATED, AS NEEDED, TO REMOVE CONTAMINATION. IF NECESSARY, A 10,000 PSI SPRAY CAN BE USED TO REMOVE A THIN SURFACE LAYER OF THE CONCRETE. HOWEVER, THE DANGERS ASSOCIATED WITH PRESSURE SPRAYERS ARE SIGNIFICANTLY GREATER AS THE PRESSURE IS INCREASED. USE OF HIGH PRESSURES WILL ONLY BE USED IF CONTAMINATION CANNOT BE REMOVED USING A LOWER PRESSURE. AFTER THE WASH IS COMPLETED, THE FLOOR SURFACE WILL BE RINSED WITH TAP WATER AS NEEDED

ATTACHMENT 2 (CONTINUED)

TO REMOVE VISIBLE WASH RESIDUES. THE WASHING AND RINSING OF THE FLOOR SURFACE CONSTITUTES A SINGLE WASH CYCLE. ~~The floor surface of the unit will be washed with a non-phosphate laboratory grade detergent and tap water solution. After the wash is completed, the floor surface will be rinsed with tap water as needed to remove visible wash residues. The washing and rinsing of the floor surface constitutes a single wash cycle.~~

6) The waste waters generated during washing the floor's surface will be collected inside the diked area (north or south portion) and then pumped into properly labeled 55-gallon drums. The volume of wash water that is expected to be generated is approximately 120 gallons per cycle.

7) Following each wash cycle, the Project Engineer will decide whether to attempt another wash cycle or collect a decontamination rinse sample from the floor's surface. The decontamination verification rinse will be conducted after waste waters have been removed from the floor's surface. Approved sampling equipment will be used to collect a sample of the verification rinse water from inside the temporary containment (diked) area in accordance with the SAP (Attachment A). The sampling equipment used to collect the verification rinse water sample shall be clean. The sample shall be field tested for pH. If the pH is greater than 2.0 and less than 12.5 the sample will be sent to the laboratory for analysis for the parameters listed in Table 1.

8) Decontamination of the floor surface will be determined in accordance with Section 3.1.1. If satisfactory decontamination has not been achieved, the wash cycle followed by a verification rinse will be repeated (up to 3 cycles).

OhioEPA
State of Ohio Environmental Protection Agency
P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
FAX (614) 644-2329

ENV. ENG. SDS DEPT

JUN 15 8 50 AM '93

-5082

George V. Voinovich
Governor
Donald R. Schregardus
Director

May 24, 1993

CLOSURE PLAN APPROVAL

CERTIFIED MAIL

RE: CLOSURE PLAN
U.S. DOE DEPARTMENT OF ENERGY-FERNALD
ENVIRONMENTAL MANAGEMENT PROJECT (DOE-FEMP)
OH6 890 008 976
05-31-0681

Mr. Thomas J. Rowland
Acting Manager
Fernald Office
U.S. DOE-FEMP
P.O. Box 398705
Cincinnati, Ohio 45239-8705

Dear Mr. Rowland:

On October 7, 1992, the U.S. Department of Energy-Fernald Environmental Management Project submitted to Ohio EPA a closure plan for Hazardous Waste Management Unit #6 (HF Residue/ Associated Storage Areas Inside Plant 4), an unpermitted storage unit located at 7400 Willey Road, Fernald, Ohio. Revisions to the closure plan were received on February 12, 1993. The closure plan was submitted pursuant to Rule 3745-66-12 of the Ohio Administrative Code (OAC) in order to demonstrate that the U.S. Department of Energy-Fernald Environmental Management Project's proposal for closure complies with the requirements of OAC Rules 3745-66-11 and 3745-66-12.

The public was given the opportunity to submit written comments regarding the closure plan of the U.S. Department of Energy-Fernald Environmental Management Project in accordance with OAC Rule 3745-66-12. No comments were received by Ohio EPA in this matter.

OHIO E.P.A.
MAY 24 93
ENTERED DIRECTOR'S JOURNAL

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.
By: Marie Clavin Date 5-24-93

Printed on recycled paper

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Based upon review of the U.S. Department of Energy-Fernald Environmental Management Project's submittal and subsequent revisions, I conclude that the closure plan for the hazardous waste facility at 7400 Willey Road meets the performance standard contained in OAC 3745-66-11 and complies with the pertinent parts of OAC Rule 3745-66-12. The closure plan submitted to Ohio EPA on October 7, 1992 and revised on February 12, 1993 by the U.S. Department of Energy-Fernald Environmental Management Project is hereby approved.

Please be advised that approval of this closure plan does not release the U.S. Department of Energy-Fernald Environmental Management Project from any responsibilities as required under the Hazardous and Solid Waste Amendments of 1984 regarding corrective actions for all releases of hazardous waste or constituents from any solid waste management unit, regardless of the time at which waste was placed in the unit.

Notwithstanding compliance with the terms of the closure plan, the Director may, on the basis of any information that there is or has been a release of hazardous waste, hazardous constituents, or hazardous substances into the environment, issue an order pursuant to Section 3734.20 et seq of the Revised Code or Chapters 3734 or 6111 of the Revised Code requiring corrective action or such other response as deemed necessary; or initiate appropriate action; or seek any appropriate legal or equitable remedies to abate pollution or contamination or to protect public health or safety or the environment.

Nothing here shall waive the right of the Director to take action beyond the terms of the closure plan pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499 ("CERCLA") or to take any other action pursuant to applicable Federal or State law, including but not limited to the right to issue a permit with terms and conditions requiring corrective action pursuant to Chapters 3734 or 6111 of the Revised Code; the right to seek injunctive relief, monetary penalties and punitive damages; to undertake any removal, remedial, and/or response action relating to the facility; and to seek recovery for any costs incurred by the Director in undertaking such actions.

OHIO E.P.A.

MAY 24 93

ENTERED DIRECTOR'S JOURNAL

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.

