PERMA-FIX
ENVIRONMENTAL SERVICES

Response to FDEP NOD #3 Dated 03/05/99

submitted
June 2, 1999

Contact:
Steve Douglas
(352) 395-1356

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PERMA-FIX®
ENVIRONMENTAL SERVICES

June 1, 1999

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DEPT. OF ENV. PROTECTION
NORTHEAST DISTRICT - JAX

Mr. Ashwin Patel
Florida Department of Environmental Protection
7825 Baymeadows Way, St. B200
Jacksonville, FL 32256

Subj: Perma-Fix of Florida, Inc.
FLD 980 711 071
Warning Letter #WL99-0920HW01NED

Dear Mr. Patel:

In response to the subject warning letter, Perma-Fix of Florida, Inc. (PFF) is pleased to provide the attached line-by-line response and modified sections of the application affected by the response. As requested, two copies of the attachments are enclosed. A copy is also being sent to EPA Region 4 (Attn: H. Singh).

PFF has taken considerable measures to ensure that the response is complete, both technically and in accordance with applicable regulations. PFF therefore asserts that the entire application is now complete and anticipates a positive response at the end of the review period. PFF is confident that the Department appreciates the sense of urgency this corporation has in seeing the review process completed as soon as possible. In that spirit, we would appreciate the opportunity to discuss any technical questions you may encounter during the review in an informal matter (i.e., telephone, electronic correspondence). In addition, we would appreciate your assistance in "cleaning up" any sections of the permit that you believe may receive public inquiry, so that the Department may better defend the application during the review period.

If you have any questions or need further information, please do not hesitate to contact me at (352) 395-1356.

Sincerely,

Steven Douglas
Regulatory Affairs Manager

cc: Harbajan Singh, EPA Region 4
Suresh Chandnani, JEA
Internal Distribution

DOCKET # P-11

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(1004)

PERMA-FIX OF FLORIDA, INC.
ITEM-BY-ITEM NOD RESPONSE

The following is an item-by-item response to each of the issues raised in the Warning Letter or Notice of Deficiency (NOD) dated March 5, 1999 and received by Perma-Fix of Florida, Inc. (PFF) on or about March 5, 1999, regarding the PFF permit renewal and expansion application submitted on June 24, 1998. When appropriate, PFF responses to NOD items are provided in their entirety. In other instances, additions, deletions or revisions to the permit application made in response to a NOD item are described and/or referenced below.

As appropriate, draft changes to the permit application described below are attached for DEP review and consideration. New and deleted text is underlined and struck out to facilitate the review of proposed revisions. PFF intends to submit a complete revised permit application once DEP and PFF have agreed that the proposed changes described below and/or attached are sufficient to satisfy the issues raised in the March 5, 1999 NOD.

1. *Three sets of Certification pages with original signature will need to be submitted.*

Response

Three sets of certification pages, with appropriate original signatures, will be resubmitted along with the revised permit application.

2. *D.1.: Comments from the Department's Solid Waste Program review of information in PFF's application concerning the management of non-hazardous waste may be forwarded under a separate letter.*

Response

Comment noted.

3. *D.2., page 9, Attachment I.D.1: Attachment II.A.7. is not in the submittal material, was Appendix A of Part I, the correct reference? Please provide details regarding hazardous debris treatment concerning, how the debris waste is received, where the debris waste segregated and stored prior to and after treatment, the parameters and rational for selecting the various treatment standard and the procedures to be used to track waste codes for generated residual waste. Also state where and how the waste ethanol from the solvent extraction is to be stored and disposed of. Our understanding is that the waste ethanol is transferred to the 3000 gallon storage tank.*

Response

The correct reference in paragraph 1 on page 9 of Attachment I.D.1 is Appendix A of Attachment I.D.1, not Attachment II.A.7. The paragraph has been revised to reflect the correct reference. Additional details regarding the receipt, segregation, storage, treatment selection and treatment, as well as the tracking of debris and resulting treatment residuals has been added to Appendix A. See Table 1 in Attachment I.D.1.

It should be noted that PFF has decided to relocate the proposed alternative treatment processes for debris (physical and chemical extraction) to the LSV processing area. Spent solvent generated from liquid phase solvent extraction activities will not be transferred to the 3,000-gallon storage tank in the Processing and Storage Building. Rather, all generated waste will be containerized and, prior to being manifested to an off-site hazardous waste disposal facility, may be treated using the Perma-Fix or Perma-Fix II treatment processes. See revised Appendix A in Attachment I.D.1.

PFF will assign and track waste codes for treatment residuals and treated debris in accordance with 40 CFR 268.45 and 40 CFR 261.3(f)(1). Hazardous debris that exhibits the characteristic of ignitability, corrosivity, or reactivity will be deactivated by treatment using one of the technologies identified in Table 1 of 40 CFR 268.45 (and described in the permit application) or continue to carry the appropriate characteristic waste code. Residue from the deactivation of ignitable, corrosive or reactive characteristic hazardous debris (other than cyanide-reactive wastes) that is not contaminated with a listed waste hazardous constituent will also continue to carry the appropriate characteristic waste code unless it is deactivated. Toxicity characteristic debris treatment residuals will remain subject to the waste code(s) and treatment standards for the toxic constituent(s) for which the debris exhibited the toxicity characteristic. Residuals from the treatment of debris contaminated with listed waste will remain subject to the treatment standards and waste codes assigned for those constituents or wastes. Hazardous debris that has been treated using one of the proposed extraction technologies in conformance with 40 CFR 268.45 and that does not exhibit a hazardous characteristic will not be a hazardous waste and will not carry any waste codes.

4. *D.2., Attachment I.D.1, Appendix D: The ".350 gal" value for the volume of the largest tank appears incorrect, should it be 350 gallons? Although adequate secondary containment does exist in the LSV, please note that the requirement is for 10% of the total volume stored or the volume of the largest container, whichever is the greater, therefore the required volume for the crusher room should be 350 gallons. Also secondary containment calculations have not been certified by a P.E.*

Response

The correct value for the largest volume storage unit in the crusher room is 350 gallons. The containment calculations for LSV Area 1 (crusher room) have been appropriately corrected.

Upon further review, it was determined that the base area square footage for the crusher room (LSV Area 1) and the ethanol room (LSV Area 2) were incorrect in the previous submittal. The containment calculations have been corrected to reflect the proper base area square footage for each of the LSV areas. In each case, adequate containment (Area 1: ≥ 350 gallons, Area 2: ≥ 100 gallons) is still demonstrated. The revised secondary containment calculations for the LSV Processing Area include a P.E. certification.

5. *D.2., Attachment I.D.1, Drawing K-2: The secondary containment in the LSV as shown does not appear to be continuous. Please provide details on how spilled hazardous waste is prevented from coming in contact with the radiological laboratory and container staging areas.*

Response

The secondary containment in the LSV Processing and Non-hazardous Waste Storage Warehouse is "continuous". Figures I.D.7 and K.2 have been revised to show the berm separating the radiological laboratory and the LSV/LSF container staging areas from the LSV Processing area.

6. *D.2., page 9, attachment I.D.1: Please state that spent mercury containing lamps will be managed in accordance with Chapter 62-737 F.A.C. and indicate the storage area location on either drawing I.D.1. or I.D.4. Also identify all "miscellaneous waste" and state whether this will be hazardous and/or non-hazardous waste. Also state that PFF will comply with the requirements of 40 CFR 260-268, 270, 279 and 62-710, 62-730, 62-737, 62-740 F.A.C. and all other applicable regulations for waste generated on-site.*

Response

The paragraph addressing the management of mercury-containing lamps in the Miscellaneous Waste Storage and Transfer section of Attachment I.D.1 of the permit application has been revised to state that spent mercury-containing lamps will be managed in accordance with Chapter 62-737 F.A.C. Please note that the mercury-containing lamp storage area is located in the LSV Processing and Non-hazardous Waste Storage Warehouse (Warehouse). The mercury-containing lamp storage location is indicated on Figure I.D.7.

Also, note that solid waste management activities addressed on page 9 of Attachment I.D.1 involve RCRA non-hazardous wastes. This section of the permit application has been revised to clearly state that miscellaneous non-hazardous wastes such as used oil, oil filters, and used antifreeze will be received, bulked and stored in the Warehouse.

Text has been added to the Waste Generated On-Site section stating that PFF will comply with the applicable requirements of 40 CFR 260-268, 270 (hazardous waste), 279 (used oil) and F.A.C. 62-710 (used oil), 62-730 (hazardous waste), and 62-740 (petroleum contact water).

7. *D.3.: Adding new waste codes could be a substantial modification. Please explain, in light of the physical characteristics and toxicity of the waste codes, whether the addition of those waste codes would increase the potential impact of a release from the facility and, if so, the degree of such increase. See comment 30 below.*

Response

PFF asserts that s. 403.7211, F.S. does not apply to this permit application because the proposed operations do not constitute a "substantial modification" as contemplated by the statute. The addition of two waste codes (D002 and D003) to the list of acceptable waste codes for the facility, 35,200 gallons of (non-ignitable hazardous waste) container storage capacity and the small batch treatment processes proposed in the permit application, do not increase the potential impact or potential risk of an airborne release of "life threatening concentrations of hazardous substances". PFF previously submitted an independent assessment of current and proposed facility operations in support of this assertion and hereby incorporates that submittal by reference. The assessment was conducted by W. Emmett Bolch, Ph.D., P.E., and his report on the assessment was submitted to the DEP on December 14, 1998.

To further substantiate the inapplicability of s. 403.7211, F.S.; and in response to this comment and comment 30 below, PFF hired Jones Edmunds & Associates, Inc. to conduct off-site consequence analyses of current and proposed facility operations in a manner similar to that provided in the risk management planning rules promulgated by EPA under Section 112(r) of the Clean Air Act. The purpose of conducting the off-site consequence analyses was to demonstrate (through modeling, as suggested in comment 30 below) that the proposed changes to facility operations in the permit application do not increase the potential impact or potential risk of an airborne release of "life threatening concentrations of hazardous substances". A report documenting the results of the off-site consequence analyses is being submitted under separate cover in response to comments 7 and 30 of this NOD.

It should be noted that PFF has filed a complaint for declaratory relief with the United States District Court for the Middle District of Florida Jacksonville Division challenging the legality of s. 403.7211, F.S. PFF's efforts to address and resolve the comments raised by the Florida Department of Environmental Protection in reviewing the subject permit should not be construed as a change of position with regard to PFF's contention that s. 403.7211, F.S. is not good law.

8. *A.4.C.(2): Please provide complete description on how material to be treated is brought into the PF-II area, how the material is to be placed inside the PF-II unit and how the material and all residues are to be removed after treatment, with reference to 40 CFR 270.14(b)(8)(I). Describe procedures for tracking waste codes for all generated residual waste.*

The receipt of waste into the Perma-Fix® II treatment area, its introduction into the treatment equipment and the removal treatment residues from the equipment is addressed, in detail, in Section II.I of the permit application. See Section II.I pages 1 – 12. In response to this comment, Section II.I has been revised to include additional details regarding the receipt of containers of waste to be treated, the introduction of waste into the Perma-Fix II Process equipment and the removal of treatment residuals from the Perma-Fix II equipment.

In addition, a reference to Section II.I, and the material handling details provided there, has been added to Section II.A4c of the permit application. Section II.A4c has also been revised as requested to address equipment used to prevent hazards during loading and unloading of the Perma-Fix II treatment equipment.

Perma-Fix II Process residual management is addressed at pages 6 and 7 in Section II.I of the permit application. Section II.I has been revised to include a description of procedures used to track and assign waste codes for residual wastes generated from the Perma-Fix II Process.

PFF will "carry through" all listed waste codes to each of the resulting treatment residual wastes generated by the Perma-Fix II process. In other words, Perma-Fix II treatment residuals will be generated and manifested with the same listed waste codes as were assigned to the waste prior to its treatment. Appropriate characteristic waste codes will be retained or assigned at the waste stream(s)' point of generation (prior to being shipped off site).

9. *A.4.d.: Please describe how PFF will demonstrate that voc emissions from the 3000 gallon storage tank complies with 40 CFR 264.31.*

Response

40 CFR 264.31 requires facilities to be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment. The equipment and procedures employed by PFF to address this requirement with regard to the 3,000-gallon storage tank in the Processing and Storage Building are described, in detail, in Sections II.A4d and II.C of the permit application. Sections II.A 4d and II.C of the permit application have been revised to include or reference additional details regarding equipment and procedures used to comply with 40 CFR 264.31. It should be noted that the 3,000-gallon storage tank has been sealed and pressure, temperature and fill gauges have been installed on the tank.

10. *A.6.: Please describe in detail, the decision process for selecting which PFF treatment and/or storage unit for incoming waste, using the waste analysis parameters in Attachment II.A.4.3. Include all treatment units and hazardous debris treatment standards used or proposed by PFF along with a list of equipment used in each treatment and/or storage operation. Because of the number of various treatment processes PFF uses or proposed to use the requested information should be presented in a table format and referred to in all appropriate sections of the application.*

Response

Additional details regarding the decision process for selecting which PFF treatment and/or storage unit will be used to manage incoming waste has been added to Attachment I.D.1 of the permit application. See Table 1 and Figures I.D.11.1 through I.D.11.4 in Attachment I.D.1. The equipment used in each treatment and/or storage operation is described in the appropriate sections of Part II of the permit application and/or accompanying figures. See Figure I.D.12 in Attachment I.D.1 to Part A of the permit application. See also Sections II.B through II.R and S.

11. *A.6.: Analytical parameter standards for non-conformance in fingerprint analysis must be quantified to ±2 points for pH and a ±30% difference for flash point.*

Response

The Waste Analysis Plan has been revised to reflect the requested change.

12. *A.6.: Please provide details for the proposed incompatible laboratory bench test including the minimum time limit for observations PFF will set prior to co-mingling waste.*

Response

A description of the bench test for incompatibility has been added to the permit application as Attachment II.A.4.5 to the Facility Waste Analysis Plan. The procedure addresses the minimum time of observation for indications of incompatibility. In addition, Section 2.8 – Procedures for Ignitable, Reactive or Incompatible Wastes – of the Waste Analysis Plan has been revised to include a reference to Attachment II.A.4.5.

13. *B.4. page 5, Appendix II.B.1, page 4: PFF states that roll-offs, tankers and trailers will not be stored in container storage areas but then states that roll-offs and other large containers may be used in the PF-I treatment process. Please provide details on how PFF will comply with the requirements for storage capacity limitations, adequate secondary containment and Subpart "CC" when performing treatment in containers, including roll-offs, tankers and trailers. Also state that all treatment in containers must be inside permitted areas otherwise the containers can only be used for unloading or loading activities.*

Response

PFF does not intend to conduct the Perma-Fix Process in containers larger than 55-gallon drums. However, roll-off boxes and other large containers may be used to bulk treated waste; i.e., treated debris waste may be placed into larger transportation containers for shipment off site, when appropriate. Such transportation containers will be managed (for inventory purposes) like the bulk liquid transportation containers (tank trucks) currently used by the Facility. Large containers (e.g., roll off boxes) will be shipped off-site within 24 hours of loading. Page 4 of Appendix II.B.1 has been revised to clearly state that 55-gallon drums are the largest containers in which the Perma-Fix Process will be conducted.

No more than 550 gallons (10 drums) of containerized hazardous waste will be present in the Perma-Fix/Perma-Fix II processing area (Quonset hut) during Perma-Fix/Perma-Fix II operations. And no more than 1,378 gallons of hazardous waste total will be present in the Quonset hut at any time. Adequate containment for the 1,378 gallons of hazardous waste has been documented in Section II.I of the permit application. See Attachment II.I.4 – Secondary Containment Calculations. No hazardous waste will be stored in the Quonset hut. All hazardous waste in the Quonset hut will be shipped off site or moved to the designated storage area in the Treatment and Operations Building unless it is staged for or currently undergoing treatment.

40 CFR Subpart CC – Air Emission Standards for Tanks, Surface Impoundments, and Containers exempts containers for which all hazardous waste entering the unit has an average volatile organic concentration at the point of waste origination of less than 500 parts per million by weight (ppmw). The Perma-Fix Process will be used to treat characteristic hazardous wastes having an average volatile organic concentration of less than 500 ppmw. No hazardous waste will be accepted for treatment using the Perma-Fix Process unless it has been identified in the pre-acceptance waste profile analysis as containing less than 500 ppmw of volatile organic chemicals.

Appendix II.B.1 to Section II.B and Section II.R,S of the permit application have been revised to indicate the less than 500 ppmw volatile organic concentration requirement for wastes treated with the Perma-Fix Process.

14. *Appendix II.B.1, page 4: Please describe the procedures PFF will implement to capture any organic or inorganic releases to the air during PF-I treatment operations. Please provide details on how PFF will comply with the requirements of 40 CFR 264.1086.*

Response

As indicated in the previous response, PFF will not treat hazardous waste with significant volatile organic chemical (VOC) content using the Perma-Fix Process. No hazardous waste will be accepted for treatment using the Perma-Fix Process unless it has been identified in the pre-acceptance waste profile analysis as containing less than 500 ppmw of volatile organic chemicals. Therefore, significant VOC emissions are not an issue and 40 CFR 264.1086 (Subpart CC standards for containers) is not applicable to the containers to be used with the Perma-Fix Process. Inorganic emissions, in the form of particulate matter, are also very unlikely given the wet nature of the Perma-Fix Process. The first step in the Perma-Fix Process is to thoroughly wet dry materials in the treatment container.

Nevertheless, Appendix II.B.1 to Section II.B of the permit application addresses the prevention of releases of emissions to the air during the Perma-Fix Process. See page 4 of Appendix II.B.

This section of the permit application has been revised to include additional details regarding equipment and procedures that prevent emissions from the Perma-Fix Process, including:

- Keeping containers closed at all times except during the treatment or removal of waste from containers;
- Description of the particulate matter emission control system employed where the Perma-Fix Process takes place; and
- Reactive sulfide and cyanide screening to prevent generation of emissions of concern.

15. C.11., page 5: Please revise by specifying that releases to the environment include areas within secondary containment, paved or concrete surfaces. Also state that PFF will notify the Hazardous Waste section of the Department's NE District office within 24 hours of detecting any release greater than one pound.

Response

The text in Section II.C of the permit application has been revised to more precisely reflect the requirements of 40 CFR 264.196.

16. C.4.: Please provide a single engineering drawing to scale, showing the LSV unit, the 3000 gallon storage tank, the interconnecting pipe line, ancillary equipment and monitoring gauges.

Response

A new Figure II.C.1 has been added to Section II.C of the permit application in order to provide the requested information.

17. I., Miscellaneous Units: PFF has submitted material including an engineering report that indicates that the miscellaneous units are constructed but in other sections of the application PFF uses future tense in reference to the units not having been constructed completely or that modifications will be added. Please clarify the status of all miscellaneous units.

Response

The referenced engineering report was provided in response to a request for proof that the proposed units are chemically compatible with the waste they would be treating. The report addresses the existing equipment, not a complete, functioning unit. As PFF has previously explained, the equipment to be used for the Perma-Fix II Process includes pre-existing equipment previously used for operations not subjected to hazardous waste permitting requirements. Please note that PFF no longer plans to use the LSV equipment to treat regulated hazardous waste and has therefore removed all references to the LSV equipment as treatment equipment. The proposed debris treatment will consist of a metal vat for rinsing or dipping debris and associated hand tools. No miscellaneous hazardous waste units are constructed or operating at the Facility at this time.

18. I.1.: Please identify what type of hazardous waste will be selected for treatment in the PF-II unit and explain the treatment goals. Also quantify all chemical and physical parameters that PFF will use to select any waste stream for treatment in the PF-II unit. Please specify criteria PFF will use to determine when a nitrogen blanket is necessary in the PF-II process.

Response

Section II.I.1 of the permit application has been revised to address the requested information.

19. I.1.: Please note that size reduction is miscellaneous treatment. Provide details on decontamination procedures PFF will use on PF-I, PF-II and LSV units and all ancillary equipment, before starting treatment of a new waste stream.
The discussion on decontamination procedures must address the following:
-how PFF will determine completeness of decontamination,
-criteria PFF will use for determination of completeness,
-justification for selection of parameters.
Also provide details on decontamination procedures PFF will use on the steel packing which may be used in between treatment of different waste streams.

Response

It should be noted that PFF has elected not to treat hazardous waste using the LSV processing equipment. Therefore, decontamination is not an issue with LSV equipment. The sizing and segregation of debris has been addressed in the revised Appendix A to Attachment I.D.1. Section II.I.1 of the permit application has also been revised to address the requested information relevant to the Perma-Fix II Process. Section II.B of the permit application has been revised to address decontamination procedures relevant to Perma-Fix stabilization equipment. See Appendix II.B.1.

20. I.1.: Please provide details on how waste codes will be assigned for process residues and different final waste streams. Does the water carry F Codes from previous waste when it is introduced into the stabilization treatment?

Response

PFF will "carry through" all assigned waste codes to each of the resulting treatment residual wastes generated by the Perma-Fix II Process. In other words, Perma-Fix II treatment residuals will be generated and manifested with the same waste codes as were assigned to the waste prior to its treatment. Additional waste codes will be assigned to treatment residuals as appropriate when different waste streams are treated in the Perma-Fix II equipment without decontaminating the equipment between batches.

As noted in Section II.I.1 (at page 3) of the permit application, condensate (e.g., water) resulting from the desorption of a batch of waste may be:

1. reused in the oxidation process step for continued treatment of the same batch of waste;
2. used in the desorption step of a different batch of the same waste stream;

3. used to prepare the solidification media if the waste is to be stabilized/solidified using the Perma-Fix Process; or
4. containerized and sent off site to a permitted waste management facility.

It should be noted that in each of these instances, different wastes from different shipments are not being commingled. Each of the above options involves the reuse of a portion of the treated waste to further treat the same waste or waste shipment.

As previously stated, each of the resulting treatment residuals (including the condensate generated from the thermal desorption step in the Perma-Fix II Process) will "carry" each of the waste codes assigned to the original shipment received for treatment. If different waste streams are treated in the Perma-Fix II Process without decontaminating the equipment between batches, the appropriate additional waste codes will be assigned to the resulting treatment residuals.

Section II.I.1 of the permit application has been revised to clarify the assignment of waste codes to the treatment residuals generated by the Perma-Fix II Process as indicated above.

21. *I.1.: Please provide calculations for the efficiency of the heat exchanger and discuss how the uncondensed volatile stream from the condenser will be captured and account for all possible VOC emission points prior to entering the filters. Also provide calculations for the efficiency and exhaustion of the activated carbon and HEPA filters for both PF-II and LSV units with estimates for amount to be used and demonstrate the integrity of ductwork and piping. Also provide drawings of the PF-II and LSV emission control equipment.*

Response

PFF has elected to change the air pollution control system that will be used to collect and control potential emissions from the Perma-Fix/Perma-Fix II processing area (Quonset hut) and the LSV processing area. A thermal oxidizer and ancillary equipment will be installed to collect and reduce volatile organic chemical emissions from each of these process areas. This system will replace the activated carbon systems for the LSV and Perma-Fix/Perma-Fix II areas currently described in the permit application. Attachment I.D.1 to Part A and Section II.I.1 of the permit application have been revised to include information detailing the appropriateness and effectiveness of the proposed air emission control system.

Section II.I.1. of the permit application has been revised to include additional details regarding the efficiency of the Perma-Fix Process and VOC emission control. Drawings of the proposed air emission control system have been added to Section II.I as Figures I.D.13 – I.D.15.

22. *I.1. Please identify the manufacturer's operation limits, such as temperature, pressure and chemical compatibility, for each component of the PF-II unit and discuss all measures PFF will take to insure operations within these limits. Also state that PFF will notify the Department prior to modifying any permitted unit, to determine whether a permit modification will be required.*

Response

The manufacturer's specifications and related performance criteria for most of the Perma-Fix II process components were added to Section II.I in response to the previous NOD. See Attachment II.I.3. Section II.I.1 of the permit application has been revised to include the details requested about the Perma-Fix II Process equipment.

PFF understands that it must comply with the applicable provisions of 40 CFR 270.41 and 270.42 (permit modification requirements) when contemplating changes to equipment or operations at a permitted facility. PFF respectfully suggests that it would be preferable to include this requirement as a general condition of the permit rather than require PFF to state that it will comply in Section II.I.1 of the permit application.

23. *I.3.: Please provide a complete description on how the emission control systems work for the LSV and PF-II units and quantify the constituents of the exhaust emissions. Please include a justification for the effectiveness of the control systems on emissions of chlorine, lead and mercury. The engineering certification report did not address the integrity of the ductwork and piping of the emission control systems.*

Response

Inorganic emissions from the Perma-Fix II Process equipment are not an issue for two primary reasons. First, the waste streams to be treated are primarily characteristic and listed organic hazardous wastes consisting of soils, sludges and other media contaminated with organic constituents. Second, the Perma-Fix II Process is a low temperature process. The volatilization and emission of any metal contaminants such as lead in the target waste streams will not occur. Emissions of particulate metals, if any, will be controlled by the HEPA filter system.

As a precaution, PFF has elected not to treat waste streams assigned a D009 (mercury) toxicity characteristic waste code. Chlorine emissions from the Perma-Fix II Process are also not an issue due to the low temperature nature of the treatment process. However, small amounts of chlorine emissions are expected to result from the operation of the thermal oxidizer and its VOC reduction. Emissions from the thermal oxidizer are subject to an air permit issued and administered by the Northeast District Air Program Administrator for the Florida Department of Environmental Protection. All components of the emission control system will be certified upon installation prior to operation. Please refer to the previous response to NOD Item 21 above for details regarding the thermal oxidizer. Additional information regarding the prevention of releases from the Perma-Fix II Process is included in Section II.I of the permit application.

24. *I.3.: PFF has stated in its air permit application that 31 tons per year of volatile organic hazardous waste compounds will be potentially emitted after controls. Please provide data on how these constituents of the exhaust emissions comply with 40 CFR 264.600(c). PFF must conduct analysis and air modeling to determine the effects from releases or potentials to emit airborne pollutants. These analysis must address the effects of pollutants on the surrounding environment including persons working and living in the vicinity. The analysis must include all potential waste constituents at the maximum potential concentrations.*

Response

PFF understands that the correct regulatory reference and basis for this comment is 40 CFR 264.601(c). The permit application currently addresses 40 CFR 264.601(c) considerations in Section II.I2, at page 8. Nevertheless, in response to the above comment, and as a result of further discussions with DEP representatives at a May 4, 1999 meeting, PFF has conducted ambient air modeling for representative waste constituents to be treated with the Perma-Fix II Process. The results of the modeling will be submitted to DEP under separate cover.

For the record, PFF would like to note that the potential 31.39 tons per year volatile organic chemical (VOC) emissions referenced in the above NOD comment and presented in the referenced air construction permit application are not representative of the proposed Perma-Fix II Process operations. Rather, these emissions estimates are worst case potential to emit estimates mandated by the air permitting process. Moreover, the 31.39 tons per year indicated in the air permit application represent combined potential VOC emissions from three units at the facility, including the Perma-Fix II Process equipment. The potential VOC emissions calculated for the Perma-Fix II Process alone were 12.319 tons per year. In keeping with potential to emit calculation requirements, conservative assumptions were used to calculate the 12.319 tons. As a result, the estimated VOC emissions are significantly overstated. Assumptions for the VOC potential to emit (PTE) calculation included:

- Maximum waste process rate of 6,000 pounds per day (a 24 hour a day, 365 days per year operation assumption);
- Waste VOC content of 45%;
- Condenser (organic constituent removal) efficiency of 50 %; and
- Air pollution control device efficiency of 95%[1]

Each of these assumptions are worse case values and are assumed to be constant; i.e., to remain consistently high (or low) during normal operations for purposes of the air permit calculations. The PTE for VOCs presented in the air permit was calculated as follows:

(Process Rate)(Days/year)(%VOCs)(1 – organic constituent removal efficiency)(1-VOC emission control efficiency)(ton/2000 lbs.) = Tons of VOCs/year

Or

(6,000 lbs./day)(365 days/year)(.45)(1.0-0.5)(1-. 95)(Ton/2000 lbs.) = 12.319 tons/year

In reality, the Perma-Fix II waste processing rate, waste VOC content, condenser efficiency, and air pollution control device efficiency will vary from the worse case values depending on the nature of the waste treated and the operation of the Perma-Fix II Process.

[1] The referenced air permit application indicated the use of a granulated activated carbon system to control VOCs. PFF has elected to install a thermal oxidizer instead. The air permit and RCRA permit application are being appropriately amended to reflect this change.

Specifically, the typical Perma-Fix II Process treatment rate will be about 3,600 pounds (or six drums) per day. That is three batches of 110 gallons (two drums) at approximately 600 pounds per drum. The VOC content of the waste treated with the Perma-Fix II process will be between approximately 10% and 30%. The organic constituent removal efficiency will vary between a low of approximately 50% and a high of about 90%. And finally, the air pollution control system efficiency will be 95% at a minimum and will likely range higher.

Without taking into account the lower average VOC content, higher average organic removal efficiency or higher average air pollution control efficiency expected during actual operations, but considering the actual expected waste processing rate, a more realistic but still conservative, VOC emission potential for the Perma-Fix II Process is calculated as follows:

(3,600 lbs./day)(365 days/year)(.45)(1.0-0.5)(1-. 95)(Ton/2000 lbs.) = 7.3913 tons/year

In short, actual expected VOC emissions are conservatively estimated to be less than 25% of the amount referenced in the above NOD comment.

25. I.4.: Please provide a report demonstrating the effectiveness of all treatment units and hazardous debris treatment standards used or proposed by PFF based upon laboratory or field data. Include a justification to show that ethanol will be effective in liquid phase extraction for all contaminants.

Response

Each of the proposed treatment processes is performance oriented. The treatment objective for the proposed Perma-Fix, Perma-Fix II and debris treatment operations is to render the treated waste streams suitable for disposal in a hazardous or mixed waste landfill. The Perma-Fix II Process and the alternative treatment technology debris treatment proposed for the PFF Facility are essentially contaminant removal processes. The Perma-Fix stabilization and fixation process will chemically "decharacterize" characteristic inorganic hazardous wastes. Waste streams will be treated using these processes until they meet the applicable land disposal restriction treatment levels. Failure to attain a treatment level would result in the shipment being sent off-site to another permitted facility for additional treatment prior to disposal.

Application of the Perma-Fix II Process will be conducted on a waste stream until a sample of the treated waste indicates that it meets applicable land disposal restriction treatment levels. The treatment steps (or component technologies) of the Perma-Fix II Process (i.e., thermal desorption, condensation, organic separation and absorption, and chemical oxidation) are established technologies comprising the technology-based treatment standards of 40 CFR 268.42, Table 1. See CHOXD, DEACT, LLEXT, and RORGS descriptions at 40 CFR 268.42, Table 1. Each of these treatment technologies is, by definition, recognized as effective. Moreover, 40 CFR 268.42 requires the use of these technologies for the majority of the wastes to be treated using the Perma-Fix II Process.

The alternative treatment technologies for hazardous debris (chemical and physical extraction) proposed for the PFF Facility are waste-specific treatment standards mandated by 40 CFR 268.45,

Table 1. Hazardous debris must be treated for each contaminant subject to treatment using the technology or technologies identified in 40 CFR 268.45, Table 1. Performance and/or design operating standards set forth in Table 1 specify the effectiveness of the proposed debris treatment operations. PFF will conduct its chemical and physical extraction debris treatment activities in accordance with the applicable performance and/or design standards of 40 CFR 268.45.

It should be noted that ethanol is not the exclusive solvent contemplated for use as a chemical extracting agent during debris treatment. The selected extracting agent will depend on the debris and the contaminants involved. Ethanol, low flash point mineral sprits and kerosene are examples of solvent that may be used as an extracting agent.

The proposed Perma-Fix inorganic stabilization and fixation process steps are also established and mandated by 40 CFR 268.42, Table 1. See CHRED, NEUTR and STABL descriptions at 40 CFR 268.42, Table 1. Each of these treatment technologies is, by definition, recognized as effective.

Given the variety of the waste streams and debris to be treated and the performance-oriented nature of the proposed treatment processes, PFF respectfully submits that it is impractical and unnecessary to produce a report "demonstrating the effectiveness of all treatment units and hazardous debris treatment standards used or proposed". Each batch of waste or debris treated by PFF will be sampled and analyzed or otherwise evaluated (in the case of debris treatment) to determine whether treatment objectives have been met and/or whether prescribed treatment technologies (standards) have been applied in a manner consistent with the applicable requirements. In other words, treatment process effectiveness will be determined on a treatment batch-by-batch basis.

26. K.1.: Please provide a complete description on how PFF decontaminated and disposed of the can crusher, replaced screw flights and previously used grinder in the LSV area.

<u>Response</u>

It should be noted that the LSV Process and associated equipment was and is not currently a RCRA permitted unit. Therefore, the equipment that was replaced and modified when the LSV Process was recently upgraded was not subject to the current facility closure plan. Nevertheless, the following information is provided in response to this NOD item.

The LSV equipment was disassembled and decontaminated and, with the exception of the shaker table and drum lifter, will be cut up and sent to a scrap metal recycler. The shaker table and drum lifter have been integrated into the upgraded LSV equipment.

Decontamination consisted of scrubbing the equipment with a commercial surfactant and triple rinsing with water. The resulting rinsate was characterized and shipped off site for disposal as a non hazardous waste.

27. K.1.: Please explain why the cooling tower, boiler and associated piping is not included in the closure cost estimate for the PF-II unit.

Response

The cooling tower and boiler and the piping associated with these two pieces of equipment do not come into contact with hazardous waste. Therefore, they were not included in the closure plan or closure cost estimate as covered equipment/units.

28. *K.1.: Please identify all occurrences of non-default values used I the Cost-Pro closure cost estimation and justify why lower values were used and identify their source. The explanation should appear on the same page as where the default value was changed but also include an index with page numbers for non-default values used.*

Response

Notes have been added to the appropriate pages of the Cost-Pro closure cost estimate addressing the source and justification for the use of non-default values. An explanation of the use of non-default values has also been added to the Facility Closure Plan (See Page 16 of Part II.K).

29. *R.1., page 1: Please explain the meaning of "as applicable" in PFF's response. Please provide a complete description on how PFF is the determining 95% operating efficiency for the emission control systems and provide details on how PFF will demonstrate that all associated ductwork and piping are leak proof. Also, include details on how PFF will comply with the monitoring, calibration and all other information required in Subparts AA and BB.*

Response

The use of the term "as applicable" in paragraph 2 on page 1 of Section II.R was intended to note that the LSV unit vent system and the Perma-Fix II process vent are subject to Subpart AA because they are "distillation" and "steam stripping operations" (respectively). See the applicability section of Subpart AA at 40 CFR 264.1030(b). The above-described paragraph has been revised to clarify the statement of applicability.

PFF has elected to employ a thermal oxidizer to control VOC emissions from the LSV and Perma-Fix II operations. The RTO will handle emissions from both of these operations simultaneously. Section II.R of the permit application has been revised to reflect the installation and use of the thermal oxidizer in lieu of the previously proposed granulated activated carbon system. The revisions are intended to address test methods and procedures, recordkeeping requirements and control device standards applicable to the use of a thermal oxidizer for VOC emissions control.

PFF has addressed compliance with 40 CFR 264.1050 (Subpart BB) in Section S of the permit application. Section S addresses the applicability of Subpart BB, provides an inventory of affected equipment and the implementation of required inspection, repair and monitoring requirements, and describes how the facility will comply with recordkeeping and reporting requirements. PFF intends to take no further action regarding this NOD item.

30. The P.E. certification report PFF provided and received by the Department on December 14, 1998, includes observations made by Mr. Bolch's on how well the plant is run. However, it does not include any analysis or modeling data. In order to support the position that there is no proposed "substantial modification" under Section 403.7211, F.S. PFF must demonstrate that requested changes in operation, additions, to the facility and changes in permit conditions could not reasonably be deemed to lead to substantially greater potential impacts or risk of impacts, from releases if a fire, spill, or explosion occurred. This demonstration may include air modeling, which may be done in the manner provided under Program 3 of the Accidental Release Prevention Program of section 112(r) of the Clean Air Act. Alternatively, you may provide information to us regarding the physical characteristics and toxicity of new waste codes in order to compare the potential risk under your current permit, with the risk that would exist if the Department approved the modification. You may also support your demonstration by showing that, in light of changes to operations and structures proposed in the modification, the proposal would not substantially increase either the potential impact from, or the risk of, a release if a fire, spills, or explosion occurred. If you have any alternative proposals with respect to making such a demonstration, please advise us before undertaking additional analysis.

Response

Please see response to NOD Item 7 above.

ATTACHMENT I.D.1

FACILITY DESCRIPTION

INTRODUCTION

This section of the permit application provides a general description of facility operations. Additional details regarding the various waste management activities at the facility can be found in other parts of this permit application.

Perma-Fix of Florida, Inc., (PFF) a subsidiary of Perma-Fix Environmental Services, Inc. operates a commercial waste bulking, storage and transfer facility (Facility) in Gainesville, Florida. Waste managed on-site includes a wide variety of hazardous, industrial, mixed and non-hazardous wastes. Currently, the Facility separately blends hazardous, non-hazardous and mixed wastes into fuels for use in off-site incinerators, industrial furnaces, etc. to generate energy and power. The Facility also consolidates, repackages and sorts waste for shipment and off-site treatment and/or disposal. Current activities at the Facility also include the receipt and non-permanent storage of mixed wastes pursuant to a license issued by the Florida Department of Health, Bureau of Radiation Control.

Proposed activities at the Facility will include a variety of chemical and physical waste treatment activities. Specifically, PFF plans to receive, store and treat hazardous waste; treatment may include thermal desorption, chemical and physical extraction, chemical oxidation, ~~microencapsulation~~ stabilization and fixation, and macroencapsulation. Proposed treatment operations at the Facility include the Perma-Fix® ~~II~~ processes as well as treatment of hazardous debris in accordance with ~~any of the~~ certain alternative treatment standards specified in 40 CFR 268.45. In addition, PFF is planning solvent recycling activities which are exempt from RCRA permitting requirements.

Definition of Mixed Wastes

Mixed wastes are wastes that are regulated by two primary agency groups, the U.S. Environmental Protection Agency (EPA) and U.S. Nuclear Regulatory Commission (NRC). The wastes could contain hazardous constituents subject to EPA regulation as well as radioactive materials that are regulated by the NRC. The State of Florida Department of Environmental Protection has been delegated authority to administer the RCRA program in the state. The NRC has an agreement with the State of Florida, Department of Health, Bureau of Radiation Control to carry out the regulatory functions regarding radioactive waste management, environmental concerns and employee safety at this facility. There are several waste streams described in the hazardous waste permit (i.e., hazardous waste fuels, metals, etc.) that may also be contaminated with radioactive materials. PFF understands that the wastes must be handled according to applicable hazardous waste management requirements; however, Bureau of Radiation Control regulations must also be followed. So, for purposes of this permit application, references to hazardous wastes may also include mixed wastes. There are certain situations where mixed wastes are specifically addressed. These are as follows:

a) The 3,000-gallon tank in which only mixed wastes are temporarily blended and stored;

b) The closure plan includes provisions for disposal for mixed wastes; and

c) The authorized storage of mixed (hazardous/radioactive) wastes on-site longer than one year may occur pursuant to the facility's radioactive materials license. This license allows PFF to "decay" short-lived radioactive wastes and to perform research and work on the development of treatment options for mixed waste. These activities may take up to 3 years.

Therefore, this initial discussion of hazardous and mixed wastes provides an overall definition of the potential wastes on site. For purposes of the review of this permit application, the term "hazardous wastes" or "wastes" includes mixed wastes unless otherwise specified.

PFF is submitting this permit application in order to:

1. Renew its current Resource Conservation and Recovery Act (RCRA) permit to conduct the waste management activities noted above.

2. Obtain RCRA authorization to manage additional waste streams (i.e., add new waste codes to the permit) at the Facility, and to increase the maximum hazardous waste storage volume allowance.

3. Obtain RCRA authorization to treat hazardous wastes on site.

<u>Wastes Managed and Waste Management Activities</u>

The waste managed at the facility will come from a variety of sources including medical and research institutions, government agencies, paint and coatings manufacturers and users, solvent users, and other industries that generate hazardous wastes. The Facility will also receive wastes from a variety of conditionally exempt and small quantity generators. In addition, waste collected during various county household hazardous waste collection campaigns will be managed at the Facility.

The following information generally describes the waste management activities, which are being renewed or are proposed pending permit approval:

- The Treatment and Operations Building, which will be used to receive, store and treat hazardous and mixed wastes via thermal desorption~~, chemical and physical extraction (e.g., water washing, high pressure steam, etc.),~~ chemical oxidation, <u>stabilization and solidification</u> ~~microencapsulation~~ and macroencapsulation. Future solvent recycling (RCRA exempt) via a solvent recovery distillation unit is also planned for this area[1].

1 Vendor specifications for the planned distillation unit are enclosed at the end of this attachment for information purposes.

- The Processing and Storage Building, which is used to receive, store and blend hazardous and mixed waste into fuel for use at off-site facilities and to bulk wastes for transfer to off-site treatment and/or disposal facilities.

- The Liquid Scintillation Vials (LSV) Processing and Non-Hazardous Waste Storage Warehouse, which, in addition to the storage of non-hazardous waste, is used to receive, empty and decontaminate LSVs and other small containers or debris, and to treat hazardous waste via chemical and physical extraction (e.g., water washing, liquid phase solvent extraction).

The conduct of these activities will be driven by the nature of the waste streams received at the Facility. Table 1 at the end of this section summarizes the treatment methods and storage locations for waste streams to be managed at the Facility. Figures I.D.11.1 through I.D.11.4 are decision trees illustrating how incoming waste streams are evaluated and assigned a management (treatment and/or storage) tract within Facility operations.

As shown in Figure I.D.11.1, and addressed in detail in the Facility Waste Analysis Plan, all incoming waste is subjected to a "fingerprint" set of analyses to verify conformance with the generator waste profile and analytical results required for each waste stream to be accepted at the Facility. The generator profile and analytical information, along with the fingerprint analyses performed by the Facility, allow for the determination of the waste stream's acceptability and proper management at the Facility.

DESCRIPTION OF OPERATIONS

Treatment and Operations Building (Planned Activities)

Container Storage

The Facility will receive and store up to 640 drum equivalents (or 35,200 gallons) of hazardous and/or mixed waste in the Treatment and Operations Building. See Figure I.D.1 for the proposed container storage configuration. Additional details regarding container management practices are provided in Section II.B of this permit application.

Treatment

Hazardous wastes may be treated in the Treatment and Operations Building via either one or both of two proprietary processes known as the Perma-Fix® Process ~~(micro encapsulation)~~ (stabilization and fixation) and Perma-Fix® II Process (thermal desorption and/or chemical oxidation). ~~The Facility will also treat hazardous debris using chemical and physical extraction techniques and macroencapsulation in this building~~. See Figure I.D.1 for the general layout of the Treatment and Operations Building. The following provides a general description of the treatment processes. Additional details regarding the treatment processes are provided below, in Appendix II.B.1, and Section II.I of this permit application. See Figure I.D.12 for a detailed illustration of the Perma-Fix treatment processes and a list of associated equipment.

The Perma-Fix® Process is a two-step procedure for permanent ~~stabilization/solidification (microencapsulation)~~ stabilization and/or solidification of characteristic hazardous and mixed wastes. As indicated in Figure I.D.11.2, the characteristic inorganic wastes which do not contain organic hazardous constituents in excess of applicable land disposal restriction levels are target waste streams for the Perma-Fix Process. First, the waste is evaluated for specific chemical characteristics in order to identify the appropriate proprietary treatment "recipe" for converting the key waste constituents to a more chemically stable and insoluble form. After receiving chemical stabilization treatment, the waste is solidified in a pozzolonic matrix to "fix" the key waste components into a dense, impermeable, acid resistant, siliceous monolithic mass.

Once subjected to the Perma-Fix® Process, the treated waste is sampled to determine whether it meets the desired treatment standards (e.g., whether the waste no longer exhibits a hazardous waste characteristic and/or meets applicable land disposal restrictions). Typically, the Perma-Fix® Process is applied to wastes in drums. However, larger or smaller containers may be used depending upon the nature of the waste to be treated. In any event, the waste is usually stabilized and solidified in the same container to be used to ship the waste off site for disposal. In some instances, the addition of treatment additives will increase volume such that the stabilized waste must be transformed to an additional or larger container prior to solidification.

The Perma-Fix® Process will generate relatively small quantities of secondary waste consisting primarily of personal protective equipment (PPE) and plastic sheeting used to collect any incidental spillage of the treated waste or waste treatment materials. Secondary waste will be appropriately characterized, treated and/or disposed. Additional details regarding the Perma-Fix process are provided in Appendix II.B.1 in Part II of this permit application.

The Perma-Fix® II Process ~~may also~~ consists of two primary steps. The first step involves thermal desorption to separate the majority of volatile, semi-volatile and other organic constituents from the waste matrix and collect them for off-site treatment and/or disposal. The second (optional) step is chemical oxidation to destroy remaining organic compounds. As indicated in Figure I.D.11.3, target waste streams for the Perma-Fix II Process are organic contaminated media (i.e., soils and sludges.)

To begin the process, contaminated media (waste) and, if necessary, water are introduced into a reactor vessel and thoroughly mixed to form a homogeneous mixture. Depending on the matrix (nature of the waste), surfactants or organic solvents may be added to the mixture to facilitate mobilization of waste constituents. Heat is applied to the reactor vessel to desorb the organic constituents from the contaminated media. The heat vaporizes the water, volatile and semi-volatile organic constituents. In a condenser unit, vapors being emitted from the reactor vessel condense and accumulate in a collection vessel. The collection vessel for the condensate may be partially filled with an organic liquid (e.g., mineral oil or diesel fuel) to extract the organic constituents from the condensate. The condensate accumulated in the collection vessel will be managed according to its fluid phase characteristics. ~~As appropriate, an~~ An inert atmosphere (e.g., nitrogen blanket) will be provided for the process.

If an organic liquid is present or the concentration of volatilized organic constituents is great enough, two immiscible phases will evolve. If not, a water phase will evolve. If an organic phase does exist, it will be containerized and sent off site to an appropriately authorized facility for treatment and/or disposal.

Depending on the process operating conditions and input, the concentration of organic constituents in the water phase may be significant. If the concentration of organic constituents is low enough, the water may be accumulated and reused in the reactor to slurry additional waste or to prepare the solidification media if the waste is to be stabilized/solidified using the Perma-Fix® Process. Alternatively, the condensate may be containerized and sent off site to an appropriately authorized facility for treatment and/or disposal.

Depending on the initial concentration, volatility, and solubility of the organic constituents, the second Perma-Fix® II Process treatment step (chemical oxidation) may not be required. Upon completion of the thermal desorption step, the temperature inside the reactor vessel will be allowed to cool to below the boiling point of water and an oxidizing solution will be added to chemically react with the residual organic constituents in the waste. Upon completion of the oxidation reaction, the reactor vessel will be heated once again to the boiling point to destroy any residual oxidizer and dry the slurry as appropriate for further treatment and/or disposal.

If the waste is to undergo further treatment on site via the Perma-Fix® Process, the remaining contents of the reactor vessel will not be heated in order to retain any free water present. (The free water is necessary for the Perma-Fix® Process.) If the stabilization/solidification of inorganic or other constituents (i.e., Perma-Fix® Process) is not required, the contents of the reactor vessel will be de-watered and placed in containers for shipment to an authorized treatment and/or disposal facility. Figures I.D.2, ~~and~~ I.D.3 and I.D.12 illustrate the Perma-Fix® II Process.

~~**Chemical Extraction, Physical Extraction and Macroencapsulation (Including Debris Treatment)** will also be occasionally conducted on hazardous debris in the Treatment and Operations Building. These activities will consist of the use of high pressure steam and water sprays, surfactants, acids, bases, and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers. Decontaminated materials will be shipped off site for reuse, reclamation or disposal depending upon the nature of the material. The contaminated media or rinsate generated as a result of the decontamination process will be properly characterized, containerized and, if hazardous, manifested and shipped off site to an authorized treatment, storage and/or disposal facility. If appropriate, contaminated media and/or treatment residuals may be subjected to macroencapsulation or microencapsulation prior to shipment to an authorized disposal facility.~~

~~Appropriate impoundment, catch basins, containment, etc. will be erected as needed to accommodate the above treatment activity depending on the nature of the treated debris and its contaminants. Additional details regarding planned debris treatment operations are provided in Appendix A.~~

Solvent Recycling

The following information is included for informational purposes only since spent solvent recycling/reclamation is exempt from RCRA permitting requirements. The Facility plans to recycle spent solvents (e.g., Freon) generated by various industrial generators. A low-temperature still or distillation unit will be used to separate the re-useable solvents from contaminants. The reclaimed solvent will be returned to the generator for reuse or to a vendor for resale. The separated contaminants will be containerized or managed in on-site process. If hazardous, waste not managed on site will be shipped off-site for subsequent treatment and/or disposal by an authorized hazardous waste facility. Ancillary activities and equipment will be conducted and operated in accordance with applicable regulations. Applicable emissions control requirements are addressed in Section II.R of this permit application. Vendor specifications for the planned distillation unit are enclosed in Appendix B for information purposes.

Processing and Storage Building

Fuel Blending

The majority of waste managed at the Facility is expected to be energy-bearing (organic) hazardous waste suitable for blending and use as a fuel in hazardous waste combustors such as boilers and cement kilns. PFF is proposing to add phase separation and decanting (Fuel Blending) to the list of permitted activities at the Facility to allow for the blending of energy-bearing hazardous wastes that have significant water content.

Currently, the bulking of ignitable liquid hazardous waste from drums and other containers to tankers is performed in the Processing and Storage Building. With this permit application, PFF is proposing to perform phase separation of water in addition to the bulking activities.

Currently, the method for bulking of hazardous waste fuel is to transfer "pumpable" liquids (those that pass the paint filter test) from 55-gallon drums into 450-gallon totes, 550-gallon totes, or directly into a tanker truck using a 2-inch diaphragm pump and hose. The suction hose is attached to a metal wand that is immersed in the liquid waste. The discharge hose is fitted with an immersion wand that remains submerged in the tanker during transfer, so as to reduce emissions.

After all pumpable liquids have been transferred out of the waste container, a small amount (5 to 10 gallons) of hazardous waste solvent is pumped into the drum from the 3,000-gallon bulk storage tank using a 2-inch diaphragm pump. The solvent mixes with the heel or sludge to make the mixture pumpable. The mixture is then pumped into the totes or tanker using the suction hose, pump and discharge hose previously described. The tanker is equipped with an agitator to keep the solids suspended while in transport.

Perma-Fix proposes adding phase separation to the current fuel bulking procedures. In this process, liquid hazardous waste containing excess water will be transferred from smaller containers such as 55-gallon drums into 550-gallon totes and allowed to sit until the excess water separates from the rest of the waste (approximately 3 to 5 hours). Then, the water will be drawn from the totes using the previously described suction wand and pump, containerized and treated or disposed of as a hazardous waste. The remaining hazardous waste will be bulked into a tanker using the methods previously described. See Figure I.D.4 for the layout of the Processing and Storage Building.

Container Storage

The Facility will continue to receive and store up to 1311 drum equivalents (or 72,105 gallons) of hazardous and/or mixed waste in the Processing and Storage Building. See Figure I.D.4 for the layout of the Processing and Storage Building and a typical container storage configuration. Additional details regarding container management practices are provided in Section II.B of this permit application.

Tank Storage

A single, 3,000 gallon storage tank is used to accumulate and store the fluids (mixed waste only) collected from the processing of Liquid Scintillation Vials (LSVs). The waste is stored in the tank until arrangements are made to ship the waste to an authorized waste treatment and/or disposal facility. See Figure I.D.4 for the layout of the Processing and Storage Building and the location of the storage tank. Additional details regarding the tank storage practices are provided in Section II.C of this permit application.

Household Hazardous Waste Collection

PFF occasionally receives 55-gallon drums and smaller containers of paint, solvents, and other household hazardous wastes. These wastes are generally received in conjunction with household hazardous waste collection events. These containers are managed within the Processing and Storage Building as follows. Drums are opened and the contents are sorted into different drums by apparent waste or product type. The contents of smaller containers are also sorted and consolidated or bulked into 55-gallon drums. Filled drums are labeled, sampled and stored pending waste characterization results. Depending upon the waste characterization results, the contents of each drum are bulked, fuel blended and/or shipped off-site individually to an authorized treatment and/or disposal facility. All empty containers will be managed in accordance with applicable regulations.

LSV Processing and Non Hazardous Waste Storage Warehouse

LSV Processing

Medical researchers and scientists conduct research using trace amounts of radioactive materials and a liquid scintillation counting detection system to analyze the results. After the research, the scintillation fluid (typically xylene and toluene), contaminated with the trace amount of radioactive material, is placed in a vial (hence, liquid scintillation vial) and accumulated in containers (usually 55 gallon drums) for subsequent treatment, disposal or reuse as a waste-derived fuel. At the PFF facility, drums containing LSVs are received at the LSV Processing and Non Hazardous Waste Storage Warehouse (Warehouse) and processed as follows.

First, a drum of LSV is received in the processing room, the drum lid is removed, and the inside of the drum is visually examined to confirm its contents. Next, the drum is mechanically lifted and the contents of the drum are dumped onto a conveyor that separates the vials from any absorbent packing material. The packing material is shaken into a 55-gallon drum and accumulated for off-site disposal by incineration. Meanwhile, the LSVs continue along the conveyor and enter a fully enclosed grinder/screw designed to break up the LSVs and separate solids and liquids. The liquid scintillation fluid (LSF) is pumped from the grinder/screw into a Fines Removal System (FRS), which consists of a 100-gallon holding tank, grinder screw and ancillary piping. The FRS removes fines and other small solids from the LSF.

The solids that collect at the bottom of the FRS holding tank are removed via the grinder screw and collected in a 55-gallon drum for off-site disposal by incineration. Next the LSF is pumped from the FRS holding tank into a 350-gallon holding/test tank where it is sampled and screened for radioactivity. The LSF is then pumped into the 3,000-gallon storage tank in the Processing and Storage Building. From there, the LSF is shipped off site for use as a fuel or for treatment and/or disposal at an authorized mixed waste facility. Depending upon the level of radioactivity, some LSF (and/or LSVs) may be containerized and stored on site to decay and attain the proper activity level before it may be shipped off site.

After the LSF is conveyed from the grinder/crusher to the FRS, a screw conveyor removes the remaining solid materials to a two-stage rinsing system. The rinsing system consists of two inclined conveyors that wash the solids in ethanol. The washed solids are gravity drained and deposited into containers for off-site treatment by incineration or energy recovery.

During the rinsing process, the ethanol is continuously re-circulated through the system. Fines or small solid materials removed by the ethanol are accumulated in the Rinse Fines Removal System (RFRS), which consists of a holding tank, grinder screw and ancillary piping. Solid materials collect at the bottom of the holding tank and are removed by a grinder screw. The solid materials from the RFRS are collected in a 55-gallon drum for off-site treatment by incineration or energy recovery.

At the end of a work day, or when the ethanol becomes spent and unusable, the ethanol is pumped from the RFRS holding tank to the 350-gallon holding/test tank where it is sampled and screened for radioactivity. As with the LSF, the ethanol rinsate is containerized and stored on site to decay or transferred to the 3,000-gallon storage tank in the Processing and Storage Building for subsequent shipment to an authorized mixed waste facility.

As a result of the above process, the Facility generates clean glass and plastic, packing materials, plastic bags/container liners, miscellaneous trash, liquids and empty containers. All of these items are tested for radioactivity to assure that radioactivity is at allowable levels or to determine if reprocessing, decay storage or additional treatment is required. After visually checking and sampling for fluids, the glass and plastic vials are bulked in trailers for shipment and subsequent treatment by incineration or energy recovery.

Other small containers of hazardous or mixed wastes and debris may also be processed in this unit. Typically, such wastes or containers are contaminated with liquids, solids or sludges, or require size reduction or solvent rinsing before further processing or treatment may be conducted. In each case, the containers, debris and other processed materials will be rinsed and cleaned to meet treatment objectives. See Figures I.D.5 and I.D.6 for an overview of the LSV processing operation. Figure I.D.7 illustrates the general layout of the LSV processing area.

It should be noted that containers of hazardous wastes are staged in the LSV Processing and Non-Hazardous Waste Storage Warehouse (Warehouse) prior to processing, but are not stored in the building. All hazardous waste containers not processed within 24 hours of arrival at the Warehouse are moved to the Treatment and Operations Building or Processing and Storage Building for storage until they are returned to the process staging area in the Warehouse.

Technical/regulatory information regarding the sufficiency of the LSV equipment for its intended use, as well as containment calculations, is included as Appendices C and D, respectively.

~~Size Reduction~~

~~Pre-treatment of the waste, consisting of size reduction of the stream, may be necessary prior to application of other treatment processes on site. When necessary, the waste stream will be size reduced in the LSV Processing area using a grinder/screw and/or shredder (or other functionally equivalent equipment). After size reduction, the waste to be treated will be containerized (in drums or other sized container) and transferred to the Treatment and Operations Building where the Perma-Fix® II treatment equipment is to be installed.~~

~~Debris Treatment~~

~~PFF proposes to treat debris using the "Alternative Treatment Standards for Debris" described in 40 CFR 268.45 Table 1. The alternative treatment technologies proposes in this area are chemical extraction techniques (water washing and spraying, liquid phase solvent extraction).\ Details regarding debris treatment are provided in Attachment H.A.7.~~

Chemical Extraction, Physical Extraction and Macroencapsulation (Including Debris Treatment) will also be occasionally conducted on hazardous debris in the LSV Processing Area. These activities will consist of the use of high-pressure steam and water sprays, surfactants, acids, bases, and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers. Decontaminated materials will be shipped off site for reuse, reclamation or disposal depending upon the nature of the material. The contaminated media or rinsate generated as a result of the decontamination process will be properly characterized, containerized and, if hazardous, manifested and shipped off site to an authorized treatment, storage and/or disposal facility. If appropriate, contaminated media and/or treatment residuals may be subjected to macroencapsulation or stabilization and fixation prior to shipment to an authorized disposal facility.

As indicated in Figure I.D.11.4, the appropriate debris treatment method depends on the physical characteristics of the debris to be treated. For example, debris with a porous surface would require chemical extraction and non-porous debris is suitable for physical extraction. The debris treatment methods (alternative treatment standards) are technologically simple, performance oriented and specified at 40 CFR 268.45, Table 1. PFF will conduct all debris treatment in accordance with the applicable requirements of 40 CFR 268.45 (and Table 1).

Appropriate containment is in place to accommodate the above treatment activities. Additional details regarding planned debris treatment operations are provided in Appendix A.

Solid Waste Management

Solid, non-hazardous wastes such as rags, paper, cardboard, plastic oily sludges, oil contaminated absorbents, crushed glass and plastic containers will also be received at the Warehouse for bulking and shipment to an authorized treatment, storage and/or disposal facility (TSD). These wastes are managed by simply bulking them into a 30-cubic yard roll-off container lined with 6-mil plastic sheeting. The roll-off containers are then covered with a tight tarpaulin and staged in the driveway between the ~~LSV processing and non-hazardous waste storage~~ Warehouse and the Treatment and Operations Building. The roll-offs are then transported, within 24 hours, to a waste-to-energy facility for disposal.

Miscellaneous Waste Storage and Transfer

Used oil, (including used oil regulated under 40 CFR 279), used oil filters, mercury-containing lamps (PFF is registered with the Florida Department of Environmental Protection to operate as a consolidation point for recyclable mercury containing lamps and devices), used antifreeze and other miscellaneous non-hazardous wastes will be received, bulked and stored in the Warehouse. These wastes will be physically separated from any mixed wastes staged in the Warehouse by berms, containment curbs, etc. Spent mercury-containing lamps will be managed in accordance with F.A.C. 62-737. The mercury-containing lamp storage location is indicated on Figure I.D.7.

~~PFF is currently registered as a transfer facility in the State of Florida. Upon approval of this permit application, PFF intends to discontinue the transfer facility operations at the facility.~~

WASTE GENERATED ON-SITE

During the course of the waste management activities describe above, PFF may generate a variety of hazardous wastes including, spent solvent/water mixtures used to rinse and decontaminate equipment and debris, soiled personal protective equipment, treatment residuals, and other incidental wastes. PFF will comply with the applicable requirements of 40 CFR ~~262~~ 260-268, 270 (hazardous waste) and 279 (used soil), as well as F.A.C. 62-710 (used oil), 62-730 (hazardous waste), and 62-740 (petroleum contact water) when managing these on-site generated wastes. The Facility will not engage in any waste generation activity other than that described in this and the preceding paragraphs.

MISCELLANY

The waste management capacity of the site is dictated by the process design capacity of the treatment equipment, layout of the container storage areas and tank storage capacity. This information is addressed in the completed Part I application forms. Table 1 summarizes the treatment methods and storage locations for waste streams to be managed at the Facility. It is anticipated that the PFF Facility will remain in operation at least until the year 2050.

TABLE 1

Summary of Treatment Methods and Storage Locations

Waste Description	Perma-Fix ®	Perma-Fix ® II	Physical Extraction	Chemical Extraction	Macroencap-sulation	Phase Separation	Storage Location[1]
Liquid Scintillation Fluid							T
Energy-Bearing Pumpable Liquid							2, 3
Energy-Bearing Pumpable Liquid *with high water content*						X	1
Hazardous Wastewater							1
D002 wastes							4,5,6,7
D003 wastes		X					10
D004-D011 aqueous waste with no organics > LDR levels	X						8
D004-D011 non-aqueous waste with no organics > LDR levels	X						8
D004-D011 wastes with organics > LDR levels (includes D012-D043 and F001-F005)	X	X					8
Debris (non-porous)			X				8
Debris (porous)				X			8
Debris treatment residuals	X	X			X		8

[1] = T - aboveground storage tank; 1-3 – storage zone in Processing and Storage building; 4-10 – storage zone in Treatment and Operation building. See Figures I.D.1 and I.D.4.

Appendix A

Debris Treatment Processes

Appendix A

Debris Treatment

Process Description

PFF proposes to treat debris using the "Alternative Treatment Standards for Debris" described in 40 CFR 268.45 Table 1. The alternative treatment technologies proposed will either be performed in conjunction with or exclusive of the Perma-Fix process and Perma-Fix II process. The technologies which are predicted to be performed in conjunction with (or purely by) the Perma-Fix® and Perma-Fix® II process are thermal desorption, chemical oxidation, and stabilization and fixation. ~~microencapsulation.~~ The details of these processes can be found in Sections II.B and II.I.

The other planned treatment technologies include ~~all approved forms of~~ physical extraction (~~abrasive blasting~~; scarification, grinding and planing; spalling; ~~vibratory finishing~~; and, high pressure steam and water sprays) and chemical extraction (water washing and spraying, liquid phase solvent extraction).

All debris will be sorted and segregated from any non-debris prior to size reduction and treatment. Sorting and segregating will consist simply of picking out the debris from the original shipping container and placing it into another container. Size reduction will be performed using hand-operated power tools (e.g., circular saw, reciprocating saw) in the debris treatment vat so that any dust and particles created by the size reduction are captured by the emissions control system. Debris will be received and stored prior to and after treatment based on its hazardous characteristics and/or assigned waste code(s). See Table 1, Summary of Treatment Methods and Storage Locations, at the end of Attachment I.D.1.

Physical Extraction

Physical extraction is the removal of the surface layer of a hazardous debris using various abrasive tools and procedures. This alternative treatment technology has been approved for the treatment of the following types of hazardous debris: glass, metal, plastic, rubber, brick, cloth, concrete, paper, pavement rock and wood. The specific details regarding each procedures are as follows:

- ~~*Abrasive Blasting* - Removal of contaminated debris surface layers using water and/or air pressure to propel a solid media (e.g., steel shot, aluminum oxide grit, plastic beads, etc.).~~

- *Scarification, Grinding, and Planing* - Process utilizing striking piston heads, saws, or rotating grinding wheels such that contaminated debris surface layers are removed.

- *Spalling* - Drilling or chipping holes at appropriate locations and depth in the contaminated debris surface and applying a tool which exerts a force on the sides of those holes such that the surface layer is removed. The surface layer removed remains hazardous debris subject to the debris treatment standards.

Appendix A (cont.)

- ~~*Vibratory Finishing* - Process utilizing scrubbing media, flushing fluid, and oscillating energy such that hazardous contaminants or contaminated debris surface layers are removed.~~

- *High Pressure Steam and Water Sprays* - Application of water or steam sprays of sufficient temperature, pressure, residence time, agitation, surfactants, and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers.

The proposed alternative treatment technologies will be performed in the LSV processing area. The LSV processing area will be equipped with a stainless steel vat measuring approximately 88" x 40" x 87" which is sufficient in size to accommodate all anticipated forms of debris. Figure 1.D.9 illustrates the location of the vat inside the LSV processing area. The vat will be a trough equipped with a mobile screen attached to a pulley. The screen will be raised and lowered into and out of the vat using the pulley. Treatment residuals will fall through the screen and into the vat where they will be removed by pumping or, in the case of solids, using hand tools (e.g., shovels, hoes). The vat will be equipped with an emissions control hood which is vented directly to the facility air pollution control system. ~~Quonset hut located within the Treatment Operations Building. The treatment area will be covered with a layer of thick polymer sheeting (i.e., Herculite®) followed by a layer of 6 mil plastic sheeting. All seams will be joined with duct tape in order to retain liquids.~~

The debris will be treated ~~in the lined storage area~~ using the aforementioned physical extraction methods ~~until the following criteria are met~~ as follows:

- For *Glass, Metal, Plastic, Rubber* - Treatment will continue until a clean debris surface is achieved. "Clean debris surface" means that the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discoloration~~s~~. ~~and~~ Soil and waste may be present in cracks, crevices, and pits ~~may be present~~ provided that such ~~staining and~~ waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

- For *Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood* - Treatment will continue until at least 0.6 cm of the surface layer has been removed, and ~~to~~ a clean debris surface is achieved.

PFF is aware that acids, solvents, and chemical reagents may react with some debris and contaminants to form hazardous compounds. Therefore, prior to debris treatment, all applicable safety precautions specified in Material Safety Data Sheets and discussed in industrial hygiene publications will be reviewed.

The treatment residue generated from the physical extraction process will be separated from the treated debris using simple physical or mechanical means, (e.g., by screening). ~~The~~ Treatment ~~residue~~ residuals will be containerized and, prior to being manifested to an off-site hazardous

Appendix A (cont.)

waste disposal facility, may be treated using the Perma-Fix® or Perma-Fix II~~®~~ process, in accordance with the waste-specific treatment standards of 40 CFR 268 Subpart D. Treatment residual candidates for the Perma-Fix or Perma-Fix II processes are solids (e.g., soil) containing organic and inorganic hazardous waste constituents in excess of applicable land disposal restriction standards. The treated debris will be managed and disposed of off-site in accordance with the conditioned exclusion provided by 40 CFR 268.45(c). ~~The plastic sheeting and all incidentals used during the treatment process (i.e., PPE) will be analyzed to ensure they do not exhibit a hazardous characteristic and disposed of at an off site solid waste disposal facility; if these residues exhibit any characteristic of hazardous waste, they will be treated on site or shipped off site to a properly permitted TSDF (as appropriate).~~

Chemical Extraction

Chemical extraction is the removal of hazardous contaminants from the surface layer of a hazardous debris using water sprays, chemical surfactants, acids, bases, detergents, and non-aqueous liquid solutions. This alternative treatment technology has been approved for the treatment of the following types of hazardous debris: glass, metal, plastic and rubber. This procedure is also approved for brick, cloth, concrete, paper, pavement, rock and wood with the following conditions:

1. The debris must be no more than 1.2 cm in one dimension.

2. The debris must be in contact with the ~~water~~ cleaning solution for 15 minutes.

3. If reduction of particle size to meet the treatment standards results in a material that no longer meets the 60 mm minimum particle size limit for debris, the material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from the contaminated soil and waste prior to size reduction. At a minimum, simple physical or mechanical means must be used to provide such cleaning and separation of non-debris materials to ensure that the debris surface is free of caked soil, waste, or other non-debris material.

The specific details regarding each procedure are as follows:

- *Water Washing and Spraying* - Application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases, and detergents, to remove hazardous contaminants from debris surfaces and surface pores or to remove the contaminated debris surface layer.

- *Liquid Phase Solvent Extraction* - Removal of hazardous contaminants from debris surfaces and surface pores by applying a nonaqueous liquid or liquid solution which causes the hazardous contaminants to enter the liquid phase and be flushed away from the debris along with the liquid or liquid solution while using appropriate agitation, temperature, and residence time.

Appendix A (cont.)

~~Water washing and spraying will be performed in the Quonset hut located within the Treatment Operations Building. The area will then be covered with a layer of thick polymer sheeting (i.e., Herculite®) followed by a layer of 6-mil plastic sheeting. All seams will be joined with duct tape in order to retain liquids.~~

The debris will be treated ~~in the lined storage bay~~ using the aforementioned chemical extraction methods ~~until the following criteria are met~~ as follows:

- For *Glass, Metal, Plastic, Rubber* - Treatment will continue until a clean debris surface is achieved. "Clean debris surface" means that the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

- *For Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood* - Treatment will continue until the contaminant has solubilized to 5% by weight in water solution or 5% by weight in emulsion.

It is anticipated that high-flash mineral spirits will be the most commonly used extraction solvent for the liquid phase solvent extraction procedure. Other extraction solvents will include ethanol and industrial soaps. Treatability study results have shown that most hazardous waste constituents can be effectively treated using high-flash mineral spirits as an extraction solvent. Bench top experiments will be performed on new debris waste streams to determine whether the high-flash mineral spirits is an appropriate solvent for the prospective treatment candidate. Bench testing for solubility consists of adding a 10:1 ratio (by weight) of mineral spirits to hazardous constituent. If no meniscus forms in the mixture, the hazardous constituent is presumed to be at least 5% soluble.

If this technology is ever implemented for waste codes F020, F021, F022, F023, F026, or F027, an application for "Equivalent Technology" approval will be filed prior to the commencement of treatment. PFF is aware that acids, solvents, and chemical reagents may react with some debris and contaminants to form hazardous compounds. Therefore, prior to debris treatment, all applicable safety precautions specified in Material Safety Data Sheets and discussed in industrial hygiene publications will be reviewed.

The treatment residue generated from the physical extraction process will be separated from the treated debris using simple physical or mechanical means (e.g., by screening). ~~The~~ Treatment ~~residue~~ residuals will be containerized and, prior to being manifested to an off-site hazardous waste disposal facility, may be treated using the Perma-Fix® or Perma-Fix II® process, in accordance with the waste-specific treatment standards of 40 CFR 268 Subpart D. Treatment residual candidates for the Perma-Fix or Perma Fix II processes are solids (e.g., soil) containing

Appendix A (cont.)

organic and inorganic hazardous waste constituents in excess of applicable land disposal restriction-standards. The treated debris will be managed and disposed of off-site in accordance with the conditioned exclusion provided by 40 CFR 268.45(c). ~~The plastic sheeting and all incidentals used during the treatment process (i.e., PPE) will be analyzed to ensure they do not exhibit a hazardous characteristic and disposed of at an off-site solid waste disposal facility. If these residues exhibit any characteristic of hazardous waste, they will be treated on site or shipped off-site to a properly permitted TSDF (as appropriate).~~

~~Liquid Phase Solvent Extraction will be performed in the LSV processing room with similar procedures used to process liquid scintillation vials. The debris will be dumped onto a vibrating conveyor which separates the debris from the non-debris (i.e., soil). The non-debris particles are shaken directly into a 55-gallon drum and managed as hazardous waste solids. The debris continues along the conveyor and enters a size reduction unit. The ground debris exits the size reduction unit via screw conveyor into an ethanol triple rinse system consisting of three inclined screw conveyors. The screw conveyors wash and agitate the debris and discharge the cleaned debris into a 55-gallon drum. The ethanol rinse is recycled until unusable and then pumped from the screw conveyors into a holding tank where it can be sampled.~~

~~The debris will be treated in the LSV processing system using the aforementioned chemical extraction methods until the following criteria are met:~~

- ~~*Glass, Metal, Plastic, Rubber* Treatment will continue until a clean debris surface is achieved. "Clean debris surface" means that the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.~~

- ~~*Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood* Treatment will continue until the contaminant has solubilized to 5% by weight in the ethanol.~~

~~Bench tests will be performed prior to the actual treatment to determine the length of time necessary to solubilize the contaminants to 5% by weight, and analysis of the waste ethanol in the holding will be used to confirm that the contaminants were successfully removed from the debris.~~

The non-debris which was separated from the debris prior to treatment, and the ~~ethanol used as a~~ spent solvent will be manifested to an off-site hazardous waste disposal facility or managed in on-site processes (as applicable). ~~The treated debris will be managed and disposed of off-site in accordance with the conditioned exclusion provided by 40 CFR 268.45(c).~~

Waste Code Tracking

PFF will assign and track waste codes for treatment residuals and treated debris in accordance

Appendix A (cont.)

with 40 CFR 268.45 and 40 CFR 261.3(f)(1). Hazardous debris that exhibits the characteristic of ignitability, corrosivity, or reactivity will be deactivated by treatment using one of the technologies identified in Table 1 of 40 CFR 268.45 (and described in the permit application) or retain the appropriate characteristic waste code. Residue from the deactivation of ignitable, corrosive or reactive characteristic hazardous debris (other than cyanide-reactive wastes) that is not contaminated with a listed waste hazardous consituent will also retain the appropriate characteristic waste code unless it is deactivated. Toxicity characteristic debris treatment residuals will remain subject to the waste code(s) and treatment standards for the toxic constituent(s) for which the debris exhibited the toxicity characteristic. Residuals from the treatment of debris contaminated with listed waste will remain subject to the treatment standards and waste codes assigned for those constituents or wastes. Hazardous debris that has been treated using one of the proposed extraction technologies in conformance with 40 CFR 268.45 and that does not exhibit a hazardous characteristic will not be a hazardous waste and will not be assigned any waste codes.

Environmental Performance Standards

Release Prevention

The debris treatment train is located, designed, constructed, operated, maintained, and will be closed in a manner that will ensure protection of human health and the environment. The hydrogeologic, geologic, and meteorologic factors of concern for the PFF Facility site and surrounding areas are addressed in Section A of this permit application. For purposes of ensuring protection of human health and the environment, PFF proposes to design and operate the debris treatment equipment in conformance with applicable container standards. Appropriate secondary containment and air emission controls will be incorporated into the design and operation of the equipment and run on and run off of precipitation or liquids from the debris treatment area will be controlled. See Part II, Section B of this permit application for details regarding containment, management of ignitable, reactive and incompatible wastes, condition and management of containers, inspections and prevention of run on and accumulation of precipitation in the Treatment and Operations Building and LSV area where the debris treatment operations will take place.

Prevention of Releases to Groundwater or Subsurface Environment

Releases to groundwater or the subsurface environment from the debris treatment train are extremely unlikely for the following reasons:

- Relatively small volumes of waste are incorporated into the debris;
- Debris will be treated within secondary containment systems designed to collect liquids generated during processing. The containment system is coated with a chemically resistant material which is compatible with the waste streams designated for processing.

Appendix A (cont.)

- The treatment areas are inspected daily in accordance with the facility inspection plan. Leaks or spills from the system are cleaned up within 24 hours of discovery or as soon as it is practicable and safe to do so.

- The areas are located within buildings physically separated from the subsurface environment and groundwater.

- The facility maintains a Contingency Plan to provide a framework for facility response to emergencies such as spills, fires, or explosions. This plan provides procedures to respond to treats to human health or the environment from the system.

<u>Prevention of Releases to Surface Water, Wetlands, or Soil Surface</u>

Releases to surface water, wetlands, or soil surface ~~from the Perma-Fix® II treatment train~~ are extremely unlikely for the following reasons:

- Relatively small volumes of waste are incorporated into the debris;

- Debris will be treated within secondary containment systems designed to collect liquids generated during processing. The containment system is coated with a chemically resistant material which is compatible with the waste streams designated for processing.

- The treatment areas are inspected daily in accordance with the facility inspection plan. Leaks or spills from the system are cleaned up within 24 hours of discovery or as soon as it is practicable and safe to do so.

- The areas are located within buildings physically separated from the subsurface environment and groundwater.

- The facility maintains a Contingency Plan to provide a framework for facility response to emergencies such as spills, fires, or explosions. This plan provides procedures to respond to treats to human health or the environment from the system.

<u>Prevention of Releases to Air</u>

Releases to air from the Perma-Fix® II treatment train are extremely unlikely for the following reasons:

- The system is located within building areas equipped with emissions control devices. The emissions control system is designed to handle the volume of organic emissions anticipated from the process.

Appendix A (cont.)

- Emissions at the loading point are minimized by limiting the time the debris is exposed to the atmosphere prior to processing.
- Emissions during unloading are minimal because the potential contaminants will be significantly removed during processing.

Monitoring and Inspections

The debris treatment process will be monitored by PFF personnel during processing operations. Loading and unloading will be conducted manually (or automated equipment will be manually operated).

The debris treatment areas will be visually inspected each operating day for evidence of leaks or spills; the inspection will be in accordance with the requirements of the facility inspection plan. The secondary containment systems will also be inspected each operating day for evidence of cracks or breaches in containment as specified in the facility inspection plan.

Potential Pathways of Exposure of Humans or Environmental Receptors

PFF workers within the treatment areas are the most likely human receptors for chemicals or chemical constituents released from the ~~drebris~~ debris treatment process. The exposure is anticipated to be minimal because of the emission control devices provided for the areas. The primary pathway for human receptors from debris treatment processes is air. Specifically, air emissions (volatiles or particulates) generated during treatment processes. Where appropriate, water may be applied during processing to minimize the generation of particulates.

Operating personnel operating (or personnel present in the treatment areas for any other reason) will be required to wear Personal Protective Equipment (PPE) selected to address the potential hazards identified for the wastes to be managed and the operating parameters of the system. The PPE selected will be in accordance with OSHA standards and may include use of particulate/radioactive/organic respirators (as appropriate).

Environmental receptors such as soil, surface water, groundwater, and air are unlikely to be impacted by the debris treatment processes because of the air controls provided for the treatment areas, containment systems and location within buildings physically separated from soils and protected from precipitation, run-on and run-off.

Appendix B

Solvent Distillation

ATTACHMENT I.D.1

Appendix B

Solvent Distillation

Siva
A Division of Pneumatic Products Corporation

M-110 SOLVENT RECOVERY SYSTEM

Standard Terms and Specifications

1.0 SCOPE

1.1 This Proposal covers standard terms and specifications for the sale of one (1) **M-110** solvent recovery distillation unit and accessories (**"M-110 System"**) by Siva, a Division of Pneumatic Products Corporation *("SIVA")*, as summarized below and described herein:

- One (1) 30,000 watt, **M-110** distillation unit with wetted parts of 304 stainless steel; explosion-proof light; elevated base stand: and on-board, microprocessor control system with LCD and LED operating displays and trouble-shooting indicators (480V, 3Ph, 60Hz)
- One (1) automatic level-controlled fill system

1.2 Siva's *"Standard Terms and Conditions"* included herein as *"Exhibit C"* shall apply to this Proposal. Siva reserves the right to change the terms and specifications of this Proposal at any time.

3.0 EQUIPMENT SPECIFICATIONS

3.1 Size and Approximate Weights of Vessels and Assemblies:

VESSEL	SIZE (W x D x H)	APPROX. WEIGHT (Empty)
M-110 Unit w/ Stand	56" x 70" x 121"	1700 Lbs.

3.2 M-110 Distillation Unit

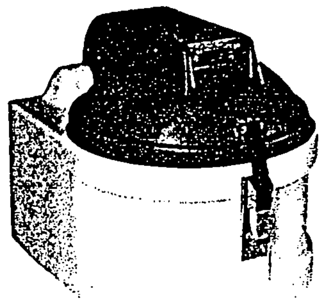
One (1) 30,000 watt, 110-gallon capacity, 304 stainless steel distillation unit to include:

- One (1) stainless steel heating jacket surrounding the distillation unit to the height of the liquid at capacity, with two inches (2") of exterior insulation covered with a painted carbon steel cabinet
- Four (4) 7,500 watt electric immersion heaters (480V, 3Ph)
- One (1) internal demisting assembly
- One (1) 304 stainless steel condenser with removable 316L stainless steel core, mounted on the distillation vessel
- One (1) painted carbon steel supporting frame
- One (1) 18" front-mounted manway for access and inspection of the solvent chamber
- One (1) manually operated 2"Ø still bottoms discharge valve
- One (1) 5" sight window and one (1) 240 volt explosion proof light
- One (1) 5 psig pressure relief valve and one (1) 15 psig pressure rupture disk (ventilation piping for the pressure relief valve and rupture disk not supplied by Siva)

3.3 Internal Oil Heating Package

One (1) 30,000 watt, internal, explosion-proof thermal oil heating unit connected by fiberoptics to the M-110 on-board control system, to include:

- Four (4) 7,500 watt electric immersion heaters, with heating elements connected to two electric circuits (each @ 15 kW; 480V, 3Ph)
- One (1) carbon steel elevated oil expansion tank, with low-level sensor alarm and shutdown.



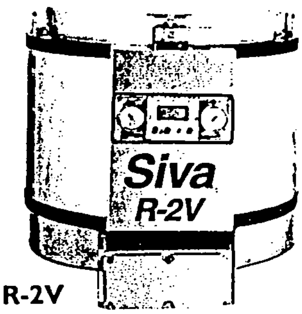
R-2A

Siva

...THE **COMPLETE** APPLICATIONS SOLUTION SOURCE

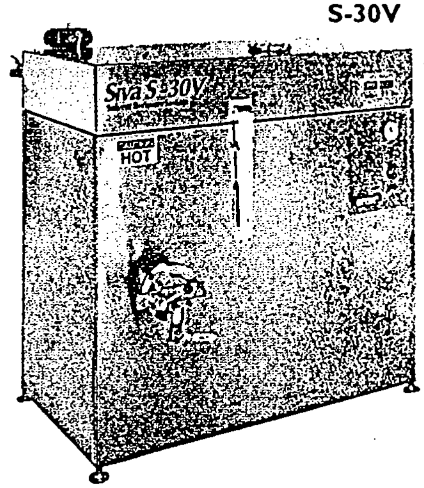
R-2A/2AX/2V SERIES

Bench-top still for recycling solvents that boil up to 500°F. R-2A distills 4 gallons in 8 hours.
R-2AX includes closed-loop cooling water system. R-2V distills 5 gallons in 8 hours with vacuum assistance. All units feature fully automatic operation with disposable liners for sludge removal.



R-2V

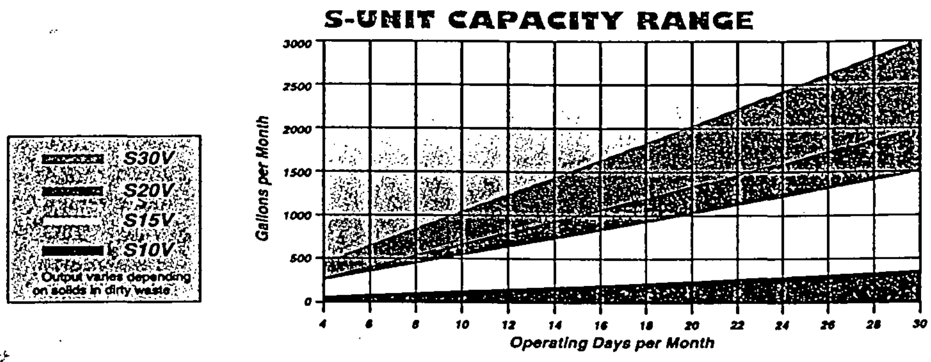
S-30V

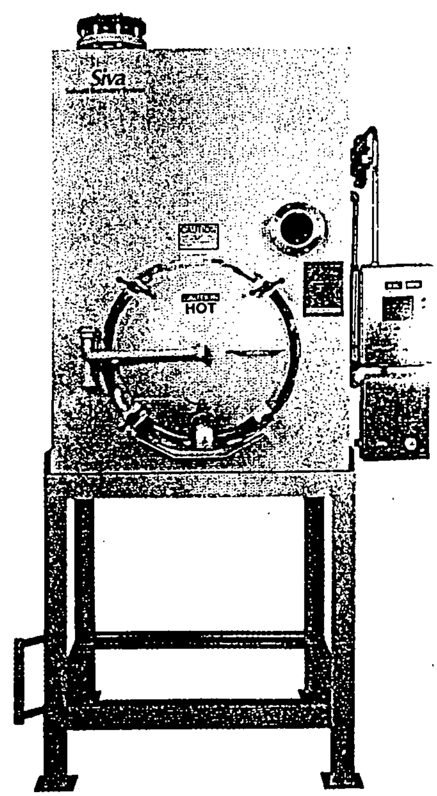


S-SERIES

UL LISTED

Self-contained vacuum and non-vacuum stills with all stainless steel and Teflon® parts. Single batch and continuous flow capacities from 10 to 100 gallons per day. Microprocessor controls and safety interlocks allow installation anywhere.

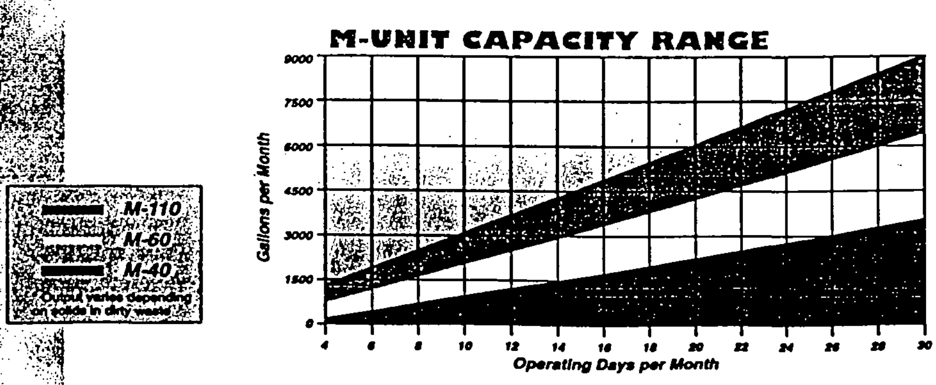




M-SERIES

UL LISTED

Batch or continuous flow vacuum and non-vacuum stills with throughput capacities from 40 to over 300 gallons per day. Front door drain and elevated base stand provide easy access to still chamber and allow gravity discharge of liquid still bottoms to a 55-gallon drum.



M-60

M and DAS Series Solvent Recovery Systems

Siva
A Division of Pneumatic Products Corporation

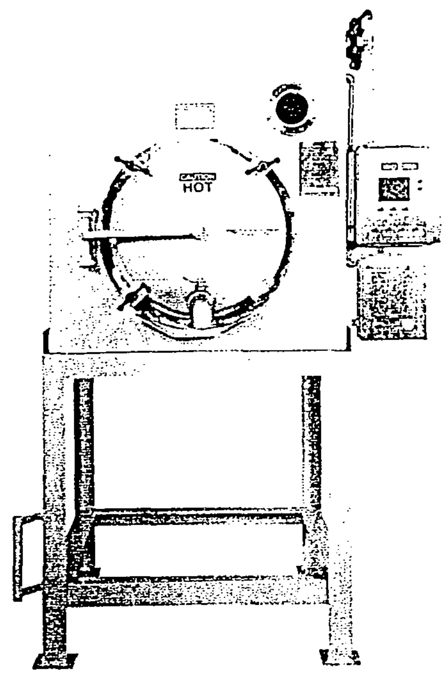
High Capacity Solvent Distillation

Description

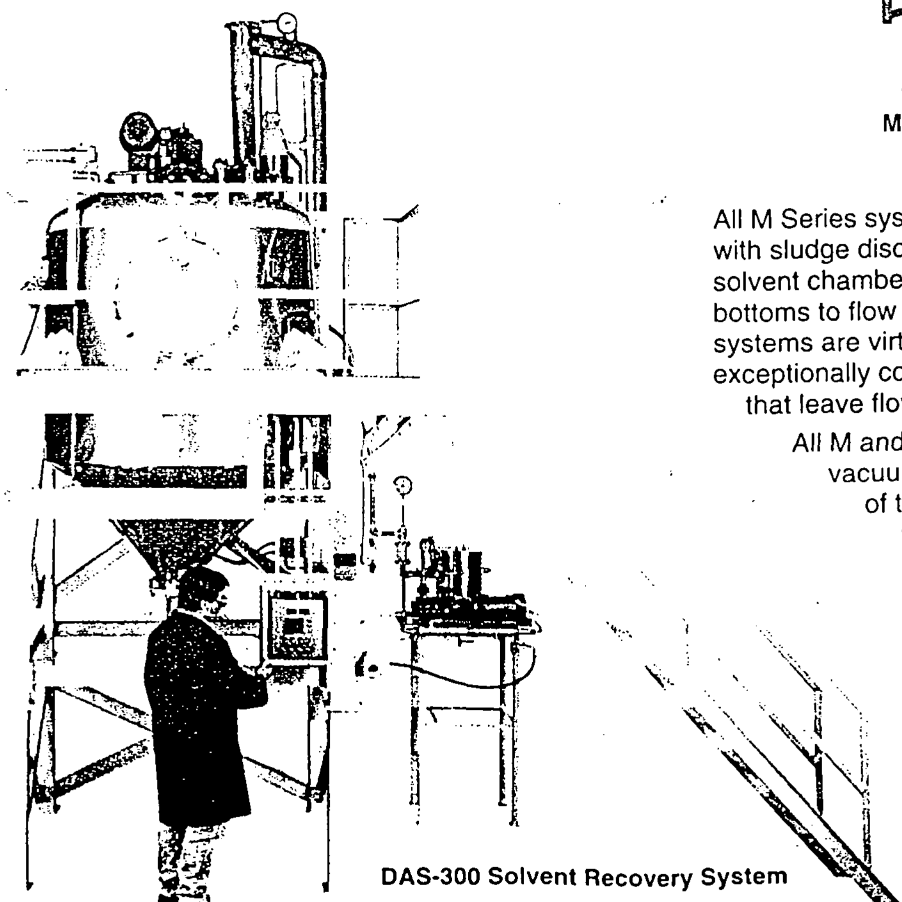
Siva M and DAS Series Solvent Recovery Systems are designed for high volume applications with throughput capacities from 40 to over 1000 gallons per day.

Electric heaters immersed in thermal oil surrounding the solvent chamber provide heat for distillation in M- Series systems. An external oil heating package or in-plant steam provides heat for distillation in DAS Series systems. Reclaimed solvent vapors are condensed in water-cooled stainless steel heat exchangers mounted on the rear of the unit. Waste contaminants remain in the solvent chamber as liquid or semi-liquid still bottoms.

All DAS systems feature an automatic internal scraper to clean the sidewalls of the solvent chamber and improve the heating efficiency of the unit. DAS systems are most effective for distillation of viscous solvents or solvents with thermosetting solids.



M-60 Solvent Recovery System


DAS-300 Solvent Recovery System

All M Series systems feature a large front-mounted door with sludge discharge valve for easy access to the solvent chamber. An elevated base stand allows still bottoms to flow by gravity to a 55-gallon drum. M systems are virtually maintenance free and are exceptionally cost effective when used for applications that leave flowable still bottoms.

All M and DAS Series systems are available with vacuum assistance to reduce the boiling point of the waste solvent. M and DAS systems with vacuum will distill and reclaim most solvents, including the new, high boiling-point, environmentally safe solvents. With vacuum assistance, actual distillation temperatures are typically below 365°F (185°C).

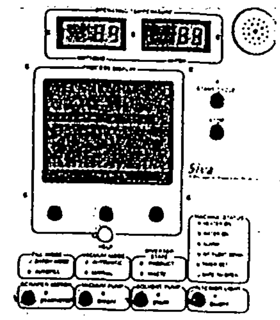
For most M and DAS Series applications, solvent recovery yields exceed 80% and reclaimed solvent purity exceeds 99%.

Control Systems

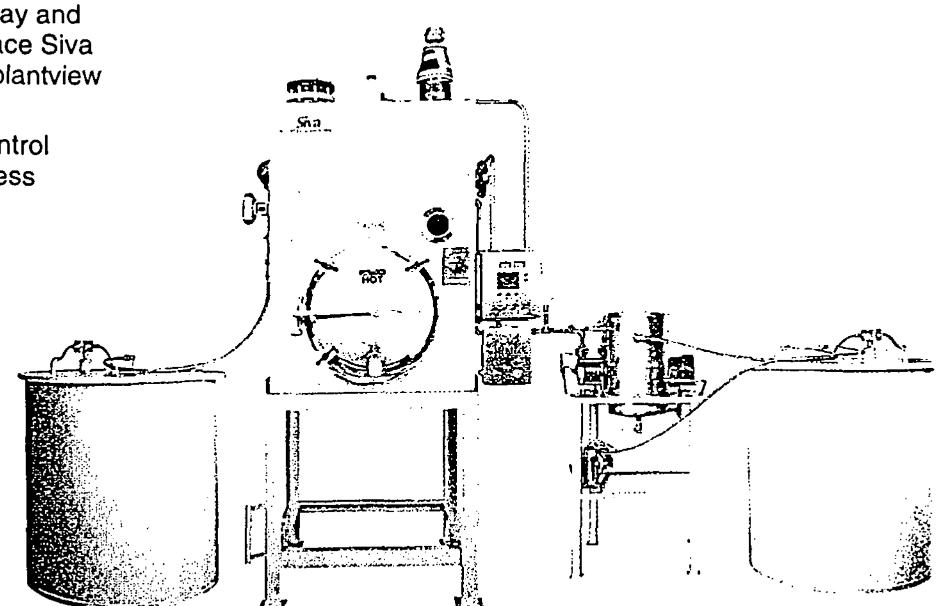
All Siva M and DAS systems feature an explosion-proof, intrinsically safe solid state control system mounted on the unit. The control system has user friendly, programmable temperature and operating set points and features LCD menu-driven displays of operating conditions and trouble-shooting indicators; as well as automatic start and stop functions.

M and DAS Series systems utilize intrinsically safe low voltage electrical circuitry, fiberoptic interfacing of accessories, and explosion-proof electrical components. Remote operating, display and alarm panels and serial ports to interface Siva control systems with customer owned plantview systems are available.

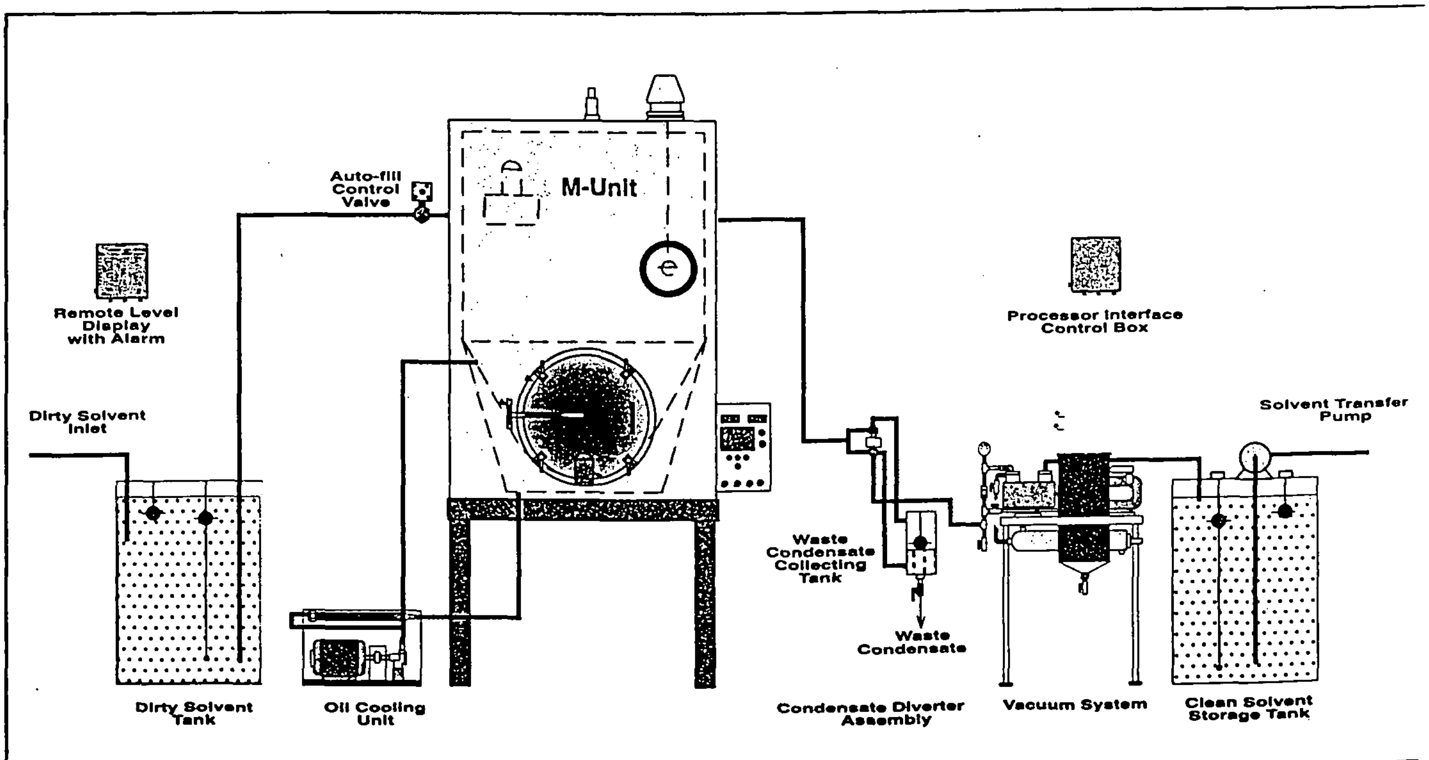
Siva systems with solvent flow and control packages are also available with process interface kits that electronically interface the solvent recovery system with down-stream solvent washers or processors. This allows the user to operate washing equipment with continuous solvent "feed-and-bleed" for true closed-loop operation.