By: Mary Cerino Date 5-24-93

You are notified that this action of the Director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after notice of the Director's action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency within three (3) days of filing with the Board. An appeal may be filed with the Environmental Board of Review at the following address: Environmental Board of Review, 236 East Town Street, Room 300, Columbus, Ohio 43266-0557.

When closure is completed, the Ohio Administrative Code Rule 3745-66-15 requires the owner or operator of a facility to submit to the Director of the Ohio EPA certification by the owner or operator and an independent, registered professional engineer that the facility has been closed in accordance with the specifications in the approved closure plan. These certifications shall follow the format specified in OAC 3745-50-42(D), and should be submitted to: Ohio Environmental Protection Agency, Division of Hazardous Waste Management, Attention: Tom Crepeau, Data Management Section, P.O. Box 1049, Columbus, Ohio 43266-0149.

Sincerely,

Donald R. Schregardus
Director

DRS/rgf

cc: Tom Crepeau, OEPA, DHWM Central File
Randy Meyer, OEPA, DHWM
Section Chief, Ohio Permit Section, USEPA, Region V
Robin Fisher, OEPA, Southwest District Office

OHIO E.P.A.

MAY 24 93

ENTERED DIRECTOR'S JOURNAL

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.

By: Maria Cavin Date 5-24-93

c:

K. Alkema

P. Clay

J. Eagle

C. Griffin

F. Jebins

J. King

B. Ko

K. Kolthoff

A. Olding

N. Redmon

M. Strimbu

T. Walsh

K. Wintz

ATTACHMENT 4: STANDARD OPERATING PROCEDURES FOR THE KELLY DECONTAMINATION SYSTEM

Fernald Environmental Management Project Fernald Environmental Restoration Management Corp. REMEDIATION SUPPORT OPERATIONS DOCUMENT PROGRAM	Page 1 of ~~21~~ Revision No. 0 Revision Date: N/A -5082

REMEDIATION SUPPORT OPERATIONS PROCEDURE	Operating the KELLY Decontamination System	SOP 20-C-015 Area: As Applicable
Authorization: R.L. Gardner Facilities & Waste Operations Mgr.	Supersedes: None	Issue Date:

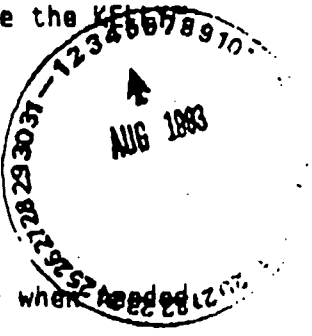
DRAFT

1.0 PURPOSE

This procedure provides instructions for the proper and safe use of the KELLY™ Decontamination System.

2.0 APPLICABILITY

This procedure applies to all persons who set-up and operate the KELLY Decontamination System (the System).



3.0 RESPONSIBILITIES

3.1 Supervisor

3.1.1 Ensure that only trained personnel operate the System.

3.1.2 Ensure that support equipment and materials are available when needed.

3.1.3 Control the movement of vacuum units between areas.

3.1.4 Contact Environmental Safety and Health (ES&H) to determine the appropriate personal protective equipment for the selected cleaning process.

3.1.5 Provide operators with the required personal protective equipment as specified by ES&H.

3.1.6 Contact ES&H to determine the appropriate hazard warning for National Fire Protection Association (NFPA) Labels.

3.1.7 Ensure the work area is properly contained for cleaning hazardous, radiological, or asbestos containing materials.

3.1.8 Ensure proper lock-out and tag-out (per SSOP-0719) of any equipment that is to be decontaminated using the System.

3.1.9 Ensure all permits are posted and documentation is complete.

3.1.10 Contact Nuclear Criticality Safety to obtain a Criticality Safety Approval (CSA) before operating.

3.2 Operators

3.2.1 Operate the System in accordance with this procedure.

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3.0 RESPONSIBILITIES (cont.)

3.2.2 Read and comply with the Radiation Work Permit (RWP).

3.2.3 Erect barriers and barricades when required by standard procedures or supervision.

4.0 DEFINITIONS

4.1 Warning - An action, process, practice, or condition that could result in injury to or death of personnel if not strictly observed.

4.2 Caution - An action, process, practice, or condition that could result in damage to, equipment or the environment if not strictly observed.

4.3 Note - An action, process, practice, or condition that requires emphasis or clarification.

4.4 Asbestos - A group of magnesium silicate minerals that readily separate into long, flexible fibers for use as a noncombustible, nonconducting, or chemically resistant material. These fibers can pollute air or water and can cause cancer or asbestosis when inhaled.

4.5 Hazardous Waste - A discarded material listed in the EPA Hazardous Waste List, fails the TCLP test or exhibits any of the following characteristics: reactivity, ignitability, corrosivity, or toxicity.

4.6 High Efficiency Particulate Air (HEPA) Filter - A pleated paper or fiber filter that removes submicron range (or larger) particles from air passing through it, and having an efficiency of 99.7% when challenged with DOP aerosol.

4.7 Radiological - Describing an item relating to nuclear radiation.

4.8 NFPA Label - A standardized color-coded diamond-shaped label that indicates the type and degree of hazard of the material in the container.

5.0 APPLICABLE DOCUMENTS

5.1 Drivers

5.1.1 RM-0012, "Quality Assurance Program Description"

5.1.2 PO-O-026, ""Site Services Document Program"

5.1.3 "FEMP Conduct of Operations Manual"

5.2 References

5.2.1 Kelly Decon Systems™ Operation & Maintenance Manual

5.2.2 SSOP-0719,"Energy Control Procedure (Lockout and Tagout)"

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6.0 INDUSTRIAL HEALTH AND SAFETY REQUIREMENTS

6.1 Protective clothing and equipment, such as gloves and face shield, are required for handling any hot components during use of the System.

6.2 Any person who operates, uses, or supervises the use of the System must be fully trained on the equipment's safe operation and be familiar with this procedure.