Microprocessor Controller
M & DAS Series



M-60 w/SFCP

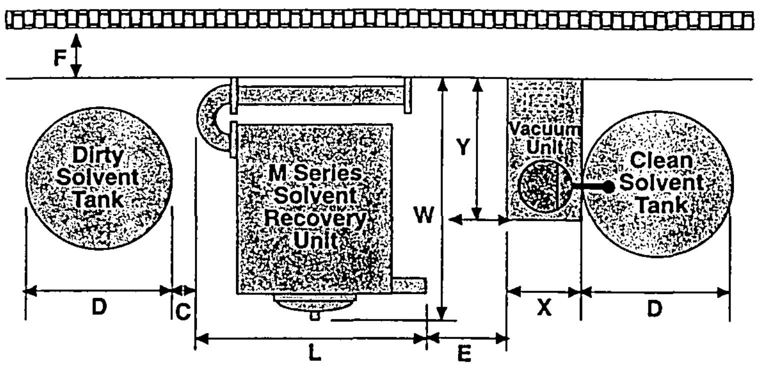


M-Unit with Optional Accessories

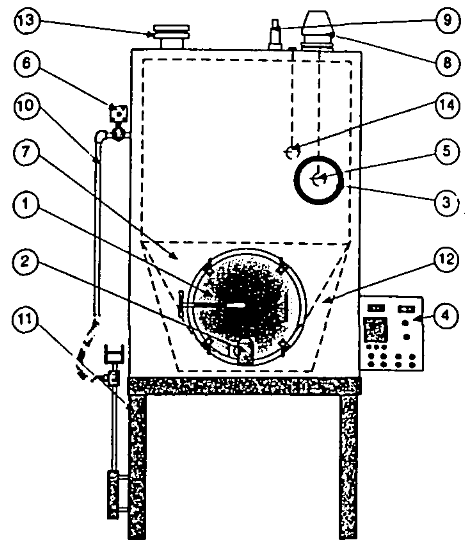
Reference Data*

Unit	Boiler Capacity, Wattage and Typical Through-put			
M-40	40 gallons (Batch or Auto-Fill)		12,000 Watts	40-120 gallons/day
M-60	60 gallons (Batch or Auto-Fill)		18,000 Watts	60-180 gallons/day
M-110	110 gallons (Batch or Auto-Fill)		30,000 Watts	110-330 gallons/day
Unit	**Electrical**			
M-40	480 V	60 Hz	Three 3Ø	16 Amps
M-60	480 V	60 Hz	Three 3Ø	22 Amps
M-110	480 V	60 Hz	Three 3Ø	34 Amps
Vacuum Unit	480 V	60 Hz	Three 3Ø	2 Amps
Unit	**Utilities**			
	Cooling Water			Process Air
	Flow	*Inlet*	*Pressure*	*Pressure*
M-40	2 gpm	<70°F	35-80 psi	80-100 psi
M-60	4 gpm	<70°F	35-80 psi	80-100 psi
M-110	7 gpm	<70°F	35-80 psi	80-100 psi

Note: Daily throughput will vary depending on the type of solvent and the amount of solids in the waste to be reclaimed. Please consult factory for throughput estimates.

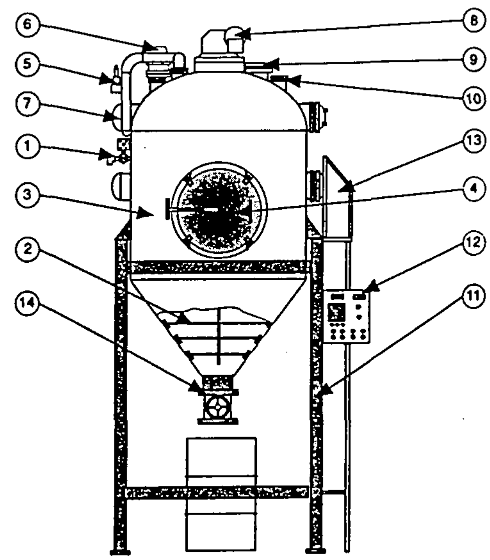


	Width			Depth				Height
	L	X	D	C	W	Y	F	H
M-40 w/Stand	58"			5"	68"		24"	110"
M-60 w/Stand	58"			5"	68"		24"	110"
M-110 w/Stand	58"			5"	72"		24"	121"
Vacuum Assy.		30"				37"		48"
100 Gal.			30"					38"
150 Gal.			36"					34"
250 Gal.			48"					36"



1. CLEAN-OUT DOOR
2. SLUDGE DRAIN VALVE
3. SIGHT GLASS
4. CONTROL PANEL
5. AUTO-FILL FLOAT
6. AUTO-FILL VALVE
7. SOLVENT CHAMBER
8. EXPLOSIONPROOF LIGHT
9. PRESSURE RELIEF VALVE
10. VAC/AUTO-FILL PICKUP
11. ELEVATED BASE STAND
12. THERMAL OIL CHAMBER
13. BURST DISK
14. OVERFILL SAFETY FLOAT

M-110 Front View



1. AUTO-FILL VALVE
2. SCRAPER BLADES
3. DISTILLATION VESSEL
4. MANWAY
5. PRESSURE RELIEF VALVE
6. EXPLOSIONPROOF LIGHT
7. CONDENSERS
8. ROTATING SCRAPER ASSEMBLY
9. INSPECTION GLASS
10. BURST DISK
11. ELEVATED BASE STAND
12. CONTROL PANEL
13. PLATFORM/LADDER
14. SLUDGE DRAIN VALVE

DAS-175 Front View

* Please consult factory for DAS Series Dimensions and Installation Data

Because of our policy of continuous improvement some information, specifications and dimensions contained herein may be revised. For confirmed accuracy, always refer to factory submittals.

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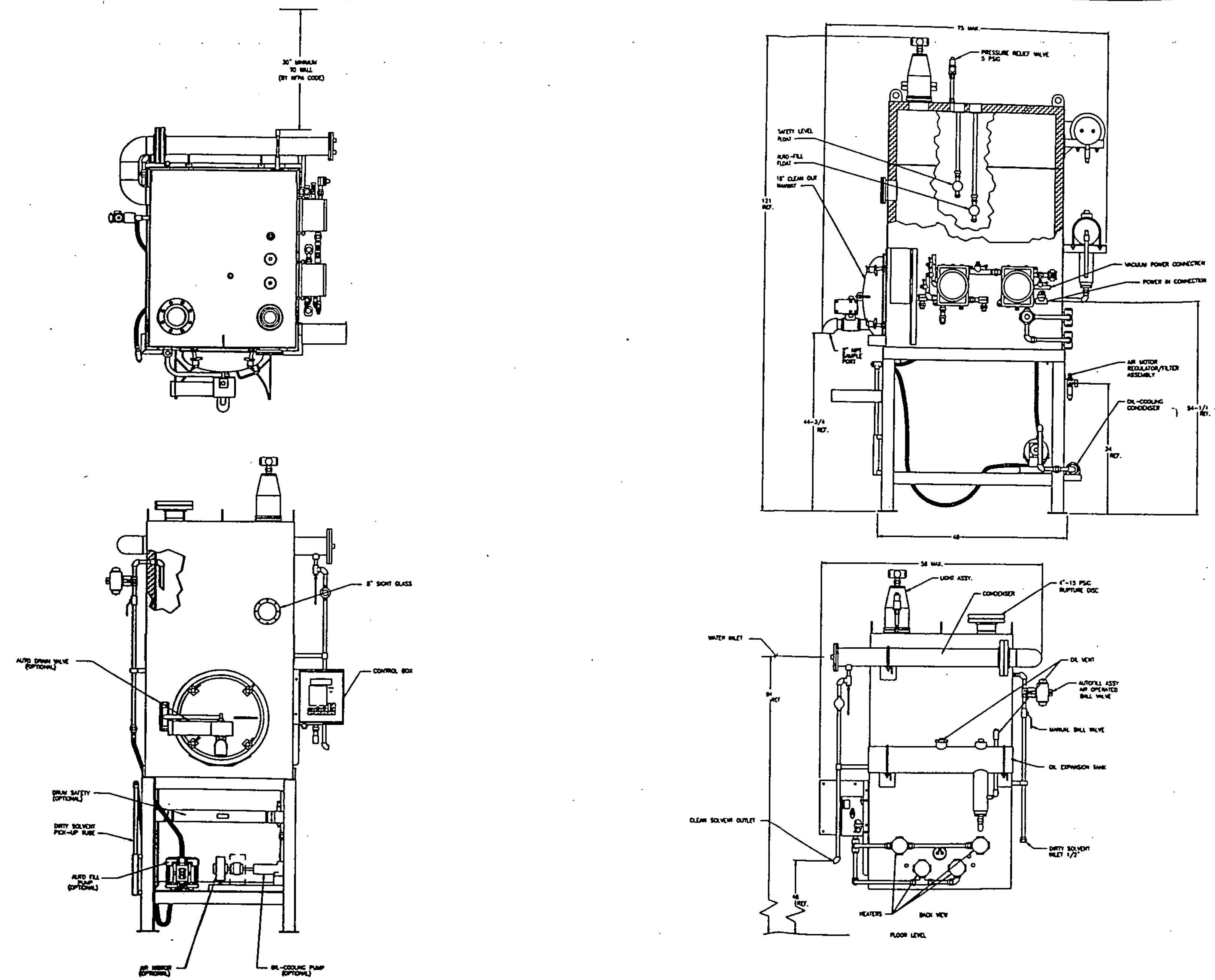
Flair Engineered Products



- REVISIONS -

FOR QUOTATION ONLY

	NAME	DATE
DWN BY	SDM	11/26/97
ENG BY	JDL	11/26/97
CHK BY	RMH	11/26/97
APP BY	JDL	12/01/97
REL BY	WHL	12/01/97
CAT NO.	1270421	
ID NO.	48647	

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES

FRACT. ±1/4 ANG. ±2°

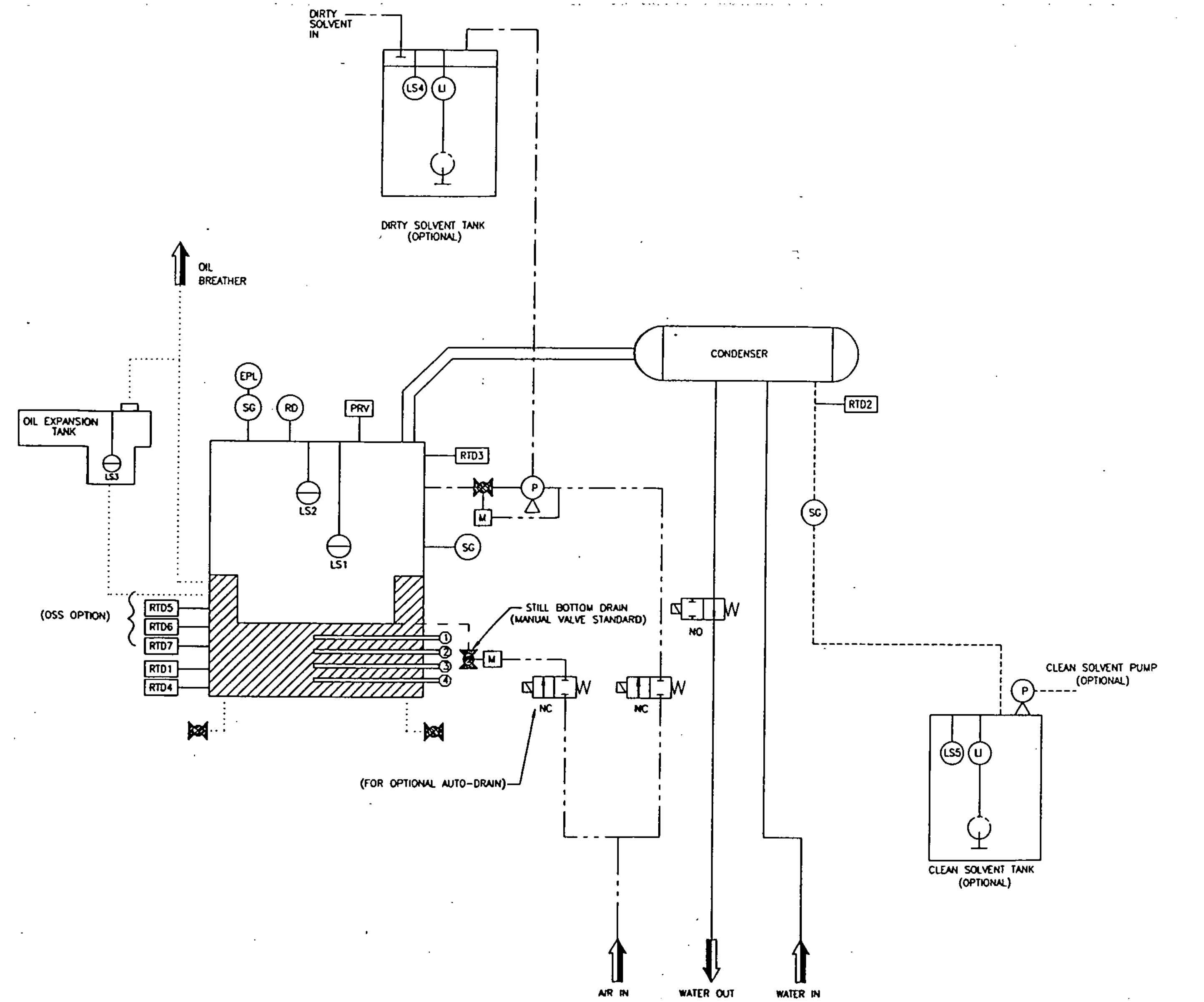
PNEUMATIC PRODUCTS CORP.

STILL, M

M-110, NON-VAC, W/ADA, OCA, 480V

SIZE D DWG. NO. 1270421 REV. - SHEET 1/1

ZONE	REV	DESCRIPTION	DWG BY	CHK BY	APP BY	REL BY	DATE
–	A	ADDED AIR DRIVEN PUMP TO DIRTY SOLVENT TANK LINE	PJC	RMH	DTA	JPN	10/27/
–	B	ADDED AUTO DRAIN OPTION.	SDM	RMH	RMH	WHL	2/5/9



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FOR QUOTATION ONLY

KEY:

- EPL ······ EXPLOSION PROOF LIGHT
- SG ······ SIGHT GLASS
- ······ THERMAL OIL
- 1 2 ······ HEATERS
- RD ······ RUPTURE DISK 15 PSIG.
- PRV ······ 5 PSIG RELIEF VALVE
- ······ NORMALLY CLOSED BALL VALVE
- ······ NORMALLY OPEN BALL VALVE
- LS ······ LEVEL SWITCH
- LI ······ LEVEL INDICATOR
- P ······ AIR DRIVEN SOLVENT PUMP
- RTD ······ TEMPERATURE SENSOR
- TC ······ THERMOCOUPLE
- M ······ AIR ACTUATED VALVE

- DIRTY SOLVENT
- WATER
- CLEAN SOLVENT
- OIL
- AIR
- SLUDGE

UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN	DWN BY	DAZ	6/24/94
SURFACE FINISH ✓	ENG BY	RMH	6/24/94
TOL.	CHK BY	EJB	6/24/94
	APP BY	DTA	6/24/94
	REL BY	JPN	6/30/94
FRACT: ANG:	CAT NO.		
SCALE: NONE WT:	ID NO.	52938	

PROPERTY OF: PNEUMATIC PRODUCTS CORP.

FLOW SCHEMATIC
M-SERIES, NON VACUUM W/AF

SIZE D | DWG. NO. 1247688-D1 | REV. B

Appendix C

LSV Process Certification Report

backflow of crushed material in the conveyors. A set of replacement screw flights were installed under the direct supervision of Reduction Technology that reduced the clearance to the allowable minimum.

All of the wetted materials in the knife hog grinder and screw conveyors, except the knife blades, are manufactured from corrosion resistant T304 stainless steel. The hardened knife blades are fabricated from either AISI 5160 alloy steel, or D2 tool steel. The interior of the screw conveyors were inspected after removal of the original screw flights. All surfaces were found to be in excellent condition with no visual indication of corrosion or deterioration. The leading edge of all screw flights have been weld overlaid with Stellite® hard facing to minimize wear at the leading edge of the flights. The original flights showed no signs of abrasive wear resulting from approximately 6 months of use.

The balance of the wet processing system consists of a holding tank for containment of used ethanol employed in the LSV process. The 350 gallon T304 stainless steel tank was manufactured in 1990, and appears to be good condition. A 16" x 24½ " x ½ " thick acrylic inspection panel is located on the front. Slight crazing of the inside wetted surface was visible.

The dry system conveyors were inspected and, also, found to be well maintained and in very good condition. The dry system appeared to have been subjected to very little use since installed. The design, selection of materials and fabrication of the system components appears to have been well executed. The knife hog grinder and conveying systems, both for wet and dry materials, are well suited and designed to either process or prepare a variety of hazardous solid wastes compatible with T304 stainless steel.

CONCLUSIONS AND RECOMMENDATIONS

The relatively new age and generally well maintained condition of the knife hog grinder and wet and dry conveying systems indicates that the dedicated system was well designed for the intended purpose and has performed well to date. The use of T304 stainless steel throughout the system for all wetted surfaces provides reliable corrosion resistance for all but very corrosive hazardous waste materials. The system would not be suitable for processing very acidic waste streams, less than pH 2, or high soluble chloride content waste streams that would be treated employing high temperature to evaporate solids to dryness. Neither of these two conditions represent foreseeable use of the wet/dry grinding system. Magnetic screening of the waste stream conveyed to the knife hog grinder minimizes the potential for generating sparks at the blades, and a fire suppression and nitrogen purge system is installed to further minimize the risk of fire and explosions.

The capacity of the existing concrete floor slab to support equipment loads was also evaluated. Maximum concentrated load was taken as 3200 lb based on a total weight of 12800 lb supported on four legs. A 1¾" core sample was drilled in order to verify the thickness of the slab. Visual inspection of the general floor area revealed no significant cracks or other signs of distress. Concrete quality, as seen in the core sample, appeared to be good, with a fairly uniform distribution of coarse aggregate and no large voids or air pockets. The slab consists of a newer layer of nominal 6" thickness over an older slab of at least 7¾" thickness.

It is the opinion of the undersigned that the system, as installed, is well suited for its intended purpose and is in very good serviceable condition.

As required by EPA 40 CFR 270.11(d):

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.

Respectfully submitted,

Richard O. Lewis

Richard O. Lewis, PE
11-17-98

Attila A. Bodo, PE 11.17.98

FIGURES

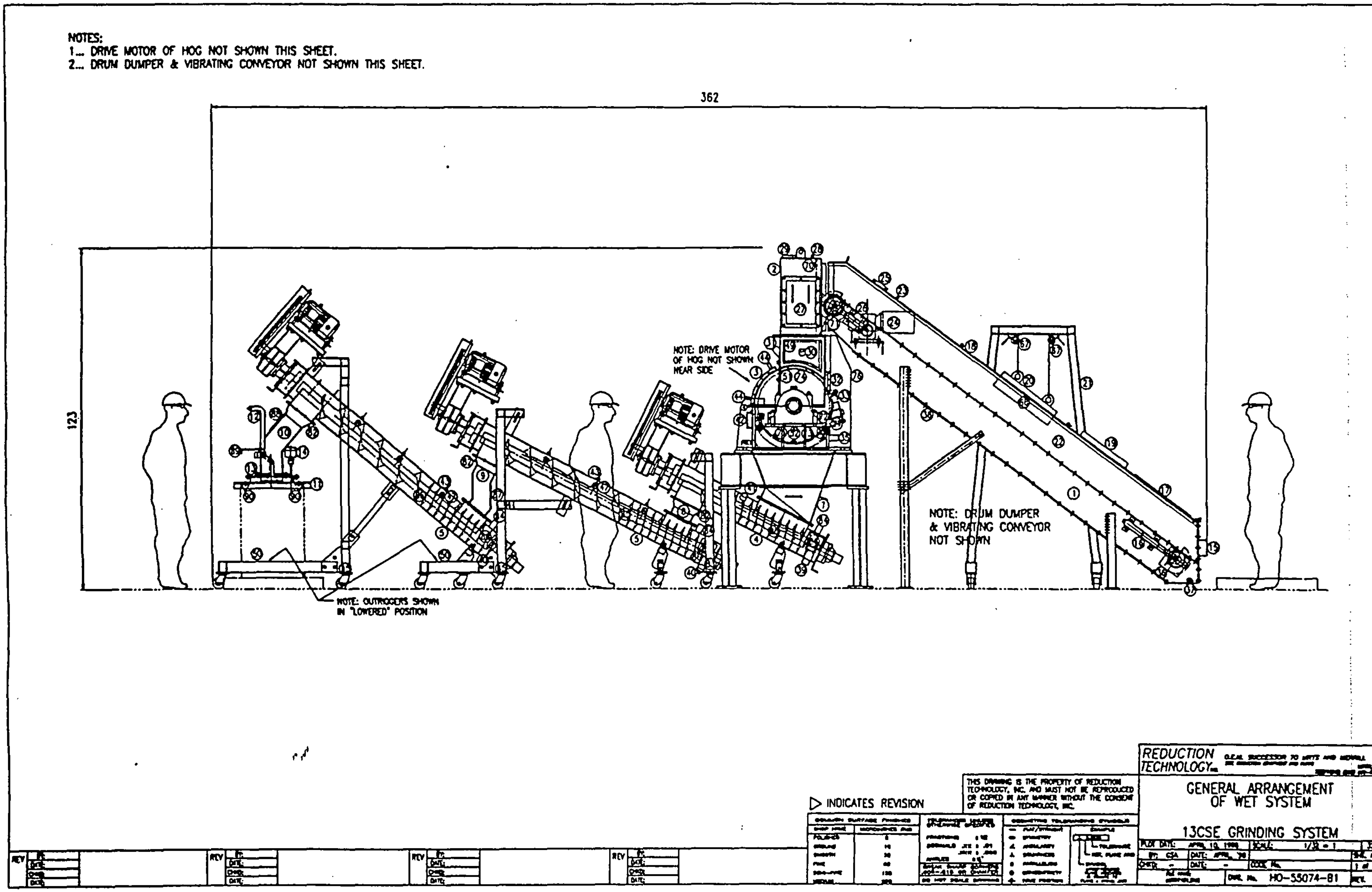

Figure 1. Elevation schematic of Reduction Technology 13CSE wet grinding system configuration; located at Perma-Fix.

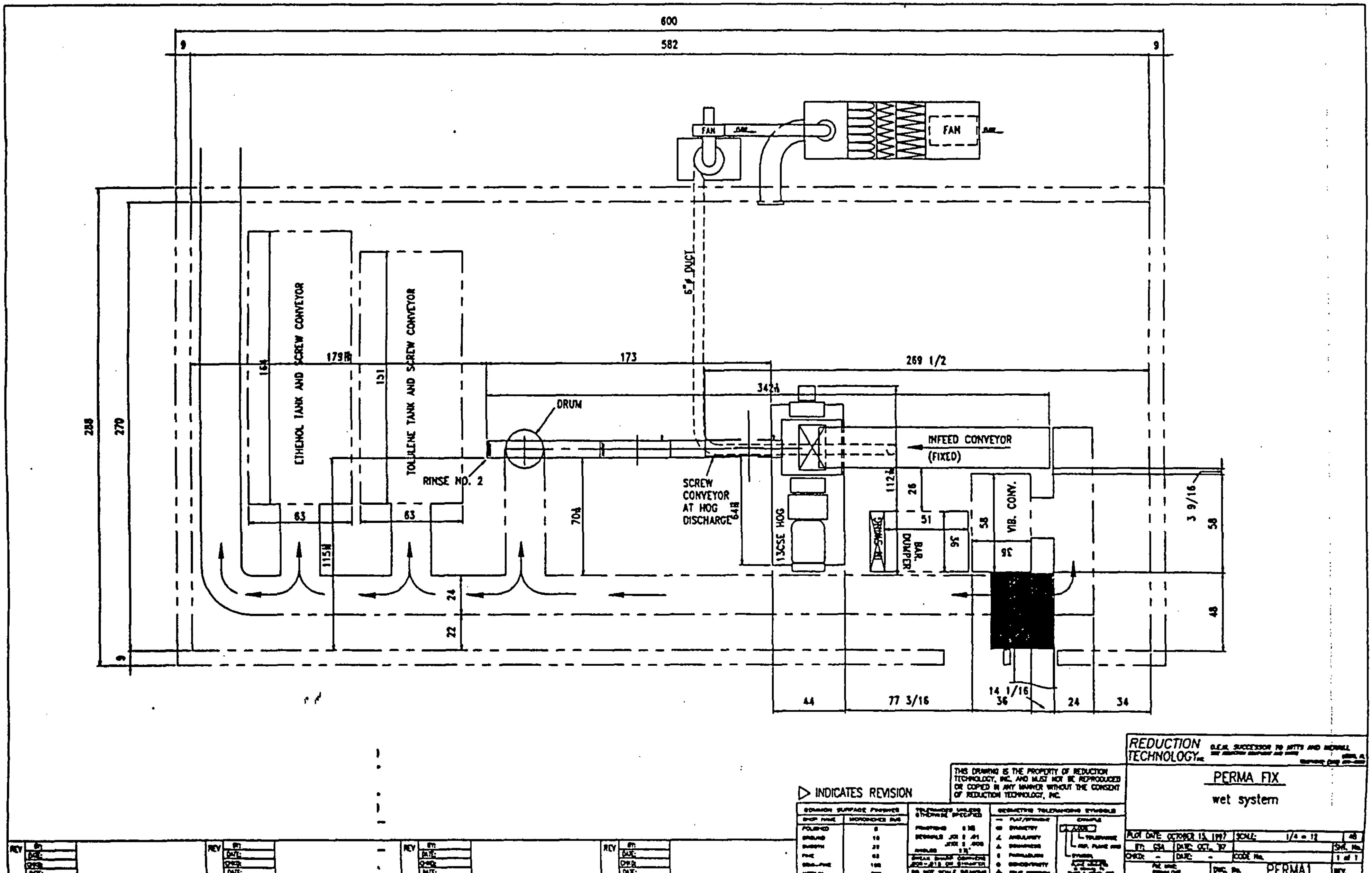

Figure 2. Plan schematic of Reduction Technology wet grinding system configuration; located at Perma-Fix.

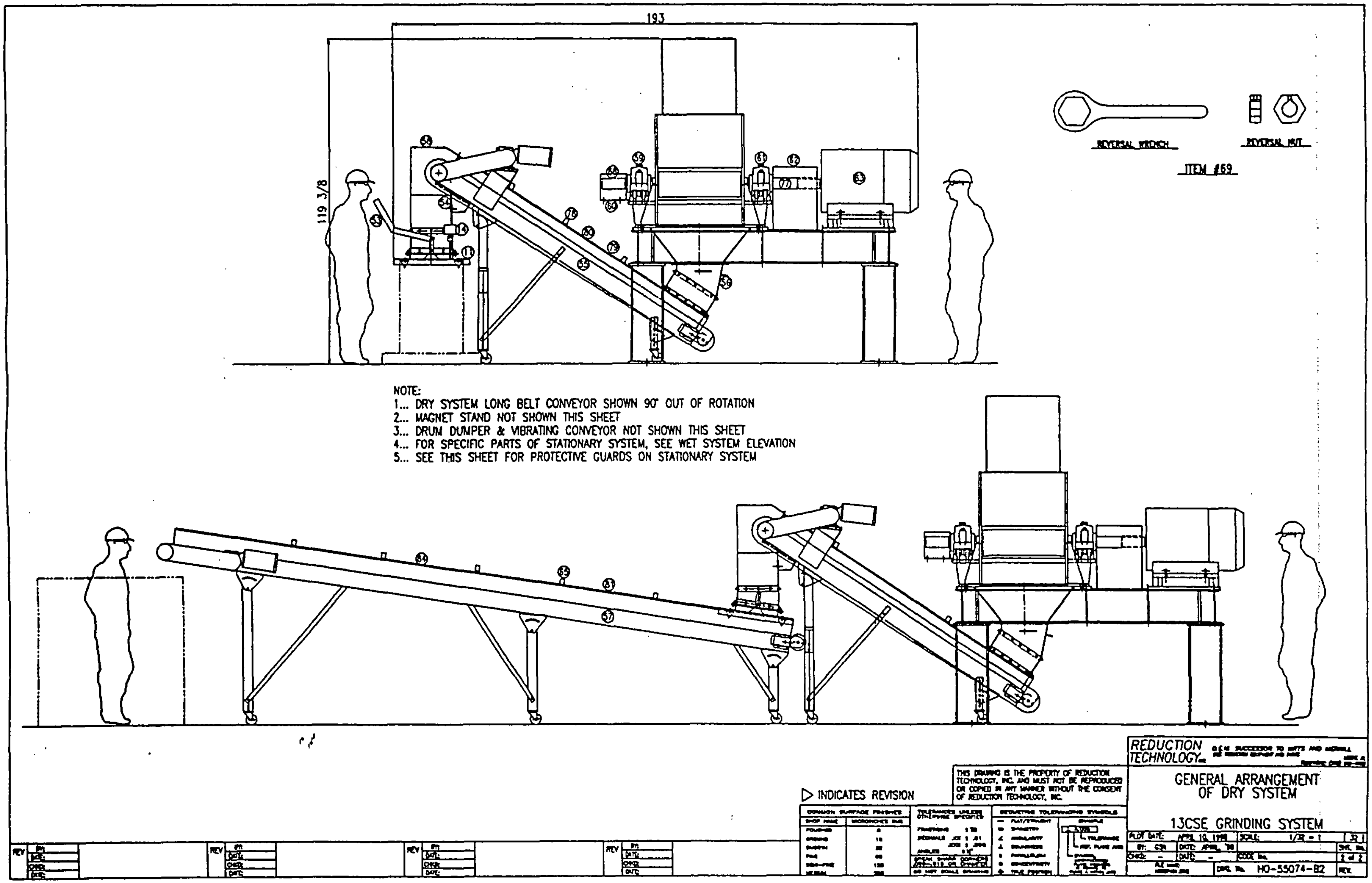

Figure 3. Elevation schematic of Reduction Technology 13CSE dry grinding system configuration; located at Perma-Fix.

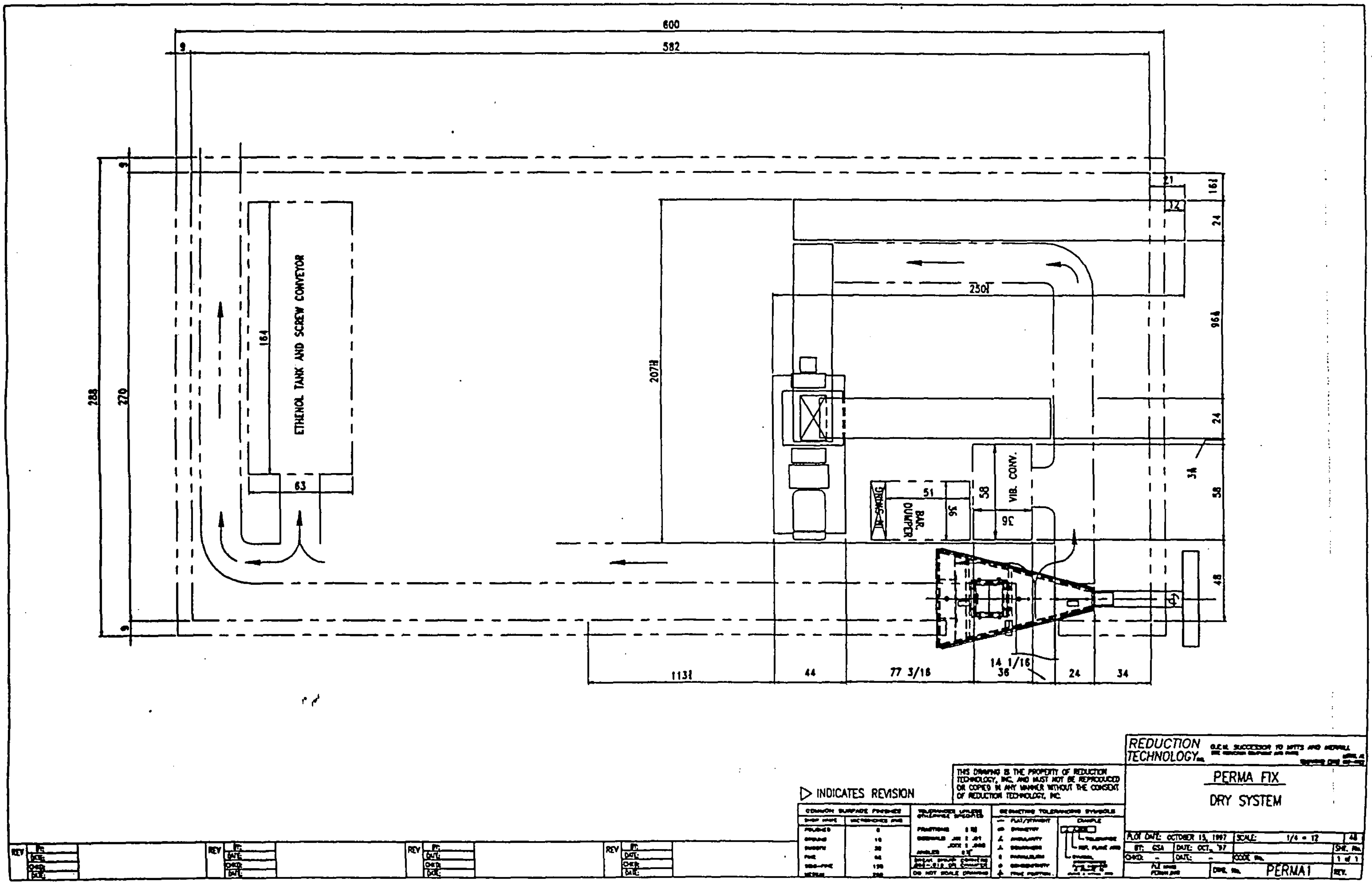

Figure 4. Elevation schematic of Reduction Technology dry grinding system configuration with ethanol tank; located at Perma-Fix

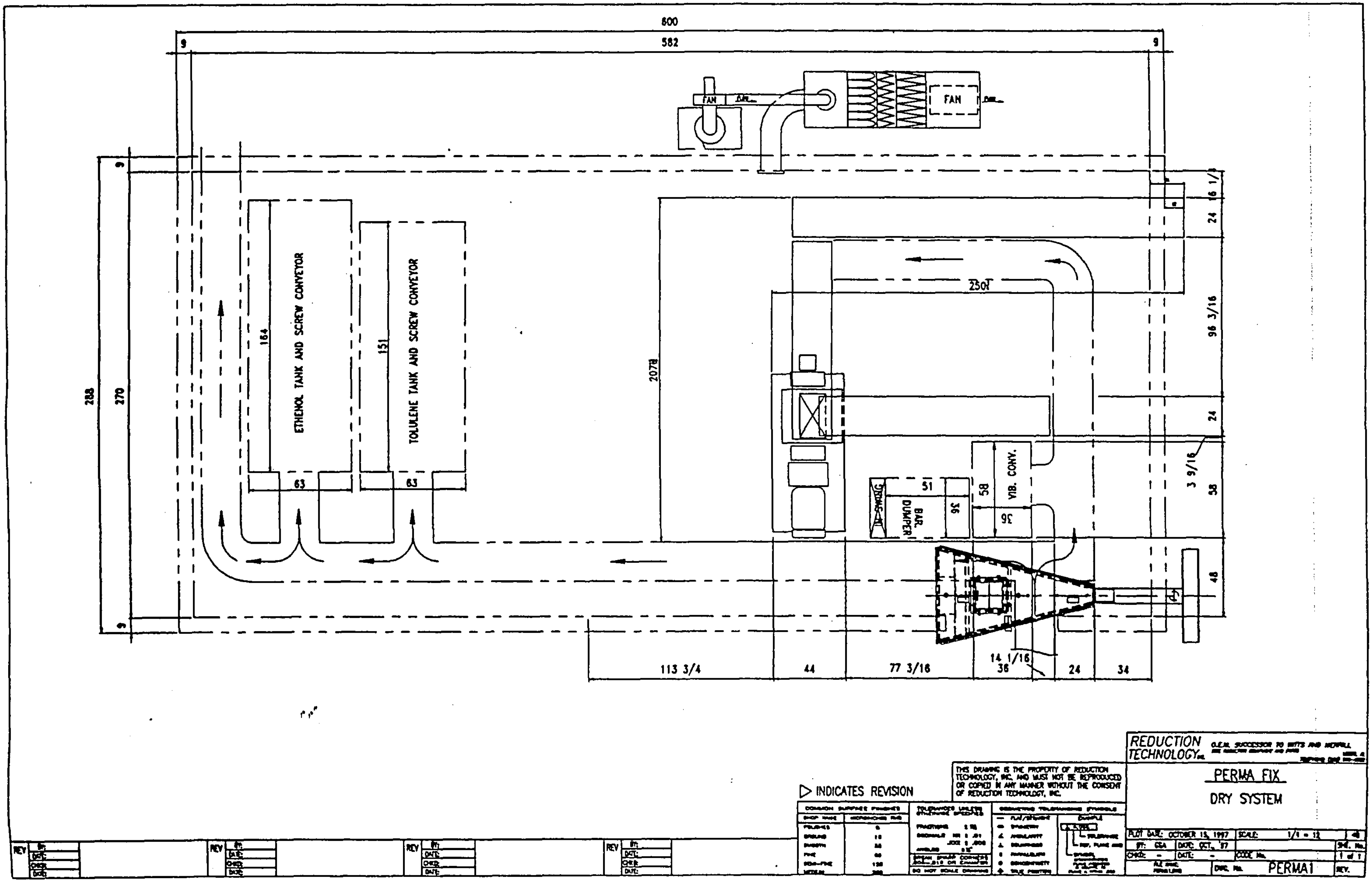

Figure 5. Plan view schematic of Reduction Technology dry grinding system with ethanol & toluene tanks; located at Perma-Fix.

Appendix D

LSV Processing Area Containment Calculations

Appendix D

LSV Processing Area Containment Calculations

~~Attachment~~ Appendix D

Containment Calculations for LSV Area 1

Crusher Room

GIVEN:

Base Area (a)	= ~~180,172~~ 1,620 ft^2
Curb Height (h)	= 5.5 in = 5.5 in/12 = 0.46
100% Volume of Largest Tank (LT)	= 350 ~~.350~~ gal test tank
100% Volume of All Tanks (TT)	= 550 gal (inc. 200 gallon ethanol fines west unit)
100% Volume of Largest Container (LC)	= 55 gal
100% Volume of All (10) Containers (TC)	= 550 gal
100% Volume All Tanks + All Containers (T)	= 1,100 gal
10% of Total Volume (TV = 10% x T)	= 110 gal
25 year/24 hour Stormwater Collected (SC)	= 0 gal (LSV Area is in a building)

CONTAINMENT CAPACITY AVAILABLE (CCA):

CCA = h x a x 7.48 gal/ft^3

= 0.46 x ~~180,172~~ 1,620 ft^2 x 7.48 gal/ft^3

= ~~619,936~~ 5,574 gal

VOLUME DISPLACED BY EQUIPMENT (VDP):

VDP = Equipment in this area is elevated; therefore, displacement is negligible = 0

NET AVAILABLE CONTAINMENT (NAC):

X = TV or ~~of~~ LT whichever is greater

NAC = CCA – (X + VDP + SC)

= ~~619,936~~ 5,574 gal – (350 gal + 0 gal + 0 gal)

= ~~619,586~~ 5,224 gal

CONCLUSION:

The net available containment volume exceeds the containment capacity needs; i.e., ~~619,586~~ 5,224 gallons of available containment is well over the volume of tank and container volumes.

~~Attachment~~ Appendix D (cont.)

Containment Calculations for LSV Area 2

Ethanol Room

GIVEN:

Base Area (a)	= ~~82,800~~ 750 ft^2
Curb Height (h)	= 5.5 in = 5.5 in/12 = 0.46
100% Volume of Largest Tank (LT)	= 100 gal
100% Volume of All Tanks (TT)	= 100 gal (toluene fines unit)
100% Volume of Largest Container (LC)	= 55 gal
100% Volume of All (2) Containers (TC)	= 110 gal
100% Volume All Tanks + Containers (T)	= 210 gal
10% of Total Volume (TV = 10% x T)	= 21 gal
25 year/24 hour Stormwater Collected (SC)	= 0 gal (LSV Area is in a building)

CONTAINMENT CAPACITY AVAILABLE (CCA):

CCA = h x a x 7.48 gal/ft^3

= 0.46 x ~~82,800~~ 750 x 7.48 gal/ft^3

= ~~284,898~~ 2,580 gal

VOLUME DISPLACED BY EQUIPMENT (VDP):

VDP = Equipment in this area is elevated; therefore, displacement is negligible = 0

NET AVAILABLE CONTAINMENT (NAC):

X = TV or ~~of~~ LT whichever is greater

NAC = CCA – (X + VDP + SC)

= ~~284,898~~ 2,580 gal – (100 gal + 0 gal + 0 gal)

= ~~284,798~~ 2,480 gal

CONCLUSION:

The net available containment volume exceeds the containment capacity needs; i.e., ~~284,798~~ 2,480 gallons of available containment is well over the volume of tank and container volumes.

Appendix D (cont.)

LSV Processing Area
Containment Calculations

Professional Engineer Certification

This is to certify that the containment calculations for this hazardous waste management unit have been reviewed by me and found to be true and accurate to the best of my knowledge.

Signature

George Harder
Name (please print or type)

47340
Florida Registration Number

Mailing Address: **1940 NW 67th Place**
Street or P.O. Box

Gainesville	**Florida**	**32653**
City	State	Zip Code

Date: **June 6, 1999** Telephone: **(352) 373-6066**

Affix Seal Below

APPLICATION FOR HAZARDOUS WASTE PERMIT

PART II

A1 GENERAL INFORMATION

A1a Site Information

1. Topographic map: See Figure I.B.3 in Part I of this application.
2. 100 - Year flood zone map: See Figure I.B.1 in Part I of this application.
3. Map orientation: See figure legends.
4. Access control: See Figure II.A.1.
5. There are no injection wells or withdrawal wells used by Perma-Fix of Florida and there are no injection or withdrawal wells within one mile of the Facility.
6. Building and other structures: See Figure II.A.2.
7. Contours: See Figure II.A.3.
8. Loading and unloading areas: See Figure II.A.2.
9. Drainage or flood control: See Figure II.A.4.
10. Hazardous waste units: See Figure II.A.5.
11. Runoff control system: See Figure II.A.4.

A1b Wind Rose

Five years of wind data selected to represent the Gainesville Regional Utilities Deerhaven Site were obtained from the National Weather Service station at the Gainesville Regional Airport. The Deerhaven site is approximately three miles east of the PFF Facility. The attached wind rose contains the most currently available data for Gainesville, Florida. Based on these data, the annual average wind speed is 6.3 mph. The wind direction during the 1985-1989 time period was variable. Approximately seven percent of the time the wind direction was from the east. Wind directions from the west, west-northwest, and northwest each occurred approximately six percent of the time. An annual wind rose for Gainesville for this time period is presented in Figure II.A.6, and quarterly wind roses are presented in Figure II.A.7.

A1c Traffic Patterns

Traffic pattern, traffic control and access patterns are identified in Figure II.A.8. The average truck traffic of incoming and outgoing waste is anticipated to be 5 trailers or tanker trucks per day. The road system and parking area have adequate load-bearing capacity to withstand the projected loads. The access route to the plant is from US441 to SR121 to NW 67th Place and then to Perma-Fix of Florida, Inc. (PFF). US441 and SR121 roadways are capable of truck traffic carrying in excess of 80,000 pounds. There are no weight restrictions on these roadways. The internal roadway (NW 67 Place) and PFF parking lot are asphalt paved and can withstand truck traffic without difficulty.

A2 FINANCIAL RESPONSIBILITY INFORMATION

A2a Closure Cost Estimate and Financial Liability Information

Financial responsibility information and the most recent closure cost estimate are included in the attached Closure Plan (see Section K). A copy of the financial mechanism used to establish financial assurance for closure of the facility and a copy of the facility liability coverage is attached (see Attachment II.A.1).

A3 FLOOD MAP

The PFF site is located outside of the 100-year flood plain. See Figure I.B.1 in Part I of this application.

A4 FACILITY SECURITY INFORMATION

A4a Description of Security

Then entire PFF facility is surrounded by a high quality six-foot chain linked fence topped with three strands of barbwire. The fence is in good condition and is periodically inspected. Entry into the facility is controlled by gate access. The entrance gates are closed at all time and only authorized personnel are allowed into the facility.

All facility visitors must enter through the main reception area located in the office building. See Figure II.A.1.

Warning Signs: Entrances to PFF loading, unloading, processing and storage areas are posted with appropriate signs signifying "Danger - Unauthorized Personnel Keep Out" and "No Smoking". These signs are visible and legible from a distance of at least 25 feet.

A4b Contingency Plan

A copy of the facility Contingency Plan is included as Attachment II.A.2.

A4c Description of Procedures, Structures or Equipment to Prevent Hazards, etc.

In the event of a power failure, all transfer pumps and treatment operations will stop. Automatic check valves prevent reversal of flow of waste in the LSV transfer lines. Operations in the container and tank storage areas and in the treatment areas are not rendered unsafe during a power failure. Nevertheless, potential hazards will be assessed by the Emergency Coordinator and facility personnel during power outages and once again upon restoration of power. Emergency exit signs and lighting are provided at critical locations throughout the facility and are powered by battery backup power units. A portable gas-powered electric generator is available for use, if necessary.

Containers of hazardous waste are unloaded from transport trucks into the staging and storage areas located in each of the three buildings where hazardous waste is managed. Special equipment such as forklift trucks and non-sparking tools will be used in the hazardous waste management areas. Forklift operators are instructed in proper and safe operation of the forklift and incident response procedures. See the Contingency Plan and Personnel Training Plan included as Attachment II.A.2 and II.A.3, respectively, for training and incident response details.

All persons entering hazardous waste management areas are required to wear protective clothing, which is appropriate for the activities to be conducted in those areas. Personal protective equipment (PPE) is selected and used according to the standards and guidelines promulgated by the Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH). The Contingency Plan contains a list of available PPE. Training in the use of PPE is covered by the Personnel Training Plan.

The Facility has been designed to prevent runoff from waste management areas onto other areas of the Facility or to the environment (e.g., ground water). Waste management areas are enclosed and/or have sufficient containment to prevent runoff of contaminated water. Rainwater is directed to the on-site retention pond or to a drainage ditch north of the facility. The 3,000 gallon mixed waste storage tank is located inside the Processing and Storage Building in a containment area which is capable of containing 150% of the entire contents of the tank. Curbs and/or storm drains prevent surface drainage from passing through the waste management areas. Adequate containment is also provided for the Perma-Fix® II process area which is located in a Quonset hut inside of the Treatment and Operations Building.

Avoiding the discharge of hazardous materials onto unprotected ground will prevent groundwater contamination. No drains are located within the waste management areas and no unauthorized materials are released to the sanitary sewer or to surface water runoff. PFF accounts for all hazardous wastes delivered to and removed from the Facility through a material accounting system. This includes a generator-specific numbering system to identify, at all times, the current status of each container of material received on-site. PFF tracks each container of material from time of receipt through final disposition. In addition, hazardous waste is stored and managed at the Facility in areas equipped with secondary containment to prevent releases to the surrounding environment. In the unlikely event of a spill on unprotected ground from a transportation incident, the procedures outlined in the Contingency Plan would provide for immediate control and removal of hazardous material spills.

All hazardous wastes received at the Facility are assumed to be ignitable and are managed accordingly. Appropriate precautions are taken to eliminate sources of ignition including open flames; smoking, cutting and welding hot surfaces, frictional heat and spark from in and around the container storage, tank storage and processing area. The facility is fenced for security and smoking is not allowed within the Facility.

The hazardous waste storage and treatment areas are operated in accordance with applicable National Fire Prevention Association (NFPA) standards. Other precautions against ignition include the following:

- All electrical systems and motors will be properly grounded and adequately rated for their intended use.
- Storage and treatment areas will be adequately ventilated.
- Special tools with low spark risk will be used for maintenance or repair work.

In the LSV processing and storage areas, additional safety features include:

- Electrical grounding for all key equipment including grinder/screw, sampling tanks, bulk storage tank, and ancillary equipment.
- Automatic fire suppression for the LSV process line.
- Overflow interlocks and alarms for the sampling tanks and bulk storage tank.
- Circuit overload and lockout mechanisms.
- Ventilation systems for the process and work areas that maintain negative pressure in these areas and filter the exhaust for particulate matter and organic vapors.
- Automatic LSV process line shutdown button.

In the Perma-Fix® II processing and storage areas, additional safety features include:

- Electrical grounding for all key equipment including the desorption unit, chemical oxidation unit, condenser, and ancillary equipment.
- Automatic fire suppression for the Perma-Fix® II process line.
- <u>Mechanical drum dumper for loading the Perma-Fix II reactor vessel.</u>
- Overflow interlocks and alarms for the process units.
- <u>Mechanical drum lifter and pneumatic guillotine valve for emptying the reactor vessel into drums.</u>
- Circuit overload and lockout mechanisms.

- Ventilation systems for the process and work areas that maintain negative pressure in these areas and filter the exhaust for particulate matter and organic vapors.

- Equipment pressure relief valves and conservation vents to prevent over pressurization.

- Automatic Perma-Fix® II process line shutdown button.

Additional details regarding safety equipment and procedures for these operations are provided in Sections II. A-C and II.I.

Undesirable, uncontrolled and dangerous reactions between incompatible wastes will be prevented by the early identification of potentially incompatible waste streams. Waste characterization and screening procedures are described in detail in the Facility Waste Analysis Plan (WAP) included as Attachment II.A.4. In addition, compatibility testing will be conducted on materials that are part of lab packs or that will be bulked with other waste streams. Compatibility testing procedures are also addressed in the WAP. These procedures include the mixing of samples of potentially incompatible wastes. The mixture(s) will be observed for temperature rise, evolution of gases and/or polymerization. Leaking or damaged containers of hazardous waste will be isolated from each other until the contents have been placed in new or overpack containers.

A4d Preparedness and Prevention Procedures

Design and Operation of Facility

The PFF treatment, storage and processing areas, and associated process equipment are designed, constructed, maintained and operated to minimize the possibility of a fire, explosion or any unplanned release of hazardous waste constituents to the air, soil, surface water or groundwater that could threaten human health or the environment. To facilitate effective responses to potential emergency situations, the following equipment and procedures are used at the Facility.

All hazardous waste to be treated with the Perma-Fix® II process will be assumed to be ignitable until proven otherwise. This waste will be separated and protected from sources of ignition or reaction such as open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electric, or mechanical), spontaneous ignition, and radiant heat. The Facility is fenced for security and smoking is not allowed within the Treatment and Operations Building where the Perma-Fix II process equipment is to be located. 50 feet will be considered a safe distance to store ignitable or reactive wastes away from an ignition source.

Potentially incompatible wastes, or incompatible wastes and materials will not be placed in the same container, tank or treatment equipment unless the wastes/materials are first tested in order to determine the necessary precautions to prevent reactions which:

1. Generate extreme heat or pressure, fire or explosions, or violent reactions;
2. Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;
3. Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion;
4. Damage the structural integrity of the container, tank or treatment equipment or the Facility; or
5. Through other like means threaten human health or the environment.