6.3 All water, steam, and vacuum hoses, must have good condition gaskets in place.

6.4 All steam hose clamps and fittings must be checked for leaks before heating up the System upon each use. Hose clamps and fittings shall not be changed, substituted, or modified.

6.5 Do not attempt to change the inlet or outlet filters or to service any internal components.

6.6 The System shall be cooled down before depressurizing.

6.7 All electrical connections shall be checked for proper voltage, amperage, and ground connection prior to initial connection.

6.8 The System temperature control must be set and maintained at <300°F.

6.9 To prevent shut-off and ensure that the input water pressure is maintained above 40 psig at 2.0 gpm, tag the cold water supply valve with a caution tag.

6.10 To prevent heater damage, the System pressure must be maintained at >200 psig when temperatures are above 225°F.

6.11 Any safety guards on rotating equipment must not be altered, defeated, or removed.

6.12 The reservoir air outlet shall not be used to add water or other materials into the liquid ring vacuum pump.

6.13 Hands or other body parts shall not be placed over or into the vacuum suction line.

6.14 Maintain the vacuum breaker setting on the vacuum pump at <10 inches mercury.

6.15 Do not place hand or other body parts or expose others to the direct spray of water or steam from the decontamination tools.

6.16 Energized electrical systems, connectors, cords, or control panels must be kept dry and away from spray or drainage.

6.17 The High Efficiency Particulate Air (HEPA) filter unit must be in place and fully functional when operating the System.

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6.0 INDUSTRIAL HEALTH AND SAFETY REQUIREMENTS (cont.)

6.18 Use the System only for its intended functions to avoid injury to personnel and/or damage to the equipment.

7.0 GENERAL

7.1 Warnings, Cautions, and Notes appear before the text to which they apply.

8.0 PROCEDURE

8.1 Description - The KELLY™ Decontamination System (Figure 1) uses the spray-vacuum cleaning technique for general area decontamination. The five major components combine a low-volume, pressurized spray of superheated water with a powerful, HEPA-filtered wet vacuum system. It uses different sizes of spray-vacuum tools for the various surface geometries to be decontaminated.

8.1.1 Main Unit - This unit supplies the superheated water under pressure to the decontamination tools. The unit contains both input and output water filters, pressure and flow rate monitors, a temperature controller, and the necessary safety devices. Normal system output pressure is between 250 and 300 psig with water temperatures of up to 300° F.

8.1.2 Vacuum Power Unit - This unit provides the source of vacuum for the decontamination tools by using a positive displacement liquid ring vacuum pump driven by a 10 HP TEFC motor. The pump is rated at 187 CFM at negative pressures up to 10 inches of mercury. This pump uses water (held in a reservoir) as the sealing and cooling medium and is designed for the high input humidity conditions of the airstream.

8.1.3 Demister/HEPA Filter Unit - This unit contains a high-efficiency Demister and a high capacity HEPA filter in a patented Bag-in, Bag-out stainless steel housing. The unit is located upstream of the Vacuum Power Unit to prevent any release of radioactive particles during decontamination operations with the spray-vacuum tools.

8.1.4 Cyclone Liquid Separator - A lightweight, portable cart with a stainless steel cyclone-type separator removes from the wastewater any large particles or trash vacuumed up during system operation. It contains a removable trash basket and/or filter bag to the facilities' liquid waste systems. A peristaltic pump constantly drains the wastewater from the separator vessel to allow continuous system operation and to limit the build-up of radiation levels.

8.1.5 Spray-Vacuum (Decon) Tools - Built entirely of stainless steel, these tools contain the properly sized spray nozzles inside a vacuum shroud supported by roller bearing wheels. Standard tools include a 12-inch wide floor tool, a 9-inch wide wall tool, and a 6-inch wide hand tool.

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8.0 **PROCEDURE** (cont.)

8.1.6 Spray Wands - For decontaminating convoluted surfaces that cannot be efficiently vacuumed, various length spray wands are provided (one 18-inch wand and one 36-inch wand). These wands are attached to a hand-held spray gun by quick-disconnect couplings for easy replacement during operations. Several spray tips are provided to allow the application of decontamination agents via a siphon assembly inserted into the hot water supply hose.

8.2 Requirements

8.2.1 Training - Personnel operating, or supervising the use of, the KELLY Decontamination System shall be trained in and knowledgeable of the safe and proper use of the System. Operator Certification requires the following.

8.2.1.1 Eight hours of documented hands-on-training under the direct supervision of a Certified Operator in RSO.

8.2.1.2 Documented training by a factory representative as an alternate for the above described training.

8.2.1.3 Documented understanding of this procedure and of the KELLY™ Decontamination System "Operation & Maintenance Manual".

8.2.2 Required Equipment

8.2.2.1 Main Unit

8.2.2.2 Liquid Ring Vacuum Pump

8.2.2.3 Demister/HEPA Filter Unit

8.2.2.4 Cyclone Liquid Separator

8.2.2.5 Spray-Vacuum (Decon) Tools - 6-inch, 9-inch, and 12-inch widths

8.2.2.6 Spray Gun

8.2.2.7 Spray Wands - one 18-inch and one 36-inch length

8.2.2.8 Soap Siphon Assembly

8.2.2.9 Steam Hose, ½-inch ID - six 50-ft sections

8.2.2.10 Vacuum Hose, 3-inch - eight 25-ft sections

8.2.2.11 Vacuum Hose, 2½-inch - two 50-ft sections

8.2.2.12 Fresh Water Supply Hose - one 50-ft section

8.2.2.13 Wastewater Discharge Hose - one 50-ft section

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8.0 **PROCEDURE** (cont.)

8.2.2.14 Main Unit Reservoir Drain Hose - 25-ft section

8.2.2.15 Vacuum Unit Water Supply Hose - 25-ft section

8.2.2.16 Metal Storage Containers on Casters - three units

8.2.2.17 Power Supply Cords, 480-Volt, 3-phase, 60 Amp - two 20-ft units

8.2.2.18 Extension Cord for the Wastewater Pump, 115-Volt

8.2.2.19 Power Supplies, 460-Volt, 3-phase, 60 Amp - one unit

8.2.2.20 Grounded Power Supply, 115-Volt, single-phase - one unit

NOTE: This system outputs approximately 3 gpm. Depending on the time of the operation, more than one drum may be required.

8.2.2.21 Wastewater Receptacle - 55 gal drum labeled "Contaminated Water".

8.2.3 Required Materials

8.2.3.1 Decontamination Agent, EPA approved

8.2.3.2 Process water supply - demineralized, deionized, or non-contaminated (between 40 and 150 psig at 3.0 gallons per minute)

8.2.3.3 White filter bags for Cyclone Liquid Separator.

8.2.4 Equipment Preparation

8.2.4.1 Prior to start-up, the System operator shall perform a daily inspection as per the operational check-off sheet (Table 1) and submit sheet to supervisor.

8.2.4.2 The electrical components of the System shall be de-energized prior to any service or maintenance.

8.2.4.3 A RWP shall be procured and posted prior to any decontamination operations as per facility policy.

8.2.4.4 Radiological controls and monitors shall be established as per facility policy.

8.2.4.5 Establish communications between the System component operator and the person performing the decontamination work in the controlled area.

8.2.4.6 At beginning of each week's use, add four drops of silicone oil to the pump oil cup of the pump with the inlet and outlet at the top.

8.2.4.7 Before heating up the System, check the steam hose clamps to ensure that there are no leaks. Clamps shall not be modified or substituted.

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8.0 **PROCEDURE** (cont.)

8.2.4.8 Prepare the required cleaning solution.

8.2.4.9 Set the System temperature control to desired temperature below 300°F .

8.2.4.10 Set the Relief Valve pressure at 300 psig.

8.3 System Set-Up

8.3.1 Tag the cold water supply valve, per SSOP-0719, "Energy Control Procedure (Lockout and Tagout)", with CAUTION tag to ensure that the water will not be shut off during operation.

8.3.2 Place the Main Unit and the Vacuum Pump within 300 feet of the farthest area to be cleaned.

8.3.3 Remove the filter screen from the Cyclone Liquid Separator and insert a white filter bag.

8.3.4 Replace the filter screen (inside the bag) and secure the lid.

8.3.5 Ensure that the correct voltage, amperage, and ground continuity is available on all electrical supply circuits (Figure 1).

8.3.6 Connect the Vacuum Pump System and the Main Unit to the plant electrical power supply if accessible, or to a generator if the operating site is remote.

CAUTION

Do not allow electrical cords or connectors to contact water; a system short circuit can damage equipment.

8.3.7 Ensure that extension cords and connectors are in good condition and free of cuts, cracks, faults, or loose wires.

8.3.8 Connect the nearest clean process water supply to a length of clean water hose long enough to reach the Main Unit cold water inlet.

8.3.9 Flush the water supply hose with clean water to ensure that the interior of the hose is not contaminated and direct the rinse water to the 55 gal drum for contaminated wastewater.

8.3.10 Connect the water supply hose to the Main Unit cold water inlet.

8.3.11 Connect the water output hose to the Main Unit hot water output tap.

8.3.12 Attach Spray Wand Gun to hot water output hose but do not connect a spray-vacuum tool at this time.

8.3.13 Route the reservoir drain hose from the Main Unit to a proper drain or receptacle for clean water.

8.0 PROCEDURE (cont.) -5082

8.3.13.1 If drain is not accessible, be sure to drain the reservoir whenever the warning buzzer and/or indicator light energizes.

8.3.14 Connect a 3-inch vacuum hose from the inlet of the Vacuum Power unit to the outlet of the Demister/HEPA Filter Unit.

8.3.15 Connect a 3-inch vacuum hose from the HEPA filter box inlet to the Cyclone Liquid Separator outlet.

8.3.16 Place a drain pan under the water level gauge in the center of the HEPA filter.

8.3.17 Connect one end of a 2½-inch vacuum hose to the inlet of the Cyclone Liquid Separator and the other end to the Spray Vacuum Tool.

8.3.18 Attach the Vacuum Unit water supply hose from the Main Unit cold water outlet to the Vacuum Pump Reservoir top fitting.

8.3.19 Connect the remaining water output hose to the output for contaminated water located to the right of the electrical connector on the Cyclone Liquid Separator and route the hose to the "contaminated water" drum.

8.3.20 With the Main Unit's input water valve open, turn on the water supply to the System.

8.3.21 Check input water pressure on the cold water outlet pressure gauge to the System and adjust the regulator knob to 40 ± 10 psig.

8.3.22 Fully open the cold water input, flow control (the black circular valve above the hot water output valve), and output water valves on the Main Unit.

8.3.23 Close the Spray Gun.

CAUTION

Do not start the vacuum system motor if the water level is above the height of the pump shaft because damage to the pump, drive belt, and/or motor may result.

8.3.24 Open cold water supply valve on Main Unit to fill vacuum pump reservoir to half shaft level. The level control valve should automatically shut off the flow when the proper level is reached.

8.4 System Turn-on

8.4.1 On the Main Unit Control Panel (Figure 2), turn the key switch, located between the "heater" and the "reservoir" lights, to the right to turn on System power.

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8.0 **PROCEDURE** (cont.)

NOTE: Pressure, temperature, and flow monitors should begin to function, and the green "power" light should illuminate.

8.4.2 Allow a few minutes for readouts to stabilize. Then, verify that the pressure monitor reads the same as the input water pressure gauge, 40 ± 10 psi .

NOTE: The digital pressure gauge is much more accurate than the input water gauge.

8.4.2.1 If the digital pressure monitor does not read within 20% of the input water gauge, notify supervisor that one of the gauges needs repair.

CAUTION

Before starting the Vacuum Pump, ensure that the proper water level has been reached (no more incoming water) or System damage may occur.