Incompatible wastes will be stored in separate containers in separate secondary containment areas. Separation will be maintained by the use of berms, dikes, or by placing containers of incompatible waste in separate buildings. Incompatible wastes will not be placed in the same container or tank.

Required Equipment

A computer system is used for management of important operations data. To minimize the potential for loss of information during power outages or computer system failure, key waste management information is also maintained in hard copy form. The following emergency or incident response equipment is maintained at the Facility:

- Internal telephone communication system capable of notifying all employees in the event of an emergency.

- External communications equipment to summon outside assistance, if necessary.

- Emergency equipment:

  - Fire fighting (automatic fire suppression system in LSV processing area, the Perma-Fix® II process line area, and strategically located fire extinguishers)
  - Spill clean-up (e.g., absorbent materials, booms, shovels, etc.)
  - Decontamination

- Water for fire control at an adequate volume and pressure to supply water hose streams, foam-producing equipment, or water spray systems. The water source for supplying water hose streams is the City of Gainesville.

Emergency equipment is listed in Table 1 below.

TABLE 1

EMERGENCY EQUIPMENT LIST

Item	Description/Capability	Location(s)
Telephone	Telephone communication for emergency notification	Waste areas, laboratory and other general locations
Fire Extinguishers	Dry chemical, CO_2, Halon extinguish fires	Waste areas, laboratory, tank and container storage areas administration area
Fire Hydrant	Fire hydrants-combat fire	Southwest corner of treatment and operations building
Absorbent Material	Vermiculite and absorbent material in spill kits-absorbs liquid spills	Waste treatment areas, container storage and tank storage areas
Respirators	Full face, half face/SCBA-Filter ambient air/supply compressed air	Waste treatment areas, laboratory
Eye Wash	Permanent installation and portable eye wash bottles-flush eyes	Waste treatment areas, laboratory
First Aid Kits	Bandaids, bandages-provide minor first aid	Change out area
Fork Lift, Bobcat	8,000 pound capacity, fossil fuel powered-assist in moving materials	Container storage areas
Automatic Fire Suppression	CO_2 dry system-control spread of fire or extinguish	LSV processing area, Perma-Fix II processing area

Access to Communication System

Access to the communication system is readily available from several locations in and around the Facility waste management areas. Additionally, a paging system allows for broadcasting of announcements at the Facility. To facilitate communications in the event of an emergency, activities are not conducted in treatment or process areas unless at least two employees are present. Operating personnel will carry two-way portable radios or will have ready access to the plant telephone or both. The plant telephone system is connected to outside telephone systems and will be used to notify local authorities in the event of an emergency. The local fire department is less than one mile from the Facility and is adequately equipped to respond in the event of a fire.

Testing and Maintenance of Equipment

An outside contractor routinely inspects facility fire suppression equipment. In addition, all emergency response equipment and supplies are tested and maintained by facility personnel to assure proper operation in time of emergency. The Contingency Plan lists the locations, number, and types of emergency equipment at the Facility, including fire extinguishers, fire suppression equipment, spill control equipment, emergency response personal protective equipment and decontamination equipment.

Required Aisle Space

Adequate aisle space will be maintained in all areas of the Facility to provide unobstructed movement of personnel, material handling machinery, fire suppression equipment, and spill control equipment. Pallets of containers or drums in storage areas that may be stacked up two high will be banded and situated so that at least two sides of each pallet is visible and accessible at all times. Pallets or drums are added and removed from the ends of rows by lift trucks. Minimum aisle space will be maintained as follows:

- Four (4) feet between rows of pallets to allow access for fire fighting, container inspection, and manual extraction of a leaking container from a pallet load.

- Eight (8) feet in appropriate locations to allow lift truck to move freely from one area of the building to another.

- Twelve (12) feet at the ends of the container rows to allow adequate room for lift trucks to maneuver for the purpose of depositing or retrieving a pallet or container.

Arrangements with Local Authorities

Arrangement have been made to familiarize local authorities, such as police, fire and emergency response departments with the:

- Layout of the Facility,
- Properties and associated hazards of the wastes managed on site,

- Places where Facility personnel would normally be working,
- Entrances to and roads inside the facility, and
- Possible evacuation routes.

This includes the opportunity for Facility inspections/visits by the local authorities. The opportunity for site inspections/visits will be repeated whenever there are relevant changes in Facility operations or on an annual basis. Arrangements with state and local emergency response authorities for assisting PFF (in the event that outside emergency response becomes necessary) are documented in the Facility Contingency Plan. See Attachment II.A.2 of the Facility permit application.

Copies of the current Facility Contingency Plan are provided to the local police and fire departments, the nearest major hospital and the local emergency response team (i.e., the fire department). Copies of each Contingency Plan update will be provided to each of the listed agencies.

A4e Personnel Training

The training programs used to prepare persons to operate or maintain the facility in a safe manner are addressed in the Personnel Training Plan included as Attachment II.A.3 to this permit application.

A5 CHEMICAL AND PHYSICAL ANALYSIS

The hazardous waste that is stored and treated at the Facility is generated by off-site and on-site sources. Off-site sources of hazardous waste may include, but are not limited to, RCRA treatment, storage or disposal (TSD) facilities; remediation sites; research institutions; government agencies; paint and coatings manufacturers and users; solvent users and other industries that generate hazardous wastes. The facility will also receive wastes from a variety of conditionally exempt and small quantity generators. In addition, waste collected during various county household hazardous waste collection campaigns will be managed at the facility. Hazardous waste generated by on-site sources consists primarily of treatment residues, spent personal protective equipment, laboratory wastes, including samples of hazardous waste taken for testing and analysis and, to a lesser extent, occasional small spill clean-up residues and soils.

The diverse nature of waste sources results in hazardous waste of variable chemical composition being stored and treated at the Facility. A list of wastes and waste constituents that may be accepted at the Facility is included as Attachment II.A.5. These materials are listed by the EPA waste numbers found in 40 CFR Part 261, Subparts C and D.

The physical composition of the hazardous waste managed at the facility is either liquid (pumpable) or solid (non-pumpable). The physical composition of hazardous waste generated off-site generally determines its mode of transportation to the facility. Typically, the hazardous waste that is used and stored at the facility can be characterized as follows:

- Organic liquids, including suspended solids, which are received from off-site in Department of Transportation (DOT) drums and other small containers.

- Sludges and solids, possibly containing free liquids, which are received from off-site by truck in drums and other containers meeting the requirement of the DOT.

- A variety of debris contaminated with hazardous constituents received in containers.

- Miscellaneous liquid and solid hazardous waste generated at the Facility as a result of waste treatment and miscellaneous management activities, such as clean-up materials, personal protective equipment and decontamination rinsate.

Liquid wastes generated on-site include cleaning solvents and residues. Solid wastes generated on-site include filter cleaning residues and used personal protective equipment (PPE).

All hazardous waste shipments determined to be unacceptable will be rejected. Rejected shipments will be returned to the generator or shipped to an alternate authorized TSD facility. Acceptance parameters are addressed in the Facility Waste Analysis Plan.

A6 WASTE ANALYSIS PLAN

The Waste Analysis Plan (WAP) has been developed as a stand-alone document and is included as Attachment II.A.4. The WAP establishes hazardous waste acceptance procedures, sampling methods, frequency of analyses, analytical techniques, and related quality control/quality assurance procedures that will be followed at the facility to ensure that sufficient information is available for proper storage and treatment of hazardous waste. The chemical and physical analytical parameters that define acceptable hazardous waste, along with the rationale for their selection, are presented in the WAP.

Also addressed in the WAP are the precautions used to prevent undesirable chemical reactions resulting from mixing of incompatible hazardous waste or from the inadvertent receipt of hazardous waste exhibiting undesirable chemical reactions.

Undesireable chemical reactions are listed in 40 CFR 264.17(b) as reactions that:

1. Generate extreme heat or pressure, fire or explosions, or violent reactions,
2. Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health and the environment,
3. Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions,
4. Damage the structural integrity of the facility, and
5. Through other like means, threaten human health and the environment.

A7 MANIFEST SYSTEM, RECORDKEEPING AND REPORTING

Required Notice

Before receiving a hazardous waste from a foreign source, PFF will notify the EPA Regional Administrator in writing at least four weeks in advance of the date the waste is expected to arrive at PFF. Notice of subsequent shipment of the same waste from the same foreign source is not required.

When entering into any agreement to receive any waste for processing from a generator, PFF will inform the generator in writing of PFF's permit status and the ability to accept the waste the generator will be shipping.

Prior to transferring ownership or operation of PFF, PFF will provide appropriate notification in writing to the proper authorities in accordance with 40 CFR Parts 264 and 270.

Use of Manifest System

PFF requires generators to provide a completed manifest for each shipment of hazardous waste. Manifests will be used in accordance with 40 CFR 264.71 and 264.72. In addition to the manifest number, PFF will assign an internal tracking number to each container and/or shipment received at the Facility for ease of identification.

If the Facility receives hazardous waste accompanied by a manifest, PFF will:

1. Sign and date each copy of the manifest to certify that the hazardous waste covered by the manifest was received;
2. Note any significant discrepancies in the manifest (as defined in 40 CFR 264.72(a)) on each copy of the manifest;
3. Immediately give the transporter at least one copy of the signed manifest;
4. Within 30 days after the delivery, send a copy of the manifest to the generator; and
5. Retain at the Facility a copy of each manifest for at least three years from the date of delivery.

Manifest Discrepancies

Upon discovering a significant discrepancy (as defined in 40 CFR 264.72(a)), PFF will attempt to reconcile the discrepancy with the waste generator or transporter (e.g., with telephone conversations). If the discrepancy is not resolved within 15 days after receiving the waste, PFF will immediately submit to the Florida Department of Environmental Protection a letter describing the discrepancy and attempts to reconcile it, and a copy of the manifest at issue.

Unmanifested Waste Report

If the Facility accepts for treatment, storage, or disposal any hazardous waste from an off-site source without an accompanying manifest, as described in 40 CFR 263.20(e)(2), and if the waste is not excluded from the manifest requirement by 40 CFR 261.5, then PFF will prepare and submit a single copy of a report to the Florida Department of Environmental Protection within fifteen days after receiving the waste.

Such report will be submitted on EPA form 8700-13B, be designated "Unmanifested Waste Report" and include the following information:

1. The EPA identification number, name and address of the Facility;
2. The date the Facility received the waste;
3. The EPA identification number, name, and address of the generator and the transporter, if available;
4. A description and the quantity of each unmanifested hazardous waste the Facility received;
5. The method of treatment, storage, or disposal for each hazardous waste;
6. The certification signed by the owner or operator of the Facility or his authorized representative; and
7. A brief explanation of why the waste was unmanifested, if known.

Operating Record/Biennial Report

Copies of the manifests and operating records will be maintained regarding each generator and records will be maintained at the Facility until the Facility is certified closed and the closure certification has been submitted to the appropriate state and/or federal authorities unless relieved of the responsibility by Florida Statutes. The Biennial Report of hazardous waste received and processed at the Facility will address the quantities of materials shipped to PFF. Copies of the Biennial Report will be submitted to the Florida Department of Environmental Protection by March 1 of each even numbered year.

The biennial report will be submitted on EPA form 8700-13B. The report will cover Facility activities during the previous calendar year and will include:

1. The EPA identification number, name, and address of the Facility;
2. The calendar year covered by the report;
3. For off-site facilities, the EPA identification number of each hazardous waste generator from which the facility received a hazardous waste during the year; for imported shipments, the report will provide the name and address of the foreign generator;
4. A description and the quantity of each hazardous waste the facility received during the year. For off-site facilities, this information will be listed by EPA identification number of each generator;
5. The method of treatment, storage, or disposal for each hazardous waste;
6. The most recent closure cost estimate under 40 CFR 264.142;
7. A description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated;
8. A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for the years prior to 1984; and

9. The certification signed by the owner or operator of the facility or his authorized representative.

The following reports will be maintained at the Facility:

- A description and the quantity of each hazardous waste received, and the method(s) and date(s) of its treatment and/or storage at the Facility, as required.
- The location of each hazardous waste within the Facility and the quantity at each location. This information will include cross-reference to specific manifest document numbers if the waste was accompanied by a manifest.
- Records and results of waste analysis performed.
- Summary reports and details of all incidents that require implementation of the Contingency Plan.
- Records and results of inspections for past three years.
- All closure cost estimates in accordance with 40 CFR 264, Subpart G.

PFF will also maintain the following records and provide copies to the FDEP.

- Waste minimization certification.
- Reports of releases, fire and explosions.
- Closure Plan and Closure Cost Estimate.
- Notices to the off-site generators in accordance with 40 CFR 264.12.
- Land disposal restriction notices received from off-site generators.

All operating records maintained on site pursuant to this permit application will be available to state and federal environmental regulatory personnel for inspection.

A8 FEDERAL ENVIRONMENTAL LEGISLATION

PFF is not subject to the Coastal Zone Management Act, Fish and Wildlife Coordination Act, the National Historic Preservation Act, and Wild and Scenic River Act. PFF is located within an Industrial Park in urban setting and to the best of our knowledge there are no endangered species or archeological or historical sites within the property. Supporting documentation from the Florida Department of State, Division of Historical Resources and the Florida Game and Fresh Water Fish Commission is included as Attachment II.A.6.

Attachment II.A.1

Financial Assurance Documentation

STATE OF FLORIDA
HAZARDOUS WASTE FACILITY INSURANCE CERTIFICATE TO DEMONSTRATE FINANCIAL ASSURANCE
FOR

☒ Closure ☐ Post-Closure ☐ Corrective Action
[Check Appropriate Box(es)]

The term "Required Action" as used in this document means closure, post-closure, or corrective action, or any combination of these, which is checked above.

Name and Address of Insurer (herein called the "Insurer"):
Steadfast Insurance Company
1400 American Lane, Schaumburg, IL 60196-1056

Name and Address of Insured(herein called the "Insured"):
Perma-Fix of Florida, Inc.
1940 Northwest 67th Place, Gainesville, FL 32653

Facilities Covered: List for each facility: The EPA/DEP Identification Number, name, address, and the amount of insurance for "Required Action". Indicate "Required Action" amounts separately (these amounts for all facilities covered must total the face amount shown below).

EPA/DEP I.D. No.	Name	Address
	Perma-Fix of Florida, Inc.	1940 NW 67th Place Gainesville, FL 32653
FL980711071	Perma-Fix of Florida, Inc.	2010 NW 67th Place Gainesville, FL 32653

$399,173.00 - Florida Dept. of Environmental Protection
$ 60,792.00 - Florida Dept. of Health and Rehabilitation Services

Face Amount: $459,965

Policy Number: PLC 82-48-584-00

Effective Date: August 2, 1995

The Insurer hereby certifies that it has issued to the Insured the policy of insurance identified above to provide financial assurance for Closure
Insert the "Required Action"
for the facilities identified above. The Insurer further warrants that such policy conforms in all respects with the requirements of 40 CFR 264.143(e), 264.145(e), 265.143(d), and 265.145(d), as adopted by reference in Section 62-730.180, Florida Administrative Code (F.A.C.), as applicable and as such regulations were constituted on the date shown immediately below. It is agreed that any provision of the policy inconsistent with such regulations is hereby amended to eliminate such inconsistency.

Whenever requested by the Secretary of the Florida Department of Environmental Protection (FDEP), the Insurer agrees to furnish to the FDEP Secretary a duplicate original of the policy listed above, including all endorsements thereon.

Attachment II.A.2

Contingency Plan

CONTINGENCY PLAN

PERMA-FIX OF FLORIDA, INC.
1940 NW 67TH PLACE
GAINESVILLE, FLORIDA 32653
(352) 373-6066

DEP/EPA ID#: FLD 980 711 071

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FIGURES

ATTACHMENTS

1.0 SCOPE AND OBJECTIVES

This Contingency Plan (hereafter referred to as "the Plan") describes an organized course of action to be taken by Facility personnel or outside organizations in response to possible hazardous waste emergencies at the Perma-Fix of Florida, Inc. facility (Facility). In addition, the Plan lists emergency equipment to be maintained on-site and designates the primary and alternate Emergency Coordinators. This plan is designed to fulfill the Resource Conservation and Recovery Act (RCRA) Subpart D requirements of 40 CFR Part 264.

The Plan is designed to be a stand-alone document that provides instructions and guidance for responding to Facility emergencies. The Facility was designed and will be operated in a manner to prevent spills, fires, and explosions. Personnel are trained to immediately implement and execute the Plan whenever there is an imminent or actual fire, explosion, or release of hazardous waste or hazardous waste constituents. Additionally, the Plan will be implemented in the event of natural disasters or bomb threats.

Updated copies of the Plan are posted within the Facility and maintained in the Facility operating record. Also, copies of the Plan have been supplied to the state and local agencies that may be called upon to assist in the event of an actual emergency at the Facility.

2.0 FACILITY OPERATIONS

Perma-Fix of Florida, Inc. (PFF) currently conducts a commercial waste bulking, storage and transfer facility operation at its Gainesville, Florida facility. Waste managed on-site includes a wide variety of hazardous, industrial, mixed and non-hazardous wastes. The Facility separately blends hazardous and mixed wastes into fuels for reuse (i.e., energy recovery) in permitted, off-site incinerators, industrial furnaces, etc. ~~to generate energy and power~~. The Facility also consolidates, repackages and sorts waste materials for shipment and off-site treatment and/or disposal.

Proposed activities at the Facility will include a variety of chemical and physical waste treatment activities. Specifically, PFF plans to receive, store and treat hazardous waste via thermal desorption, chemical and physical extraction (~~e.g.,~~ extraction methods include water washing, high pressure steam, blasting, grinding, spalling etc.), chemical oxidation, size reduction and separation techniques, microencapsulation and macroencapsulation.

A general description of the proposed treatment operations at the Facility include the Perma-Fix® (chemical stabilization) and Perma-Fix® II (thermal desorption/chemical oxidation) processes as well as treatment of hazardous debris in accordance with the alternative treatment standards specified in 40 CFR 268.45 (namely physical abrasion, chemical washing, and encapsulation). In addition, PFF is planning solvent recycling activities (distillation) which are exempt from RCRA permitting requirements. Complete details of these process may be found in Part II Section I of PFF's RCRA permit application.

Figure CP-1 is a Site Plan showing the locations of hazardous waste management areas at the Facility.

Liquid scintillation fluid (LSF) is an example of one waste stream received at PFF. LSFs are generally received in vials from off-site generators. The vials are crushed and the scintillation ~~fluid~~ fluid is captured and pumped into a 3,000-gallon aboveground storage tank located in the Processing and Storage Building (see Figure CP- 1). The scintillation fluid is then fuel blended and shipped off site for energy recovery. The broken vials are washed with an ~~in~~ ethanol solvent and disposed as a non-hazardous solid waste.

Size reduction prior to other treatment activities will also be conducted in the LSV Processing and Non-Hazardous Waste Storage Warehouse. Perma-Fix® and debris decontamination activities will be conducted in an empty storage bay in the proposed container storage area in the Treatment and Operations Building or in the Quonset Hut if VOC emissions controls are required. The Perma-Fix® II process, macroencapsulation, and solvent recycling activities will be carried out inside the Quonset hut located in the Treatment and Operations Building. Fuel blending (bulking and de-watering) operations are conducted in the Processing and Storage Building.

Used oil is stored in the LSV Processing and Non-Hazardous Waste Storage Warehouse (see Figure CP-1) in either 55-gallon drums or 250-gallon tote containers. The used oil is fuel blended. Spent fluorescent lamps destined for recycling, and various non-hazardous wastes are also stored in the LSV Processing and Non-Hazardous Waste Storage Warehouse.

Additional information regarding facility operations relevant to contingency plan implementation are addressed in the procedures noted below.

3.0 EMERGENCY COORDINATORS

This Plan identifies a primary Emergency Coordinator and alternate Emergency Coordinators as indicated in Attachment CP-1. The individuals identified are familiar with all aspects of PFF operations, trained in Contingency Plan implementation and are capable of making appropriate decisions under emergency circumstances. The primary and alternate Emergency Coordinators are authorized and have the ability to commit the resources of Perma-Fix Environmental Services, Inc. in order to implement the plan. The Emergency Coordinators have the authority to shut down and restart processing areas and evacuate plant personnel. An Emergency Coordinator will be able to reach the Facility in a short period of time, should it be necessary to respond after regular business ~~working~~ hours.

4.0 IMPLEMENTATION

The Plan will be implemented whenever an incident or emergency threatens or has the potential to threaten human health, the environment, and public or private property. Criteria for implementation of the Contingency Plan at the Facility includes the following scenarios and potential emergencies:

A. Fires and/or Explosions

- A large fire has been discovered and the fire is not extinguished using portable fire extinguishers
- Facility personnel have exhausted locally available fire extinguishers on a small fire and the ~~a~~ fire continues to burn or spread.
- A fire causes the release of toxic fumes affecting the surrounding area.
- ~~A fire could spread.~~
- Use of water or chemical fire suppressant could result in contaminated runoff.
- An imminent danger of an explosion exists.
- An explosion has occurred.

B. Spills or Releases

- A spill exceeds the size or seriousness that can be controlled and remediated by Facility personnel using portable equipment available in the immediate area of a spill or release.
- A spill or uncontrolled reaction has caused or could cause the release of hazardous waste or hazardous waste constituents to the air, surface water, or soil.

C. Natural Disasters

- A hurricane, tornado, or severe weather event is forecast for the immediate area of the facility.
- A hurricane, tornado, or severe weather event has occurred at the Facility.

D. Bomb Threat

- A bomb threat concerning the Facility is received by Facility personnel or by other persons who make the event known to Facility personnel.

The designated Emergency Coordinator will implement the Plan in the event of an imminent or actual emergency. The Emergency Coordinator will also provide coordinated assistance to the internal personnel and outside organizations responding to the emergency incident.

4.1 Emergency Response Procedures

4.1.1 Notification

Facility personnel will immediately notify the Emergency Coordinator by telephone or intercom when an actual or imminent emergency is identified ~~exists~~. If the emergency occurs after regular business hours, the Emergency Coordinator (or designated alternate) will be immediately notified using the telephone numbers listed in the Emergency Coordinator Contact List (Attachment CP-1).

The Gainesville Police and Fire Department can be summoned by telephone. All telephones in the Facility have outdial capability (dial "9" for outside line). Telephones are located inside each building containing hazardous waste management areas. Copies of the Contingency Plan and the Emergency Coordinator Contact List are posted in several heavy traffic areas inside the Facility, on the employee bulletin board, and beside the telephones near the waste management areas.

4.1.2 Identification of Hazardous Materials

As a precaution, all waste received at PFF is assumed to be ignitable and toxic. All smoke and fumes from fires and explosions will be assumed to be hazardous. The atmosphere around all spills will be assumed to be toxic and potentially reactive until determined to be otherwise. The Emergency Coordinator or his/her alternate will make an inspection of the material(s) involved in an incident and determine the next course of action.

Whenever there is a release, fire, or explosion, the Emergency Coordinator will (to the extent possible) immediately identify the character, source, amount, and aerial extent of any released materials. He may do this by visual observation, review of facility records, and (if necessary) by chemical analysis. Facility records available for review include manifests, operator records, truck placards, container labels, and waste analysis data on-site. The Emergency Coordinator may consider incident character (i.e., size of spill or type of incident) as well as weather conditions when coordinating response actions.

4.1.3 Hazard Assessment

As part of the Facility training program, facility personnel are trained to assess the potential emergencies for which they have the capacity to respond. Facility personnel will be trained to use locally available fire extinguishers and control equipment for minor spills. If more serious events are immediately recognized, or ~~the~~ local resources are exhausted, the Emergency Coordinator will be notified, and local authorities will be summoned for assistance. The Emergency Coordinator will provide information regarding ~~their expertise of~~ the materials (if known) and the Facility in advising the fire department as to when firefighting efforts should cease, and when defensive measures to prevent the spread of contamination should be initiated. The on-site fire or emergency response official shall have primary control and authority during an emergency situation at PFF.

The need for partial or full evacuations of the Facility and surrounding areas will be assessed by the Emergency Coordinator and outside emergency agency personnel.

Medical emergencies will be assessed by the affected employees' supervisor. Any employee who is injured to the extent where the injury cannot be remedied by simple first aid, will be treated by either the Facility's local medical provider, or a local emergency medical facility.

Bomb threats will be treated as actual emergency events ~~threats~~ until determined otherwise. The Gainesville Police Department will make further assessments and recommendations to the PFF Emergency Coordinator.

The Emergency Coordinator will have a variety of tools and equipment available to asses the extent and severity of an incident including:

- photo-ionization detector
- organic vapor analyzer
- colorimetric tubes
- wellpoints and groundwater sampling equipment
- gas chromatograph, mass spectrometer, and miscellaneous lab instruments

The Emergency Coordinator will assess the potential environmental effects of an incident using the following criteria:

- Potential effects of gases, vapors, and smoke.
- Potential effect of water run-off from fire control.
- Potential effect of fire fighting foams or chemicals.
- Potential effect on local surface water or groundwater.
- Potential effect on human and animal health or life; inside and outside the facility.

4.1.4 Control Procedures

4.1.4.1 Fire and Explosion

All Facility employees are trained in fire prevention and response. Employees are trained to respond to small fires with portable fire extinguishers. Structural, or large incipient fires will be responded to by the Gainesville Fire Department. Specific instructions for responding to a fire or explosion at PFF are contained in Attachment CP-2, Emergency Procedures for Fire and Explosion.

In the event of fire or explosion, the following actions will be immediately taken:

1. All work will cease and all non-essential personnel will be evacuated to the designated assembly area.

2. All valves and conveyance systems in the LSV processing area which lead to the 3,000-gallon aboveground storage tank, and those in the treatment area will be secured. All loading, processing, and unloading operations of the Perma-Fix, Perma-Fix® II system or other site operations in the affected area will be shut down.

3. The Emergency Coordinator and local authorities will be notified.

4.1.4.2 Minor Spills

Minor spills may occur during waste sampling, equipment maintenance, waste transfer, and treatment operations. Waste is managed throughout the Facility within secondary containment structures. Therefore, minor spills have minimal potential for off-site migration to the local environment. In most cases, these spills occur where adequate ventilation is present to dissipate any harmful vapors. These spills can generally be remediated using absorbent pads or materials.

4.1.4.3 Major Spills

Major spills may result from overturned containers or ruptures in the storage tank, containers, piping or ~~and~~ hoses. Secondary spill containment has been installed at hazardous waste treatment process areas and storage locations ~~all potential spill points~~ within the Facility.

~~The following step-action table summarizes those activities that should be taken immediately upon the discovery of a spill/release in any one of the Perma-Fix® II processing areas~~

Specific instructions for responding to a spill or unplanned release at PFF are contained in Attachment CP-3, Emergency Procedures for a Spill/Unplanned Release. Attachment CP-3 includes a step-action table which summarizes those activities that should be taken immediately upon the discovery of a spill or release in any one of the process areas (e.g., LSV processing, Perma-Fix®, Perma-Fix® II, or other treatment areas on site).

4.1.4.4 Natural Disasters

The most probable ~~likely~~ natural disasters to affect the Facility would be either a tornado or a hurricane. Warnings of approaching tornadoes and hurricanes will be received from the National Weather Service or local media. Given sufficient warning, the Facility will shut down all facility operations. All loose objects and projectile hazards will be secured, and personnel will seek shelter. If a severe weather event results in a fire, explosion or spill, control and containment efforts will begin as soon as weather conditions permit ~~improve~~. The Emergency Coordinator will activate the Contingency Plan in response to these conditions.

4.1.4.5 Bomb Threats

All bomb threats will be reported to the Emergency Coordinator or company officials and subsequently to the Gainesville Police and Fire Departments. The Facility will be evacuated and a bomb search may be conducted by law enforcement officials. The Facility will remain unoccupied until the law enforcement officials and Emergency Coordinator determine the threat no longer exists, and it is safe to return to the facility.

4.1.4.6 Power or Equipment Failure

In the event of a power failure, all transfer pumps and treatment operations will stop. Reversal of flow in the LSV transfer lines is prevented by existing automatic check valves. The container storage facilities and conveyors in the LSV area are not rendered unsafe during a power failure. Potential damage resulting from a loss of power will be surveyed by the Emergency Coordinator and facility personnel. ~~and~~ Equipment will be repaired immediately after power is restored or as soon as possible. If equipment is beyond repair, it will be properly disposed or managed as scrap. If power failure occurs during Perma-Fix process operations, the operator will remove mixing equipment from the container and will close the container. No run-away reactions will occur as a result of suspension of the Perma-Fix process. Equipment damage would not be anticipated as a result of a power outage.

In the event of a power failure, all operations in the Perma-Fix® II process line will be discontinued. The system is manually loaded and unloaded so backflow or unintended unloading of material will not occur. The process line (including the heating system) is equipped with an automatic shut-off that will not reactivate until the operator re-starts; (i.e., in the event of a power failure, the system will shut-down automatically so that inadvertent re-start will not occur when power is restored. Power failure will not be a factor for container treatment operations since these operations are manually operated. Therefore, in the event of a power failure, the process will be shut-down and all container(s) will be closed until safe processing can be resumed. No other facility operations are anticipated to potentially result in safety or damage problems if interrupted by a power outage.

Emergency exit signs and lighting are provided at critical locations throughout the facility and are supplied with battery-backup power units. The Facility is not equipped with automatic emergency backup generators. However, a portable gas-powered electric generator is located on site.

Equipment failure and malfunction will be recorded in the operating record. Maintenance personnel will check and repair malfunctioning equipment as needed. Equipment and instrument calibration will be performed as needed by qualified individuals to minimize the potential for equipment failure. The facility inspection schedule and inspection log sheets provide a mechanism for inspection of tanks and accessories and implementation of inspection procedures minimize the potential for equipment failure and potential releases to the environment. Most equipment failures would not result in any release of hazardous constituents to the environment. In addition, storage and treatment areas are provided with secondary containment systems designed to prevent migration of released materials to environmental media. In the event that equipment failure results in a release, the incident response procedures outlined in this CP are designed to address the most likely possible scenarios.

5.0 PREVENTION OF RECURRENCE OR SPREAD OF FIRES, EXPLOSIONS OR RELEASES

In the event of a fire, explosion or release, transfer pumps, electric motors, heating units, mixing equipment and other equipment items will be shut off to mitigate the possibility of recurrence. This is instituted by the Emergency Coordinator, as necessary. The storage tank is ~~tanks are~~ equipped with a high-level alarm system~~s~~ to prevent overfilling. The proper functioning of this system also will mitigate the possibility of a recurrent emergency situation. The automatic power shut-off system for the Perma-Fix® II process line will minimize the potential for recurrence of any fire, explosion or release.
Plant personnel will tour affected areas of the Facility on a two-hour schedule frequency, inspecting for possible recurrences of fire or material release until the "all clear" determination has been announced.

6.0 STORAGE AND TREATMENT OF RELEASED MATERIAL

If PFF halts operations in response to a fire, explosion or release, the Emergency Coordinator must monitor for potential leaks, pressure buildup, gas generation or ruptures in valves, pipes or other equipment, wherever appropriate.

Immediately after an emergency, the Emergency Coordinator must provide for the treatment, storage or disposal of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire or explosion at PFF. If the recovered material cannot be processed on-site, it will be characterized and disposed of properly in an approved off-site hazardous or non-hazardous waste management Facility, as applicable. Collected waste, contaminated soil/surface water, or other material resulting from release response will be designated a storage area (prior to treatment on-site or shipment off-site) based on the identity of the waste and conditions at the facility. In most cases, the material will be containerized and stored in container storage areas used for management of the original waste. If incident conditions preclude storage in standard storage areas, temporary areas will be designated in accordance with the requirements of 40 CFR 262.34. In some cases, liquid waste may be collected directly onto a tanker and shipped off-site for proper disposal.

7.0 EMERGENCY EQUIPMENT

A list of emergency equipment available on-site is provided ~~listed~~ in Attachment CP-5, Emergency Equipment List. Locations of the facility's emergency equipment is shown on CP-6, Emergency Equipment Locator Map. Available equipment includes fire extinguishers, portable ~~diaphragm~~ pumps, forklift, containers, shovels, brooms and absorbent.

The Emergency Coordinator will supervise ~~existing~~ Facility personnel in the clean-up and treatment of hazardous wastes after the emergency is mitigated. If an outside emergency response/cleanup contractor is required, the Emergency Coordinator will interface with the outside contractor to ensure proper response or cleanup in accordance with procedures in the contingency plan.

Corrosive materials will be neutralized in place, then absorbed and containerized. All others will be absorbed (if liquid) and containerized, followed by waste characterization, and (if necessary, analysis) analysis and shipment off-site for disposal. Large volumes of liquids may be pumped into containers or tanker trucks for appropriate management.

8.0 INCOMPATIBLE WASTE

The Emergency Coordinator will ensure that (in the affected area(s) of the Facility) all waste that may be incompatible with the released material is treated, stored or disposed of until clean-up procedures are completed. Depending on the situation, this may require isolation of certain classes of material on-site, or loading and shipping certain classes of material off site.

9.0 POST-EMERGENCY EQUIPMENT MAINTENANCE

All emergency equipment listed in Attachment CP-5 will be replenished or cleaned and inspected for integrity before operations are resumed. The FDEP (see Section 15) and the local response authorities will be notified when emergency equipment and supplies are replenished and operations resume.

After an incident, all emergency equipment listed in this Contingency Plan will be cleaned and fit for its intended use before operations are resumed (i.e., equipment used for emergency response will be decontaminated by steam cleaning, water washing or other appropriate method, used fire extinguishers re-charged, depleted supplies restocked, etc.). Appropriate decontamination methods will be chosen based on manufacturers recommendation and/or the type/quantity of contamination present. Disposable equipment will be properly managed and decontamination residues will be managed in accordance with 40 CFR 262.34.

10. CONTAINER SPILL AND LEAKAGE

Leaking containers will be overpacked into non-leaking secondary containers until processed; or the material in the leaking container will be transferred into another appropriate DOT container. No attempt will be made to repair leaking containers. Waste which leaked from the container will be absorbed and managed and disposed as hazardous waste.

The Perma-Fix process will be conducted in an area equipped with secondary containment and debris treatment as well as container treatment activities will be conducted within secondary containment. Spills will be managed in the same manner as tank releases discussed above. Incidental spills will be removed from containment upon detection. Containment areas are subject to routine inspections in order to facilitate the detection and timely response to leaking containers or accumulated liquids.

11.0 TANK SPILLS AND LEAKAGE

The bulk storage tank at the Facility is located within secondary containment. Spills will be absorbed and managed as hazardous waste for proper disposal. If the tank itself develops a leak, the remaining waste will be pumped from the tank into containers, or directly into a tanker truck.

The tank will then be assessed by a Florida registered professional engineer and either repaired or closed in accordance with the approved closure plan contained in the Facility's Part B permit.

The Perma-Fix® II system is also equipped with secondary containment. Spills will be managed in the same manner as tank releases discussed above. Incidental spills will be removed in a timely manner. Additionally, these areas are subject to routine inspections in order to facilitate the detection and timely response to leaking containers or accumulated liquids.

12.0 COORDINATION AGREEMENTS

Arrangements have been made with the following state and local authorities to provide emergency assistance to the facility:

NAME OF ORGANIZATION	FUNCTION
• City of Gainesville Fire and Rescue Department	• Respond to fires, explosions, spills or releases
• City of Gainesville Police Department	• Primary responder for plant security & traffic control
• Alachua County Sheriff's Office	• Secondary responder for plant security & traffic control
• North Florida Regional Medical Center	• Emergency medical treatment
• State of Florida DEP Emergency Response Unit	• Assist in emergency response coordination efforts

Coordination agreements are intended to document each emergency response organization's ability and willingness to assist the PFF facility in the event of an emergency incident.

Complete copies of the current Plan have been sent to the local police and fire departments, nearby hospital, emergency response contractor, and state and local emergency response teams to familiarize them with the facility and those actions needed in case of an emergency. Documentation indicating that a copy of the plan has been submitted to these organizations is maintained in the Facility Operating Record. Also, documentation of each organization's acceptance or refusal to enter into a coordination agreement is maintained in the Facility operating record. Example copies of these documents are provided as Attachments CP-9 and CP-10 respectively.

Whenever the Plan is amended, copies of the amendments will be provided to these organizations. The invitation for site inspections will be offered whenever there are significant changes to PFF operations, or annually.

13.0 *COORDINATION OF EMERGENCY SERVICES

This section of the contingency plan identifies outside organizations that are available for emergency response services. Written agreements with these organizations are maintained in the

Facility Operating Record. These service agencies and organizations are to be summoned only by the PFF Emergency Coordinator or his/her alternate.

The following table summarizes those notifications and actions that should be undertaken in response to emergency situations that could arise at the Facility.

IN CASE OF A	THEN NOTIFY	SIMULTANEOUS ACTIONS
• Fire or Explosion	Gainesville Fire Department & Rescue Call 911, or (352) 334-2586	• Evacuate Facility employees to assembly location • Take attendance for missing persons • Emergency Coordinator assists ranking Fire official
• Release of harmful or toxic gases or fumes	Gainesville Fire Department & Rescue Call 911, or (352) 334-2586	• Evacuate facility employees to upwind assembly location • Take attendance for missing persons • Emergency Coordinator assists ranking Fire official
• Spill or release of hazardous materials or hazardous wastes	Local Hazardous Materials Response Team (Gainesville Fire Department) Call 911, or (352) 334-2586 OR Florida DEP Emergency Response Section (904) 448-4320 (24 hours)	• Evacuate facility employees to Assembly Location (as required) • Take attendance for missing persons (if required) • Emergency Coordinator(s) evaluate the situation and potential hazards • Either coordinate in-house spill response (minor spills) or contact outside responders major spills).
• Bomb threat or unauthorized trespass	Gainesville Police Department Call 911, or (352) 334-2401 OR Alachua County Sheriff's Office Call (352) 955-2660	BOMB THREAT • Evacuate Facility employees to assembly location • Take attendance for missing persons • Emergency Coordinator assists ranking police official TRESPASS • Emergency Coordinator & Operations Personnel check for tampering, theft, etc. • Resecure facility
* Written reports and additional agency notifications may be required beyond those emergency notifications listed above (e.g., RQ report, or hazardous waste tank release, etc.).		

14.0 EVACUATION PLAN

Potential emergencies requiring evacuation from hazardous waste management areas are primarily fire hazards and the potentially associated release of toxic, irritating or asphyxiating gas/fumes or bomb threat. In either case, PFF employees will execute the ~~following~~ procedures listed below.

All employees are trained in evacuation procedures. Periodic evacuation drills are conducted to familiarize facility personnel of the primary and secondary evacuation routes and assembly locations throughout the facility. Evacuation routes are shown on Attachment CP-7, Emergency Evacuation Route Map.

Criteria for implementation of the PFF evacuation plan include the following scenarios and potential emergency situations:

- Fire and Explosion

  All Facility employees are trained in PFF's evacuation plan procedures in the event of a fire or explosion. Employees are instructed to evacuate the facility using either primary or alternate emergency evacuation routes, as instructed. Employees shall remain at the assembly location until clearance has been given by the ranking fire official and Emergency Coordinator, unless conditions warrant an off-site evacuation.

- Release of Toxic, Irritating or Asphyxiating Gases or Fumes

  A remote possibility exists for the release of gases or fumes which may cause toxic, irritating or asphyxiating effects on Facility employees. Employees are instructed to evacuate the Facility and proceed to the designated assembly point for attendance counts. If the primary evacuation routes and assembly point are unusable due to encroaching gases or fumes, employees shall use the secondary evacuation routes and assembly point, depending on wind direction or dispersal of fumes or gases. Employees shall remain at the assembly location until clearance has been given by either the Emergency Coordinator or ranking emergency official, unless conditions warrant an off-site evacuation.

- Bomb Threat

  If a bomb threat is received by the Facility, all employees are instructed to evacuate the PFF Facility via either primary or secondary evacuation routes, as instructed. All employees will evacuate and proceed to either the primary or secondary assembly area as instructed for an attendance count. Employees shall remain at the assembly location until clearance has been given by the ranking police official and the Emergency Coordinator.

Procedure

- Signals: An internal announcement is broadcasted using the telephone public address system.

- All personnel and employees are instructed to evacuate the Facility through the front door or closest exit, excluding those near the LSV processing area, as directed by the Emergency Coordinator.

- Primary evacuation routes have been established and are depicted on Attachment CP-7, Emergency Evacuation Route Map. Additionally, secondary evacuation routes have been established in order to provide employees with an alternate route to the assembly location so that an attendance count may be taken. Secondary routes are utilized in the event that primary routes are unusable due to fire, heat, smoke, fumes or asphyxiating gases. Attachment CP-8 illustrates the areas where potential facility hazard locations could exist.

- Evacuation Route Maps are posted at strategic locations throughout the Facility in order to guide employees to assembly locations by illustrating the established primary and secondary evacuation routes.

- Upon complete evacuation of the Facility, all employees will immediately assemble in the parking lot adjacent to the east side entrance (or alternate assembly location) as directed by the Emergency Coordinator. In the event that toxic or irritating gases are generated, the Emergency Coordinator shall direct further evacuation from the area to a safe upwind location. Authorized emergency response personnel remaining in the area will be required to don appropriate personal protective equipment.

- The first person arriving at the assembly point will take attendance and report this information to the responding Fire and Police departments. Outside agencies will receive copies of the plan and will be aware of the assembly point location(s).

- All employees will remain at the assembly point location until instructed otherwise by the Emergency Coordinator or outside agencies.

- The Emergency Coordinator will advise the appropriate responding agencies if there is a need for the evacuation of the surrounding area.

15.0 REQUIRED REPORTS

The time, date and details of any incident that requires implementation of the Plan will be documented in the facility operating log. Within 15 days after an incident, a written report will be submitted to the Florida Department of Environmental Protection. The report will include:

(1) Name, address and telephone number of the owner or operator;

(2) Name, address and telephone number of PFF;

(3) Date, time and nature of incident (e.g., fire, explosion);

(4) Name and quantity of material(s) involved;

(5) The extent of injuries, if any;

(6) An assessment of actual or potential hazards to human health or impacts to the environment, where applicable; and

(7) Estimated quantity and disposition of recovered material that resulted from the incident.

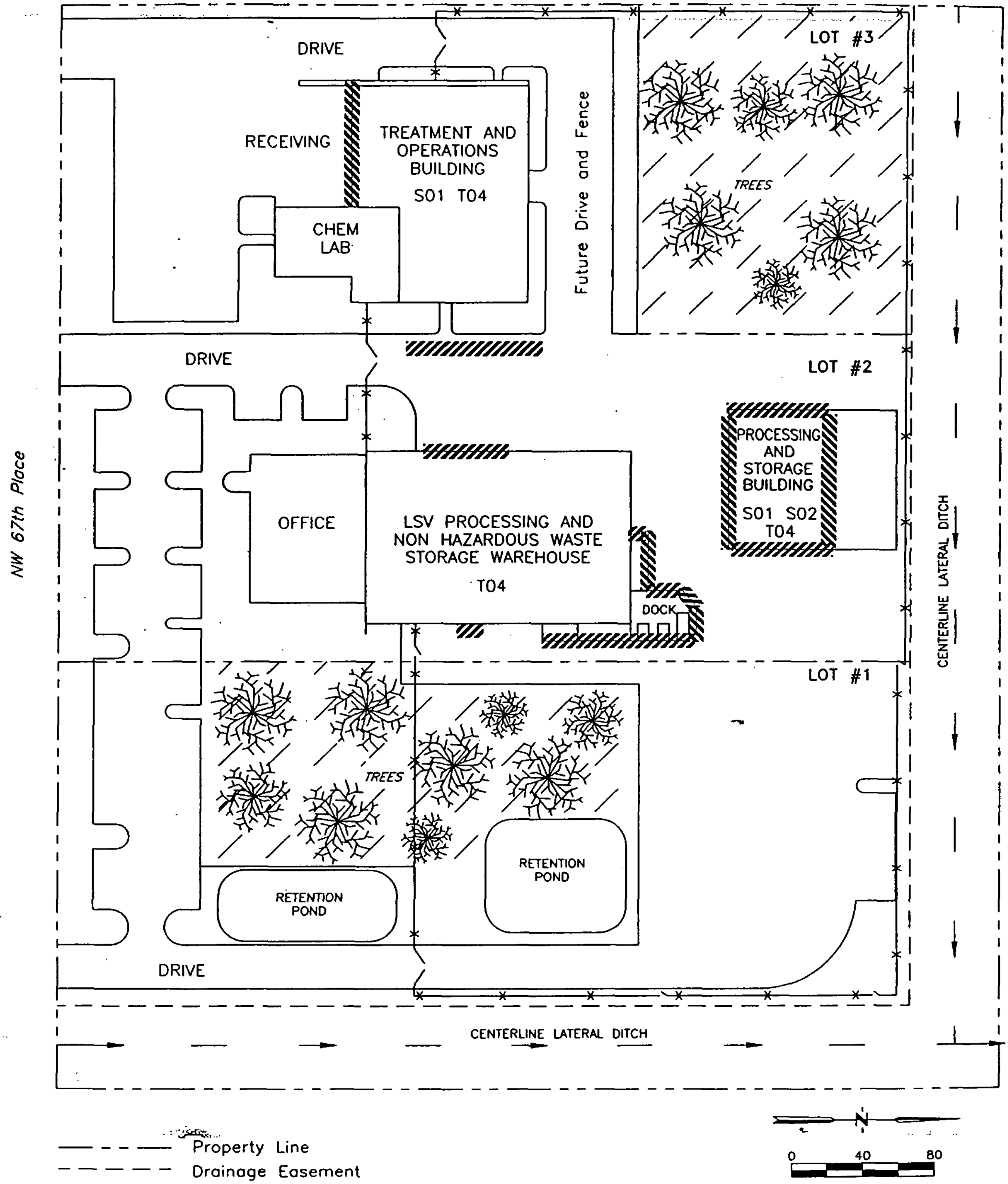
After an incident that requires implementation of the Contingency plan [in accordance with the requirements of 40 CFR 264.70(i)], PFF will notify the Florida Department of Environmental Protection and appropriate local authorities that the facility is in compliance with the requirements of 40 CFR 264.70(h) prior to resumption of operations in the affected portions of the facility.

The Plan will be reviewed and immediately amended, if necessary, whenever:

- The Plan fails in an emergency.
- The list of emergency equipment changes.
- Changes occur in the Facility's design, construction, operating, maintenance, or other circumstances which materially increase the potential for fires, explosions, or releases of hazardous waste.
- The list of Emergency Coordinators changes.
- The Facility permit is revised.

FIGURE CP-1

SITE PLAN



Property Line
Drainage Easement
Loading Areas

S01 Hazardous Waste Container Storage
S02 Hazardous Waste Tank Storage
T04 Treatment Area

TITLE: FIGURE CP-1
Site Plan

PREPARED FOR: PERMA-FIX OF FLORIDA, INC.
1940 NW 67th Place Gainesville, FL 32653

PERMA-FIX ENVIRONMENTAL SERVICES

SCALE: 1=80	APPROVED BY:	DRAWN: SYA
DATE: 6/17/98		REVISED: 5/20/98
PROJECT NUMBER: PFIFLA 970343		DRAWING NUMBER: CPFIG1

Attachment CP-1

Emergency Coordinators

ATTACHMENT CP-1
EMERGENCY COORDINATORS

Primary Emergency Coordinator

Name:	**Raymond Whittle**
Position/Title:	Facility Manager
Home Address:	Route 2, Box 1763, Starke, Florida 32091
Work Telephone Number:	(352) 395-1353/373-6066
Home Telephone Number:	(904) 964-7475
Pager Number:	(352) 334-5473
Mobile Phone	(904) 966-7322

Alternate Emergency Coordinators

Name:	**Steve Douglas**
Position/Title:	Regulatory Affairs Manager
Home Address:	3560 NW 34th Place, Gainesville, Florida 32609
Work Telephone Number:	(352) 395-1356/373-6066
Home Telephone Number:	(352) 374-9181
Pager Number	(352) 334-5476
Mobile Phone	(352) 215-3267

Name:	**Dwayne Singleton**
Position/Title:	Site Coordinator
Home Address:	4138 NW 48th Place, Gainesville, Florida 32606
Work Telephone Number:	(352) 395-1362/373-6066
Home Telephone Number:	(352) 376-9624
Pager Number	(352) 334-5475

Name:	**Andy Owens**
Position/Title:	Site Coordinator
Home Address:	246 13th Street, Interlachen, Florida 32148
Work Telephone Number:	(352) 395-1357/373-6066
Home Telephone Number:	(904) 684-2520
Pager Number	(352) 334-5474

Revised ~~May~~ November, 1998

Attachment CP-2

Emergency Procedures for Fire and Explosion

ATTACHMENT CP-2
EMERGENCY PROCEDURES FOR FIRE AND EXPLOSION

Initial Response

- Assess the extent and magnitude of the event
- No entry into any area that would jeopardize the safety of an employee will be allowed.
- Sound alarm using the intercom and by word of mouth. If after hours, contact the Emergency Coordinator using the phone numbers in CP-1 (Emergency Coordinator Contact List).
- FOLLOW THE SPECIFIC INSTRUCTIONS OF THE EMERGENCY COORDINATOR, including evacuation of the Facility and surrounding areas.

Fire Fighting Procedures

- Begin using the nearest available portable fire extinguisher.
- Stop the flow of ignitable and/or reactive material, if possible.
- Second person on scene should go for one or more additional portable fire extinguishers.

Sustained Response

- Use proper personal protective equipment.
- Use available monitoring equipment to assess safety of area.
- Be alert for wind shifts or other weather changes.

Fire Department Guidance

- The Emergency Coordinator will provide the Fire Department with guidance on the location of ignitable, corrosive, reactive and toxic material in the Facility.
- Due to the potential for ~~additional contamination~~ contaminant runoff, use only as much water as absolutely necessary.
- Allow only emergency vehicles into the Facility during the emergency.