NOTE: The level control valve within the pump should automatically shut off the flow when the proper water level is reached.

8.4.3 Press the PUMP ON button while observing the pressure gauge.

8.4.3.1 If pressure does not rise, immediately shut down the unit by pressing the emergency STOP button, and contact the supervisor.

CAUTION

Air should vent from top of reservoir if pump rotation is correct.

8.4.4 If pump rotation is correct (venting air), run pump (only) to completely vent the System of all air pockets by opening the Spray Gun.

8.4.5 If pump is taking in air instead of venting air, press the emergency STOP button and request the supervisor to contact maintenance.

NOTE: The Spray-vacuum Tool is not connected until the System is fully vented.

8.4.6 Perform a Leak Check as follows:

8.4.6.1 Close Spray Gun and allow the System to pressurize to between 250 and 300 psig.

8.4.6.2 Simultaneously close the input water supply valve and shut down the pump by pressing the EMER STOP button.

8.4.6.3 Observe the pressure gauge. If pressure holds and does not lose more than 30 psig for one minute, proceed to paragraph 8.4.7.

8.4.6.4 If the pressure drops more than 30 psig in one minute, there is a leak.

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8.0 PROCEDURE (cont.)

8.4.6.5 Shut off the output water valve on the Main Unit to determine if the leak is in the hose or inside the Main Unit.

8.4.6.6 If pressure continues to drop, indicating that the leak is inside the Main Unit, shut down the system and contact Maintenance.

8.4.6.7 If pressure does not continue to drop, the leak is in the output water hose. Investigate and tighten the leading connections until pressure holds.

8.4.7 Open the input water supply valve and the outlet water valve.

8.4.8 Press the "pump on" button.

CAUTION

Do not allow the System temperature to exceed 300°F.

8.4.9 On the Main Unit internal panel, set the temperature controller to the desired temperature: 120° to 140°F for soap application; 200° to 250°F for spray wand washing; 250° to 285°F for spray-vacuum tools.

8.4.9.1 If System temperature exceeds 300°F, shut down the Unit and notify the supervisor that maintenance is required.

8.4.10 Press the yellow HEATER CURRENT button. The temperature and output pressure should begin to rise.

CAUTION 1

Outlet pressure should not exceed 300 psig during heat up.

CAUTION 2

If System pressure drops below 200 psig while temperature is above 225°F, the heater may be damaged.

8.4.10.1 If pressure exceeds 300 psig, shut down unit and adjust heater relief valve (located behind the electrical control box) to 290 psi by unlocking the Main Unit.

8.5 Tool Selection

8.5.1 Hot Soap Siphon Rig

8.5.1.1 Select nozzle size 4020 to operate the siphon.

8.5.1.2 Shut off the output water valve.

8.5.1.3 Relieve the pressure in the hose.

8.5.1.4 Connect the siphon rig to the output connection and reconnect the hose.

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8.0 PROCEDURE (cont.)

8.5.1.5 Select temperature of ≤180°F for proper siphon function.

8.5.2 Steam Spray Wand

8.5.2.1 Select nozzle size 4008 or 4010 for best pressure/flow characteristics.

8.5.3 Spray-Vacuum Tools

8.5.3.1 Check vacuum pump for proper water level.

8.5.3.2 When the water heater reaches the preset temperature, slowly open the output valve and flush system and hoses until hot water and steam are being released.

8.5.3.3 Close the Spray Gun.

8.5.3.4 Depressurize steam hose.

8.5.3.5 Remove spray wand gun and then connect to the Spray-Vacuum Tool to be used.

8.6 System Operational Test

8.6.1 Disconnect the vacuum hose from the liquid ring vacuum pump inlet.

8.6.2 Turn on key switch of the Vacuum Pump Unit and press green PUMP button.

8.6.3 Check the Vacuum Pump for correct rotation: air should exit from top of reservoir if rotation is correct.

8.6.4 Check that water flows into reservoir tank from pump.

NOTE: Water or other materials should not be added into the liquid ring vacuum pump through the reservoir air outlet.

8.6.4.1 If water flows out of the air inlet, press the emergency STOP button and notify the supervisor that maintenance is required.

8.6.5 Reconnect the 3-inch Vacuum Hose and turn on vacuum pump to start operational test.

8.6.6 Open spray gun by pulling handle, and check for leaks.

8.6.7 If volume desired is less than allowed by spray nozzle back pressure, adjust the water flow.

8.6.7.1 For best Spray-Vacuum Tool performance, allow the nozzles to regulate water volume with flow control valve fully open.

8.6.8 Test the operation of the System in a clean, low-dose-rate area.

8.0 **PROCEDURE** (cont.)

8.6.9 Repair any leaks or problems before entering the high radiation level area.

8.6.10 Tighten all leaking steam hose clamps and pipe fittings.

8.7 Decontamination Preparation

8.7.1 Begin operations by working into the area from the "clean side" if possible.

8.7.2 If the area to be cleaned is on a different floor or elevation than the Main Unit, place the Cyclone Liquid Separator on the level of operations and run the vacuum hose from the separator's outlet to the inlet of the filter unit.

8.7.3 For the most efficient operation of the decontamination tools, the spray must be in a fairly solid state as it exits the spray nozzles but also carry as much heat to the surface as possible. Operation is best at temperatures between 250°F and 275°F and pressures between 225 and 285 psig.

CAUTION 1

Do not operate the System at temperatures and pressures that cause steam pockets or voids.

CAUTION 2

If pressure is lost, shut down unit to prevent heater damage.

8.7.4 If using the System as a hot spray wand, set the heater temperature control to between 140° and 150°F.

8.7.4.1 When using soap siphon to apply hot solutions, do not exceed 180°F output temperature.

NOTE 1: Normal flow rates, for different tools, can range from 0.4 to 3.0 gallons per minute (gpm). Spray quality and impact force may vary with the temperature and flow rate used. The nozzle size regulates the flow rate and pressure of the system. Use the flow control valve only for calibration checks.

NOTE 2: The Portable Vacuum System is designed for high humidity operations and uses water as the pump sealing and cooling medium. Some evaporation of water is normal during operation.

NOTE 3: Maximum recommended vacuum pressure is 10.0 inches of Mercury (Hg). The setting of the electrical vacuum breaker may be adjusted so that it trips at 10.0 inches Hg.

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8.0 PROCEDURE (cont.)

CAUTION 1

Do not exceed a value of 10 inches Hg negative pressure or System may be damaged.

CAUTION 2

The HEPA filter unit must be in place and fully functional before operating the vacuum system.

8.7.5 Check the HEPA filter differential pressure gauge for proper indication and operation.

8.7.6 Energize the Liquid Separator/Trash Collector Pump Unit and run it continuously during vacuuming.

8.7.7 Run the pump and verify the operation of the vacuum breaker by lifting the Liquid Separator high level float ball into the 3-inch suction elbow.

NOTE: The pump should shut down when the negative pressure reaches 10 inches Hg.

WARNING

Do not put hands or other items over the vacuum pump inlet. Severe injury can result due to high suction power of unit.

8.7.8 Connect all hoses and observe starting vacuum pressure.

8.7.8.1 If the vacuum pressure stays at 10 inches Hg during operation, shut down the unit.

8.7.9 Check the liquid level in the reservoir frequently to verify proper operation of the float valve.

NOTE 1: Demister/HEPA Filter Unit is a passive system with no controls or adjustments. It should always be placed between the liquid separator and the vacuum pump. A Magnehelic Gauge is supplied to monitor the differential pressure across the HEPA filter. The filter manufacturer's maximum DP should be used as the replacement value. (0.25 inches H_2O is normal start-up value; replace filter if DP rises to greater than 1.0 inch water DP)

NOTE 2: The Liquid Separator/Trash Collector unit must be used between the Decon Tool and the Demister/HEPA Filter Unit to collect the water and trash vacuumed up during operation.

8.7.10 After each day's use, or more often if necessary, drain all condensation collected from the HEPA filter into the contaminated-water drum. Observe the sight level gauge tube on bottom of condensate trough frequently during operation.

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8.0 PROCEDURE (cont.)

8.7.11 Periodically check wastewater pump output for flow .

8.7.12 Ensure that the internal drum screen was cleaned after last use.

8.7.12.1 When cleaning is required, drain wastewater into contaminated water drum.

8.8 Decontamination Operations

8.8.1 Remove trash and obstructions to access.

8.8.2 With vacuum, remove heavy accumulations of dirt from area to be decontaminated.

8.8.3 If the surface has an oil or grease film or has been contaminated for a long period, apply hot soap solution or emulsifier via the siphon and spray wand to significantly increase decontamination factors.

NOTE: The siphon must use a 4020 sized spray nozzle on the spray wand. Do not exceed 180°F water temperature when using siphon.

8.8.4 Lightly scrub the heavy accumulations of oil and dirt to physically loosen the deposits.

NOTE: If doing only the floor or if the floor is significantly higher in contamination levels than the vertical surfaces, start from the clean area and work toward the contamination center.

8.8.5 Use the floor tool as you would a vacuum cleaner and overlap each pass at least 1/3 of the tool's width.

NOTE 1: Leave as little water behind as possible.

NOTE 2: Be careful to maintain tool flush with surface while the water spray is on.

8.8.6 If the vertical surfaces are to be done first, select the proper hand held tool and work from the top down and from lowest contamination level to highest level unless significant dose reduction can be gained by removing the highest levels first.

8.8.7 After the vertical surfaces are finished, work from farthest point back to the step-off pad to prevent cross-contamination from hoses.

8.8.8 Resurvey area after the first pass to locate any remaining "hot" (contaminated) spots.

8.8.9 Repeat above procedure if necessary, using a suitable decontamination agent, and lightly scrubbing the surfaces until the contamination level does not decrease noticeably between readings.

8.0 PROCEDURE (cont.)

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NOTE: The spray wand may be used as a hot pressure washer by adjusting the temperature to the desired level and using a flat spray nozzle with a capacity of between 1.0 and 3.0 gpm.

8.9 System Shutdown

8.9.1 After the job is finished, turn off the heater and cool down all components by flowing cold water through the System.

8.9.1.1 Open the spray gun and allow the spray-vacuum tool to run for 10 to 15 minutes in one position on a clean surface.

8.9.2 When the temperature indicator stabilizes at the temperature of the input water supply, turn off water supply.

8.9.3 Disconnect the hot water hose to the spray-vacuum tool and run the System for another 10 minutes so that the Cyclone Liquid Separator is dry.

8.9.4 Turn the key switch to OFF.

8.9.5 Completely drain the unconnected hot water hose (clean water).

8.9.6 Notify the supervisor that the System and work area are ready for a radiological contamination survey.

8.9.7 Remove CAUTION tag from the cold water supply.

CAUTION

Do not open the liquid cyclone separator until a Radiological Control Technician (RCT) has approved the operation.

8.9.8 Disconnect the vacuum lines from the lid.

8.9.9 Remove the lid of the Cyclone Liquid Separator.

8.9.10 Remove the internal trash and dirt build-up from the Liquid Cyclone Separator and place in container for contaminated waste.

8.9.11 Remove the screen from the separator and, while holding screen in one hand, remove the white filter bag.

8.9.11.1 Dispose of filter bag as contaminated waste.

8.9.12 Replace the screen in the separator.

8.9.13 Rinse the screen with clean water from the hose.

8.9.14 Replace the lid on the Cyclone Liquid Separator.

8.9.15 Disconnect all electrical cords.

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8.0 **PROCEDURE** (cont.)