ATTACHMENT CP-2 (continued)

Containment and Cleanup

- Contain any spilled material or contaminated water using absorbent or booms.
- Pump free liquids into containers or a tank truck
- Collect all contaminated absorbent and place in closed and labeled containers.
- If directed by the Emergency Coordinator ~~facility Radiation Safety Office~~r, survey all affected areas and materials for radiation.

Emergency Terminated

- Begin equipment and area cleanup.
- Complete a written description of the event while details are still fresh.

The following actions should be taken immediately upon discovery of a fire anywhere within the facility's processing areas.

<table>
<tr><th>STEP</th><th>ACTION</th></tr>
<tr><td>1</td><td>Sound alarm and quickly evaluate the extent of the emergency. The alarm should alert the Emergency Coordinator.

If after hours, contact Emergency Coordinate using phone numbers in CP-1 posted by phone.</td></tr>
<tr><td>2</td><td>If the situation allows it, actuate the kill switch to disconnect the power to all process equipment. This should stop the flow of potentially ignitable and/or reactive materials. Lights should remain on inside the process area.</td></tr>
<tr><td>3</td><td>Follow the specific instructions of the Emergency Coordinator who will direct any internal efforts to contain, control or extinguish the fire, if the Emergency Coordinator is present.</td></tr>
<tr><td>4</td><td>If Emergency Coordinator is not present, attempt to contain the fire as follows, otherwise Emergency Coordinator will conduct evaluation:

<table>
<tr><th>If the fire is a...</th><th colspan="2">Then respond by following these steps...</th></tr>
<tr><td rowspan="3">Large fire (i.e., it cannot be extinguished without outside assistance)</td><td>a</td><td>Call the Fire Department – 911</td></tr>
<tr><td>b</td><td>The Emergency Coordinator should contact the following as necessary:
• Gainesville Police Department 911
• Gainesville Fire Department & Rescue (352) 334-2586</td></tr>
<tr><td>c</td><td>Evacuate the affected area to the designated evacuation assembly area.</td></tr>
</table>
</td></tr>
</table>

ATTACHMENT CP-2 (continued)

		d	If the situation allows it, prevent the spread of fire beyond the immediate area using fire extinguishers until outside assistance arrives.
		e	Follow directions given by ranking fire official.
		f	If hazardous materials are involved in the fire, provide the MSDS or chemical information for the materials to the Fire Department.
		g	After the fire is extinguished, the Emergency Coordinator should evaluate the situation and determine whether an emergency response contractor is needed for environmental cleanup.
		h	Resume operations only after the fire department and Emergency Coordinator have made a full inspection and have determined that the area is fit for restarting operations.
		i	Make proper notifications and prepare a written report regarding the incident.
	Small isolated fire (i.e., one that can be extinguished without outside assistance)	a	Attempt to use fire extinguishers to control the fire.
		b	Use dry chemical, foam or CO, fire extinguishers for fighting fires. Do not use water on electrical fire or liquid fires. • Class C extinguishers: For use on electrical fires • Class B extinguishers: For use on flammable liquid fires.
		c	Direct the stream from the extinguisher at the base of the fire from upwind and the sides. Do not stand downgradient of the fire.
		d	If efforts to extinguish the fire are not immediately effective, the Emergency Coordinator should contact the following as necessary: • Gainesville Police Department 911 • Gainesville Fire Department & Rescue (352) 334-2586
		e	After the fire is extinguished, the Emergency Coordinator must conduct an inspection before resuming operations.
		f	Prepare a fire report.
5	Refer to Attachment CP-4 for reporting requirements (if applicable).		
6	If incident required implementation of the Contingency Plan, then notify the Florida DEP that the Facility is in compliance with 40 CFR 264.70(h) before operations are resumed in affected areas of the facility.		

ATTACHMENT CP-2 (continued)

EMERGENCY RESPONSE PROCEDURE
RESPONSE TO FIRES

The following actions should be taken immediately upon discovery of a fire anywhere in the Perma-Fix® II processing area.

STEP	ACTION		
1	Sound alarm and quickly evaluate the extent of the emergency. The alarm should alert the Emergency Coordinator. If after hours, contact Emergency Coordinator using phone numbers in CP-1 posted by phone.		
2	If the situation allows it, actuate the kill switch to disconnect the power. This should stop the flow of ignitable and/or reactive materials. Lights should remain on inside the Quonset Hut.		
3	Follow the specific instructions of the Emergency Coordinator who will direct any internal efforts to contain, control or extinguish the fire, if the Emergency Coordinator is present.		
4	If Emergency Coordinator is not present, attempt to contain the fire as follows, otherwise Emergency Coordinator will conduct evaluation:		
	If the fire is a ...	Then respond by following these steps ...	
	Large fire (i.e., it cannot be extinguished without outside assistance.)	a	Call the Fire Department – 911
		b	The Emergency Coordinator should contact the following as necessary: • Gainesville Police Department: 911 • Gainesville Fire Department & Rescue (352)334-2586
		c	Evacuate the affected area to the designated evacuation assembly area.
		d	If the situation allows it, prevent the spread of fire beyond the Quonset Hut using fire extinguishers until outside assistance arrives.
		e	Follow directions given by ranking fire official.

ATTACHMENT CP-2 (continued)

		f	If hazardous materials are involved in the fire, provide and MSDS or chemical information for the materials to the Fire Department.
		g	After fire is extinguished, the Emergency Coordinator should evaluate the situation and determine whether an emergency response contractor is needed for environmental cleanup.
		h	Resume operations only after the Fire Department and Emergency Coordinator have made a full inspection and have determined that the area is fit for restarting operations.
		i	Prepare a written report regarding the incident.
	Small isolated fire (i.e., one that can be extinguished without outside assistance.)	a	Attempt to use fire extinguishers to control the fire.
		b	Use dry chemical, foam or CO_2 fire extinguishers for fighting fires. Do not use water on electrical fire or liquid fires. • Class C extinguishers: For use on electrical fires • Class B extinguishers: For use on flammable liquid fires.
		c	Direct the stream from the extinguisher at the base of the fire from upwind and the sides. Do not stand downwind of the fire.
		d	If efforts to extinguish the fire are not immediately effective, the emergency coordinator should contact the following as necessary: • Gainesville Police Department: 911 • Gainesville Fire Department & Rescue (352)334-2586
		e	After the fire is extinguished, the Emergency coordinator must conduct an inspection before resuming operations.
		f	Prepare a fire report.
5	Refer to Attachment CP-4 for reporting requirements (if applicable).		
6	If incident required implementation of the Contingency Plan, then notify the FDEP that the Facility is in compliance with 40 CFR 264.70 (h) before operations are resumed in affected areas of the facility.		

Attachment CP-3

Emergency Response Procedures for Spill/Unplanned Release

ATTACHMENT CP-3
EMERGENCY RESPONSE PROCEDURES FOR SPILL/UNPLANNED RELEASE

Minor spills may occur during sampling, equipment maintenance, transfer, and treatment operations. In most cases, these spills will occur where adequate ventilation is present to dissipate any harmful vapors. These spills can generally be remediated using pads and absorbent materials.

Major spills may result from overturned containers or ruptures in storage tanks, containers, piping and hoses. Secondary spill containment has been installed at hazardous waste process and storage areas ~~all potential facility spill points~~. The following actions will be taken in the event of a major spill:

Initial Response

- Assess the extent and magnitude of the event.
- No entry into any area that would jeopardize the safety of an employee will be allowed.
- Sound alarm using the intercom and by word of mouth. If after hours, contact the Emergency Coordinator using the phone numbers in CP-1 (Emergency Coordinator Contact List).
- FOLLOW THE SPECIFIC INSTRUCTIONS OF THE EMERGENCY COORDINATOR, including evacuation of the facility and surrounding areas.
- If it is safe to do so, stop the flow of the released material by closing valves, shutting off pumps, or rotating ruptured containers.
- All loading and transfer activities are to be ceased.

Spill Control Procedure

- Close all stormwater effluent gates.
- Contain the spill as much as possible using the following equipment:

1. Absorbent booms
   Use these in tandem (one placed a few inches behind the other) to help control the flow of the material.

   Absorbent booms should be used on any surface water that could be contaminated.

2. Use other absorbent materials
   Use a commercial absorbent to soak up spills.

   Empty 55-gallon drums can be turned on their sides and rolled to create an "instant" dike.

ATTACHMENT CP-3 (continued)

3. Use mechanical means (where applicable)
   Ditch with Shovels.

   Ditch with front end loader.

Sustained Response

- Use on-site monitoring equipment to determine safety of area.
- If there is a need for outside help, the Emergency Coordinator will contact the appropriate agency.
- Pump free liquids into containers, drums, or tanker truck.
- Collect all contaminated absorbent and place in closed and labeled containers.
- If directed by the Emergency Coordinator ~~Facility Radiation Safety Officer~~, survey all affected areas and materials for radiation.

Emergency Terminated

- Begin equipment and area clean-up.
- Complete a written description of the event while details are still fresh.

The following actions should be taken immediately upon discovery of a spill or release of hazardous materials within the facility:

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Communicate the spill event to others.</td></tr>
<tr><td>2</td><td>Assess the extent and magnitude and source of the event.</td></tr>
<tr><td>3</td><td>Shut down processing operations, if necessary.</td></tr>
<tr><td>4</td><td>Assess immediate health and safety concerns. Evacuate area if necessary.</td></tr>
<tr><td>5</td><td>Attempt to remediate the spill/release as follows:
<table>
<tr><th>If spill is a...</th><th colspan="2">Then respond ~~response~~ by following these steps...</th></tr>
<tr><td rowspan="2">Minor spill (may occur during sampling, equipment maintenance...)</td><td>a</td><td>Remediate using pads and absorbent materials.</td></tr>
<tr><td>b</td><td>Collect all contaminated absorbent and place in closed and labeled container.</td></tr>
<tr><td>Major spill (may result from</td><td>a</td><td>Deny entry into any area that would jeopardize the safety of an employee.</td></tr>
</table></td></tr>
</table>

ATTACHMENT CP-3 (continued)

	overturned containers or ruptures in storage tanks, containers, piping and hoses.)	b	Sound alarm. The alarm should alert the Emergency Coordinator. If after hours, contact Emergency Coordinator using phone number in Attachment CP-1.
		c	Follow the specific instructions of the Emergency Coordinator, including evacuation of the area <u>(if required)</u>.
		d	If it is safe to do so, stop the flow of the released material by closing valves, shutting off pumps, or rotating <u>or "overpacking"</u> ruptured containers.
		e	All loading and transfer activities <u>in the area</u> are to be ceased.
		f	Contain the spill as much as possible using the following equipment: - **Absorbent booms**: Use these in tandem (one place a few inches behind the other) to help control the flow of the material. - **Use other absorbent materials**: Use a commercial absorbent to soak up spills. - **Empty 55-gallon drums** can be turned on their sides and rolled to create an "instant" dike. - **Use mechanical means**: Ditch and shovels<u>, if applicable</u>.
		g	If there is a need for outside help, the Emergency Coordinator will contact the appropriate local authority, agency or remediation contractor.
		h	Pump free liquids into containers or drums <u>or tanker trucks</u>.
		i	Collect all contaminated absorbent and place in closed and labeled containers.
		j	If directed by the Facility Radiation Safety Officer, survey all affected areas and materials for radiation.
		k	Begin equipment and area clean-up.
		l	Complete a written description of the event while details are still fresh.
6	Notify local, state and/or federal agencies listed in Attachment CP-1, as appropriate.		

ATTACHMENT CP-3 (continued)

The following actions should be taken immediately upon the discovery of a spill/release in the Perma-Fix® II processing area.

STEP	ACTION		
1	Assess the extent and magnitude of the event.		
2	Attempt to remediate the spill/release as follows:		
	If spill is a ...	Then respond by following these steps...	
	Minor spill (may occur during sampling, equipment maintenance,...)	a	Remediate using pads and absorbent materials.
		b	Collect all contaminated absorbent and place in closed and labeled container.
	Major spill (may result from overturned containers or ruptures in storage tanks, containers, piping and hoses.)	a	No entry into any area that would jeopardize the safety of an employee will be allowed.
		b	Sound alarm. The alarm should alert the Emergency Coordinator. If after hours, contact Emergency Coordinator using phone number in CP-1 posted by phone.
		c	Follow the specific instructions of the Emergency Coordinator, including evacuation of the area, if required.
		d	If it is safe to do so, stop the flow of the released material by closing valves, shutting off pumps, or rotating ruptured containers, or other appropriate means.
		e	All loading and transfer activities are to be ceased.
		f	Contain the spill as much as possible using the following equipment:
			• **Absorbent booms**: Use these in tandem (one place a few inches behind the other) to help control the flow of the material. • **Use other absorbent materials**: Use a commercial absorbent to soak up spills. • **Empty 55-gallon drums** can be turned on their sides and rolled to create and "instant" dike.

ATTACHMENT CP-3 (continued)

		g	If there is a need for outside help, the Emergency Coordinator will contact the appropriate agency.
		h	Pump free liquids into containers or drums. Plug or overpack leaking containers.
		i	Collect all contaminated absorbent and place in closed and labeled containers.
		j	If directed by the Facility Radiation Safety Officer, survey all affected areas and materials for radiation.
		k	Begin equipment and area clean-up.
		l	Arrange for proper management of remediation waste.
		m	Complete a written description of the event while details are still fresh.
		n	Refer to Attachment CP-4 to complete reporting requirements, if applicable.
3	If incident required implementation of the Contingency Plan, then notify the FDEP that the Facility is in compliance with 40 CFR 264.70 (h) before operations are resumed in affected areas of the Facility.		

Attachment CP-4

Emergency Notification Information

ATTACHMENT CP-4
EMERGENCY NOTIFICATION INFORMATION

In the event of an emergency which could threaten human health or the environment outside of PFF, the General Manager or Emergency Coordinator shall immediately notify:

State of Florida
Department of Environmental Protection
Northeast District
Jacksonville, Florida
Telephone: **(904) 448-4320** (24 hours)

To report a reportable quantity spill or release of a listed hazardous material, the PFF General Manager or Emergency Coordinator shall immediately notify:

National Response Center (NRC)
Telephone: **800-424-8802** (24 hours)
or
State Warning Point Number
(904) 413-9911

If unsuccessful in reporting to the above numbers, call:

U.S. Environmental Protection Agency
Region 4, Atlanta, GA
Emergency Response Center
Telephone: **(404) 562-8700** (24 hours)

Within 15 days after the incident, send written report to:

State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256
Attention: Northeast District Manager

ADDITIONAL OUTSIDE ORGANIZATIONS:

Police Departments:	Gainesville Police Department
	Alachua County Sheriff's Office
Fire & Rescue:	Gainesville Fire & Rescue Department
Hospital:	North Florida Regional Medical Center
Local Emergency Planning Committee:	North Central Florida LEPC

Attachment CP-5

Emergency Equipment List

ATTACHMENT CP-5
EMERGENCY EQUIPMENT LIST

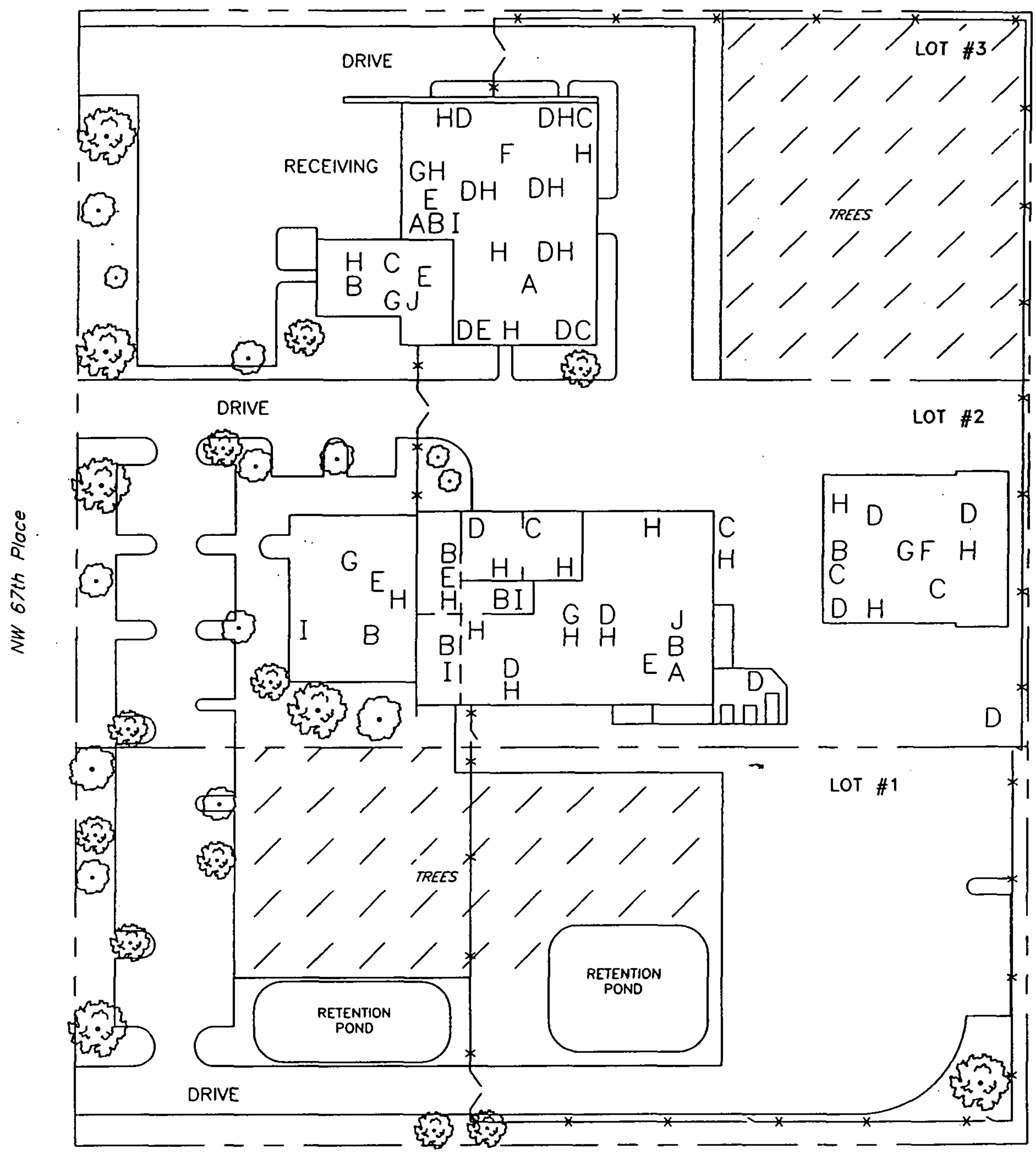
Item	Description/Capability	Location(s)
Telephone	Telephone communication for emergency notification	Waste areas, laboratory and other general locations
Fire Extinguishers	Dry chemical, CO_2, Halon extinguish fires	Waste areas, laboratory, tank and container storage areas administration area
Fire Hydrant	Fire hydrants- combat fire	Southwest Corner of Treatment and Operations Building
Absorbent Material	Vermiculite and absorbent material in spill kits-absorbs liquid spills	Waste treatment areas, container storage and tank storage areas
Respirators	Full face, half face/SCBA- Filter ambient air/supply compressed air	Waste treatment areas, laboratory
Eye Wash	Permanent installation and portable eye wash bottles- flush eyes	Waste treatment areas, laboratory
First Aid Kits	Bandaids, bandages- provide minor first aid	Change out area
Fork Lift, Bobcat	8,000 pound capacity, fossil fuel powered- assist in moving materials	Container storage areas
Automatic Fire Suppression	CO_2 dry system- control spread of fire or extinguish	LSV Processing area, Perma-Fix II Processing Area

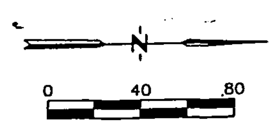
ATTACHMENT CP-5 (Continued)

Item	Description/Capability	Location(s)
Protective Aprons & Gloves	Cloth, Tyvek, Rubber or Nitrile- Body Protection	Waste Management Areas & Maintenance Area
Safety Glasses	Personal Protective Eyeware- Issued to Employees	All Operational Areas
Emergency Exit Lighting & Signs	Emergency Egress Equipment	Throughout Administrative Offices, Lab, Waste Management Areas
Portable Radios and/or Cellular Phones ~~& Portable Radios~~	Communication Devices	Portable Devices
Spill Kit(s)	Clean Up Minor Spills	Each Waste Management Area

Attachment CP-6

Emergency Equipment Location Map





Legend

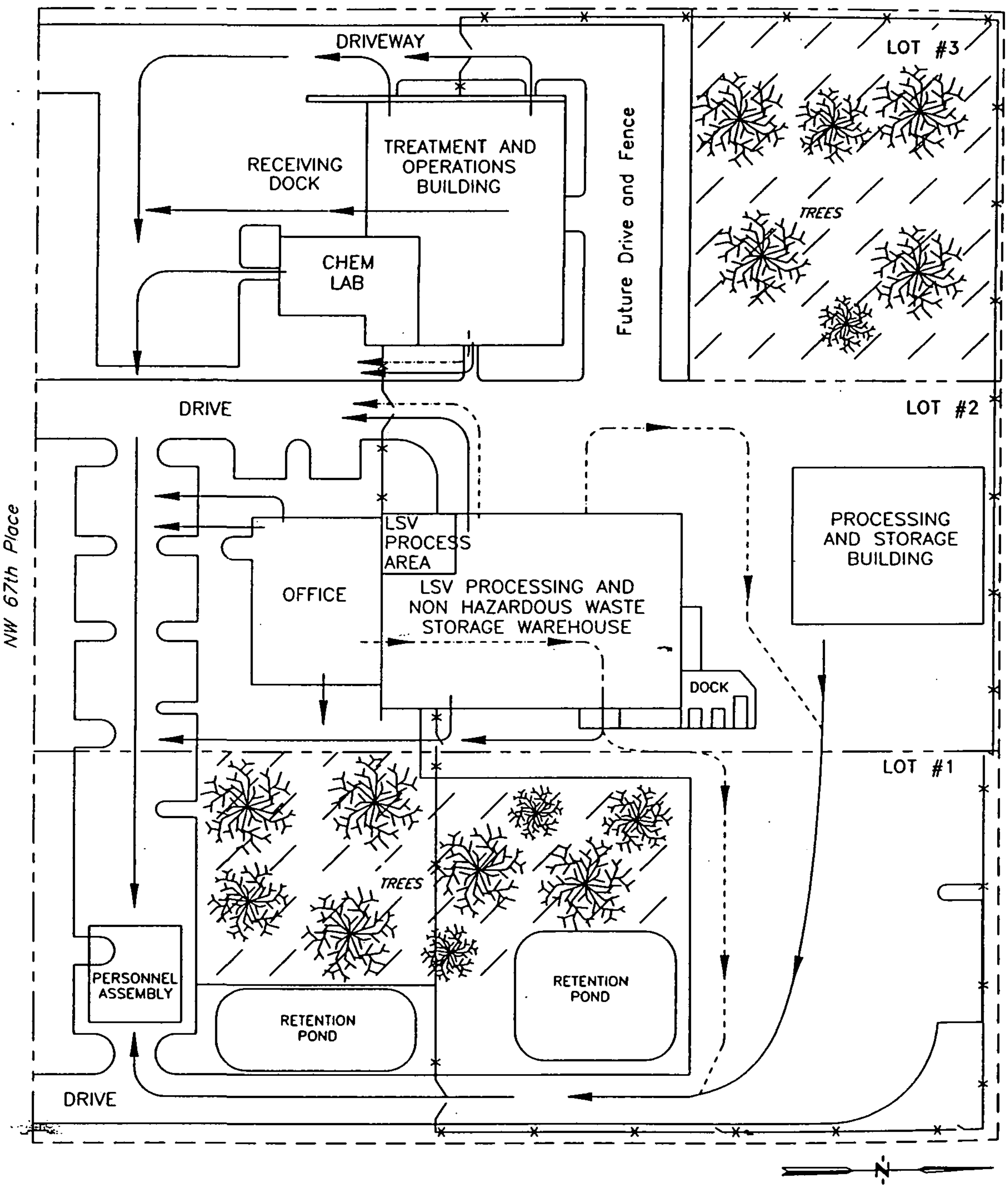
A	Protective Equipment
B	Phone
C	Eyewash
D	Spill Kit
E	First Aid
F	Drum Storage
G	Alarm
H	Fire Extinguisher
I	Contingency Plans
J	Shower

TITLE: FIGURE CP-6 EMERGENCY EQUIPMENT LOCATOR MAP		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 NW 67th Place Gainesville, FL 32653		
SCALE: 1=80	APPROVED BY: J. HAZARD	DRAWN: PRODRAFT
DATE: 6/17/98		REVISED:
PROJECT NUMBER: 9003		DRAWING NUMBER: CP-6

PERMA-FIX ENVIRONMENTAL SERVICES

Attachment CP-7

Emergency Evacuation Route Map



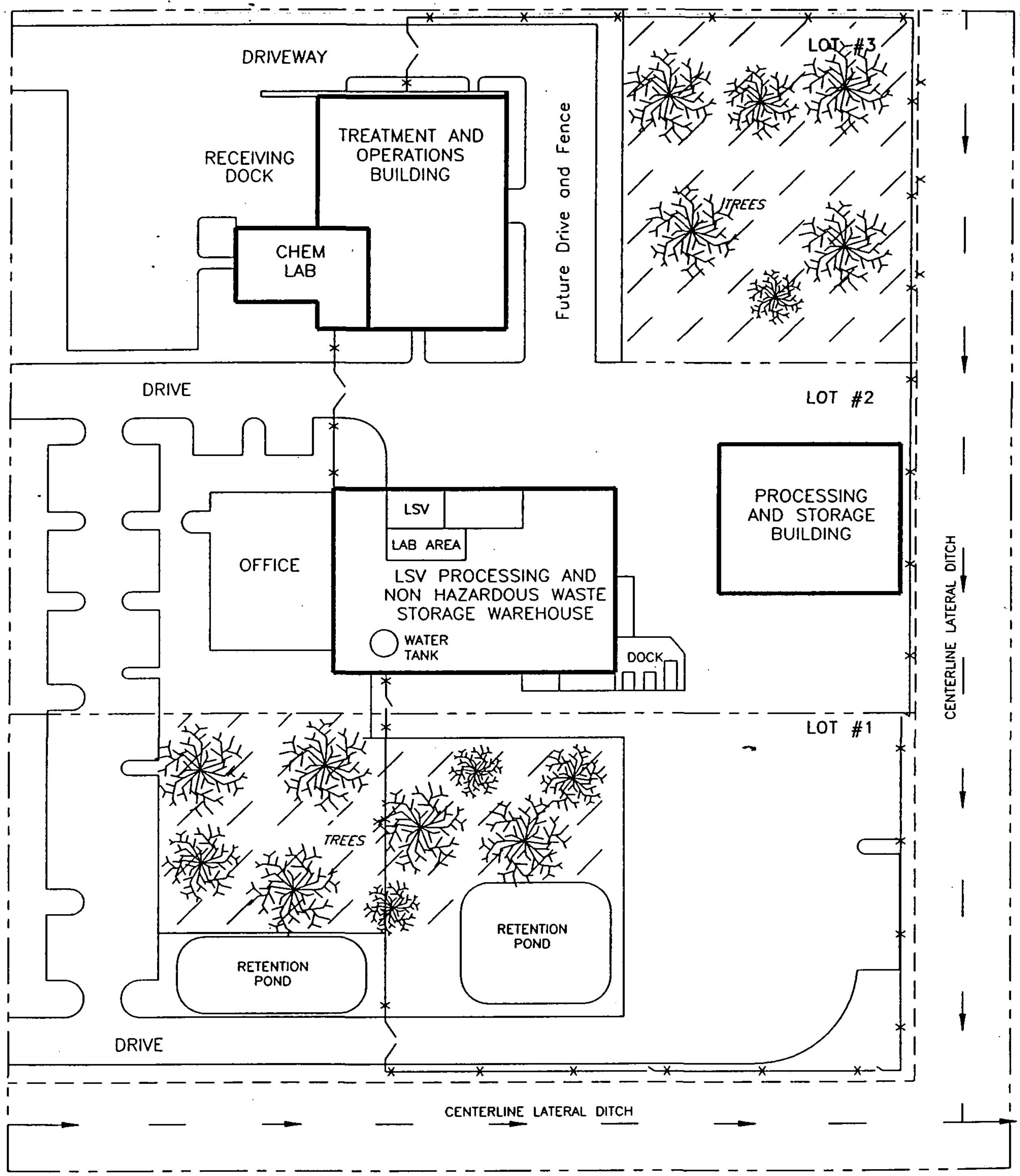
PRIMARY EXCAVATION ROUTE
ALTERNATIVE EXCAVATION ROUTE

TITLE: FIGURE CP-7 EMERGENCY EVACUATION ROUTE MAP	
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 NW 67th Place Gainesville, FL 32653	
SCALE: 1=80	APPROVED BY:
DATE: 6/17/98	DRAWN: SYA
PROJECT NUMBER: PFFLA970343	REVISED:
	DRAWING NUMBER: CP-7

PERMA-FIX ENVIRONMENTAL SERVICES

Attachment CP-8

Facility Hazard Location Map



Property Line
Drainage Easement
Facility Hazard Locations

N

0 40 80

TITLE: FIGURE CP-8 FACILITY HAZARD LOCATION MAP		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 NW 67th Place Gainesville, FL 32653		
SCALE: 1=80	APPROVED BY:	DRAWN: SYA
DATE: 6/17/98		REVISED:
PROJECT NUMBER: PFIFLA 970343		DRAWING NUMBER: CP-8

PERMA-FIX ENVIRONMENTAL SERVICES

Attachment CP-9

Coordination Agreements/Receipt Documentation

ATTACHMENT CP-9
COORDINATION AGREEMENTS/RECEIPT DOCUMENTATION

EXAMPLE	Certified Mail # ____________ Return Receipt Request

CONTINGENCY PLAN SUBMITTAL

ACCEPTANCE

I certify that on this __________ day of ____________, I received a copy of the Contingency Plan for Perma-Fix of Florida located at 1940 NW 67th Place in Gainesville, Florida 32653. Further, this organization agrees to respond to, or assist in, emergency situations which may arise at the subject facility should the need arise.

REFUSAL

☐ By checking this box, the undersigned organization refuses to enter into an agreement to provide emergency response services to the subject facility. However, we do acknowledge receipt of the Contingency Plan being offered by Perma-Fix of Florida, Inc.

Signature: ________________________________

Printed Name: ________________________________

Title: ________________________________

Organization: ________________________________

NOTE: Contingency Plan submittals and coordination agreements are required in order to document Perma-Fix of Florida, Inc.'s compliance with 40 CFR 264.37. Where state or local authorities or organizations decline to enter into emergency response agreements or arrangements, the facility owner or operator must document the refusal within the facility's operating record.

Attachment CP-10

Contingency Plan Revisions - Transmittal Letter

ATTACHMENT CP-10
CONTINGENCY PLAN REVISIONS - TRANSMITTAL LETTER

EXAMPLE	Certified Mail # ____________ Return Receipt Request

DATE: ____________________

TO: ____________________

____

____

FROM: Perma-Fix of Florida, Inc.
1940 NW 67th Place
Gainesville, FL 32653

RE: Contingency Plan Revisions - Perma-Fix of Florida, Inc.

Dear ____________:

Perma-Fix of Florida, Inc. has revised the facility's Contingency Plan document. Copies of the revised pages are enclosed for insertion within your organization's copy of the Perma-Fix Contingency Plan document. Please make the necessary updates to your copy of the plan and discard all outdated pages.

Our facility is required to supply your organization with a complete copy of the Contingency Plan document, and all subsequent revisions in accordance with federal EPA regulations listed at 40 CFR 264.53/264.54.

If you have any questions regarding the information received or your organization's role in contingency planning for the Perma-Fix of Florida, Inc. facility, please contact me at (352) 373-6066.

Sincerely,

Steve Douglas
Regulatory Affairs Manager
Perma-Fix of Florida ~~Dayton~~, Inc.

Attachment II.A.3

Personnel Training Program

HAZARDOUS WASTE-RELATED

HEALTH AND SAFETY PERSONNEL TRAINING PROGRAM ~~PLAN~~

FOR

PERMA-FIX OF FLORIDA, INC.

GAINESVILLE, FLORIDA

Dates of Revision
Original: June 19, 1998
Revised: November 23, 1998

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1.0 PERSONNEL TRAINING PROGRAM

This section outlines, in accordance with 40 CFR §264.16, the initial and continuing training that Perma-Fix of Florida (PFF) employees at the Gainesville waste management facility (Facility) will receive. Training methods include lecture, discussion, hands-on skill training, on-the-job training (OJT), and video or movie viewing followed by discussions. Subject matter for training includes:

- Job content and responsibilities
- Hazard recognition
- Hazard communication
- Health affects and physical hazards of hazardous wastes
- Communication and alarm systems
- Medical surveillance and medical monitoring
- Process and safety controls and operating procedures
- Inspection, repair and replacement of emergency equipment and supplies
- Use of personal protective equipment (PPE)
- Emergency response procedures and review of the facility's Contingency Plan
- First aid
- Recordkeeping connected with the storage and management of hazardous wastes
- Standards for owners and operators of TSDFs and other applicable RCRA regulations

PFF's personnel training program is designed to provide all facility employees with a level of training that is directly related and pertinent to their level of responsibility and specific job functions.

1.1 Outline of the Training Program

A description of the content of the classroom training sessions, drills and OJT is presented in the Personnel Training Plan (Training Plan) which is included as Attachment 1 to this section. A training manual, containing lesson outlines, covers the material presented in the formal training sessions and is available for review at the facility.

The Training Plan will be modified in response to changes in government regulations, upon direction of the U.S. Environmental Protection Agency (EPA) or the Florida Department of Environmental Protection (FDEP), or when required as a condition of an issued permit.

1.2 Job Title, Job Description, and Duties

The job title, job description, and name of each employee filling a job at the facility related to hazardous waste management will be kept as part of the Facility Operating Record. Job descriptions include educational and other necessary qualifications as well as the assigned duties and responsibilities for each position.

1.3 Training Content, Frequency and Techniques

This Section of the Permit Application and Attachment 1, the Personnel Training Plan describes the training that employees receive at the PFF Facility.

A. Job Assignment and Training Prerequisites

No employee shall be assigned the duties of transferring, handling, sorting, or mixing hazardous waste unless that employee has demonstrated his/her capabilities to:

1. Read and comprehend label instructions, operational procedures, contingency plans, regulatory directives, and where applicable, inspection procedures;

2. Understand the basic nature of the hazardous materials which he/she is assigned to transfer, handle, sort, or mix relative to the material's reactivity, toxicity, explosiveness, flammability and corrosivity;

3. Operate all equipment which he/she is assigned to operate, including personal safety and emergency equipment.

No employee of the facility shall be assigned the duties of transferring, handling, sorting, or mixing hazardous waste unless that employee meets the minimum requirements set out in 40 CFR §264.16(a), (b), and (c). These job prerequisites will be verified during pre-employment interviews or through observation and knowledge of present employees, and will be documented in each employee's training file.

B. Initial Training Period

All newly hired, transferred or cross-trained personnel will receive the instruction and OJT relating to the specific job assignments at the facility within six months of hire and assignment or reassignment to a job. Employees will not work in unsupervised positions until they have completed the following minimum training requirements and have demonstrated they can safely perform their duties in compliance with applicable regulations and company operating procedures.

1. Procedures for using, inspecting, repairing and replacing facility emergency, safety, and monitoring equipment applicable to their job tasks.
2. Key parameters for automatic waste feed cut-off systems.
3. Communications or alarm systems.
4. Response to fires or explosions.
5. Response to groundwater contamination incidents.
6. Shutdown of operations.
7. Security provisions.

The initial training will vary in duration for each job title as presented in the training matrices presented as Figures 2 and 3 in the Training Plan, which is found in Attachment 1.

C. On-The-Job Training

The Training Plan lists specific OJT tasks for each job title. The acquisition and mastery of specific skills or operational procedures will be accomplished through supervised OJT activities which will continue during and after the initial training period. Supervisory personnel will observe and evaluate the performance and competence of trainees during the period of OJT. The completion of OJT will be documented on a form that will be retained in the employee's training file.

D. Annual Review, Update Training and Retraining

The Training Module Matrix, Figure 2, of the Training Plan lists facility personnel who will attend eight hours of annual update training and review. These personnel are indicated in Column A2 of Figure 2. The annual review and update program consists of an abbreviated review of the introductory training program, updates and a detailed review of existing emergency response procedures as contained in the Facility's Contingency Plan. Emphasis is placed on any changes in waste constituents and characteristics, equipment, operating procedures or regulations that affect the Contingency Plan and emergency response activities. Emergency response drills will be a part of the refresher training when the Contingency Plan or emergency response procedures are changed. Question and answer periods will allow for focused discussion of any employee concerns, operational difficulties, equipment malfunctions, and incidents or emergencies which may have occurred in the preceding six months.

Employees may be required to participate in retraining activities under the discretion of their supervisor or the Training Director. Examples of this situation include a return to work from an extended leave of absence, new job assignment, unsatisfactory or unsafe job performance, a return to a previous job assignment, or involvement in an accident or incident where review is appropriate to prevent recurrence.

1.4 Training Director

The PFF Regulatory Affairs Manager will serve as the facility Training Director. That person shall be qualified by way of training and experience to serve in this function. Records documenting the training and qualifications of the Training Director will be maintained in the facility Operating Record. The facility Training Director may be assisted by qualified outside training consultants, the PFF Health & Safety Officer, or other qualified staff persons, in executing the duties of this function.

1.5 Relevance of Training to Job Position

The personnel training program seeks to accomplish two goals:

- Preparation of facility personnel to safely, effectively and efficiently manage the hazardous and non-hazardous materials that are received for storage or processing.
- Protection of human health and the environment.

OJT supplements more formal classroom training and provides the practical training and experience in daily waste handling operations that are related to each employee's particular duties. OJT builds upon PFF's formal classroom training to provide specific job skills an employee will need to function efficiently and safely in their position.

1.6 Training for Emergency Response

Facility personnel will receive training in implementing the Contingency Plan during initial training and thereafter during annual refresher training and emergency response drills. Facility employees will be trained to be familiar with the facility's emergency procedures, equipment and systems so that they can promptly, safely and effectively respond to emergency situations; consistent with the level of emergency response training that each employee has received.

2.0 IMPLEMENTATION OF THE TRAINING PROGRAM

The Training Program is outlined in the Training Plan in Attachment 1. It is designed to be more detailed and comprehensive ~~rigorous~~ than that currently required under 40 CFR Part 264.

Facility employees will receive, or have received, introductory training in accordance with the Training Plan in Attachment 1 (or an earlier version) and will receive continuing training in accordance with the training frequency described in Section 1.3 above. Refresher training will be conducted annually and documented in the facility's operating record. The following records will be maintained in the Facility's Operating Record to document the training status of each employee:

- The job title for each position at the Facility relating to waste management and the name of the employee filling each position.

- A written job description for each position, including the requisite skills, education, qualifications and duties of the employees assigned to each position.

- A written description of the type or amount of both introductory and continuing training that will be given to each employee filling a position.

- A written record which confirms that the appropriate training and OJT outlined in the Training Plan has been given to, and completed by, facility employees.

Training records on current personnel shall be kept for three (3) years from the date the employee last worked at the Facility. An example of the records that will be kept in the Operating Record within each employee's training file to show compliance with the requirements of 40 CFR §264.16(a), (b) and (c), is contained in Appendix 1 to the Training Plan.

- An attendance record for individual training sessions.

- An example certificate of training that is used to verify completion of training classes or modules by individual employees and is the basis of entries to the employee training record.

- The individual training record for each employee.

- A form used to verify OJT.

Attachment 1

Personnel Training Plan

A. INTRODUCTION

Perma-Fix of Florida, Inc. (PFF) operates a RCRA-regulated treatment, storage and disposal facility (Facility) located at 1940 N.W. 67th Place in Gainesville, Florida. The EPA ID# for the facility is FLD 980 711 071.

Currently, hazardous waste management operations conducted on-site include the storage and treatment of a wide variety of industrial wastes. The Facility receives shipments of hazardous wastes from industrial generators and subsequently blends similar waste types into a fuel that will be beneficially reused as a hazardous waste-derived fuel at facilities such as cement kilns. The facility also repackages, sorts and consolidates other hazardous wastes for shipment and treatment off-site. A variety of chemical and physical treatment activities are also conducted at the facility.

This document is PFF's Hazardous Waste Related Health and Safety Training Plan, referred to herein as the "Training Plan," for routine and emergency waste handling operations. The Training Plan enumerates the job titles of and necessary training for those employees who work directly with hazardous and non-hazardous wastes and employees who have emergency response duties. Only PFF employees are included in the Training Plan. Hazard awareness and recognition training is provided to PFF personnel whose job function does not include direct waste handling activities, but are trained as first responders.

This Training Plan describes the integral components of PFF's comprehensive Health and Safety Training and resources used to train employees, in addition to methods used to evaluate employee training. Table 4 and Table 5 contain examples of training topic records that will be maintained in the facility Operating Record. Tables 4 and 5 also list the title and minimum length of each Training Module.

Training assignments are made through the designation of specific Training Modules to employees filling the job titles listed in this Training Plan. Instructor Manuals, which contain the lesson outlines and course outlines for each training topic, and master sets of participant resource materials are not contained in this Training Plan, but are supplementary materials maintained by the facility Training Director, or his designee.

B. SCOPE OF TRAINING PLAN

The objective of this Training Plan is to provide a comprehensive program, whereby PFF personnel who work directly with hazardous wastes receive training in the following areas, as appropriate:

- Management of all waste materials in a manner that is safe, effective, efficient and in compliance with applicable laws and regulations.
- Emergency response procedures, equipment and emergency systems.
- Safety and health-related matters.

All employees who work directly with hazardous waste are trained to perform their job duties in a manner that ensures the operation of the Gainesville hazardous waste management facility in compliance with the requirements of EPA and FDEP regulations. Some of these employees also receive training as required by applicable OSHA and USDOT regulations and requirements. The degree of training that each person receives depends upon his/her job duties, as well as that person's assigned tasks or responsibilities involving hazardous waste in a routine or emergency response capacity.

In addition to providing a training program for employees who work directly with hazardous waste, this Training Plan provides for the training of PFF employees who have emergency response duties. These employees are responsible for implementing the facility's Contingency Plan. The degree of training of these employees is consistent with their role in emergency response, as specified in the facility's Contingency Plan.

PFF recognizes that there are potential safety and health hazards associated with the improper handling and storage of hazardous waste. In order that facility personnel, the community, the environment and PFF property be adequately protected, it is necessary to provide safety and health training based on worst-case scenarios for day-to-day operations, maintenance activities and emergencies. The Training Plan is meant to be flexible and will be reviewed at least annually by the PFF Regulatory Affairs Manager. The Training Plan will be modified based on Facility or process changes, the Facility's needs, and changing government regulations, or upon direction of the EPA or FDEP, or when modification is required as a condition of a permit.

C. LOCATION OF TRAINING

The majority of personnel training will be conducted on site at the PFF Gainesville Facility. Adequate classroom Facilities' and training aids are available. Documented OJT will be conducted on the premises in the related work areas.

Some training courses may be offered away from the Facility due to small numbers of personnel needing training in specialty subjects or when special facilities are necessary.

D. PERSONNEL TO BE TRAINED

An organizational chart for the PFF Gainesville Facility as it relates to waste management activities is shown in Figure 1. The jobs that are directly involved with hazardous waste operations are listed in Table 1. The job titles of personnel who have emergency response duties are listed in Table 2. Other jobs at the facility which have no direct relationship to hazardous waste management and no emergency response duties under the facility's Contingency Plan are listed in Table 3.

Job descriptions and qualifications for the various jobs that are directly involved with waste management operations have been developed and included in the facility Operating Record, which is maintained on-site. Each job qualification requires the completion of specific training topics, as described in this Training Plan, including on-the-job training and annual refresher training. Section H of this Training Plan provides details about the training topics and the specific training assignments required for personnel in each job classification.

Not all personnel are required to be trained in all of the training topics. The training that an employee receives depends upon his or her assigned job duties, as contained in their job description.

No employee shall be assigned to work in an unsupervised position in the waste management Facility until he/she has demonstrated their capabilities and has successfully completed the training topics assigned to his/her job description, in compliance with 40 CFR §264.16(a) and (b) or 40 CFR §265.16(a) and (b) or any condition of the Facility's Part B permit.

E. INSTRUCTORS AND TRAINING METHODS

With the exception of OJT, training conducted at the PFF Facility will be under the direction of the Facility Training Director, who is also the Regulatory Affairs Manger. The Training Director is experienced in hazardous waste management procedures and other appropriate areas of instruction. On-the-job training is under the director of the employee's supervisor. Supervisors have received classroom training and OJT appropriate to their positions and job functions and are qualified and authorized to provide OJT under this Training Plan.

Methods of training may include lecture, discussion, hands-on skill training, on-the-job training, and video or movie viewing followed by discussions. This Training Plan incorporates simulation or case study/scenario training where pertinent. Some training materials may be recorded or video taped and subsequent trainees will view the recording. The Training Director or an authorized designee may facilitate training by video or movie viewing by introducing the material and leading discussion after the recording has been reviewed.

Individual instructors may be PFF employees or consultants depending upon the course, the topic, and the schedule. All instructors will be knowledgeable in the subjects that they teach or facilitate. The instructors will be familiar with PFF Gainesville and hazardous waste operations. Instructors will be qualified through education, credentials or experience. The Training Director's qualifications will be maintained on-site in the Facility Operating Record. This file will be maintained by the Facility Manager or other authorized designee of the Facility Manager who is responsible for scheduling personnel training and recordkeeping requirements. Credentials of the Training Director are provided in Attachment 2.

F. EVALUATION

Training will be evaluated by participants and instructors. The evaluation technique will vary by course, purpose, and format. Techniques may include written exam, skills observation, skills performance checklists or questionnaires. Occasionally, other representatives of PFF may participate in evaluating course instruction. OJT will be evaluated by the employee's supervisor or the Training Director.

G. RECORD KEEPING AND CERTIFICATION

As required by EPA, FDEP, OSHA and USDOT, documentation of attendance, method of instruction, instructor's qualifications and successful completion of each training topic will be maintained in the Facility Operating Record. Tables 4 and 5 contain examples of employee training topic records that will be maintained in the Facility Operating Record.

Each participant will be awarded training certificates signed by the Training Director or his/her authorized designee denoting successful completion of the various training topics (except OJT). Copies of training certificates will be placed in the training file of each employee required to be trained under this Training Plan. A record of successful completion of OJT Task Training will be completed by the employee's supervisor and maintained in the training file of each employee.

Records documenting completion of the various training topics by current personnel will be kept for three (3) years following closure of the facility. Records documenting former employees' completion of the various training topics will be kept for at least three (3) years from the date the employee last worked at the facility. Training records will be maintained in the Facility Operating Record.

Additional records required by 40 CFR §264.16(d), including job titles, names of incumbents in those jobs, and job descriptions will be maintained in the Facility Operating Record for three (3) years following closure of the Facility.

H. TRAINING TOPICS, LENGTH AND SCHEDULING

This Training Plan provides numerous training topics. Each job classification is assigned specific training topics related to the successful performance of that job in a manner that is safe and healthful to self, co-worker, environment and property. These training assignments are listed on Figure 2 in this Training Plan. Tables 4 and 5 list a description and minimum length of each training topic assigned to employees.

The Facility operates five (5) days per week. There is one shift per day. It is the responsibility of the Facility Training Director or his/her authorized designee to schedule the necessary training for each person and to document attendance and successful course completion. It is the responsibility of the Personnel Manager to advise the Facility Training Director of new hires and personnel classification changes that result in the need for training. The Facility Training Director will be responsible for scheduling timely refresher training for current employees when annual refresher training comes due.

Supervisors are responsible for providing OJT and for assuring that employees will not work in unsupervised positions until they have completed the training requirements of their job classification. Supervisors evaluate OJT and document the completion of each assigned OJT task. The OJT training documentation is provided to the Facility Training Director for appropriate record keeping. Table 6 contains a list of OJT tasks. Supervisors also provide refresher OJT to appropriate personnel, and document the completion of assigned OJT tasks for record keeping by the Training Director.

TABLE 1

JOB TITLES RELATED TO HAZARDOUS WASTE MANAGEMENT

Radiation Safety Officer
Facility Manager
QA/QC Technician
Site Coordinator
Process Technician
Support Technician
Maintenance Technician
Sales Representative
Regulatory Affairs Manager
Health & Safety Consultant
Senior Health Physicist
Analytical Service Manager
Assistant Lab Manager
Senior Lab Technician
Research & Development Manager
Research & Development Technician
Project Engineer

Note: Job description for the above positions are maintained at the PFF Gainesville facility. Each job description contains those duties typically performed by an individual filling each position.