8.9.16 For long term storage, cap ends of all hoses using manufacturer-supplied caps.

8.9.17 Wipe down all accessible external and internal surfaces on the spray-vacuum tools, hoses, and equipment.

8.9.17.1 Dispose of wipes as contaminated material.

8.9.18 Empty the drain pan (below the water level gauge in the center of the HEPA filter) into the contaminated water drum and rinse the pan into this drain.

8.9.19 Drain the Demister/HEPA filter box of condensation into the drum of contaminated waste before moving equipment to new working location.

8.10 System Storage

8.10.1 Disconnect all power sources.

8.10.2 Disconnect and drain all hoses from the Main Unit (clean water).

8.10.3 Disconnect all other hoses and drain into the drum of contaminated waste.

8.10.4 Cap ends of all hoses or bag entire assembly to prevent contamination.

8.10.5 Drain the vacuum pump reservoir and HEPA filter box of all water and dispose of this water in the drum of contaminated water.

8.10.6 Ensure that all input and output valves are closed.

8.10.7 Store System where it is not exposed to freezing temperatures.

9.0 APPLICABLE FORMS

None

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TABLE 1
KELLY™ Decon System Pre-Operational Check-Off Sheet

	Signed
1.0 Required Services	
• 460 volt, 3 phase, 60 amp service	____
• 115 volt, 5 amp, ground fault protected service	____
• Demineralized, deionized, or clean process water	____
• Wastewater drain/receptacle available	____
2.0 Safety Checks	
• Electrical extension cord continuity	____
• Water supply clean, tagged, and less than 150 psig	____
• Steam hose clamps tightened	____
• Communications available	____
• All hose gaskets in place and in good condition	____
• Work permit approved, and posted	____
• Barriers to work area in place	____
• Personal protective equipment received	____
3.0 Main Unit Pre-Operational Checks	
• Water supply flushed before connection	____
• Input and output filters clean	____
• Pressure, flow rate, and temperature indicators functional	____
• Low pressure switch functional	____
• Main unit flushed of all air pockets	____
• Pressure boost pump functional	____
• Pump pressure between 260-280 psig with no flow	____
• Emergency stop button functional	____
• Heater relief valve setting < 300 psig	____
4.0 Cyclone Liquid Separator	
• Lid gasket in place	____
• Waste water pump functional	____
• High level float ball functional	____
• Trash basket and filter bag clean	____
• Camlock gaskets in place	____
5.0 Demister/HEPA Filter Unit	
• Condensate reservoir drained	____
• Drain valve and sight glass valve closed	____
• Filter change out bags properly installed	____
• Housing doors tight, gaskets in place	____
• Magnehelic gauge functional	____
• Camlock gasket in place	____
6.0 Vacuum Power Unit	
• Reservoir lid gasket in place	____
• Float valve functional	____
• Water level cut-off at pump centerline	____
• Vacuum breaker cut-off at 10" Hg	____
• Drive belt tension correct	____
• Vacuum gauge functional	____

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TABLE 1 (cont.)
KELLY™ Decon System Pre-Operational Check-Off Sheet

7.0 Spray-Vacuum Tools

- Steam and vacuum hose clamps tight _____
- Spray gun fittings tight _____
- In-line steam hose filters clean (6" and 9" tools only) _____
- Spray nozzle body filters clean (12" floor tool only) _____
- Roller wheels free turning _____
- Tool shroud gap even at 1/16 - 1/8 inch _____
- Spray nozzles not clogged _____

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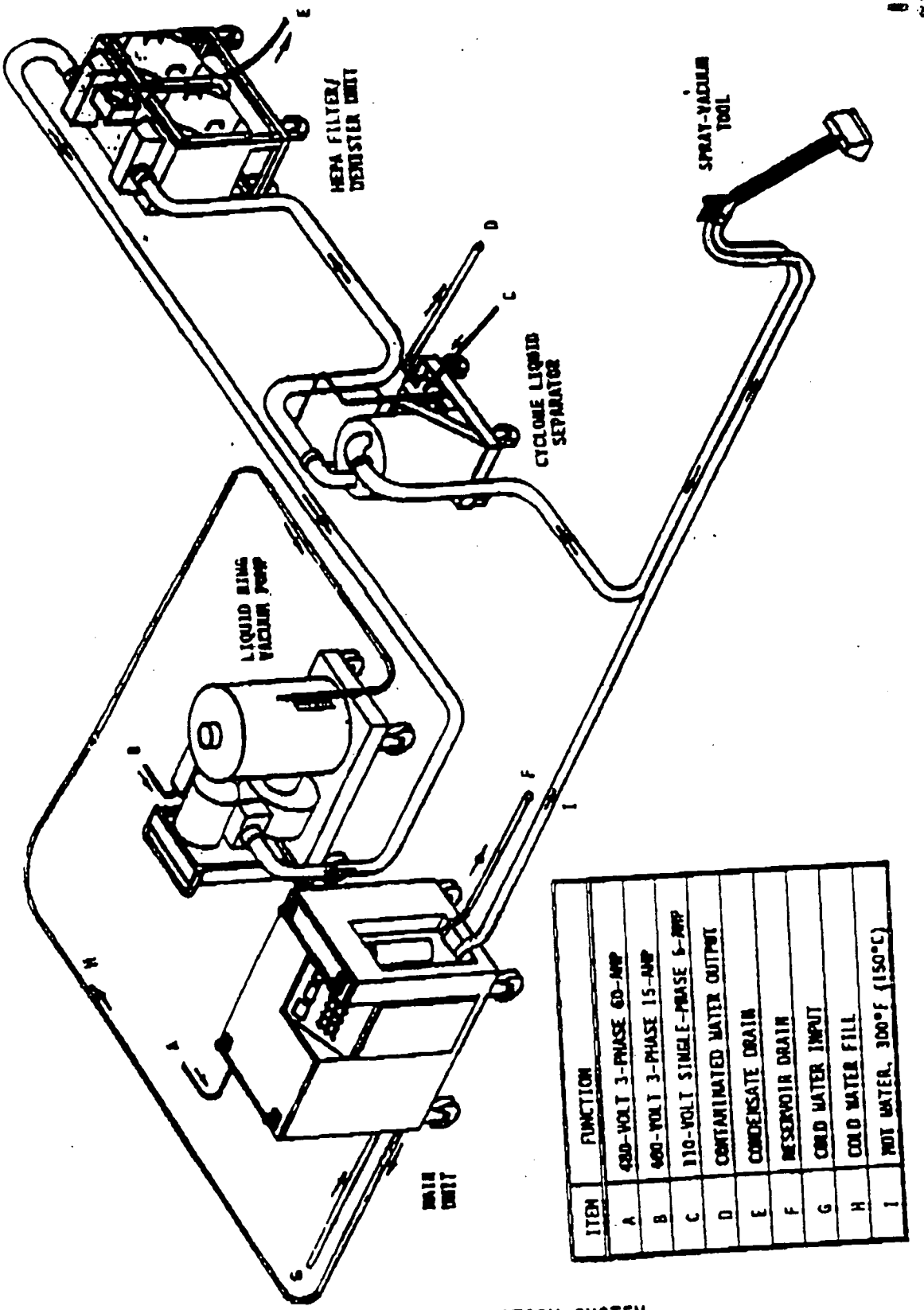