TABLE 2

JOB TITLES OF EMERGENCY COORDINATORS AND OTHERS WITH EMERGENCY RESPONSE DUTIES

EMERGENCY COORDINATORS	
Primary Emergency Coordinator	**Alternative Emergency Coordinator**
Facility Manager	Regulatory Affairs Manager
	Site Coordinator 1
	Site Coordinator 2

TABLE 3

JOB TITLES NOT INVOLVED WITH HAZARDOUS WASTE OPERATIONS OR EMERGENCY RESPONSE

Controller
Document Specialist
Administration/Marketing Support Specialist
Accounting Specialist
Receptionist
Customer Service Supervisor
Telemarketing Specialist

TABLE 4

PERMA-FIX OF FLORIDA, INC.
EMPLOYEE INITIAL TRAINING TOPICS RECORD

NAME: ______________________ START DATE: ____________

TITLE: ______________________

HAZARDOUS WASTE MANAGEMENT TRAINING

GROUP	DATE	COURSE TOPIC	HOURS*	INSTRUCTOR	RESULTS
	____	New Hire Training		____	N/A
A	____	General Orientation	2.00	____	N/A
	____	The Convincer	0.50	____	N/A
	____	Right to Know/The MSDS	1.00	____	
	____	Right to Know/Hazcom Labels	1.0	____	
	____	Mod V-Right to Know	1.50	____	
B	____	RCRA Hazardous Waste Training	0.50	____	
	____	Protect the Environment	0.25	____	
	____	Mod I-Introd to RCRA	1.50	____	
	____	Forklift Training Part 1		____	
	____	Forklift Training Part 2		____	
	____	Forklift Training Part 3		____	
	____	Forklift Training Part 4	2.00	____	
C	____	Hazardous Waste Safety Part 1		____	
	____	Hazardous Waste Safety Part 2	0.50	____	
	____	DOT Regs-Placards	0.50	____	
	____	Flammable Liquids	0.50	____	
	____	Hazardous Flammable Material	0.50	____	
	____	Extinguishers	0.50	____	
D	____	Chemical Safety-PT 1, Handling	0.75	____	
	____	Chemical Safety-PT 2, Health Haz	0.75	____	
	____	Chemical Safety-PT 3, Fire	0.75	____	
	____	Mod III-Safety/Clothing/Equip[1]	1.50	____	
	____	Bonding & Grounding	1.00	____	
E	____	Lifting Safely[1]	0.50	____	
	____	Drum Handling Safety[1]	0.50	____	
	____	Drum and Other Spills[1]	0.50	____	
	____	SCBA Training	1.00	____	
	____	Respirator Training	1.00	____	
	____	Pro-Flex Training	1.0	____	
F	____	Intro to Hazardous Waste ~~Oper~~ & Special Waste Operations[1]	1.75	____	N/A
G	____	Mod II-Keeping Track of HW	1.50	____	
	____	Occupational Heat Stress	1.00	____	
	____	Mod IV-Conting Plan & Spills	0.50	____	
H		Standard Operation Procedures #1-11	4.00		N/A

Table 4 (cont'd)

HAZARDOUS WASTE MANAGEMENT TRAINING

GROUP	DATE	COURSE TOPIC	HOURS*	INSTRUCTOR	RESULTS
I	________	Standard Operation Procedure #12-21 ~~11~~	4.00	________	N/A
J	________	First Aid-Part 1	0.75	________	
	________	First Aid-Part 2	0.75	________	
	________	First Aid-Part 3	0.75	________	
K	________	Intro to Radiation-Part 1[1]	4.00	________	
	________	Intro to Radiation-Part 2[1]	4.00	________	
	________	Intro to Radiation-Part 3[1]	4.00	________	
	________	Intro to Radiation-Part 4[1]	4.00	________	
L		Standard Operating Procedures #22-2X	2.5	________	
		TOTAL	55.5 ~~42.50*~~	________	

*Does Not Include Review or Test Time

[1]Indicates training that will address new treatment operations at the Facility (e.g., Perma-Fix® II) specifically.

Training must be completed within 6 months of hire or assignment to the facility, or transfer to a new position at the facility, whichever is later.

TARGET DATE FOR COMPLETION OF INITIAL TRAINING (Date: _________)

TABLE 5

PERMA-FIX OF FLORIDA, INC.
EMPLOYEE ANNUAL REFRESHER TRAINING ~~TOPICS~~ RECORD

NAME: ______________________ START DATE: ______________

TITLE: ______________________

HAZARDOUS WASTE MANAGEMENT TRAINING

GROUP	DATE	COURSE TOPIC	HOURS*	INSTRUCTOR	RESULTS
A	________	~~1997~~ Annual RCRA Refresher - Including Contingency Plan and Emergency Response Procedures	8.00		
B	________	Fire Safety Alachua County Fire Department	2.00		
C	________	Hazardous Waste Safety (1 hour/month)	12.00		
D	________	Bonding & Grounding Video #17	1.00		
E	________	Drum & Other Spills On-site exercise	2.00		
F	________	Respirators	1.00		
G	________	Container Management	2.00		
H	________	Forklift Training	2.00		
I	________	History of Other Training ~~1998~~	2.00		
		TOTAL	32.00		

TABLE 6

ON-THE JOB TRAINING TOPICS

TASK		MATRIX ABBREVIATION
1.	Sampling	Sample
2.	Off Loading	Off Load
3.	Maintenance	Maint.
4.	Tank Management Practices	Tnk Mgt Pract
5.	Container Management Practices	Contr Mgt Pract
6.	Repackaging Operations	Repack Oper
7.	Laboratory	Lab
8.	Inspection and Remedial Action	Insp & Remed
9.	Recordkeeping	Record Keep
10.	Administration	Admin
11.	Personal Protective Equipment	PPE
12.	Emergency Procedures and Controls	Emer Proc
13.	Supervisory Duties	Super Duties

FIGURE 1

ORGANIZATION CHART
of
PERMA-FIX OF FLORIDA
and
PERMA-FIX ANALYTICAL SERVICES

PERMA-FIX
ENVIRONMENTAL SERVICES

PERMA-FIX OF FLORIDA
and
PERMA-FIX ANALYTICAL SERVICES

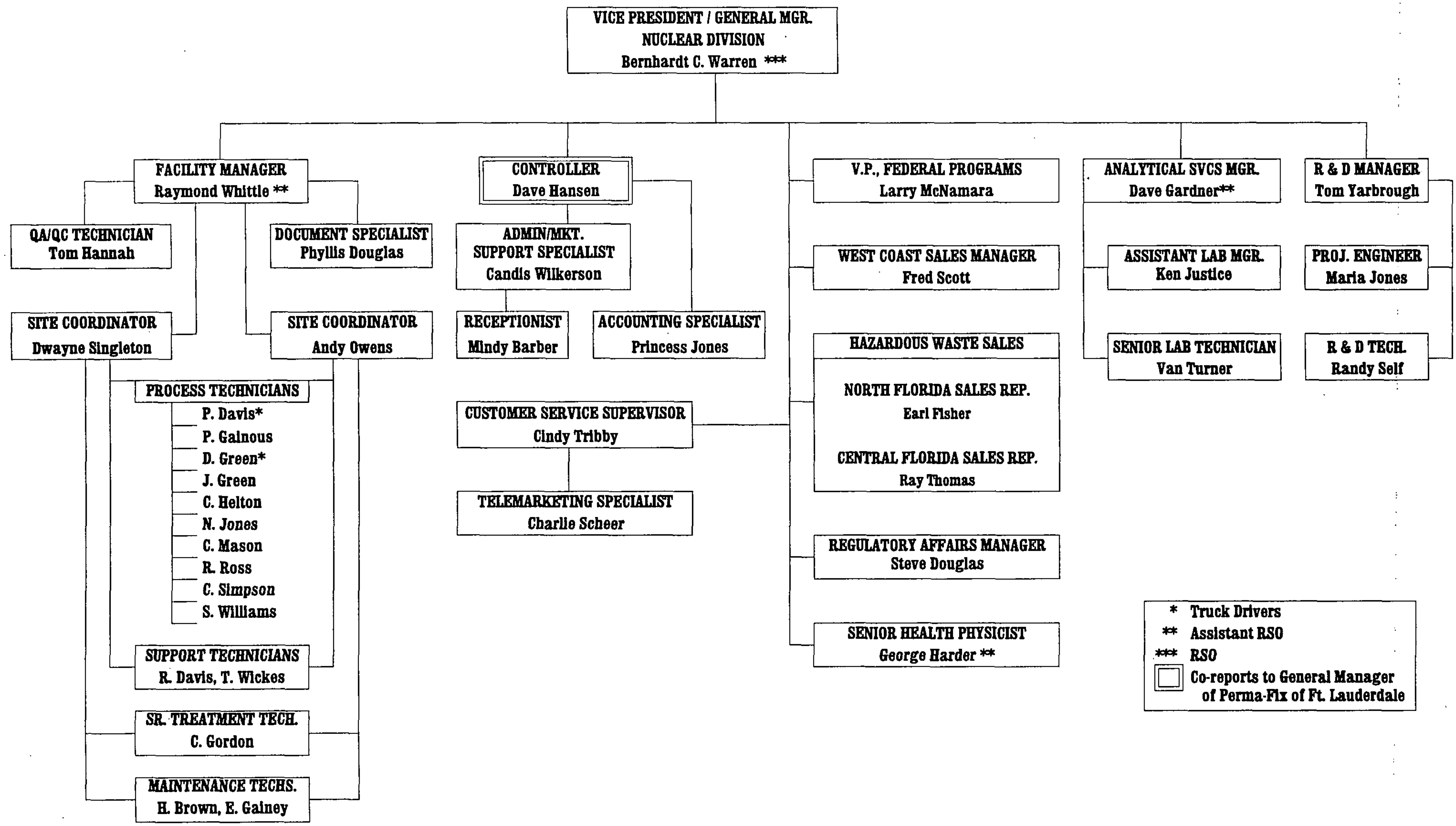

FIGURE 2

JOB ASSIGNMENTS
TRAINING TOPIC MATRIX

FIGURE 2

JOB ASSIGNMENTS - TRAINING TOPIC MATRIX

TRAINING TOPIC	A1	A2	B1	B2	B3	C1	C2	C3	D1	D2	E1	E2	E3	F1
Job Title	NEW HIRE	GEN ORIENT	R-T-K HAZCOM	SPILL RESPONSE	CONT PLAN	FIRE SAFETY	FORK LIFT	HW SAFETY	DOT REGS	FLAM MAT'LS	CHEM SAFETY	P.P.E	BOND & GROUND	LIFT SAFETY
VP/GENERAL MGR														
RADIATION SAFETY OFFICER														
FACILITY MANAGER														
QA/QC TECHNICIAN														
SITE COORDINATOR														
PROCESS TECHNICIAN														
SUPPORT TECHNICIAN														
MAINTENANCE TECHNICIAN														
SALES REPRESENTATIVE														
REGULATORY AFFAIRS MANAGER														
HEALTH & SAFETY CONSULTANT														
SENIOR HEALTH PHYSICIST														
ANALYTICAL SERVICES MANAGER														
ASSISTANT LAB MANAGER														
SENIOR LAB TECHNICIAN														
RESEARCH & DEVELOPMENT MANAGER														
RESEARCH & DEVELOPMENT TECHNICIAN														
PROJECT ENGINEER														

FIGURE 2

JOB ASSIGNMENTS - TRAINING TOPIC MATRIX
(continued)

TRAINING TOPIC	F2	G1	G2	H1	H2	I1	I2	J1	J2	K1	K2
Job Title	DRUM HANDLING	SCBA TRAINING	RESP TRAINING	PRO-FLEX TRAINING	INTRO HAZWOPER	REF HAZWOPER	HEAT STRESS	MANIFESTS	SOPs	FIRST AID	RAD SAFETY
VP/GENERAL MGR											
RADIATION SAFETY OFFICER											
FACILITY MANAGER											
QA/QC TECHNICIAN											
SITE COORDINATOR											
PROCESS TECHNICIAN											
SUPPORT TECHNICIAN											
MAINTENANCE TECHNICIAN											
SALES REPRESENTATIVE											
REGULATORY AFFAIRS MANAGER											
HEALTH & SAFETY CONSULTANT											
SENIOR HEALTH PHYSICIST											
ANALYTICAL SERVICES MANAGER											
ASSISTANT LAB MANAGER											
SENIOR LAB TECHNICIAN											
RESEARCH & DEVELOPMENT MANAGER											
RESEARCH & DEVELOPMENT TECHNICIAN											
PROJECT ENGINEER											

FIGURE 3

ON-THE-JOB TASK TRAINING

BY JOB TITLE

FIGURE 3

ON-THE-JOB TASK TRAINING BY JOB TITLE

OJT TASKS	1	2	3	4	5	6	7	8	9	10	11	12	13
Job Title	SAMPLE	OFF LOAD	MAINT	INK MGT PRACT	CONTR MGT PRACT	REPAK OPER	LAB	INSP & REMED	RECORD KEEP	ADMIN	PPE	EMER PROC	SUPER DUTIES
VP/GENERAL MGR													
RADIATION SAFETY OFFICER													
FACILITY MANAGER													
QA/QC TECHNICIAN													
SITE COORDINATOR													
PROCESS TECHNICIAN													
SUPPORT TECHNICIAN													
MAINTENANCE TECHNICIAN													
SALES REPRESENTATIVE													
REGULATORY AFFAIRS MANAGER													
HEALTH & SAFETY CONSULTANT													
SENIOR HEALTH PHYSICIST													
ANALYTICAL SERVICES MANAGER													
ASSISTANT LAB MANAGER													
SENIOR LAB TECHNICIAN													
RESEARCH & DEVELOPMENT MANAGER													
RESEARCH & DEVELOPMENT TECHNICIAN													
PROJECT ENGINEER													

Attachment 2

Credentials of Training Director

STEVEN DOUGLAS

PERMA-FIX ENVIRONMENTAL SERVICES

REGULATORY AFFAIRS MANAGER

EXPERIENCE HIGHLIGHTS

- Instructor for hazardous waste/used oil public training classes while employed by Florida Department of Environmental Protection.
- Designed tracking system used to monitor cleanup efforts for Exxon-Valdoz oil spill.
- Participated in Space Shuttle Challenger recovery operations
- Volunteer for several public organizations or outreach efforts, including Special Olympics, Coast Guard Sea Servants and Florida Clean Marinas.

PROFESSIONAL EXPERIENCE

January 1998 PERMA-FIX ENVIRONMENTAL (PF) SERVICES

Regulatory Affairs Manager. Responsible for assisting PF in complying with programs regulated by the U.S. EPA, (RCRA, TSCA, SARA), OSHA, DOT, State of Florida DEP and other state and local agencies, as applicable. Duties include preparing EPA permit applications, maintenance and various permit compliance monitoring, SARA Title III reporting, training and investigations of regulatory requirements for new business areas.

1/94 - 3/95 and 7/96 - 1/98

FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION

Environmental Specialist, Hazardous Waste Section. Perform hazardous waste inspections to evaluate compliance with Resource Conservation and Recovery Act (RCRA). Review and monitor corrective and remedial actions for cases involving hazardous waste violations and pollutant discharge. Investigate and initiate corrective action for public complaints and emergency responses involving illegal dumping, spills, and improper handling of hazardous materials.

3/95 - 7/96 COASTAL SCIENCE ASSOCIATES, INC.

Environmental Scientist (Consultant). Project Manager for a variety of environmental assessment and remediation projects throughout the southeast United States. Assessments included Phase I/Phase II investigations, Pollutant Storage Tank evaluations, abandoned drums and pollutant releases. Remedial projects included underground storage tank removal, spill response, hazardous waste removal, and groundwater remediation. Performed compliance audits to evaluate conformity with CERCLA, RCRA and TSCA. Initiated and supervised internship/mentor program for local college students.

UNITED STATES COAST GUARD/COAST GUARD RESERVE
9/85 to 11/90 (active) 6/97 to Present (Reserve)

Commissioned Officer

- Supervise pollution response and inspection team.
- Conduct Military Prepositioning Ship (MPS) explosive loadout inspections.
- Participate in public outreach programs including Sea Servants and Clean Marinas.

Radarman First Class (E-6)

- Watch supervisor and Executive Petty Officer of USCG Aerostat vessel.
- Assisted NASA in search and recovery efforts during the Space Shuttle Challenger disaster. *Awarded Certificate of Commendation from NASA.*
- Selected by U.S.C.G. District Commander to aid Federal On-Scene Coordinator for Exxon-Valdez oil spill. Major accomplishments included shoreline evaluations, and development of computer database used in tracking clean-up efforts. *Awarded Letter of Appreciation from F.O.S.C.*

EDUCATION:

- B.S., Environmental Science, Jacksonville University

PROFESSIONAL CERTIFICATION:

- Certified Hazardous Material Manager
- OSHA 40-Hour HAZWOPER
- 8 Hour HAZWOPER Refresher
- 16 Hour Radiation Safety
- HM-181 D.O.T. HAZMAT Transportation

Attachment II.A.4

Waste Analysis Plan

ATTACHMENT II.A.4

WASTE ANALYSIS PLAN

1.0 INTRODUCTION

The Perma-Fix of Florida (PFF) facility receives wastes from off-site generators for treatment and storage. Wastes received on-site are managed using the following methods: Perma-Fix® Process ~~(micro-encapsulation)~~ solidification/stabilization, Perma-Fix® II® Process (thermal desorption and/or chemical oxidation), waste bulking activities, storage and miscellaneous treatment processes (i.e., chemical and physical extraction and fuel blending). The facility accepts hazardous waste, non-hazardous waste, and mixed waste for these processes. This section provides details on the types of hazardous wastes received, the analyses performed, and acceptance limits. This section also provides information regarding post-treatment analysis, where applicable.

1.1 General Description of the Wastes

PFF receives wastes in both pumpable and solid forms from various generators. In general, the pumpable wastes received at the PFF facility are received from industrial, manufacturing and service industries. PFF typically receives solids from service industries and environmental remediation sites.

The wastes accepted at the facility can be divided into the general categories hazardous and non-hazardous waste.

1.1.1 Hazardous Waste

Hazardous wastes received at the PFF facility can include liquids, solids, or sludges. At the PFF facility, pumpable liquids which have a suitable BTU value will be fuel blended for off-site energy recovery. 5,000 Btus per pound is the generally accepted criteria for adequate energy content. PFF uses 5,000 Btus as a minimum for energy recovery use. Hazardous liquids with little or no BTU value are sent to an off-site incineration facility.

Liquids received at the PFF facility which exhibit a RCRA hazardous characteristic for metals only may be processed using the Perma-Fix Process. After being treated with the Perma-Fix process, the material will be disposed of as a non-hazardous waste.

Liquid wastes with a combination of high BTU organics and water will go through phase separation. The water will be sent off-site and treated as hazardous wastewater, and the organics will be fuel blended for off-site energy recovery.

Solids received at the site will be bulked and manifested to an off-site incinerator. However, if the solids exhibit a RCRA hazardous characteristic for metals only, the waste may be processed using the Perma-Fix Process. The resulting waste will be disposed of as a non-hazardous waste.

Materials that are hazardous due to corrosivity (D002) will be bulked and manifested to an appropriately permitted facility for treatment and/or disposal.

The facility also receives contaminated media and debris from various facilities. The contaminated media and debris may be treated using the Perma-Fix and/or Perma-Fix II processes. Perma-Fix process residues remaining after treatment of mixed wastes will either be sent off-site for further treatment (e.g., incineration) and/or ~~sent off-site for~~ disposal.

Attachment II.A.4.1 includes a list of the hazardous waste codes accepted at the facility.

1.1.2 Non-Hazardous Waste

The non-hazardous wastes received at the PFF facility include, but are not limited to, used oil, used oil filters, used oil contaminated media, and used antifreeze from automotive and industrial facilities.

The used oil received at the facility is fuel blended, and the antifreeze is sent off-site for recycling. The used oil filters are bulked on-site and shipped off-site for recycling. The used oil contaminated media is shipped off-site for energy recovery.

2.0 WASTE ANALYSIS PLAN

PFF has developed waste analysis procedures, as described in the following sections.

The Waste Analysis Plan for the PFF facility incorporates procedures to meet three main objectives:

1. Pre-Acceptance Analyses performed by or at the request of PFF to determine whether a waste will be accepted from off-site generators;

2. Waste Receipt Analyses used to confirm that wastes, when received, are consistent with the profile; and

3. Post-Treatment Analyses to confirm that the Perma-Fix and/or Perma-Fix II treatment processes have successfully treated the waste, ~~where~~ as required.

The following provides details regarding the Pre-Acceptance Waste Profile Analysis, the Waste Receipt Analysis, and the Post-Treatment Analysis for the wastes received at the facility.

2.1 Pre-Acceptance Waste Profile Analysis

2.1.1 Pre-Acceptance Waste Profile Sheet

Before approving wastes for management at the facility, PFF conducts a preliminary evaluation to determine if the material is suitable for management at the facility. A Waste (Material) Profile Sheet summarizing waste characteristics~~, as shown in Attachment II.A.4.2~~ is required to be completed by the generator for each hazardous waste stream. See Attachment II.A.4.2.

2.1.2 Pre-Acceptance Waste Profile Analysis

Prior to accepting shipments of hazardous waste, a ~~Waste Profile~~ Pre-Acceptance Analysis is conducted for the following parameters: specific gravity, pH, percent water, flash point, volatile organic compounds, total BTU value, and RCRA Metals. Additionally, hazardous waste streams which will undergo the Perma-Fix Process are also analyzed for sulfides and cyanides. Analyses may be performed by Perma-Fix of Florida, a Perma-Fix affiliate or a comparable independent environmental laboratory.

Alternately, the generator may apply process knowledge to complete the Waste Profile Analysis. Process knowledge must, however, be substantiated by analytical data from an outside independent laboratory, Material Safety Data Sheets (MSDS), or profile information, including analytical data from a permitted Treatment, Storage, or Disposal facility.

Attachment II.A.4.4 provides a summary of the Pre-Acceptance Analyses ~~acceptance limits~~ for wastes received at the PFF facility.

2.1.3 Waste Stream Recertification

The initial waste profile will be evaluated and recertified annually. If a generator can certify that the chemical and physical characteristics and the process generating the waste have not changed over the past year, the initial waste analysis requirements (if applicable) will not be repeated. A periodically shipped waste will be recertified with the first shipment after the annual recertification date.

Recertification of a waste stream will be required for generators who have not manifested the profiled waste stream to the facility during the preceding 12-month period. Additionally, when a generator notifies PFF that the process or operation generating a profiled waste stream has changed, the waste must be re-characterized. In the event PFF has reason to believe that the process or operation generating the waste has changed without notice from the generator, a re-characterization will also be required. In order to re-characterize their waste stream, the generator may be required to complete a revised Waste Profile Sheet and conduct a Waste Profile Analysis on the new waste stream. The results will be submitted to PFF before additional waste can be accepted from the generator.

For certain emergency response situations and generator spills, some of the initial waste analysis parameters for on-site management may be waived until after the waste is received at PFF. This will only occur if the generator can adequately make the hazardous waste determination of 40 CFR 262.11. The available analytical data and supporting MSDSs will be evaluated prior to receipt of the waste at the facility.

2.2 Waste Receipt Analysis

Upon arrival of a hazardous waste at PFF, a visual inspection is conducted and resultant observations are compared to data contained on the Waste Profile Sheet to verify that the waste stream is consistent with the Waste Profile Sheet. If the waste is visually consistent with the physical characteristics indicated on the Waste Profile Sheet, a sample of the waste stream is collected and subjected to on-site "fingerprint analysis."[1] A waste stream is considered visually consistent if its physical consistency is the same as that which is indicated on the waste profile; i.e., liquids must be pumpable, sludges must be viscous and pourable, but not pumpable, and solids must not contain significant quantities of pumpable or pourable liquids.

The analyses conducted on-site are for selected analytical (fingerprint) parameters. Fingerprint parameters are selected to screen incoming wastes to determine that the wastes received at the facility are the anticipated wastes. These parameters are normally a subset of the initial waste analysis information (profile) that generators have provided to PFF during pre-acceptance procedures. The analysis performed on a waste will be selected to provide adequate information to provide confirmation of waste identity, facilitate sound waste management practices on-site, and determine applicability of LDR requirements for appropriate waste management. The fingerprint sample will be analyzed for the following: specific gravity (liquids only), pH, percent water, flash point and percent halogens. ~~chlorine compounds.~~

The results of the fingerprint analyses are compared to the Waste Profile Analysis data. If the fingerprint analysis results are within acceptance tolerances, the waste received at the facility will be accepted for management at the facility. Examples of anticipated waste variability could be the result of any of the following: 1) differences due to temperature; 2) precipitation or absorption of constituents after sampling for waste analysis data due to varying length of storage before disposal; and 3) sedimentation of solids during prolonged storage times or during transportation to the PFF facility.

After undergoing fingerprint analysis, waste will be considered non-conforming if the sample is physically different from the Waste Profile Analysis, the pH is significantly different (±2 points) from the Waste Profile Analysis, the difference in water content is greater than 30% from the Waste Profile Analysis, the flash point is significantly different (±30%), or the difference in the halogen content ~~of chlorine compounds~~ is greater than 10% from the Waste Profile Analysis. The generator may be given the opportunity to provide a corrected Waste Profile Analysis or opt to transport the waste to another facility. If a non-conforming waste is one which PFF is not

[1] All waste streams received at the facility are sampled and subjected to the Finger Print Analysis. For single waste streams consisting of multiple containers, 20% of the containers for that waste stream are sampled (non-composite) and analyzed.

permitted to accept, the waste will be rejected and arrangements will be made to have the generator remove the rejected waste within 5 working days of the date of the rejection decision.

Waste streams consisting of transshipped wastes, discarded/off-spec chemical products, and lab packs will be scrutinized for consistency with the Waste Profile Analysis and the packing list. No analysis of these materials will occur.

2.3 Post-Treatment Analysis

~~Except for wastewater that can be sent to the POTW, residues~~ Residues remaining after on-site treatment of wastes will either be sent off-site for further treatment (e.g., combustion ~~incineration~~) or sent off-site for disposal, depending on whether the residues meet LDR treatment standards as specified in 40 CFR § 268.40. Hazardous waste/residues sent off-site will be sent to facilities with interim or final hazardous waste permits. In accordance with 40 CFR § 268.7(a)(4), the facility has developed and will follow a Post-Treatment Waste Analysis Plan to determine whether the treatment residues meet LDR treatment standards.

Treatment residues that exceed applicable LDR treatment standards will be sent off-site for further treatment (e.g., combustion~~incineration~~). LDR notifications will be supplied with the shipment of waste and will contain the information required under 40 CFR § 268.7.

Several types of waste may be generated by the various steps in the Perma-Fix II process. Waste characterization will be conducted on these wastes in accordance with the requirements of 40 CFR 262 and may include application of process knowledge and/or analytical testing. Residuals from the Perma-Fix II process will be assumed to retain detectable radioactivity levels. The anticipated disposition of these wastes is discussed below. Alternative disposal options may be used if additional facilities become available.

Treatment residues that are shipped off site for land disposal will be analyzed to verify that the wastes meet LDR treatment standards as specified in 40 CFR § 268.40. If the residue to be disposed exhibits a hazardous characteristic and/or possesses a listed waste code, the residue will be disposed at a Subtitle C facility. Otherwise, the residue may be shipped to a Subtitle D facility.

For treatment residue that is sent to a Subtitle C facility:

- Analytical results will be used to ensure that accurate LDR notifications and certifications are prepared.
- LDR notifications and certifications will be supplied with the shipment of waste and will contain the information required under 40 CFR § 268.7.
- Analytical results completed in support of LDR requirements will be retained within the facility operating record.

For treatment residue that is sent to a Subtitle D facility:

- Analytical results will be used to ensure that accurate LDR notifications and certifications are prepared.
- LDR notifications and certifications will be submitted to the EPA region or authorized state.
- LDR notifications and certifications will be placed within the facility operating record.

2.4 Waste Analysis Parameters and Rationale

Summaries of the pre-acceptance and receipt waste analysis parameters selected and their rationale for selection are shown in Attachment II.A.4.3.

2.4.1 Pre-Acceptance Waste Profile Analysis Parameters and Rationale

Specific Gravity and Percent Water:
Specific gravity analysis is conducted to provide general information regarding the waste stream, including the percent water.

pH:
pH analysis is conducted in order to identify corrosive materials.

Flash Point:
A flash point determination is conducted in order to identify wastes as D001 ignitable wastes. It is also used to provide verification that non-hazardous wastes are not ignitable.

Organic/Hydrocarbon Analysis ~~Volatiles~~
~~Volatile analysis~~ Organic/hydrocarbon analysis is conducted in order to assist the generator in assigning the appropriate waste codes to their waste stream and to identify the underlying hazardous constituents (UHCs) in order to determine proper treatment and management of the waste at the Facility.

BTU Content
The BTU content is determined to provide general information on the waste stream. The information will be used to aid in fuel blending composition.

Paint Filter Test:
The paint filter test is conducted when necessary to determine if a waste stream meets the regulatory definition of a liquid and to determine if the waste contains free liquid. ~~is "pumpable."~~ This aids in material handling at the facility.

Sulfide/Cyanide Screen:
The sulfide and cyanide screens are conducted on materials that carry the D003, F006, and/or F019 waste codes. The sulfide and cyanide screens are used to determine reactivity of a material.

Metals:
Metals analysis is conducted to assist the generator in assigning appropriate waste codes to a waste stream to confirm metals content and to determine whether the facility can effectively manage (treat) the waste.

2.4.2 Waste Receipt Analysis Parameters and Rationale

Specific Gravity and Percent Water:
Specific gravity analysis is conducted to verify that the material received is similar to the material analyzed under the Pre-Acceptance Waste Profile Analysis. Specific gravity information is also used to determine percent water and to make volume/weight determinations for incoming and outgoing loads of material.

pH:
pH analysis is conducted to confirm that the material received matches the Pre-Acceptance Analysis. It is also used to identify materials that are considered corrosive.

Compatibility:
Compatibility testing will be conducted on materials that are part of lab packs or on materials that will be bulked with other waste streams.

Chlorides/Halogen:
Chloride/halogen analyses are conducted to confirm that the material received matches the Pre-Acceptance Analysis.

Polychlorinated Biphenyls (PCB)
PCB analysis will be conducted on aged paint waste and petroleum waste where petroleum was used as a heat sink. PFF has been granted approval by EPA to store commercially-generated, PCB-contaminated waste.

2.4.3 Post-Treatment Analysis Parameters and Rationale

Identification of the parameters to be tested are determined based on pretreatment waste stream knowledge, ~~and~~ RCRA waste identification information (i.e., 40 CFR Part 261, Appendices VII and VIII; the basis for listing hazardous wastes, and hazardous characteristics, respectively) and the generator's land disposal restriction notification information. Each sample will be analyzed for concentrations of constituents that are identified. For LDR treatment standards expressed as concentrations in the residue extract, the TCLP (EPA SW-846 Method 1311) will be employed to obtain an extract of the waste. Then, the extract and/or residue sample will be analyzed for TCLP and/or total waste concentrations, respectively.

2.5 Analytical Test Methods

Analytical test methods used by PFF to test for waste parameters are standard laboratory methods or methods developed specifically for waste managed on-site. Attachment II.A.4.3 provides analytical test methods which may be used to evaluate physical/chemical waste analysis parameters for pre-accepted and received waste.

The analytical test methods performed for the Post-Treatment organic and inorganic constituents follow SW-846 Test Methods or American Society for Testing and Materials (ASTM) methodologies, or equivalent.

2.6 Methods for Additional Waste Analysis Requirements

The methods used for analysis are detailed in Attachment II.A.4.3.

2.7 Sampling Methods

Sampling methods used at the PFF facility will be those listed in 40 CFR 261 Appendix I or equivalent. PFF recognizes the importance of collecting a representative sample (as defined in 40 CFR 260) of each waste stream and recommends appropriate sampling methods specified in 40 CFR 261, Appendix I or equivalent sampling methods. If standard facility sampling techniques do not provide a representative sample for analysis, an appropriate alternate method will be used.

Wastes are primarily received at the facility in containers (e.g., drums) and roll-off boxes. However, wastes may also be received at the facility in vials, lab packs, and tanker trucks. Off-site generators are responsible for collecting representative samples of their waste streams; however, PFF staff or waste brokers may perform this service for the generator. For waste streams which consist of multiple containers, a <u>grab</u> sample will be drawn from <u>at least</u> twenty percent (20%) of the total number of containers for each waste stream. COLIWASA methods are used for sampling containerized liquids. Sampling devices for other than containerized liquids may be weighted bottles, dippers, coliwasas, triers or other equivalent devices depending upon the characteristics of waste to be sampled. Sludges and/or solids are sampled using a scoop or similar device in order to obtain a representative sample.

The Perma-Fix treatment processes are batch operations. Therefore, PFF will either:

1) collect and analyze one grab sample from <u>the residue generated from each batch</u>; or

2) if residues <u>are</u> generated <u>from multiple treatment batches from the same waste stream,</u> collect one random grab sample from no less than 10% of the <u>total number of</u> containers <u>of</u> residues <u>generated</u>, composite the grab samples, and analyze the composite sample.

Perma-Fix treatment residues will be sampled using one of the following:

- coliwasa, dipper (liquids)
- trier, auger, scoop, tube sampler, dipper (solids, sludges)

Once a sample is drawn, the sample is placed in a sample container. The samples are stored in glass or polyethylene bottles, depending on whether organic analyses are conducted. The container is labeled with an identification of the sample source, the date and initials of the person taking the sample. In addition, the samples will be refrigerated if necessary to insure that volatile constituents do not evaporate.

2.8 Procedures for Ignitable, Reactive or Incompatible Wastes

PFF may handle ignitable, reactive or incompatible wastes. Prior to co-mingling wastes, PFF operations personnel will use existing waste analysis information provided by the generator, and/or published literature to determine if there is a potential danger in mixing incompatible wastes. Potentially incompatible wastes will also be bench tested in the on-site laboratory.

Materials will be considered incompatible <u>and will not be mixed together in containers, tanks or treatment processes</u> if they:

- Generate extreme heat or pressure, fire or explosions, or violent reactions;
- Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;
- Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;
- Damage the structural integrity of the <u>container, tank or treatment process or</u> facility;
- Through other like means threaten human health or the environment.

<u>The following resources, among others, may be referenced to evaluate incoming waste streams for potential incompatibility:</u>

<u>1. 40 CFR 264 Appendix V;</u>
<u>2. *Dangerous Properties of Industrial Materials*, 7th edition, N. Irving Sax and Richard J. Lewis, Sr., Van Nostrand Reinhold, New York, NY, 1989;</u>
<u>3. *Manual of Hazardous Chemical Reactions*, NFPA No. 491M-1975, National Fire Protection Association; and</u>
<u>4. *Handbook of Toxic and Hazardous Chemicals, Marshall Sitting*, Noyes Publications, Park Ridge, NJ, 1981.</u>

PFF will manage ignitable and reactive waste in accordance with the following procedures. Ignitable or reactive wastes are either stored in containers or tanks and are protected from sources if ignition or reaction. Activities that would produce open flames, hot surfaces, frictional heat, sparks, spontaneous ignition or radiant heat will not occur in the vicinity of ignitable wastes. As a safeguard for handling ignitable and reactive wastes, smoking is not allowed within the facility (except in designated areas).

Incompatible wastes are placed in separate secondary containment areas. Incompatible wastes are physically separated by the use of a berm, dike, or by placing them in separate buildings. Incompatible wastes will not be placed in the same container or tank. Figure I.D.1 in Part A of the facility's permit application illustrates the separate storage areas for containers of incompatible wastes. Ignitable wastes will be stored in the Processing and Storage building. See Figure I.D.4 in Part A of the facility permit application.

3.0 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

3.1 Sampling Quality Assurance/Quality Control

The quality assurance (QA) of sampling is controlled through the proper training of all personnel who are involved in sampling. In addition, chain of custody information is documented on each sample taken, usually in the form of an initialed label which is attached to the sample container.

Quality control (QC) on samples is measured by comparing the analytical results of the sample against its Pre-Acceptance Waste Profile Analysis. If a discrepancy is noted, a second sample may be obtained and analyzed to verify the results of the first analysis, or the instruments which yielded the discrepant result will be checked for proper calibration, programmed dilution factors, etc. Where applicable, and depending on the specific QA/QC requirements of a test procedure, a duplicate sample analysis will be performed to verify sampling and instrumentation quality control.

3.2 Laboratory Quality Control

The Perma-Fix on-site laboratory uses standard quality control procedures as part of the overall quality assurance program. These quality control procedures specify that QC checks must be conducted to verify that all analyses are accurate and precise. Each analytical procedure uses the following QC checks, where applicable:

Calibration and Reagent Standardization:
Each time an instrument is calibrated or a reagent is standardized, a record is kept of the results. The analytical methods specify the procedure and frequency required to maintain accuracy.

Known Standards:
If an instrument is not calibrated at an equivalent frequency, a known standard is analyzed on a frequent basis. Calibration or analysis of a known standard is done either daily or weekly, depending upon the specific requirements of the analytical method. Calibration or analysis of a known standard is done at least once for every 20 samples run, even if it is more frequent than weekly or daily.

Blanks:

Where applicable, blanks are run for each analytical method on a daily basis, and the results are recorded in the laboratory log.

Duplicates:
A duplicate sample is run, on the average, after the analysis of 10 or 20 samples, depending upon the method, and the results are recorded in the laboratory log.

Spiked Samples:
Where applicable, samples are spiked with the analyte and analyzed. Spikes are typically conducted after 10 or 20 samples, depending upon the method.

Attachment II.A.4.1

List of Waste Codes Accepted at the Facility

ATTACHMENT II.A.4.1

List of Waste Numbers for Waste Accepted at the Facility

EPA Hazardous Waste Number

D001	D021	D041	U037	U122
D002	D022	D042	U044	U124
D003	D023	D043	U052	U140
D004	D024	F001	U053	U154
D005	D025	F002	U055	U159
D006	D026	F003	U056	U161
D007	D027	F004	U057	U165
D008	D028	F005	U068	U169
D009	D029	P003	U070	U171
D010	D030	P022	U071	U196
D011	D031	P075	U072	U208
D012	D032	U001	U076	U209
D013	D033	U002	U077	U210
D014	D034	U003	U080	U211
D015	D035	U004	U083	U213
D016	D036	U012	U108	U220
D017	D037	U019	U110	U226
D018	D038	U027	U112	U227
D019	D039	U029	U117	U228
D020	D040	U031	U121	U239
				U328
				U353
				U359

Attachment II.A.4.2

Example Waste (Material) Profile Sheet

PERMA-FIX
ENVIRONMENTAL SERVICES

MATERIAL PROFILE FORM

Approval Number:

⁻A ID# ______________________

_⌄nerator Name ______________________

Generator Address ______________________

City/State/Zip ______________________

Telephone ______________________

For Broker Use Only

Broker______________________

Contact:______________________

Telephone______________________

❑Hazardous Waste ❑Mixed Waste *(requires Mixed Waste Profile)* ❑PCB(*requires PCB Addendum*) ❑Used Oil ❑Used Oil Filters

❑Universal Waste ❑Non-Hazardous Waste

Please provide a detailed description of the process that generated this waste:

Characterization Method: ❑Laboratory Analysis ❑MSDS ❑Generator Knowledge

Physical Description: ❑Solid ❑Liquid ❑Sludge

RCRA Waste Codes: ______________________

Volume: ______________________ Gross Weight:______________________

Container Type: ______________________ Total Number of Containers:______________

DOT Hazardous Material? ❑Yes ❑No

DOT Shipping Description:

____

____

❑This waste stream subject to the Land Disposal Restrictions of 40 CFR 268.
If checked, complete a Land Disposal Restriction Notification form.

❑This waste stream contains benzene.
If checked, complete the Benzene NESHAP worksheet.

For Broker Use Only:

I certify the following:

- The containers used to ship this material meet the requirements of 49 CFR 173 Subpart B (HazMat).
- This material will be inspected for consistency with the pre-approved profile at the time of transportation.

____
Signature Date

For Used Oil Only:

Does the used oil **exceed** any of the metals specification levels? ❑Yes ❑No
If yes, check which applies:
❑Arsenic - >5 ppm ❑Cadmium - >2 ppm ❑Chromium - >10 ppm ❑Lead - >100 ppm

Is the Total Organic Halogen (TOX) content greater than 1,000 ppm? ❑Yes ❑No
If yes, the used oil is presumed to be hazardous waste, unless a successful rebuttal is demonstrated.

Is the flashpoint less than 100°F? ❑Yes ❑No
If yes, the used oil is off-spec.

I certify that all hazards, known or suspected, have been disclosed on this profile. Further I understand that a surcharge may be imposed for any material which is rejected or requires additional handling due to the material being inconsistent with the profile, improper or damaged containers, or improper shipping documents.

______________________ ______________________ ______________
Signature Title Date

Perma-Fix Facility Use Only

❑Accepted

❑Accepted with the following conditions: ______________________

❑Rejected for the following reasons: ______________________

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PERMA-FIX ENVIRONMENTAL SERVICES

BENZENE NESHAP QUESTIONNAIRE

Generator:______________________________ Profile Number:____________

1. Does your facility have one of the following SIC codes?

2812 Alakalies and Chlorine	2861 Gum and Wood Chemicals
2813 Industrial Gases	2865 Cyclic Crudes and Intermediates
2816 Inorganic Pigments	2869 Industrial Organic Chemicals, NEC
2819 Industrial Inorganic Chemicals, NEC	2873 Nitrogenous Fertilizers
2821 Plastic Materials and Resins	2874 Phosphatic Fertilizers
2822 Synthetic Rubber	2875 Fertilizers, Mixing Only
2823 Cellulose Man-Made Fibers	2879 Agricultural Chemicals, NEC
2824 Organic Fibers, non-cellulosic	2891 Adhesives and Sealants
2833 Medicinals and Botanicals	2892 Explosives
2834 Pharmaceutical Preparations	2893 Printing Ink
2835 Diagnostic Substances	2895 Carbon Black
2836 Biological Products, exc. Diagnostic	2899 Chemical Preparations, NEC
2841 Soap and Other Detergents	2911 Petroleum Refining
2842 Polishes and Sanitation Goods	3312 Blast Furnaces and Steel Mills
2843 Surface Active Agents	4959 Sanitary Services, NEC
2844 Toilet Preparations	9511 Air, Water and Solid Waste Management
2851 Paint and Allied Products	
	NEC = not elsewhere classified

❑ Yes Please go to the next question
❑ No STOP. Please sign the certification at the end of this form.

2. What is your facility's total annual benzene (TAB) quantity generated? ______________lb/yr

If TAB is less than 22,000 lb/yr, STOP. Please sign the certification at the end of this form.

3. Is the TOTAL benzene concentration of this waste greater than 10 ppmw?
❑ Yes Please go to the next question
❑ No STOP. Please sign the certification at the end of this form.

4. Does this waste stream contain greater than 10% water?
❑ Yes
❑ No This waste stream is exempt.

Certification

I hereby certify, under penalty of law, that the above information is true, accurate and complete to the best of my knowledge.

__________________ __________________ ______________
Signature Title Date

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PERMA-FIX ENVIRONMENTAL SERVICES

PCB ADDENDUM

Generator:______________________________ Profile Number:________________

Waste Description
Please complete all sections of the table for each PCB waste stream.

Physical Description of Waste (e.g., sludge, dielectric fluid)	Number/Type of Containers	Total PCB Waste Weight	Date Article Removed from Service for Disposal	Total PCB Concentration

Certification

I hereby certify, under penalty of law, that the above information is true, accurate and complete to the best of my knowledge.

______________________ ______________________ ______________________
Signature Title Date

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Attachment II.A.4.3

Waste Analysis Parameters, Rationale and Applicability

Attachment II.A.4.3.
Waste Analysis Parameters, Rationale and Applicability

Parameter	Rationale	Perma-Fix Protocol	Method (see notes)	Applicability
Specific Gravity	Waste characteristic, fingerprint		ASTM D-1298 or ASTM 287	All liquid waste streams
pH	Waste characteristic, fingerprint	PAS-4000-004	SW-846 9040B or SW-846 9041A or SW-846-9045C	Liquid waste streams >20% H_2O
Percent Water	Wastte characteristic, fingerprint	PAS-4000-003	ASTM E 203-75 ASTM D 4017-81 ASTM D 1744-83 ASTM 4377-84	Waste fuel streams PTP liquid streams
Flash Point	Waste characteristic, determine ignitability	PAS-4000-002	SW-846 1010 ISO 2719	Non-haz waste streams
Gas Chromatograph (FID)	Waste characteristic, qualitative and quantitative evaluation of organic/hydrocarbons	PAS-4000-001	PAS Protocol	Fuels
Paint Filter Test	Identification of free liquids	PAS-4000-011	SW-846 9095	Optional analysis
BTU	Waste characteristic	PAS-4000-008	ASTM D-4809	Fuels
Sulfide Screen	Waste characteristic for PTP, identification of reactive wastes	PAS-4000-018	SW-846-9030 SW-846-9031 EPA 372.6	D003, F006, F019 Waste streams

Attachment II.A.4.3 (cont.)
Waste Analysis Parameters, Rationale and Applicability

Parameter	Rationale	Perma-Fix Protocol	Method (see notes)	Applicability
Cyanide Screen	Waste characteristic for PTP, identification of reactive wastes	PAS-4000-019	EPA 335.3 SW-846-9010 SW-846-9012 SW-846-9013	D003, F006, F019 Waste streams
Fuel Compatibility	Waste characteristic, fingerprint	PAS-4000-013	PAS Protocol	Waste fuels
Chlorides/Halogen Chlorides/Halogen, (TOX) Chloride/Halogen, (Test Kit)	Fingerprint, screen for chloride content	PAS-4000-007 PAS-4000-014 Manufacturer's specification	SW-846 5050 SW-846 9252A SW-846-9253 SW-846-9076 SW-846-9023 SW-846-9077	Halogenated solvents Waste streams
PCB Screen	Screen for TSCA wastes	PAS-2000-004	Chlor-N-Oil, Chlor-N-Soil, SW-846-8080, EPA 608	Waste paint Used oil Petroleum contaminated soil Petroleum contact water
Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)	Waste characteristic	PAS-4000-015	SW-846-1311 SW-846-3051 SW-846-6010A SW-846-7470A SW-846-7471A	PTP metals stream TCLP (PTP treated metals)

Attachment II.A.4.4

Summary of Pre-Acceptance Analyses ~~and Acceptance Limits~~

Attachment II.A.4.4

Summary of Pre-Acceptance Analyses ~~and Acceptance Limits~~
~~Fuel Blending & Perma-Fix I Treatment Process~~

Type of Analysis	Pre-Acceptance Waste Profile Analysis	Waste Receipt Analysis	~~Acceptance Range~~
Specific Gravity[1]	X	X	~~None~~
pH	X	X	~~None~~
Percent water	X	X	~~None~~
Flash point	X	X	~~None~~
Gas Chromatographic (FID) ~~(Volatiles)~~ (Organics/Hydrocarbons)	X	X	~~None~~
Paint Filter Test	(optional analysis)	(optional analysis)	~~None~~
BTU	X		~~None~~
PCBs	X		~~None~~
Sulfide Screen	X[2]		~~None~~
Cyanide Screen	X[2]		~~None~~
Fuel compatibility		X[3]	~~None~~
Chlorides/Halogen, (TOX)	X	X	~~None~~
Metals			
Arsenic	X		~~None~~
Barium	X		~~None~~
Cadmium	X		~~None~~
Chromium	X		~~None~~
Lead	X		~~None~~
Mercury	X		~~None~~
Selenium	X		~~None~~
Silver	X		~~None~~

[1] Liquids only
[2] Performed for wastes that will be treated using the Perma-Fix I treatment process
[3] Bulked materials and lab packs

Attachment II.A.4.5

Potential Incompatibility Testing Procedure

ATTACHMENT II.A.4.5

POTENTIAL INCOMPATIBILITY TESTING PROCEDURE

PFF currently mixes different waste streams during bulking operations for its waste-derived fuels blending operations. Although it is not anticipated that different waste streams will be routinely mixed and treated in the same batch during Perma-Fix® treatment operations, the need exists to confirm the compatibility of individual waste streams that may come into contact with other waste streams and with treatment additives used in the Perma-Fix treatment processes. In addition to avoiding undesirable chemical reactions such as those listed in 40 CFR 264.17(b), potential reactions that may be incompatible with the treatment processes or equipment (e.g., polymerization of liquid wastes into a solid inside process equipment, excessive foaming, synergistic interference with the effectiveness of a treatment process, etc.) need to be identified.

In situations where there is a need to mix different waste streams together or to mix treatment additives with waste streams, samples of the wastes (and additives as appropriate) will first be segregated into compatibility groups based on the available waste generator material profile and analytical data. Next, samples from within each of these groups will be blended together and observed for changes in temperature, pH and other signs of chemical reactions such as fumes, smoke, bubbles, color changes, and changes in viscosity. See 40 CFR 264.17(b). Observation will be continuous for the first five minutes after blending. The samples will then be periodically (every 5-10 minutes) inspected during a 30-minute period following blending. Any counter-indications to mixing or treatment will be evaluated further. For example, tests may be conducted to determine whether blending with different wastes or in smaller or more dilute quantities would allow the mixing or treatment to proceed in a safe manner. Mixing of wastes will be prohibited or managed in accordance with the observations and determinations made as described above.

Samples of wastes and treatment additives intended for treatment using the Perma-Fix treatment processes will be mixed in a manner simulating the entire treatment processes (Perma-Fix and/or Perma-Fix II) on a bench scale prior to full scale processing. In addition, samples of waste streams intended for fuel blending will be tested for compatibility prior to blending.

Attachment II.A.5

Acceptable Hazardous Waste and Waste Constituents

Attachment II.A.5

Acceptable Hazardous Waste and Waste Constituents

Attachment II.A.5.1

Waste Code	Description
D001	Ignitable Waste
D002	Corrosive Waste
D003	Reactive Waste (not DOT Class I (explosive) hazardous materials)
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium
D008	Lead
D009	Mercury
D010	Selenium
D011	Silver
D012	Endrin
D013	Lindane
D014	Mehtoxychlor
D015	Toxaphene
D016	2,4-D
D017	2,4,5-TP (Silvex)
D018	Benzene
D019	Carbon Tetrachloride
D020	Chlordane
D021	Chlorobenzene
D022	Chloroform
D023	o-Cresol
D024	m-Cresol
D025	p-Cresol
D026	Cresol
D027	1,4-Dichlorobenzene
D028	1,2-Dichloroethane
D029	1,1-Dichloroethylene
D030	2,4-Dinitrotoluene
D031	Heptachlor (and its epoxide)
D032	Hexachlorobenzene
D033	Hexachlorobutadiene
D034	Hexachloroethane
D035	Methyl ethyl ketone
D036	Nitrobenzene
D037	Pentrachlorophenol
D038	Pyridine
D039	Tetrachloroethylene
D040	Trichloroethylene
D041	2,4,5-Trichlorophenol
D042	2,4,6-Trichlorophenol

Waste Code	Description
D041	2,4,5-Trichlorophenol
D042	2,4,6-Trichlorophenol
D043	Vinyl chloride
	F-Codes
F001	The following spent halogenated solvents used in degreasing; tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixture.
F002	The following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluorethane, orthodichlorobenzene,trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F003	The following spent non-halogenated solvents; xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F004	The following spent non-halogenated solvents: cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F005	The following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or

Waste Code	Description
	more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
~~F006~~	~~Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating carbon steel; and (6) chemical etching and milling aluminum.~~
~~F007~~	~~Spent cyanide plating bath solutions from electroplating operations.~~
~~F008~~	~~Plating sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process.~~
~~F009~~	~~Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.~~
~~F019~~	~~Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.~~
~~F037~~	~~Petroleum refinery primary oil/water/solids separation sludge - Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated in aggressive biological treatment units as defined in Sec. 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.~~
~~F038~~	~~Petroleum refinery secondary (emulsified) oil/water/solids separation sludge - Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not~~

Waste Code	Description
	~~receive dry weather flow, sludges generated in aggressive biological treatment units as defined in Sec. 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.~~
~~F039~~	~~Leachate resulting from the treatment, storage, or disposal of wastes classified by more than one waste code under Subpart D, or from a mixture of wastes classified under Subparts C and D of this part. (Leachates resulting from the management of one or more of the following EPA Hazardous Wastes and no other hazardous wastes retains it hazardous waste code(s): F020, F021, F022, F023, F027, and/or F028.~~
~~K-Codes~~	
~~K035~~	~~Wastewater treatment sludges generated in the production of creosote.~~
~~K048~~	~~Dissolved air flotation (DAF) float from the petroleum refining industry.~~
~~K049~~	~~Slop oil emulsion solids from the petroleum refining industry.~~
~~K050~~	~~Heat exchanger bundle cleaning sludge from the petroleum refining industry.~~
~~K051~~	~~API separator sludge from the petroleum refining industry.~~
~~K052~~	~~Tank bottoms (leaded) from the pertroleum refining industry.~~
~~K141~~	~~Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coake from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations).~~
~~K142~~	~~Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.~~
~~K143~~	~~Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.~~
~~K144~~	~~Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.~~
~~K145~~	~~Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.~~
~~K147~~	~~Tar storage tank residues from coal tar refining.~~
~~K148~~	~~Residues from coal tar distillation, including but not limited to, still bottoms.~~
~~K149~~	~~Distillation bottoms from the production of alpha- (or methyl-)~~

Waste Code	Description
	~~chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups (This waste does not include still bottms from the distillation of benzyl chloride).~~
~~K150~~	~~Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.~~
~~K151~~	~~Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these funcational groups.~~
	~~P-Codes~~
~~P001~~	~~2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%~~
~~P002~~	~~Acetamide, N-(aminothioxomehtyl)-; 1-Acetyl-2-thiourea~~
P003	Acrolein; 2-Propenal
~~P004~~	~~Aldrin; 1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a-hexahydro-, (1alpha, 4alpha, 4abeta, 5alpha, 8alpha, 8abeta)-~~
~~P005~~	~~Allyl alcohol; 2-Propen-1-ol~~
~~P006~~	~~Aluminum phosphide~~
~~P007~~	~~5-(Aminomehtyl)-3-ixoxazolol, 3(2H)-Isoxazolone, 5-(aminomethyl)-~~
~~P008~~	~~4-Aminopyridine; 4-Pyridinamine~~
~~P009~~	~~Ammonium picrate; Phenol, 2,4,6-trinitro-, ammonium salt~~
~~P010~~	~~Arsenic acid H_3AsO_4~~
~~P011~~	~~Arsenic Oxide As2O5~~
~~P011~~	~~Arsenic pentoxide~~
~~P012~~	~~Arsenic oxide As_2O_3; Arsenic trioxide~~
~~P013~~	~~Barium cyanide~~
~~P014~~	~~Benzenethiol; Thiophenol~~
~~P015~~	~~Beryllium~~
~~P016~~	~~Dichloromethyl ehter; Methane, oxybis[chloro~~
~~P017~~	~~Bromoacetone; 2-Propanone, 1-bromo~~
~~P018~~	~~Brucine; Strychnidin-10-one, 2,3-dimethoxy~~
~~P020~~	~~Dinoseb; Phenol, 2-(1-mehtylpropyl)-4, 6-dinitro-~~
~~P021~~	~~Calcium cyanide~~
P022	Carbon disulfide
~~P023~~	~~Acetaldehyde, chloro-; Chloroacetaldehyde~~

Waste Code	Description
~~P024~~	~~Benzenamine, 4-chloro-; p-Chloroaniline~~
~~P026~~	~~1-(o-Chlorophenyl)thiourea; Thiourea, (2-chlorophenyl)~~
~~P027~~	~~3-Chloropropionitrile; Propanenitrile, 3-chloro~~
~~P028~~	~~Benzene, (chloromethyl)-; Benzyl chloride~~
~~P029~~	~~Copper cyanide; Copper cyanide Cu(CN)~~
~~P030~~	~~Cyanides (soluble cyandie salts), not otherwise specified~~
~~P031~~	~~Cyanogen~~
~~P033~~	~~Cyanogen chloride~~
~~P034~~	~~2-Cyclohexyl-4,6-dinitrophenol; Phenol, 2-cyclohexyl-4,6-dinitro-~~
~~P036~~	~~Arsonous dichloride, phenyl~~
~~P037~~	~~Dieldrin; 2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta,7aalpha)-~~
~~P038~~	~~Arsine, diethyl-; Diethylarsine~~
~~P039~~	~~Disulfoton; Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester~~
~~P040~~	~~O,O-Ditthyl O-pyrazinyl-phosphorothioate; Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester~~
~~P041~~	~~Diethyl-p-nitrophenyl hosphate; Phosphoric acid, diethyl 4-nitrophenyl ester~~
~~P042~~	~~1,2-Benzenediol, 4-(1-hydroxy-2-(methy(amino)ethyl)-; Epinephrine~~
~~P043~~	~~Diisopropylfluorophosphate (DFP); Phosphorofluoridic acid, bis(1-methylethyl) ester~~
~~P044~~	~~Dimethoate; Phosphorodithioic acid, O,O-dimethyl S-[2-(methyl-amino)-2-oxoethyl] ester~~
~~P045~~	~~2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[methylamino)carbonyl] oxime; Thiofanox~~
~~P046~~	~~Benzeneethanamine, alpha, alhpha-dimethyl-; Alpha,alpha-Dimethylphenethylamine~~
~~P047~~	~~4,6-Dinitro-o-cresol, & salts; Phenol, 2-methyl-4,6-dinitro-, & salts~~
~~P048~~	~~2,4-Dinitrophenol; Phenol, 2,4-dinitro~~
~~P049~~	~~Dithiobiuret; Thioimidodicarbonic diamide [(H2N)C(S)]2NH-~~
~~P050~~	~~Endosulfan; 6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide~~
~~P051~~	~~2,7:3,6-dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,3alpha,6alpha,6abeta,7beta,7aalpha)-, & metabolites; Endrin; Endrin, & metabolites~~
~~P054~~	~~Aziridine; Ethyleneimine~~
~~P056~~	~~Fluorine~~

Waste Code	Description
~~P057~~	~~Acetamide, 2-fluoro-; Fluroracetamide~~
~~P058~~	~~Acetic acid, fluoro-, sodium salt; Fluoroacetic acid, sodium salt~~
~~P059~~	~~Heptachlor; 4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-~~
~~P060~~	~~1,4,5,8-dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a-hexahydro-(1alpha, 4alpha, 4abeta, 5beta, 8beta,8abeta)-; Isodrin~~
~~P062~~	~~Hexaethyl tetraphosphate; Tetraphosphoric acid, hexaethyl ester~~
~~P063~~	~~Hydrocyanic acid; Hydrogen cyanide~~
~~P064~~	~~Methane, isocyanato-~~
~~P065~~	~~Fulminic aicd, mercury(2+) salt~~
~~P066~~	~~Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester; Methomyl~~
~~P067~~	~~1,2-Propylenimine; Aziridine, 2-methyl-~~
~~P068~~	~~Hydrazine, methyl-; Methyl hydrazine~~
~~P069~~	~~2-Methyllactonitrile; Propanenitrile, 2-hydroxy-2-mehtyl-~~
~~P070~~	~~Aldicarb; Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime~~
~~P071~~	~~Methyl parathion; Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester~~
~~P072~~	~~alpha-Naphthythiourea; Thiourea, 1-naphthalenyl-~~
~~P073~~	~~Nickel carbonyl; Nickel carbonyl Ni(CO)$_4$~~
~~P074~~	~~Nickel cyanide~~
P075	Nicotine & salts; Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
~~P076~~	~~Nitric oxide; Nitrogen oxide NO~~
~~P077~~	~~Benzenamine, 4-nitro-; p-Nitroaniline~~
~~P078~~	~~Nitrogen dioxide; Nitrogen oxide NO$_2$~~
~~P081~~	~~Nitroglycerine; 1,2,3-Propanetriol, trinitrate~~
~~P082~~	~~Methanamine, N-methyl-N-nitroso-; N-nitrosodimethylamine~~
~~P084~~	~~Nitrosomethylvinylamine; Vinylamine, N-methyl-N-nitroso-~~
~~P085~~	~~Diphosphoramide, octamethyl-; Octamethylpyrophosphoramide~~
~~P087~~	~~Osmium oxide OsO$_4$; Osmium tetroxide~~
~~P088~~	~~Endothall; 7-Oxabicyclo[2,2,1]heptane-2,3-dicarboxylic acid~~
~~P089~~	~~Parathion; Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester~~
~~P092~~	~~Mercury, (acetato-O)phenyl-~~
~~P093~~	~~Phenythiourea; Thiourea, phenyl-~~
~~P094~~	~~Phorate; Phosphorodithioic acid, O,O-diethyl S-[(elthylthio)methyl] ester~~
~~P095~~	~~Carbonic dichloride; Phosgene~~

Waste Code	Description
~~P096~~	~~Hydrogen phosphide; Phosphine~~
~~P097~~	~~Famphur; Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester~~
~~P098~~	~~Potassium cyanide; Potassium cyanide K(CN)~~
~~P099~~	~~Argentate(1-), bis(cyano-C)-, potassium~~
~~P101~~	~~Ethyl cyanide~~
~~P102~~	~~Propargyl alcohol; 2-Propyn-1-ol~~
~~P103~~	~~Selenourea~~
~~P104~~	~~Silver cyanide; Silver cyanide Ag(CN)~~
~~P105~~	~~Sodium azide~~
~~P106~~	~~Sodium cyanide; Sodium cyanide Na(CN)~~
~~P108~~	~~Strychnidin-10-one, & salts; Strychnine, & salts~~
~~P109~~	~~Tetraethyldithiopyrophosphate; Thiodiphosphoric acid, tetraethyl ester~~
~~P110~~	~~Tetraethyl lead~~
~~P111~~	~~Diphosphoric acid, tetraethyl ester; Tetraethyl pyrophosphate~~
~~P112~~	~~Methane, tetranitro-; Tetranitromethane (R)~~
~~P113~~	~~Thallic oxide~~
~~P114~~	~~Selenious acid, dithallium (1+)salt~~
~~P115~~	~~Sulfuric acid, dithallium (1+) salt; thallium (I) sulfate~~
~~P116~~	~~Hydrazinecarbothioamide; Thiosemicarbazide~~
~~P118~~	~~Methanethiol, trichloro-; Trichloromethanethiol~~
~~P119~~	~~Ammonium vanadate; Vanadic acid, ammonium salt~~
~~P120~~	~~Vanadium oxide V_2O_5; Vanadium pentoxide~~
~~P121~~	~~Zinc cyanide; Zinc cyanide $Zn(CN)_2$~~
~~P122~~	~~Zinc phosphide Zn_3P_2, when present at concentrations greater than 10%~~
~~P123~~	~~Toxaphene~~
~~P127~~	~~7-Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylepyrrolo[2,3-b]indol-5-yl carbomate ester (1:1)~~
~~P128~~	~~Mexacarbamate~~
~~P185~~	~~Tirpate~~
~~P188~~	~~Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylepyrrolo[2,3-b]indol-5-yl carbomate ester (1:1)~~
~~P189~~	~~Carbamic acid, [cdibutylamino)-thio]-methyl-2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester~~
~~P190~~	~~Carbamic acid, methyl-3-methylphenyl ester~~
~~P191~~	~~Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]-5-methyl-1H-pyrazol-3-yl ester~~
~~P192~~	~~Carbamic acid, dimethyl-,3-methyl-1-(1-methyl-ethyl-)-1H-pyrazol-5-yl ester~~

Waste Code	Description
~~P194~~	~~Ethanimidothioc acid, 2-(dimethylamino)-N-[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester~~
~~P196~~	~~Manganese,bis(dimethylcarbamodithioato-S,5Á)-~~
~~P197~~	~~Form paramate~~
~~P198~~	~~Methanimidamide,N,N-dimethyl-NÁ-[3-[(methylamino)carbonyl]oxy]phenyl]-monohydrochloride~~
~~P199~~	~~Methiocarb~~
~~P201~~	~~Promecarb~~
~~P202~~	~~Phenol,3-(1-methylethyl)-methyl carbamate~~
~~P203~~	~~Propanal, 2-methyl-2-(methyl-sulfonyl)-,O-[(methylamino)carbonyl]oxime~~
~~P204~~	~~Pyrrolo[2,3-b]indol-5-ol,1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl methyl carbamate (ester),(3aS-cis)-~~
U-Codes	
U001	Acetaldehyde; Ehanal
U002	Acetone; 2-Propanone
U003	Acetonitrile
U004	Acetophenone; Ehtanone, 1-phenyl-
~~U005~~	~~2-Acetylaminofluorene; Acetamide, N-9H-fluoren-2-yl~~
~~U006~~	~~Acetyl chloride~~
~~U007~~	~~Acrylamide; 2-Propenamide~~
~~U008~~	~~Acrylic acid; 2-Propenoic acid,~~
~~U009~~	~~Acrylonitrile; 2-Propenenitrile~~
~~U010~~	~~Azirino[2Á,3Á:3,4]pyrrolo[1,2-a]indole-4,7-dione, amino-8-[(aminocarbonyl)oxy/methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-,[1aS-(1aalpha, 8beta,8aalpha,8balpha)]; Mitomycin C~~
~~U011~~	~~Amitrole; 1-H-1,2-4-Triazol-3-amine~~
U012	Aniline; Benzenamine
~~U014~~	~~Auramine; Benzenamine, 4,4Á-carbonimidoylbis/N,N-dimethyl-~~
~~U015~~	~~Azaserine; L-Serine, diazoacetate (ester)~~
~~U016~~	~~Benz[c]-acridine~~
~~U017~~	~~Benzal chloride; Benzene, (dichloromethyl)~~
~~U018~~	~~Benz[a]anthracene~~
U019	Benzene
~~U020~~	~~Benzenesulfonic acid chloride; Benzenesulfonyl chloride~~
~~U021~~	~~Benzidine; [1,1Á-Biphenyl]-4,4Ádiamine~~
U022	Benzo[a]pyrene
~~U023~~	~~Benzotrichloride; Benzene, (trichloromethyl)~~
~~U024~~	~~Ethane, 1,1Á-[methylenebis(oxy)]bis[2-chloro-; Dichloromethoxy ethane~~

Waste Code	Description
~~U025~~	~~Dichloroethyl ether; Ehtane, 1,1Á-oxybis[2-chloro~~
~~U026~~	~~Chlornaphazin; Naphthalenamine, N,NÁ-bis(2-chloroethyl)-~~
U027	Dichloroisopropyl ether; Propane, 2,2Á-oxybis[2-chloro-
~~U028~~	~~1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester; Diethylhexyl phthalate~~
U029	Methane, bromo-; Methyl bromide
~~U030~~	~~Benzene, 1-bromo-4-phenoxy-; 4-Bromophenyl phenyl ether~~
U031	1-Butanol; n-Butyl alcohol
~~U032~~	~~Calcium chromate; Chromic acid H_2CrO_4, calcium salf~~
~~U033~~	~~Carbon oxyfluoride; Carbonic difluoride~~
~~U034~~	~~Chloral; Acetaldehyde, trichloro-~~
~~U035~~	~~Chlorambucil, Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-~~
~~U036~~	~~Chlordane, alpha & gamma isomers; 4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-, 2,3,3a,4,7,7a-hexahydro-~~
U037	Benzene, chloro-; Chlorobenzene
~~U038~~	~~Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester; Chlorobenzilate~~
~~U039~~	~~p-Chloro-m-cresol; Phenol, 4-chloro-3-methyl-~~
~~U041~~	~~Epichlorohydrin; Oxirane, (chloromethyl)-~~
~~U042~~	~~2-Chloroethyl vinyl ether; Ethene (2-chloroethyoxy)-~~
~~U042~~	~~Ethene, (2-chloroethoxy)-~~
~~U043~~	~~Ethene, chloro-; vinyl chloride~~
U044	Chloroform; Methane, trichloro-
~~U045~~	~~Methyl chloride; Methane, chloro-~~
~~U046~~	~~Methane, chloromethoxy-; Chloromethyl methyl ether~~
~~U047~~	~~beta-Chloronaphthalene; Naphthalene, 2-chloro-~~
~~U048~~	~~Phenol, 2-chloro-; o-Chlorophenol~~
~~U049~~	~~4-Chloro-o-toluidine, hydrochloride; Benezenamine, 4-chloro-2-methyl, hydrochloride~~
~~U050~~	~~Chrysene~~
~~U051~~	~~Creosote~~
U052	Cresol (Cresylic acid); Phenol, methyl-
U053	2-Butenal; Crotonaldehyde
U055	Cumene; Benzene, (1-methylethyl)-
U056	Benzene, hexahydro-; Cyclohexane
U057	Cyclohexanone
~~U058~~	~~Cyclophosphamide; 2H-1,3,2-Oxazaphosphorin-2-amine,N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide~~
~~U059~~	~~5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopryranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-; Daunomycin~~
~~U060~~	~~Benzene, 1,1Á-(2,2-dichloroethylidene)bis[4-chloro-; DDD~~

Waste Code	Description
~~U061~~	~~DDT; Benzene, 1,1Á-(2,2,2-trichloroethylidene)bis[4-chloro-~~
~~U062~~	~~Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester; Diallate~~
~~U063~~	~~Dibenz[a,h]anthracene~~
~~U064~~	~~Dibenzo[a,i]pyrene; Benzo(rst)pentaphene~~
~~U065~~	
~~U066~~	~~1,2-Dibromo-3-chloropropane; Propane, 1,2-dibromo-3-chloro-~~
~~U067~~	~~Ethane, 1,2-dibromo-; Ethylene dibromide~~
U068	Methane, dibromo-; Methylene bromide
~~U069~~	~~Dibutyl phthalate; 1,2-Benzenedicarboxylic acid, dibutyl ester~~
U070	o-Dichlorobenzene; Benzene, 1,2-dichloro-
U071	m-Dichlorobenzene; Benzene, 1,3-dichloro-
U072	Benzene, 1,4-dichloro-; p-Dichlorobenzene
~~U073~~	~~3,3Á-Dichlorobenzidine; [1,1Á-Biphenyl]-4,4Ádiamine, 3,3-dichloro-~~
~~U074~~	~~1,4-Dichloro-2-butene; 2-Butene, 1,4-dichloro-~~
~~U075~~	~~Dichlorodifluoromethane, Methane, dichlorodifluoro-~~
U076	Ethane, 1,1-dichloro-; Ethylidene dichloride
U077	Ethane, 1,2-dichloro-; Ethylene dichloride
~~U078~~	~~Ethane, 1,1-dichloro-; 1,1-Dichloroethylene~~
~~U079~~	~~1,2-Dichloroethylene; Ethene, 1,2-dichloro-~~
U080	Methylene chloride; Methane, dichloro-
~~U081~~	~~Phenol, 2,4-dichloro-; 2,4-Dichlorophenol~~
~~U082~~	~~Phenol, 2,6-dichloro-; 2,6-Dichlorophenol~~
U083	Propane, 1,2-dichloro-; Propylene dichloride
~~U084~~	~~1-Propene, 1,3-dichloro-; 1,3-Dichloropropene~~
~~U085~~	~~2,2Á-Bioxirane~~
~~U086~~	~~N,NÁ-Diethylhydrazine; Hydrazine, 1,2-diethyl-~~
~~U087~~	~~Phosophorodithioic acid, O,O-diethyl s-methyl ester; O,O-Diethyl S-methyl dithiohosphate~~
~~U088~~	~~Diethyl phthalate; 1,2-Benzenedicarboxylic acid, diethyl ester~~
~~U089~~	~~Diethylstilbesterol; Phenol, 4,4Á-(1,2-diethyl-1,2-ethenediyl)bis-~~
~~U090~~	~~1,3-Benzodioxole, 5-propyl-; Dihydrosafrole~~
~~U091~~	~~3,3Á-Dimethoxybenzidine; [1,1Á-Biphenyl]-4,4Ádiamine, 3,3Á-dimethoxy-~~
~~U092~~	~~Dimethylamine; Methanamine, N-methyl-~~
~~U093~~	~~p-Dimethylaminoazobenzene; Benzenamine, N,N-dimethyl-4-(phenylazo)-~~
~~U094~~	~~7,12-Dimethylbenz[a]anthracene; Benz[a]anthracene, 7,12-dimethyl-~~
~~U095~~	~~3,3Á-Dimethylbenzidine; [1,1Á-Biphenyl]-4,4Á-diamine, 3,3Á-dimethyl-~~

Waste Code	Description
~~U096~~	~~Hydroperoxide, 1-methyl-1-phenylethyl-; alpha, alpha-Dimethylbenzlhydroperoxide~~
~~U097~~	~~Dimethylcarbamoyl chloride; Carbamic chloride, dimethyl-~~
~~U098~~	~~1,1-Dimethylhydrazine; Hydrazine, 1,1-dimethyl-~~
~~U099~~	~~Hydrazine, 1,2-dimethyl-; 1,2-Dimethylhydrazine~~
~~U101~~	~~Phenol, 2,4-dimethyl-; 2,4-Dimethylphenol~~
~~U102~~	~~Dimethyl phthalate; 1,2-Benzenedicarboxylic acid, dimethyl ester~~
~~U103~~	~~Sulfuric acid, dimethyl ester; Dimethyl sulfate~~
~~U105~~	~~2,4-Dinitrotoluene; Benzene, 1-methyl-2,4-dinitro-~~
~~U106~~	~~2,6-Dinitrotoluene; Benzene, 2-methyl-1,3-dinitro-~~
~~U107~~	~~Di-n-octyl phthalate; 1,2-Benzenedicarboxylic acid, dioctyl ester~~
U108	1,4-Dioxane; 1,4-Diethyleneoxide
~~U109~~	~~1,2-Diphenylhydrazine; Hydrazine, 1,2-diphenyl-~~
U110	Dipropylamine; 1-Propanamine, N-propyl-
~~U111~~	~~1-Propanamine, N-nitroso-N-propyl; Di-n-propylnitrosamine~~
U112	Ethyl acetate; Acetic acid, ethyl ester
~~U113~~	~~Ethyl acrylate; 2-Propenoic acid, ethyl ester~~
~~U114~~	~~Ethylenebisdithiocarbamic acid, salts & esters; Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters~~
~~U115~~	~~Ethylene oxide; Oxirane~~
~~U116~~	~~Ethylenethiourea; 2-Imidazolidinethione~~
U117	Ethyl ether; Ethane, 1,1Á-oxybis
~~U118~~	~~Ethyl methacrylate; 2-Propenoic acid, 2-methyl-, ethyl ester~~
~~U119~~	~~Ethyl methanesulfonate; Methanesulfonic acid, ethyl ester~~
~~U120~~	~~Fluoranthene~~
U121	Methane, trichlorofluoro-; Trichloromonofluoromethane
U122	Formaldehyde
~~U123~~	~~Formic acid~~
U124	Furan; Furfuran
~~U125~~	~~2-Furancarboxaldehyde; Furfural~~
~~U126~~	~~Glycidylaldehyde; Oxiranecarboxyaldehyde~~
~~U127~~	~~Hexachlorobenzene; Benzene, hexachloro-~~
~~U128~~	~~Hexachlorobutadiene; 1,3-Butadiene, 1,1,2,3,4,4-hexachloro-~~
~~U129~~	~~Lindane; Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha, 2alpha, 3beta, 4alpha, 5alpha, 6beta)~~
~~U130~~	~~Hexachlorocyclopentadiene; 1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-~~
~~U131~~	~~Hexachloroethane; Ethane, hexachloro-~~
~~U132~~	~~Hexachlorophene; Phenol, 2,2Á-methylenebix/3,4,6-trichloro-~~
~~U133~~	~~Hydrazine~~

Waste Code	Description
~~U134~~	~~Hydrofluoric acid; Hydrogen fluoride~~
~~U135~~	~~Hydrogen sulfide; Hydrogen sulfide H_2S~~
~~U136~~	~~Cacodylic acid; Arsinic acid, dimethyl~~
~~U137~~	~~Ideno/1,2,3-cd/pyrene~~
~~U138~~	~~Methane, iodo-; Methyl iodide~~
U140	Isobutyl alcohol; 1-Propanol, 2-methyl-
~~U141~~	~~Isosafrole; 1,3-Benzodioxole, 5-(1-propenyl)-~~
~~U142~~	~~Kepone; 1,3,4-Metheno-2H-cyclobutal[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-~~
~~U143~~	~~Lasiocarpine; 2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S/1alpha(z), 7(2S*,3R*), 7aalpha/]-~~
~~U144~~	~~Lead acetate; Acetic acid, lead (2+) salt~~
~~U145~~	~~Lead phosphate; Phosphoric acid, lead(2+) salt (2:3)~~
~~U146~~	~~Lead, bis(acetato-O)tetrahydroxytri-; Lead subacetate~~
~~U147~~	~~Maleic anhydride; 2,5-Furandione~~
~~U148~~	~~Maleic hydrazide; 3,6-Pyridazinedione, 1,2-dihydro-~~
~~U149~~	~~Malononitrile; Propanedinitrile~~
~~U150~~	~~Melphalan; L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-~~
~~U151~~	~~Mercury~~
~~U152~~	~~Methacrylonitrile; 2-Propenenitrile, 2-methyl-~~
~~U153~~	~~Methanethiol; Thiomethanol~~
U154	Methanol; Methyl alcohol
~~U155~~	~~Methapyrilene; 1,2-Ethanediamine, N,N-dimethyl-NÁ-2-pyridinyl-NÁ-(2-thienylimethyl)-~~
~~U156~~	~~Carbonochloridic acid, methyl ester; Methyl chlorocarbonate~~
~~U157~~	~~3-Methylcholanthrene; Benz/j/aceanthrylene, 1,2-diydro-3-methyl-~~
~~U158~~	~~4,4Á-Methylenebis (2-chloroaniline); Benzenamine, 4,4Á-methylenebis/2-chloro-~~
U159	Methyl ethyl ketone (MEK); 2-Butanone
~~U160~~	~~Methyl ethyl ketone peroxide; 2-Butanone, perioxide~~
U161	Methyl isobutyl ketone; 4-Methyl-2-pentanone; Pentanol, 4-methyl-
~~U162~~	~~Methyl methacrylate; 2-Propenoic acid, 2-methyl-, methyl ester~~
~~U163~~	~~MNNG; Guanidine, N-methyl-NÁ-notro-N-nitroso-~~
~~U164~~	~~Methylthiouracil; 4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-~~
U165	Naphthalene
~~U166~~	~~1,4-Naphthalenedione; 1,4-Naphthoquinone~~

Waste Code	Description
~~U167~~	~~1-Nephthalenamine; alpha-Napththylamine~~
~~U168~~	~~beta-Naphthylamine; 2-Naphthalenamine~~
U169	Nitrobenzene; Benzene, nitro-
~~U170~~	~~p-Nitrophenol; Phenol, 4-nitro-~~
U171	2-Nitropropane; Propane, 2-nitro-
~~U172~~	~~N-Nitrosodi-n-butylamine; 1-Butanamine, N-butyl-N-nitroso-~~
~~U173~~	~~N-Nitrosodiethanolamine; Ethanol, 2,2Á-(nitrosolmino)bis-~~
~~U174~~	~~N-Nitrosodiethylamine; Ethanamine, N-ethyl-N-nitroso-~~
~~U176~~	~~N-Nitroso-N-ethylurea; Urea, N-ethyl-N-nitroso-~~
~~U177~~	~~N-Nitroso-Nmethylurea; Urea, N-methyl-N-nitroso-~~
~~U178~~	~~N-Nitroso-N-methylurethane; Carbamic acid, methylinitroso-, ethyl ester-~~
~~U179~~	~~N-Nitrosopiperidine; Piperidine, 1-nitroso-~~
~~U180~~	~~N-Nitrosopyrrolidine; Pyrrolidine, 1-nitroso-~~
~~U181~~	~~5-Nitro-o-toluidine; Benzenamine, 2-methyl-5-nitro-~~
~~U182~~	~~Paraldehyde; 1,3,5-Trioxane, 2,4,6-trimethyl-~~
~~U183~~	~~Pentachlorobenzene; Benzene, pentachloro-~~
~~U184~~	~~Penthachloroethane; Ethane, pentachloro-~~
~~U185~~	~~Pentachloronitrobenzene (PCNB); Benzene, penachloronitro-~~
~~U186~~	~~1,3-Pentadiene; 1-Methylbutadiene~~
~~U187~~	~~Phenacetin; Acetamide, N-(4-thoxyphenyl)-~~
~~U188~~	~~Phenol~~
~~U189~~	~~Phosphorus sulfide; Sulfur phosphide~~
~~U190~~	~~Phthalic anhydride; 1,3-Isobenzofurandione~~
~~U191~~	~~2-Picoline; Pyridine, 2-methyl-~~
~~U192~~	~~Pronamide; Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-~~
~~U193~~	~~1,3-Propane sultone; 1,2-Oxathiolane, 2,2-dioxide~~
~~U194~~	~~1-Propanamine; n-Propylamine~~
U196	Pyridine
~~U197~~	~~2,5-Cyclohexadiene-1,4-dione; p-Benzoquinone~~
~~U200~~	~~Reserpine; Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy-], methyl ester, (3beta, 16beta, 17alpha, 18beta, 20alpha)-~~
~~U201~~	~~Resorciniol; 1,3-Benzenediol~~
~~U202~~	~~Saccharin, & salts; 1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts~~
~~U203~~	~~1,3-Benzodioxole, 5-(2-propenyl)-; Safrole~~
~~U204~~	~~Selenious acid; Selenium dioxide~~
~~U205~~	~~Selenium sulfide; Selenium sulfide SeS_2 (R,T)~~
~~U206~~	~~Streptozoticin; Glucopyranose, 2-deoxy-2-(3-methyl-3-~~

Waste Code	Description
	~~nitrosoureido)-, D-; D-Glucose, 2-deoxy-2-[[(methyl-3-nitrosoamino)-carbonyl)amino]~~
~~U207~~	~~Benzene, 1,2,4,5-tetrachloro-; 1,2,4,5-Tetrachlorobenzene~~
U208	1,1,12-Tetrachloroethane; Ethane, 1,1,1,2-tetrachloro-
U209	1,1,2,2-Tetrachloroethane; Ethane, 1,1,2,2-tetrachloro-
U210	Tetrachloroethylene; Ethene, tetrachloro-
U211	Carbon tetrachloride; Methane, tetrachloro-
U213	Tetrahydrofuran; Furan, tetrahydro-
~~U214~~	~~Thallium (I) acetate~~
~~U215~~	~~Thallium carbonate; Carbonic acid, dithallium(1+) salt~~
~~U216~~	~~Thallium (I) chloride~~
~~U216~~	~~Thallium chloride Tlcl~~
~~U217~~	~~Thallium (I) nitrate~~
~~U218~~	~~Thioacetamide; Ethanethioamide~~
~~U219~~	~~Thiourea~~
U220	Benzene, methyl-
~~U220~~	~~Toluene; Benzene, methyl~~
~~U221~~	~~Benzenediamine, ar-methyl~~
~~U221~~	~~Toluenediamine; Benzendiamine, ar-methyl~~
~~U222~~	~~o-Toluidine hydrochloride; Benzenamine, 2-methyl-, hydrochloride~~
~~U223~~	~~Toluene diisocyanate; Benzene, 1,3-diisocyanatomethyl~~
~~U225~~	~~Bromoform; Methane, tribromo~~
U226	Ethane, 1,1,1-trichloro-; Methyl chloroform
U227	Ethane, 1,1,2-trichloro-; 1,1,2-Trichloroethane
U228	Trichloroethylene; Ethene, trichloro-
~~U234~~	~~1,3,5-Trinitrobenzene; Benzene, 1,3,5-trinitro~~
~~U235~~	~~Tris92,3-dibromopropyl) Phosphate; 1-phosphate; 1-propanol, 2,3-dibromo-, phosphate (3:1)~~
~~U236~~	~~Trypan blue; 2,7-Naphthalenedisulfonic acid, 3,3Á-/(3,3Á-dimethyl/1,1Á-biphenyl/4,4Ádiyl)bis(azo)bis/5-amino-4-hydroxy/-, tetrasodium salt~~
~~U237~~	~~Uracil mustard; 2,4-(1H, 3H)-Pyrimidinedione, 5-[bis(2-chloroethyl) amino]~~
~~U238~~	~~Ethyl carbamate (urethane); Carbamic acid, ethyl ester~~
U239	Xylene; Benzene, dimethyl-
~~U240~~	~~2,4-D, salts & esters; Acetic acid, (2,4-dichlorophenoxy)-, salts & esters~~
~~U243~~	~~1-Propene, 11,2,3,3,3-hexachloro-; Hexachloropropene~~
~~U244~~	~~Thioperoxydicarbonic diamide /$(H_2N)C(S)/_2S_2$, tetra-methyl; Thiram, Cyanogen bromid (CN) Br~~
~~U246~~	~~Cyanogen bromide (CN) Br~~

Waste Code	Description
~~U247~~	~~Benzene, 1,1Á-(2,2,2-trichloroethylidene)bis/4-methoxy-; Methoxychlor~~
~~U248~~	~~2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations of 0.3% or less; Warfarin, & salts, when present at concentrations of 0.3% or less~~
~~U249~~	~~zinc phosphide An_3P_2, when present at concentrations of 10% or less~~
~~U271~~	~~Benomyl~~
~~U278~~	~~Bendiocarb~~
~~U279~~	~~Carbaryl~~
~~U280~~	~~Barban~~
~~U328~~	~~o-Toluidine; Benzenamine, 2-methyl-~~
~~U353~~	~~p-Toluidine; Benzenamine, 4-methyl-~~
U359	Ethylene glycol monoethyl ether; Ethanol, 2-ethoxy-
~~U364~~	~~Bendiocarb phenol~~
~~U367~~	~~7-Benzofuranol, 2-3-dihydro-2,2-dimethyl-~~
~~U372~~	~~Carbamic Acid, 1H-benzimidazol-zyl, methyl ester~~
~~U373~~	~~Carbamic acid, Phenyl-, 1-methylethyl ester~~
~~U387~~	~~Carbamothoic acid, dipropyl-, S(phenylmethyl)ester~~
~~U389~~	~~Carbamothoic acid, bis(1-methyl-ethyl)-, S-(2,3,3-trichloro-2-propenyl)ester~~
~~U394~~	~~Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester~~
~~U395~~	~~Diethylene glycol, dicarbamate~~
~~U404~~	~~Ethanamine, N,N-diethyl-~~
~~U409~~	~~Thiophanate-methyl~~
~~U410~~	~~Ethanimidothioic acid, N,N-[thiobis(methylamino)carbonyloxy]]bis-, dimethyl ester~~
~~U411~~	~~Propoxur~~

Attachment II.A.6

Federal Environmental Legislation

FLORIDA DEPARTMENT OF STATE
Sandra B. Mortham
Secretary of State
DIVISION OF HISTORICAL RESOURCES
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

Director's Office (904) 488-1480
Telecopier Number (FAX) (904) 488-3353

April 10, 1996

Ms. Jennifer B. Hazard
Perma-Fix
1940 N.W. 67th Place
Gainesville, Florida 32653

In Reply Refer To:
Robin D. Jackson
Historic Sites Specialist
(904) 487-2333
Project File No. 961234

RE: Cultural Resource Assessment Request
Permit Renewal - Existing Treatment, Storage and Disposal Facility
Gainesville, Alachua County,Florida

Dear Ms. Hazard:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced project(s) for possible impact to historic properties listed, or eligible for listing, in the National Register of Historic Places. The authority for this procedure is the National Historic Preservation Act of 1966 (Public Law 89-665), as amended.

It is the opinion of this agency that because of the project nature it is considered unlikely that archaeological or historical sites will be affected. Therefore, it is the opinion of this office that the proposed project will have no effect on any sites listed, or eligible for listing in the National Register.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Jrj

PERMA-FIX
ENVIRONMENTAL SERVICES

April 2, 1996

Mr. George W. Percy, Compliance Review Department
Division of Historical Resources
R A Gray Building, 500 South Bronough
Tallahassee, Florida 32399

CERTIFIED MAIL

Dear Mr. Percy:

Perma-Fix of Florida, Inc. (PFF) is an existing Treatment, Storage and Disposal (TSD) facility located in Gainesville, Florida. PFF received its Final Part B Permit in September of 1989 and we are presently in the renewal phase of our permit with the Florida Department of Environmental Protection (FDEP).

On April 2, 1996, I spoke with Gary Goodwin, Historical Preservation Planner, to determine if any historically significant sites exist in the vicinity of the PFF facility. After reviewing an extensive list of sites and concluding no sites existed in the PFF vicinity, Mr. Goodwin transferred me to Ms. Robin Jackson, of your office. Ms. Jackson suggested that I submit a facility description and a USGS map for an archaeological review.

In accordance with 40 CFR 270.3(b), PFF requests an evaluation of the presence of any historically significant sites in the area of our facility.

Should you have any questions or concerns, please contact me at (352) 395-1356.

Sincerely,

Jennifer B Hazard

Jennifer B. Hazard
Southeast Regional Compliance Coordinator

Enclosures: Facility Description and USGS Map

JBH\96.049

NORTHEAST REGION
Lt. COL. LARRY L. MARTIN, Director
Route 7, Box 440
Lake City, FL 32055
(904) 758-0525

April 5, 1996

Ms. Jennifer B. Hazard
Southeast Regional Compliance Coordinator
Perma-Fix Environmental Services
1940 N.W. 67th Place
Gainesville, FL 32653

Dear Ms. Hazard:

This responds to your inquiry dated April 3, 1996 regarding the potential occurrence of listed species in the vicinity of your facility in Alachua County, Florida. You defined the location as Latitude 29°43'00" and Longitude 82°20'58". We have conducted a search on our computer database and other pertinent records of wildlife observations. To facilitate this, we searched an area whose boundaries are two miles north, east, south, and west of your facility:

Latitude: >29°41'00"N and <29°45'00"N
Longitude: >82°18'58"W and <82°22'58"W

As for wildlife species over which this agency has jurisdiction, at least one wading bird rookery is known to occur in close proximity of the searched area. It is located at 29°45'30"N, 82°23'42"W, T8S, R19E, Sec. 12SW. Cattle egret (Bubulcus ibis), little blue heron (Egretta caerulea), a Species of Special Concern, and other unidentified small white wading birds have been known to occur there.

Please note, however, that our database is not necessarily inclusive of all listed species which may occur in a given area. For various reasons, occurrence records for some species are not necessarily input into our database on a site-specific basis. The indigo snake, gopher tortoise and most listed mammal species are notable examples of that. Moreover, some species which are accounted for in the database may occur in areas we are unaware of. Only through systematic field surveys could such data be factored in with respect to your request.

Thank you for consulting us in this matter. As for occurrence records for listed plants and plant communities of concern, the appropriate contact would be the Florida Natural Areas Inventory, 1018 Thomasville Road, Suite 200C, Tallahassee, FL 32303, 904/224-8207.

Sincerely,

Keith Singleton

Keith G. Singleton
Nongame Wildlife Biologist

KGS/..
WLD 4-3-5
Enclosure
listed13.ltr

APPLICATION FOR A HAZARDOUS WASTE PERMIT

PART II

B. CONTAINERS

PFF is currently permitted to store 72,105 gallons of containerized hazardous waste in the Processing and Storage Building (see Figure I.D.4 in Part I of this application). PFF proposes to permit a total of 107,305 gallons of container storage as well as treatment in containers at the Facility. The additional 35,200 gallons of container storage capacity will be in the Treatment and Operations Building (see Figure I.D.1 in Part I of this application). Proposed container treatment activities include stabilization/solidification; i.e., the Perma-Fix® ~~process~~ Process (see Appendix II.B.1 for details regarding this process).

B1 Containment

The secondary containment systems for the Processing and Storage Building and the Treatment and Operations Building consist of curbed and sloped concrete slabs and sumps, which are designed and operated to drain and remove liquids resulting from leaks, spills or precipitation. The containment system for the Processing and Storage Building consist of the following:

- 4-inch by 6-inch #4 rebar reinforced concrete curb berming around separated container storage areas.
- 4-inch by 58-inch #4 rebar reinforced concrete sloped berming ("rollovers") at forklift entry points to container storage areas.
- 5.75-inch by 6-inch #4 rebar reinforced concrete curb berming around storage building perimeters.
- Continuous Neoprene® water stops within the concrete berming.
- Minimum of 20 mils of epoxy sealer at all joints and gaps.
- Polysulfide joint sealant in all floor joints.
- Minimum of 30 mils of flexible epoxy sealer on the entire floor of the Treatment and Operations building.

~~An~~ A nearly identical containment system will be built for the proposed container storage area in the Treatment and Operations Building. The only significant difference between the two containment systems is that the Treatment and Operations Building curb height will be 6" rather than 4". See Figure I.D.1 of Part I of this permit application.

The floor slab making up the container storage areas in the Treatment and Operations Building and in the Processing and Storage Building will consist of a concrete base that is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed. In addition, the surface of the concrete base will be coated with an epoxy designed to ensure the impervious nature of the containment base. The product data for the proposed epoxy coating is included as Attachment II.B.3. In addition, the entire perimeter of the Treatment and Operations Building will be fitted with a 6" Neoprene-impregnated containment curb.

The capacities of the containment systems in both the Processing and Storage Building and Treatment and Operations Building are sufficient to contain greater than 10% of the volume of the maximum number of containers in the building. Containment calculations are included as Attachment II.B.1. Details of the secondary containment system for the Processing and Storage Building are shown on Figure I.D.4 in Part I of this application. The secondary containment details for the Treatment and Operations Building are shown on Figure I.D.1 in Part I of this application.

Engineering reviews have been conducted on the floor slabs in the container storage areas of each container storage building at the facility. Copies of the engineering reports for the floors are included as Attachment II.B.2. The October 13, 1997 Floor Slab Inspection letter addresses the concrete pad in the former Nelson Building; referred to in this permit application as the Treatment and Operations Building. The 1989 work sheet addresses the integrity of the concrete pad in the former Quadrex container and tank storage building; referred to in this permit application as the Processing and Storage Building.

To prevent run-on and accumulation of precipitation, the container storage areas in the Processing and Storage Building and Treatment and Operations Building are roofed and sufficiently sided to prevent run-on of stormwater. In addition, the perimeters of the concrete floor slabs are curbed in each building. Finally, site grading directs surface water away from the buildings.

The sloped floors in the Processing and Storage Building will direct any liquid to the sumps. The container storage area and sumps will be inspected at least once a day for accumulation of liquids and any accumulation will be removed from the container storage area and/or sumps in as timely a manner as possible but no later than within 24 hours of detection by PFF personnel. Material removed from the container storage area and/or sump will be characterized and managed in accordance with applicable regulations. In addition, all containers stored in the Processing and Storage Building are kept off the floor on pallets or, in the case of totes, on built-in legs to keep them from coming into contact the standing liquids.

The concrete slab in the Treatment and Operations Building is on a near level gradient. However, the container storage area will be inspected at least once a day for accumulation of liquids which will be remediated in as timely a manner as possible but no later than within 24 hours of detection. Depending on the amount involved, absorbents, submersible pumps or a vacuum truck will be used to remove any liquids. All containers stored in the Treatment and Operations Building will also be kept off the floor on pallets or, in the case of totes, on built in legs to keep them from coming into contact with standing liquids. All material removed from secondary containment areas will be characterized in accordance with 40 CFR 262.11 and stored, treated or disposed of accordingly.

B2 & 3 Ignitable, Reactive and Incompatible Wastes

No container of ignitable or reactive waste will be stored within 15 meters (50 feet) of the Facility property line or a public right-of-way. See revised Figure I.B.2 in Part I of this permit application.

PFF will not intentionally mix, combine or commingle incompatible waste streams. In order to ensure compatibility of waste streams intended for commingling, the Facility will implement the following management procedures prior to mixing potentially incompatible wastes:

- Prior to receipt at the Facility, all hazardous wastes must be profiled and preapproved. See the Facility Waste Analysis Plan (WAP) (Attachment II.A.4 of this permit application) for details on the approval and profile process.

- Containers of incompatible waste identified by the waste profile and/or WAP will be segregated from each other.

- Potentially incompatible wastes will be mixed together in small quantities and observed under laboratory conditions for undesirable reactions prior to being stored, treated or otherwise managed together at the Facility. See the WAP for compatibility testing details. Incompatible wastes, or incompatible wastes and materials will not be placed in the same container (or an unwashed container), unless the requirements of 40 CFR 264.17(b) are complied with.

- Lab Pack packing lists will be reviewed to identify potentially incompatible wastes.

- During decommissioning (transfer of waste from small containers to bulk containers), potentially incompatible wastes will not be bulked together unless compatibility testing indicates that the wastes may be combined i.e., the requirements of 40 CFR 264.17 (b) are complied with. Lab Pack wastes determined to be incompatible will be segregated from each other and shipped off site for disposal in separate containers. See revised Figure I.D.1 in Part I of this permit application for an illustration of segregated storage bays.

B4 Condition and Management of Containers

Upon receipt of a shipment of containers, PFF personnel will review the manifest and other documents accompanying the shipment for completeness and accuracy and to identify the shipment and verify its compliance with 40 CFR 264.71 and 40 CFR 264.72. After verification, the containers will be inspected for defects and/or unacceptable conditions, as required in 40 CFR 264.171. If a container is found to be leaking, or is of questionable integrity, the container will be overpacked. If, following analysis in accordance with the WAP, the contents of a container are found to be unacceptable, the containerized waste will be rejected and returned to the generator, or sent to an alternate TSD, per the generator's instructions.

A representative sample of the incoming waste will be collected and analyzed in accordance with the WAP "finger print" analysis to determine consistency with the waste profile[1]. Containers of waste will remain in the receiving area portions of the storage areas until accepted for storage in accordance with the WAP. Upon acceptance, containers will be moved to one of the container storage areas in the Processing and Storage Building or Treatment and Operations Building. Unacceptable or rejected containers will be stored in one of the container storage areas until transportation to the generator or an alternate TSD can be arranged.

All containers will be managed as if they contain free liquids. Containers of hazardous waste will be kept closed except during sampling or when hazardous waste is added or removed. All containers will be palletized upon arrival, and all palletized containers will be banded when double-stacked. The following minimum aisle spaces will be maintained in the container storage areas:

- Four (4) feet between rows of pallets to allow access for fire fighting, container inspection, and manual extraction of a leaking container from a pallet load.

- Eight feet (8) in the aisle spaces to allow forklifts to move unobstructed through the aisleways.

All containers received from off-site must meet US Department of Transportation (DOT) requirements for the material being shipped in the container. Containers that do not meet DOT requirements will be overpacked into suitable containers for storage and/or shipment off site.

Types of DOT containers typically received at the Facility will include:
- 55 gallon steel drums (on standard pallets)[2]

- 55 and 30 gallon poly drums (on standard pallets)[2]

- 30 gallon steel drums (on standard pallets)[2]

1 All waste streams (shipments) received at the facility are sampled and subjected to the "finger print" analysis. For single waste streams consisting of multiple containers, 20% of the containers for that waste stream are sampled (non-composite) and analyzed.
2 Typical dimensions: 55-gal drum – 36" x 22" dia; 30-gal drum - 27" x 18" dia; 5-gal container - 14" x 10" dia.

- 5 gallon steel drums (on standard pallets)[2]

- DOT overpacked drums containing: glass vials, plastic vials, ½ to 1 gallon glass or plastic containers, and up to 30 gallon plastic carboy containers (on standard pallets)

- DOT specification roll-off containers (not stored in container storage areas)

- DOT specification fiberboard containers (on standard pallets)

- DOT specification tote tanks (450 and 550 gallon capacity)[3]
- DOT specification tanker/trailers (not stored in container storage areas)

- Other DOT approved (performance oriented) containers (on standard pallets)

It should be noted that 550-gallon totes are the largest containers that will be stored in the Processing and Storage Building. Figures I.D.1 and I.D.4 in Part I of this permit application illustrate typical container storage configurations in the container storage areas. PFF will only receive containers made of or lined with materials, which will not react with, and are otherwise compatible with, the hazardous waste to be stored.

B5 Inspections

PFF personnel will inspect areas where containers are stored or treated on a daily basis. The inspections will cover proper placement of containers for ready access, container conditions labeling and inventory control. A detailed inspection log is maintained to ensure compliance with applicable Florida container and tank inspection requirements. Sample inspection logs are included as Attachment II.B.4. Inspection logs will be maintained in the Facility operating record until closure of the Facility.

B6 and B7 Closure Plan and Closure Cost Estimate

A copy of the Facility Closure Plan and closure cost estimate is included in Section II.K of Part II of this application.