ITEM	FUNCTION
A	480-VOLT 3-PHASE 60-AMP
B	480-VOLT 3-PHASE 15-AMP
C	110-VOLT SINGLE-PHASE 5-AMP
D	CONTAMINATED WATER OUTPUT
E	CONDENSATE DRAIN
F	RESERVOIR DRAIN
G	COLD WATER INPUT
H	COLD WATER FILL
I	HOT WATER, 300°F (150°C)

KELLY DECONTAMINATION SYSTEM
Figure 1

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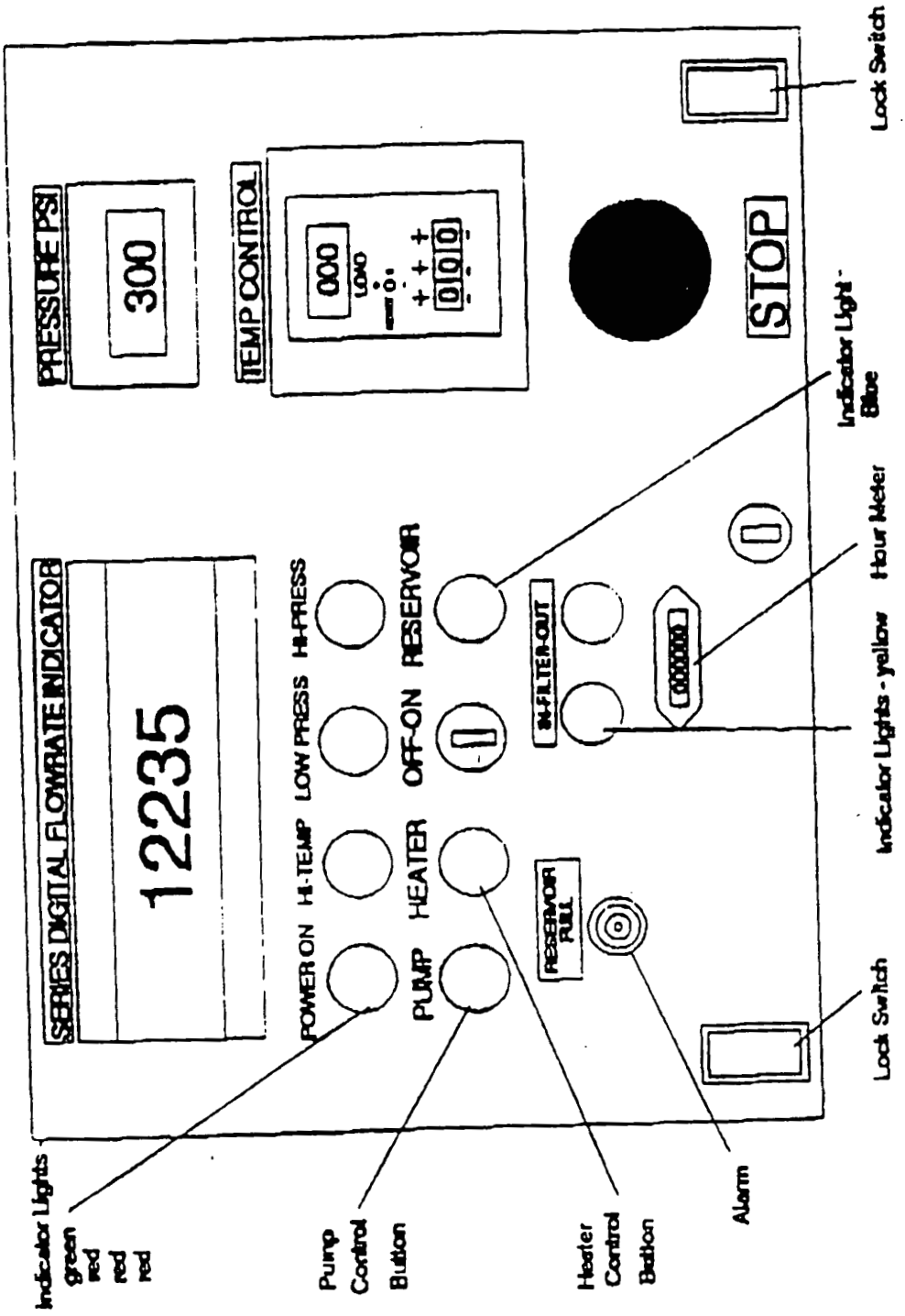

MAIN UNIT CONTROL PANEL
Figure 2

RECORD OF ISSUE/REVISIONS

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DATE	REV. NO.	DESCRIPTION AND AUTHORITY
Draft	0	Request for new procedure for set up and operation of the KELLY™ Decontamination System per Request No. P93-015, initiated by E. Evans.