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3 Totes are on legs which keep them off the ground and away from accumulated liquid in containment areas. The dimensions for 450-gallon totes are 4 feet by 4.5 feet (base) by 5 feet, 4 inches (height). 450-gallon totes have 5.5 inch legs. 550-gallon totes have a base which is 3.5 feet by 4 feet and are 6 feet, 3 inches tall. 550-gallon totes sit on 6.5 inch legs.

Attachment II.B.1

Treatment and Operations Building Container Storage Area

Containment Calculations

Attachment II.B.1

Treatment and Operations Building
Container Storage Area

Containment Calculations

Given:

Base Area (a)	2,736 ft^2
Curb Height (h)	6 ~~4~~ in = 6 ~~4~~ in / 12 in = .5 ~~.333~~ ft
Pallet Displacement (pd)	(12.48 gal) (80 pallets) = 998.4 gal
100% volume of largest container (LC)	= 55 gal
100% volume of total containers (TC)	= 35,200 gal (640, 55-gallon drums)
10% volume of total container = (10%) (TC)	= 3,520
25 year/24 hour storm water volume	= 0 gal (building is totally enclosed)

Containment Capacity Available (CCA):

CCA = (h x a x 7.48 gal/ft^3) - pd

CCA = (~~.333~~ .5 ft x 2,736 ft^2 x 7.48 gal/ft^3) – 998.4

CCA = ~~5,816.5~~ 9,234 gal

Conclusion

The net available containment volume (~~5,816.5~~ 9,234 gal) exceeds the volume of the largest container (55 gal) and is in excess of 10% of the maximum volume (3,520 gal) of containerized waste that will be stored in the Treatment and Operations Building container storage area. No equipment that may displace containment volume is kept in the container storage area.

Attachment II.B.1 (cont.)

Processing and Storage Building Container Storage Area

Containment Calculations

Containment Calculations Adjustment for Pallet Displacement

Given:

Zone 1 Containment Capacity	3,257 gal (see attached calculations)
Zone 2 Containment Capacity	5,308 gal (see attached calculations)
Zone 3 Containment Capacity	7,208 gal (see attached calculations)
Pallet Displacement (pd) Total	(12.48 gal) (164 pallets) = 2,046.72 gal
Zone 1 pd	(12.48 gal) (24 pallets) = 299.52 gal
Zone 2 pd	(12.48 gal) (46 pallets) = 574.08 gal
Zone 3 pd	(12.48 gal) (94 pallets) = 1,173.12 gal
100% volume of largest container (LC)	= 550 gal
Zone 1 LC	= 550 gal
Zone 2 LC	= 550 gal
Zone 3 LC	= 55 gal
100% volume of total containers (TC)	= 72,105 gal
Zone 1 TC	= 10,560 gal drum equivalents
Zone 2 TC	= 20,240 gal drum equivalents
Zone 3 TC	= 41,305 gal drum equivalents
550 gal totes displacement	= not significant (totes are on legs 5.5 in off the ground, containment curb is 5 ¾ in)
Other equipment displacement	= not significant (no equipment of significance is kept in containment areas)
25 year/24 hour storm water volume	= 0 gal (building will be totally enclosed)

Containment Capacity Available (CCA):

Zone 1 CCA

CCA = 3,257 gal – 299.52 gal
CCA = 2,957.48 gal

Zone 1 Conclusion

The net available containment volume (2,957 gal) exceeds the volume of the largest container (550 gal) and is in excess of 10% of the maximum volume (1,056 gal) of containerized waste that will be stored in Zone 1.

Attachment II.B.1 (cont.)

Processing and Storage Building
Container Storage Area

Containment Calculations

Zone 2 CCA

CCA = 5,308 gal – 574.08 gal
CCA = 4,733.92 gal

Zone 2 Conclusion

The net available containment volume (4,733.92 gal) exceeds the volume of the largest container (550 gal) and is in excess of 10% of the maximum volume (2,024 gal) of containerized waste that will be stored in Zone 2.

Zone 3 CCA

CCA = 7,208 gal – 1,173.12 gal
CCA = 6,034.88 gal

Zone 3 Conclusion

The net available containment volume (6,034.88 gal) exceeds the volume of the largest container (55 gal) and is in excess of 10% of the maximum volume (4,130.5 gal) of containerized waste that will be stored in Zone 3.

Attachment II.B.1 (cont.)

Treatment and Operations Building and Processing and Storage Building Container Storage Area

Containment Calculations

Professional Engineer Certification

This is to certify that the containment calculations for this hazardous waste management unit have been reviewed by me and found to be true and accurate to the best of my knowledge.

George Harder

Signature

George Harder
Name (please print or type)

47340
Florida Registration Number

Mailing Address: **1940 NW 67th Place**
Street or P.O. Box

City	State	Zip Code
Gainesville	**Florida**	**32653**

Date: **June 6, 1999** Telephone: **(352) 373-6066**

Affix Seal Below

GEORGE F. HARDER CERTIFICATE NO. CC[illegible]0 STATE OF FLORIDA PROFESSIONAL ENGINEER

Appendix II.B.1

Perma-Fix® Process

Description of Perma Fix ®Process

The Perma-Fix® Process is used for treating characteristic inorganic hazardous (or industrial) wastes to meet treatment standards for land disposal. Specially designed mixing equipment is utilized to treat these wastes; this treatment may be conducted at the point of waste generation (in the tanks or containers in which they are accumulated) or at a RCRA permitted TSDF.

The basis for The Perma-Fix® Process is the permanent stabilization of the waste. Stabilization (fixation and solidification) is the current term the Environmental Protection Agency (EPA) has adopted to use in its ~~current~~ regulations and guidelines. Stabilization is a chemical process which changes the chemical composition and permanently binds the potentially hazardous and leachable components of the hazardous or industrial waste. The Perma-Fix® Process utilizes the addition of a solidifying agent which incorporates the "fixed" waste components into a dense, very impermeable, acid resistant, siliceous monolithic mass which may be disposed of in a properly permitted landfill.

A waste can be classified as a hazardous waste if it is listed under 40 CFR Part 261, Subpart D, or if it exhibits one or more of the general characteristics of a hazardous waste presented in the regulations under 40 CFR Part 261, Subpart C. The wastes of Subpart C are commonly referred to as "characteristic" hazardous wastes. These characteristic wastes currently fall into four general categories: Ignitability, Corrosivity, Reactivity, and Toxicity. The Perma-Fix® Process will, in many instances, convert a characteristic inorganic hazardous waste to a non-hazardous waste. This often allows for the waste to be classified as an "other industrial waste" which can be disposed of properly in a permitted "Other Industrial Waste" landfill facility, rather than in a hazardous waste disposal facility.

Process Description

EPA has determined that stabilization, which is the basis for the Perma-Fix® Process, is the best demonstrated available technology (BDAT) for the treatment and pre-treatment of certain listed and characteristic hazardous wastes. The Perma-Fix® Process will be conducted in ~~a container treatment area~~ the Quonset hut located in the Treatment and Operations Building.

The Perma-Fix® Process includes the determination of the proper stabilizing agents required to be used in the fixation/solidification process, the amounts of the various stabilization agents to be utilized, the technique (duration and efficiency) of the mixing procedure, and the testing and results reporting mechanisms for the project. The "formula" developed for each particular waste takes into consideration whether the waste or hazardous waste must be chemically pre-treated with oxidizing or reducing agents or chemical polymers and considers the ambient moisture and percentage of oil in the waste to be treated.

The resultant stabilized wastes generally exhibit permeabilities ranging from 1 x 10^{-6} cm/sec to as low as 1 x 10^{-9} cm/sec. Forty-eight hour (2-day) unconfined compressive strengths on the stabilized wastes range from 20 to 300 pounds per square inch (psi), with 7 day strength ranging from 50 to 1000 psi and 28 day strengths which may exceed 3000 psi. Perma-Fix formulations can be optimized to achieve any desired compressive strength within the ranges presented above.

The Perma-Fix® Process presents a cost effective, environmentally sound method for landfill disposal of many listed or characteristic hazardous wastes. Non-hazardous liquids and sludges can likewise be stabilized to allow for more efficient handling and disposal of the wastes. Liquid waste collected in 55 gallon drums and stabilized by the Perma-Fix® Process no longer poses a significant "spill" hazard for transportation companies, and minimizes the handling cost at the ultimate disposal facility.

A number of different waste types have been successfully treated using The Perma-Fix® Process. The following is a partial list:

Glass and plastic beads used for paint removed;
Powdered coatings containing cadmium;
Caustic cleaners;
Spent acid sludge;
Acid sludges from lubrication oil manufacturers;
Chromium & cadmium sludge from plating tank;
Dust contaminated with heavy metal;
Zinc phosphate sludge;
Caustic queach sludge;
Water fall paint booth sludge;
Cyanide contaminated sludges;
Lead chromate sludge;
Soils contaminated with heavy metals.

For each of these waste types, Perma-Fix has developed a formula which renders the waste non-hazardous and solidifies the waste so that it can be disposed of in a non-hazardous waste landfill. <u>The Perma-Fix Process will be used at the facility to treat characteristic hazardous waste with an average Volatile Organic Chemical (VOC) concentration of less than 500 ppmv.</u>

<u>Physical Characteristics, Materials of Construction, and Dimensions of the Unit</u>

The Perma-Fix® Process will be conducted on containerized waste; the operation consists of adding treatment chemicals to the container and subsequently mixing the additives into the waste. Because of the additional volume caused by addition of treatment chemicals and (where applicable) water, the waste may be divided into two containers for treatment. The process will be conducted in an area equipped with secondary containment and the equipment will be designed, located, constructed, operated, maintained, monitored, inspected and closed in accordance with the applicable requirements of 40 CFR 264 Subpart I. All relevant procedures to prevent hazards, inspections, testing and maintenance and closure procedures and containment requirements addressed in this permit application for containers will be applied to the construction and operation of the Perma-Fix® Process equipment as well. Records of inspections, etc. will be maintained in the Facility Operating Record. The Perma-Fix® Process equipment and location has been addressed in the Facility Closure Plan included in this permit application. See Figure I.D.12 (Perma-Fix and Perma-Fix II Process Flow Diagram) for a detailed description of Perma-Fix equipment.

Decontamination Procedures

The Perma-Fix Process uses a skid-mounted hydraulic mixer with each container of waste (drum) serving as the mixing vessel. Only the steel shaft of the mixer enters the top of the drum undergoing treatment. No other equipment comes into contact with the waste during treatment. The steel shaft will be decontaminated in the following manner, as appropriate.

Upon completion of the treatment and mixing of the last drum before decontamination of the mixer shaft is required, the operator of the mixer will reverse the rotation of the shaft as it is being removed from the drum of treated, thickening waste. Reversing the mixer shaft as it is withdrawn from the drum will remove most of the residual waste from the shaft. The bulk of any remaining waste will be scraped from the shaft with a spatula or other suitable scraping devise. Next, the shaft will be wiped down as necessary to remove remaining waste residuals. The mixer shaft will be deemed decontaminated when visual inspection of the shaft reveals there is no waste remaining that may inappropriately contaminate the next drum of waste to be treated.

Environmental Performance Standards

Release Prevention

The Perma-Fix~~® treatment process~~ Process area and equipment is located, designed, constructed, operated, maintained, and will be closed in a manner that will ensure protection of human health and the environment. The hydrogeologic, geologic, and meteorologic factors of concern for the PFF Facility site and surrounding areas are addressed in Section A of this permit application. For purposes of ensuring protection of human health and the environment, PFF will operate the Perma-Fix® Process in conformance with applicable container standards. Appropriate secondary containment will be incorporated into the design and operation of the equipment and run on and run off of precipitation or liquids from the Perma-Fix® Process area will be controlled. See Part II, Section B of this permit application for details regarding containment, management of ignitable, reactive and incompatible wastes, condition and management of containers, inspections and prevention of run on and accumulation of precipitation in the Treatment and Operations Building where the Perma-Fix® Process operations will take place.

Prevention of Releases to Groundwater or Subsurface Environment

Releases to groundwater or the subsurface environment from the Perma-Fix~~® process~~ Process are extremely unlikely for the following reasons:

- The containers to be treated contain relatively small volumes of material and the operation is a batch process; i.e., ~~normally,~~ waste will be treated ~~will be~~ in 55 gallon drums. ~~However, larger containers may be used if bulking of larger waste streams into roll-off or vac box containers is appropriate.~~

- The process is located within a secondary containment system designed to meet the requirements of 40 CFR Subpart I. The containment system is designed to contain the volume of the largest container or 10 % of the total volume of containers permitted for the area, whichever is larger. The containment system is coated with a chemically resistant material which is compatible with the waste streams designated for processing.

- The Perma-Fix~~® treatment~~ Process area is inspected daily in accordance with the facility inspection plan. Leaks or spills are cleaned up within 24 hours of discovery or as soon as it is practicable and safe to do so.

- The system is located within a building; i.e., the system is physically separated from the subsurface environment and groundwater.

- The facility maintains a Contingency Plan to provide a framework for facility response to emergencies such as spills, fires, or explosions. This plan provides procedures to respond to treats to human health or the environment from the system.

Prevention of Releases to Surface Water, Wetlands, or Soil Surface

Releases to surface water, wetlands, or soil surface from the Perma-Fix~~® II~~ treatment process ~~train~~ are extremely unlikely for the following reasons:

- The containers to be treated contain relatively small volumes of material and the operation is a batch process; i.e., ~~normally,~~ waste will be treated ~~will be~~ in 55 gallon drums. ~~However, larger containers may be used if bulking of larger waste streams into roll-off or vac box containers is appropriate.~~

- The process is located within a secondary containment system designed to meet the requirements of 40 CFR Subpart I. The containment system is designed to contain the volume of the largest container or 10 % of the total volume of containers permitted for the area, whichever is larger. The containment system is coated with a chemically resistant material which is compatible with the waste streams designated for processing.

- The Perma-Fix~~® treatment~~ Process area is inspected daily in accordance with the facility inspection plan. Leaks or spills are cleaned up within 24 hours of discovery or as soon as it is practicable and safe to do so.

- The system is located within a building; i.e., the system is physically separated from the subsurface environment and groundwater.

- The facility maintains a Contingency Plan to provide a framework for facility response to emergencies such as spills, fires, or explosions. This plan provides procedures to respond to treats to human health or the environment from the system. See Attachment II.A.2 to Part II.A of this permit application.

Prevention of Releases to Air

Releases to the air from the Perma-Fix~~® process~~ Process are extremely unlikely for the following reasons:

- The system is located within a building;

- Containers will be kept closed at all times except during treatment or removal of waste from containers;

- Organic vapors are not anticipated because the wastes to be treated are classified as inorganic wastes (The Perma-Fix Process will be used to treat characteristic inorganic hazardous wastes having an average VOC content of less than 500 ppmw.);

- Particulate emissions generation during the addition of treatment chemicals are minimized by wetting or other means (as appropriate);

- Particulate emissions after treatment are minimal because of the consistency of the treated waste and solidification of the matrix.

- Any fugitive particulate emissions generated during treatment will be captured by a dust collector and HEPA filter system.

- Screening the wastes for reactive cyanide and sulfide will prevent generation of fumes from reactive wastes.

Monitoring and Inspections

The Perma-Fix~~® process~~ Process will be monitored by PFF personnel during processing operations. The system will be operated manually (or automated equipment will be manually operated).

The Perma-Fix~~® process~~ Process area will be visually inspected each operating day for evidence of leaks or spills; the inspection will be in accordance with the requirements of the facility inspection plan. The secondary containment system will also be inspected each operating day for evidence of cracks or breaches in containment as specified in the facility inspection plan.

Potential Pathways of Exposure of Humans or Environmental Receptors

PFF workers within the Treatment and Operations building are the most likely human receptors for chemicals or chemical constituents released from the Perma-Fix~~® process~~ Process. The exposure is anticipated to be minimal because personnel will be provided with appropriate personal protective equipment including, as applicable, respirators. The primary pathway for human receptors from the Perma-Fix® II ~~process~~ Process is air. Specifically, air emissions (particulates) generated by addition of treatment chemicals. Where appropriate, water may be added to the wastes or treatment chemicals prior to loading to minimize the generation of particulates.

Personnel operating the system (or personnel present for any other reason) will be required to wear Personal Protective Equipment (PPE) selected to address the potential hazards identified for the wastes to be managed and the operating parameters of the system. The PPE selected will be in accordance with OSHA standards and may include use of particulate respirators (as appropriate).

Environmental receptors such as soil, surface water, groundwater, and air are unlikely to be impacted by the Perma-Fix~~® process~~ Process because of the containment system and location of the treatment area within a building physically separated from soils and protected from precipitation, run-on and run-off.

Effectiveness of Perma-Fix® Process

EPA has determined that stabilization, which is the basis for the Perma-Fix-® Process, is the best demonstrated available technology (BDAT) for the treatment and pre-treatment of certain listed and characteristic hazardous wastes. Perma-Fix has been conducting the Perma-Fix® Process for many years and has a large experience base on which to determine optimal formulations for a wide variety of wastes.

APPLICATION FOR A HAZARDOUS WASTE PERMIT

PART II

C. TANK SYSTEM

C1 Tank System and Ancillary Equipment Description

The Perma-Fix of Florida facility (Facility) in Gainesville, Florida uses a 3,000 gallon tank system. The tank system is used to accumulate and store mixed liquid wastes which are transported off site for energy recovery. The tank consists of one above ground vessel which was constructed in 1983 and has a capacity of 3,000 gallons. The tank is installed horizontally on steel supports in a concrete and block secondary containment structure inside the Processing and Storage Building. The tank is connected to the liquid scintillation vial (LSV) processing system located in the LSV Processing and Non-Hazardous Waste Storage Warehouse. The connection is through piping running from the LSV processing area to the tank. See Figures I.D.4 - I.D.6 in Part I of this application and Figure II.C.1 (attached).

The feed system associated with the 3,000-gallon bulk storage tank consists of the following equipment:

- Type 5, air driven, dual diaphragm pump
- Pump suction line with ball valve
- Pump discharge line with ball valve
- Main fluid discharge control ball valve
- Discharge hose connection
- Main pump cutoff ball valve

~~Currently, there is no fluid bypass system, temperature controls or pressure controls on the tank or feed system. Overfill protection is provided by a high level alarm which emits an audible alarm and shuts off the feed pump when the tank level reaches 90% capacity.~~

The materials stored in the 3,000 gallon tank consist of the solvent-based liquid carriers used for scintillation fluids and the rinse solvent (e.g., ethanol) used to clean the vial glass. Major compounds which may individually constitute up to 25% of the supplemental fuel include; ethanol, toluene and xylenes. Toluene and xylenes are used for scintillation fluids and ethanol is the rinse solvent. Figures I.D.7, I.D.8, I.D.9 and I.D.10 in Part I of this permit application show the location of the LSV processing area and associated equipment.

C2 Tank System Integrity

The integrity of the tank system was certified by Bodo and Associates, Inc. on October 6, 1995 (Appendix A). The certification by Mr. Bodo, a professional engineer, found the tank to be in good repair and structurally sound. The certification process included a review of facility records for the tank system, a visual inspection of the tank and its containment area and an ultrasonic thickness survey of the tank walls. The visual inspection found no leaks or exterior corrosion of the tank. The ultrasonic survey found no excessive deterioration of the tank walls and the engineer estimated a remaining tank life of more than 20 years. The conclusions of the 1995 certification remain valid in that PFF has not and does not intend to store waste materials in the tank that are different in nature, characteristic or composition from those that are currently stored in the tank.

The storage tank is located within the walls of the secondary containment system. Foundation support for the full storage tank is provided by the concrete floor of the containment structure and underlying soil. Foundation calculations for the storage tank are provided in Appendix B. Based on this review, the tank foundation is designed to maintain the load of a full tank in a satisfactory manner. The tank is supported by three carbon steel support frames. The foundation appears to be adequate to resist anticipated frost heave.

Ancillary equipment is provided with secondary containment. The piping from the LSV Processing area is contained in a sealed concrete pipe valley. ~~above ground and~~ The pipe valley is overlaid with a steel grid making the piping available for inspection by Facility personnel at all times.

C3 Corrosion Protection

The tank system and its appurtenances are not exposed to the weather. The exterior of the tank is protected from corrosion by a paint coating. Exposed piping is also painted for protection. These coatings have performed satisfactory and are periodically reapplied as indicated by routine inspections. The Bodo and Associates, Inc. certification report (Appendix A) demonstrates that corrosion protection for the tank has also been satisfactory.

In addition to corrosion protection for the tank, surface protection for the secondary containment has been provided. This protection consists of application of Sherwin Williams® Tile - Clad II™ Epoxy (Appendix C) to the floors and walls of the tank and pipe valley containment structure. This epoxy seals cracks and voids in the structure surfaces and provides good resistance to fumes, splashes and spillage that may occur in the containment area.

C4 Secondary Containment System Assessment

The following paragraphs give a detailed comparison between current containment system features and applicable requirements. For brevity, "secondary containment" as used here means features that meet the requirements of 40 CFR 264.193.

A. Materials compatibility (40 CFR 264.193(c)(1))
The only waste materials collected and stored in the tank system consists of toluene, xylenes and ethanol. The primary hazardous characteristic of the waste is ignitability. These wastes are considered compatible with the system materials of construction (primarily concrete, carbon steel and epoxy coatings).

B. Strength and Foundation (40 CFR 264.193(c)(1)(2))
The most critical strength requirement for the floor slab of the tank containment structure is its service as foundation support for the tank when full. Pressures on the soils below the floor slab are well below acceptable levels (Appendix B). Satisfactory service with practically no cracking of the slab or the containment walls is further evidence of the adequacy of the system. As previously stated, the foundation support is adequate to prevent failure due to settlement, compression, uplift or pressure gradients. The floor is supported under the tank supports by increased concrete thickness and steel reinforcing.

C. Leak Detection (40 CFR 264.193(c)(3))
All components of this system are aboveground and accessible for visual inspection. Leak detection is provided by daily visual inspection of the tank system for prompt detection of leaks and removal of liquids if required. Overfill protection is provided by a high level alarm which emits an audible alarm and shuts off the feed pump when the tank level reaches ~~90%~~ 80% capacity (~~4.25~~ 4 feet). Normal operating practice is to keep the tank level below 4.0 feet.

D. Liquid Removal (40 CFR 264.193(c)(4))
Liquid removal from the secondary containment is accomplished by a vacuum pump which removes liquid from a blind sump within the containment to the tank or other container. The containment floor is sloped to the blind sump.

E. External Liner System (40 CFR 264.193(d) and (e)(1))
As documented in Appendix D, the secondary containment for the tank system has a design capacity (4,870 gallons) sufficient to hold more than 100 percent of the tank's (3,000 gallon) capacity.

Inspection of the facility demonstrated that the secondary containment floor slab and walls were free of cracks and gaps (Appendix A). The floor and walls had been coated with the impermeable sealant described by Appendix C. The containment completely surrounds the tanks and is capable of preventing both lateral and vertical migration of the waste.

C5 Inspection Requirements

The bulk tank, its associated equipment and containment are inspected daily in accordance with applicable requirements of 40 CFR 264.195. Detailed inspection logs are maintained in the Facility Operating Record until closure of the Facility. An example inspection log is included in Appendix E to this section.

C6 Closure Plan

A copy of the Facility Closure Plan is included in Section K of this permit application.

C7 Description of Safety Systems and Controls

~~The tank is outfitted with an inspection port and an overflow indicator gauge.~~

40 CRF 264.31 requires facilities to be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents. The following addresses the equipment and procedures employed by PFF to facilitate compliance with 40 CFR 264.31.

All flanges and openings on the tank have been sealed to minimize the emission of volatile organic chemicals (VOCs). In addition, even though the mixed waste storage tank is exempt from 40 CFR 264 Subpart CC (Subpart CC) VOC emission control requirements, the tank is designed and will be operated in a manner consistent with Subpart CC Level 1 emission controls. Specifically, the following controls will be maintained:

- Fixed Roof
- Vent pipe with a spring-loaded pressure relief valve

The tank is equipped with mechanical pressure and temperature gauges as well as a fill gauge. Overfill protection is provided by an intrinsically safe high level alarm. The alarm emits an audible signal and shuts off power to the tank feed pump when the tank level reaches 80% of its capacity.

In addition, the tank is grounded to prevent risks associated with potential electrical surges and located in a containment vault to prevent releases to the soil or surface water. Exposure to the sun and extreme temperatures is not an issue because the tank is under a roof which protects it from direct sunlight.

C8 Diagram of Piping, Instrumentation and Process Flow

A tank process flow diagram is presented in Figure II.C.1.

C9 Spills and Overflow Protection

The tank infeed lines are utilized only in a batch mode and not prone to fluid loss. Detailed inventory logs are maintained for each process batch with any potential losses occurring in the transfer of fluids being readily identified. The overflow protective device is interlocked to the fluid infeed system to prevent overfilling. Should overfilling be attempted, the tank has a high level alarm which shuts off the feed pump when the tank reaches ~~90%~~ 80% capacity. The infeed system will not function and an alarm will sound. The bulk tank is compatible with the flammable liquids and is permanently grounded via a specifically installed grounding system.

C10 Ignitable, Reactive or Incompatible Wastes in Tanks

The 3,000 gallon storage tank is a dedicated tank and can only receive mixed liquid wastes. PFF operating procedures including waste profile prior to acceptance and evaluation upon arrival at PFF are designed to prevent the addition of incompatible wastes which could cause failure of the tank system.

Specifically, PFF will not place incompatible wastes, or incompatible wastes and materials in the same tank unless the requirements of 40 CFR 264.17(b) are complied with; wastes designated as D002 will not be managed in the facility tank system. Waste is stored in such a way that it is protected from any material or condition that may cause the waste to react or ignite. The tank content is tested prior to each shipment for disposal. The fluids pumped into and out of the tank are controlled through the manifold system. (see Section 6, Waste Analysis Plan).

C11 Response to Leaks or Spills

Should there be a leak or spill from the storage tank and/or its secondary containment, the following will be performed:

PFF will immediately stop flow to the tank.

Accumulated liquids will be removed from the secondary containment as soon as it is practicable and safe to do so; but no later than within 24 hours of detection.

PFF will prevent further migration of the leak or spill.

In accordance with 40 CFR 264.196(d), any release of hazardous waste, except as provided in paragraph (d)(2), ~~to the environment, unless the quantity is less than or equal to one (1) pound and the spill is immediately contained and cleaned up,~~ will be reported to the ~~FDEP~~ hazardous waste section of the DEP's N.E. District Office within 24 hours of its detection. Similarly, a report will be made to the EPA Regional Administrator, as appropriate. A report of a release in excess of the RQ as specified in 40 CFR Part 302 will satisfy this requirement. Any leak or spill of hazardous waste of less than one (1) pound that is immediately contained and cleaned up will be exempt from the reporting requirement.

A written report in accordance with the requirements of 40 CFR 264, 196(d)(3) will be sent to the FDEP within 30 days of such occurrence.

PFF will perform the repairs, or provide secondary containment, as required, prior to returning the tank system to service.

If repairs are extensive, PFF will obtain a certification from a qualified, registered professional engineer prior to returning the tank system to service. Within seven (7) days of the tank system returning to service, a copy of such certification will be sent to the FDEP.

APPENDIX A

BODO AND ASSOCIATES WASTE STORAGE TANK EVALUATION AND CERTIFICATION

WASTE STORAGE TANK

EVALUATION AND CERTIFICATION

PERMA-FIX ENVIRONMENTAL SERVICES, INC.

GAINESVILLE, FLORIDA

6 October 1995

BODO AND ASSOCIATES, INC.
Consulting Engineers
P. O. Box 698
Gainesville, Florida 32602-0698

INTRODUCTION

A waste storage tank and its secondary containment, located at Perma-Fix Environmental Services, Inc., 1940 NW 67th Place, Gainesville, Florida, was inspected by Messrs. Richard O. Lewis, P.E. and Attila A. Bodo, P.E. on 26 September 1995. The inspection was conducted for purposes of recertification as required by EPA 40 CFR, section 264, subpart J, Tank Systems. The tank was visually inspected on the outside, and on the inside through access openings located on the top of the tank. The tank was not entered for inspection purposes. The inspection was conducted following practices described in the American Petroleum Institute (API) publication, *GUIDE for INSPECTION of REFINERY EQUIPMENT, Chapter XIII, "Atmospheric and Low-Pressure Storage Tanks,"* 4th edition, 1981. The secondary containment structure was also inspected visually.

Ultrasonic thickness measurements were made of the wall thickness for comparison with minimum thickness requirements determined from structural considerations and the principles contained in API 650, *WELDED STEEL TANKS for OIL STORAGE.*

BACKGROUND HISTORY AND ASSUMPTIONS

The carbon steel tank is installed horizontally on three carbon steel supports spaced 7 feet on centers. As surveyed, the tank was nominally 21 feet long by 5 feet in diameter. The approximate volume based on these dimensions is 3000 gallons. Based upon the thickness measurements obtained in this survey, it is assumed that the original plate thickness of the end plates and the shell was nominally 0.250 inch.

The secondary containment structure was evaluated by *BODO and ASSOCIATES, INC.* in January and February of 1988. As the tank has been in service prior to that time, it is assumed that the tank is at least 10 years old.

VISUAL INSPECTION

The general layout of the secondary containment area and the location of the tank are shown in Figure 1. Secondary containment is provided by a structure consisting of a concrete slab and concrete masonry walls. The existing roof was added subsequent to the construction of the secondary containment structure, therefore, the volume provided includes an allowance for rainfall.

The current inspection of the tank shows it to be in generally sound condition. There were no obvious blisters or spots of corrosion undermining the exterior paint. The interior of the tank was visually inspected through access openings at the top. The condition of the interior is generally good. Some corrosion products (rust scale) are present on the interior surfaces.

Inspection of the secondary containment structure shows it to be in generally sound condition. No significant cracks or other signs of structural distress were observed.

ULTRASONIC THICKNESS SURVEY

A *CIGNUS INSTRUMENTS, LTD.* pulse-echo ultrasonic instrument was employed in the shell thickness survey of the tank. The instrument was calibrated on a carbon steel step block to an accuracy of ±0.002 inch within the thickness range of 0.100 to 0.500 inch.

Measurements of wall thickness were made at five locations on each end plate and around the circumference at five locations approximately 4 feet apart along the tank shell. Additional locations were selected for measurement adjacent to the two circumferential plate welds. Figure 2 shows the relative locations and values of the ultrasonic thickness measurements.

The west end plate of the tank varied in measured thickness between 0.210 and 0.235 inch. The 0.210 inch thickness is the minimum thickness measured on the tank during this survey. The east end plate of the tank varied between 0.230 and 0.235 inch in thickness.

Thickness measurements on the shell of the tank were made at the circumferential locations indicated. At each circumferential location, measurements were made at top dead center (TDC), bottom dead center (BDC), and at both spring lines, or midway between TDC and BDC, along the sides of the tank. The shell varied in thickness between 0.210 and 0.245 inch. The average thickness of the shell was calculated to be 0.228 inch. Results of the ultrasonic thickness survey are summarized in Table 1.

The average thickness of 0.228 inch compared to the assumed original plate thickness of 0.250 inch indicates an average corrosion rate of approximately 2 mils per year (mpy) during the assumed 10-year service life of the tank. In the worst case, the minimum measured thickness of 0.210 inch translates into a maximum corrosion rate of 4 mpy. These are low nominal corrosion rates for unpainted structural steel alternately exposed to humid air and generally non-corrosive waste materials.

TABLE 1 - ULTRASONIC THICKNESS SURVEY SUMMARY

LOCATION	AVERAGE THICKNESS (inch)	RANGE OF THICKNESS MEASURED (inch)
West End Plate	0.221	0.210-0.235
East End Plate	0.232	0.230-0.235
TDC	0.231	0.210-0.240
North Spring Line	0.223	0.220-0.230
BDC	0.232	0.230-0.240
South Spring Line	0.225	0.215-0.235

The minimum structural thickness requirement of 0.125 inch for the installation and use of this tank implies that the remaining minimum corrosion allowance of 0.085 inch extrapolates into an anticipated remaining useful life of 21 years.

CONCLUSIONS AND CERTIFICATION

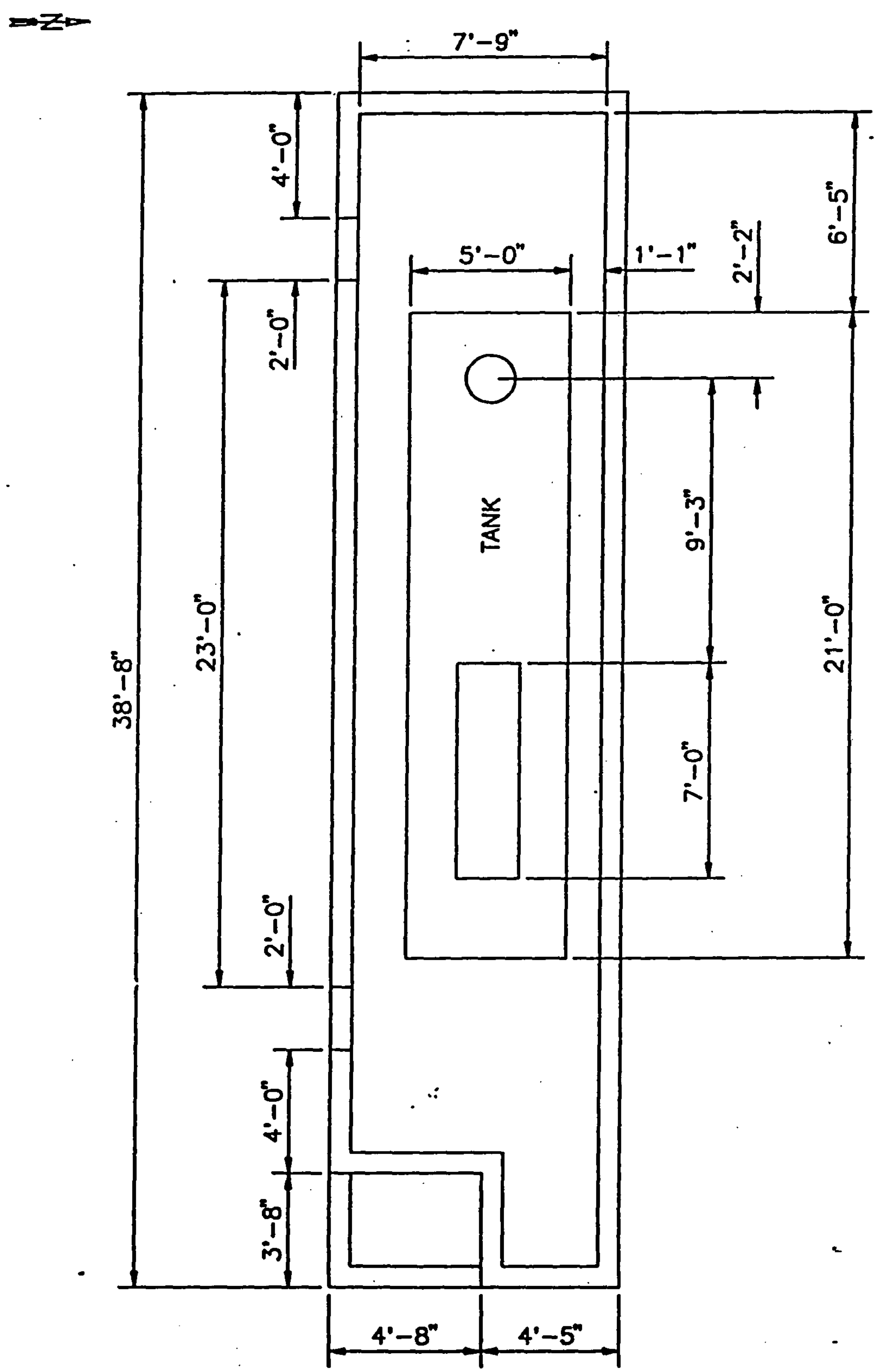
Based on the results of this inspection, the tank and its secondary containment are hereby certified to be in good repair and structurally sound. This certification is effective until September 1999, for a period of four years, provided that the nature, composition and characteristics of the stored materials will not be changed. In the event of such a change, a recertification inspection should be conducted by September 1998. This certification is also contingent upon routine inspection and maintenance of the paint coating on the exterior of the tank.

As required by 40 CFR Ch. 1, section 270.11d:

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.

Respectfully submitted,

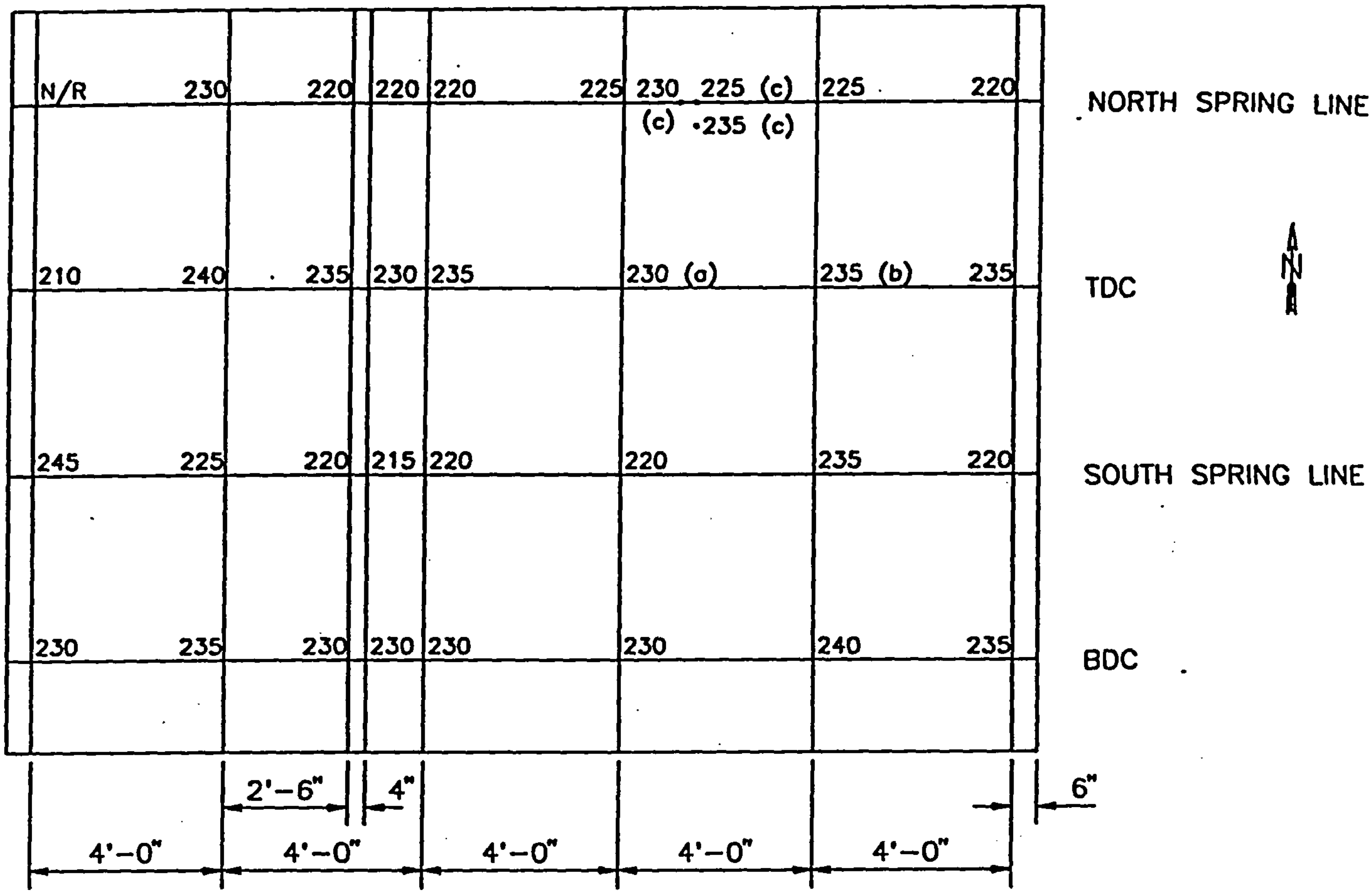
Attila A. Bodo, P.E.
Fla. Registration No. 15834
6 October 1995



BODO AND ASSOCIATES, INC.
Structural Engineers

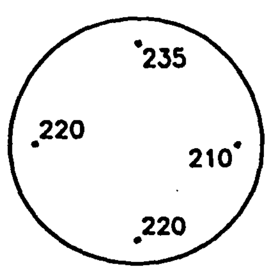
WASTE STORAGE TANK EVALUATION
SECONDARY CONTAINMENT AREA LAYOUT

Scale: 3/16"=1'-0"	Date: 6 OCT 95	PN: 444-00-01
Drawn by: DWG	Checked by: AAB	Figure 1

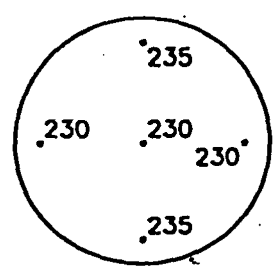


(a): OFFSET TO WEST EDGE OF ACCESS OPENING
(b): NEXT TO EDGE OF ACCESS OPENING
(c): 2" ON EITHER SIDE OF CIRCUMFERENTIAL SEAM
N/R: NO READING

SHELL PLATE



WEST END PLATE



EAST END PLATE

NOTE: ALL READINGS ARE IN UNITS OF 0.001 INCH

BODO AND ASSOCIATES, INC.
Structural Engineers
GAINESVILLE FLORIDA

WASTE STORAGE TANK EVALUATION
ULTRASONIC THICKNESS MEASUREMENTS

Scale: 1/4"=1'-0"	Date: 6 OCT 95	PN: 444-00-01
Drawn by: DWG	Checked by: AAB	Figure 2

APPENDIX B

FOUNDATION CALCULATIONS

Tank Weight

W_s = Weight of shell

$= G_{cs} \times (t_s \times \pi D \times L)$

$= 0.283\,(.25 \times \pi \times 5 \times 21) \times 144$

$= 3360$ lb.

$G_{cs} = 0.283$ lb/in³

$t_s = 0.25$ in

$D = 5'$

$L = 21'$

W_e = Weight of tank ends

$= G_{cs} \times (t_e \times \pi \frac{D^2}{4}) \times 2$

$= 0.283\,(.25 \times \pi \times \frac{25}{4})\,144 \times 2$

$= 400$ lb.

$t_e = 0.25$ in

W_T = Weight of tank = 3360 + 400 = 3760 lb.

Tank Contents Weight

W_c = Full tank at Specific Gravity of 1.05

$= \pi \frac{D^2}{4} \times L \times S.G. \times 62.4$

$= 3.1416 \times \frac{25}{4} \times 21 \times 1.05 \times 62.4$

$= 27000$ lb.

Tank Fittings including Tank Support Weights

W_F = 15% of tank weight

$= 3760 \times 0.15 = 560$ lb.

No. 5505
Engineer's Computation Pad

Tank Support Bearing Pressure

3 Carbon Steel Supports Used with a concrete surface bearing area of 12" x 7'8"

$$\text{Bearing Pressure} = \frac{W_T + W_C + W_F}{1' \times 7.67' \times 3}$$

$$= \frac{3760 + 27000 + 560}{3 \times 7.67 \times 144}$$

$$= 9 \text{ psi}$$

Compressive Strength of Concrete = 3000 psi

$\therefore$ OK.

Soil Bearing Load

$$\text{Soil Load} = W_T + W_C + W_F + W_{conc.\ base} + W_{walls} + W_{FOOTINGS}$$

$$W_{CONC.\ BASE} = 4" \times 38.67' \times 9.00 \times \frac{1}{12} \times \frac{150\text{ lb}}{ft^3} = 17400\text{ lb}$$

$$W_{FOOTINGS} = \overset{?}{8}" \times 7.75' \times 1'8" \times \frac{150\text{ lb}}{ft^3} \times 3 = 3870\text{ lb}$$

$$W_{walls} = 8' \times (2 \times (38'8 + 7'8")) \times \frac{78\text{ lb}}{ft^2} = 57800\text{ lb}$$

$$\text{Area of Base} = 38.67 \times 9 = 348\ ft^2$$

$$\text{Soil Bearing Pressure} = \frac{\text{Soil Load}}{\text{Area}}$$

$$= \frac{3760 + 27000 + 560 + 17400 + 57800 + 3870}{348}$$

$$= \frac{110390}{348} = 317\ lb/ft^2$$

Average bearing capacity of soil = 2000-4000 lb/ft²

$\therefore$ OK

3000 Gallon Tank

Tank built 1983, Installed September, 1983

Bodo Ultrasonic Measurements September, 1995

Average shell thickness = 0.228 in.

Average corrosion rate

$$= \frac{0.250 - 0.228}{12} = 0.0018 = 0.002 \text{ in/year}$$

Minimum Structural Thickness = 0.125 in

$$\text{Estimated tank life} = \frac{\text{Lowest Thickness} - \text{min. struct. Thick.}}{\text{Avg. Corrosion rate}}$$

Lowest thickness reading (1995) = 0.210 in.

$$\text{Estimated tank life} = \frac{0.210 - 0.125}{0.002} = 42.5 \text{ years.}$$

APPENDIX C

CONCRETE SURFACE COATING MATERIALS

4.03

PRODUCT DATA

"1C-56, E18)

Sherwin Williams

Industrial Maintenance Coatings

TILE-CLAD® II EPOXY

B62 Series (Part A)
B60V70 Gloss Hardener (Part B)
B60VA7 Eg-Shel Hardener (Part B)

RECOMMENDED SYSTEMS

- **Steel (Epoxy Primer)**
  1 ct. Tile-Clad II Hi-Bild Primer, *B62N71/B60V70 @ 4 mils DFT
  NOTE: Topcoat within 90 days
  2 cts. Tile-Clad II Epoxy, B62 Series/B60V70 @ 4 mils DFT/ct.
  Total DFT: 12 mils
- * NOTE: Recoatable Epoxy Primer B67 Series/ B67V5 also acceptable.
- **Steel (Universal Primer)***
  1 ct. Kem Kromik Universal Metal Primer, B50NZ6, B50WZ1, B50HZ1 @ 3 mils DFT
  2 cts. Tile-Clad II Epoxy, B62 Series/B60V70 @ 4 mils DFT/ct.
  Total DFT: 11 mils.
- **Steel (Epoxy Mastic Primer)**
  1 ct. Epoxy Mastic Aluminum II, B62S100/ B60V100 or Epoxy Mastic B58 Series/B58V1 @ 6 mils DFT
  NOTE: Topcoat within 7 days
  ct. Tile-Clad II Epoxy, B62 Series/B60V70 @ 4 mils DFT
  Total DFT: 10 mils
- **Aluminum**
  1 ct. Wash Primer P60G2/R7K44 @ 0.3 mil DFT
  NOTE: Topcoat within 4 hours.
  2 cts. Tile-Clad II Epoxy, B62 Series/B60V70 @ 4 mils DFT/ct.
  Total DFT: 8.3 mils
- **Concrete Block***
  1 ct. Heavy Duty Block Filler, B42W46 @ 10-12 mils DFT
  2 cts. Tile-Clad II Epoxy, B62 Series/B60V70 @ 4 mils DFT/ct.
  Total DFT: 18-20 mils:
- * NOTE: Kem Cati-Coat Epoxy Filler/Sealer also acceptable.
- **Galvanized Metal**
  2 cts. Tile-Clad II Epoxy, B62 Series/B60V70 @ 4 mils DFT/ct.
  Total DFT: 8 mils.
  (Rusty only): 1 ct. Tile-Clad II Primer, B62N71/ B60V70 @ 4 mils DFT
  NOTE: Topcoat within 90 days.
- **Interior Plaster and Wallboard:**
  1 ct. ProMar 200 Latex Wall Primer, B28W200 @ 1.4 mils DFT
  2 cts. Tile-Clad II Epoxy, B62 Series/B60V70 @ 4 mils DFT/ct.
  Total DFT: 8-9.4 mils.
- **Masonry and Wood (including floors):***
  2 cts. Tile-Clad II Epoxy, B62 Series/B60V70 @ 4 mils DFT/ct.
  Total DFT: 8 mils.

NOTE: Deep colors in Deeptone and Ultradeep bases exhibit less abrasion resistance. Scratches and film haze are more apparent in these colors. Use these dark colors on floor surfaces with caution.

APPLICATION

Strong solvents in this material may loosen old residual paint and cause blocking of equipment. To eliminate possible blocking of equipment during spraying, clean equipment before use and before extended periods of downtime with Methyl Ethyl Ketone, following supplier's safety cautions. Moisture condensation on Tile-Clad II Epoxy which is not thoroughly dry will adversely affect its cure.

- **Application Conditions:**
  Temperature (air, surface, material): 55°-95°F *(at least 5°F above the dew point)*
  Relative Humidity: 85% maximum
- **Methods:**
  Brush, roll, conventional and airless spray
  Airless Spray:
  Unit: 2500 psi pressure
  Tip: .015"
  Filter: 60 mesh
  Conventional Spray:
  Binks 18 gun, 66 fluid nozzle, 69p air nozzle, 80 psi atomization pressure, 20-25 psi fluid pressure or equivalent equipment.
- **Mixing Instructions:**
  Thoroughly mix each separate component (A & B). Then combine equal parts by volume of Part A with Part B; thoroughly agitate mixture. Allow material to "sweat in" 1 hour when temperatures are between 65°-95°F. At lower temperatures (55-65°F), or when high humidity (60-85%) is present, "sweat-in" time must be 2 hours. Proper induction time is essential for Tile-Clad II Epoxy to dry. Do not mix previously catalyzed material with new.
- **Tinting:**
  Tint with Blend-A-Color colorants into Part A only. 150% tint strength. Shake on mechanical shaker for 15 minutes for complete mixing of color. DO NOT USE RED. Nuodex Chroma-Chem 844 Colorants also acceptable, use 150% tint strength formulas.
- **Reducer:**
  Reducer #54, R7K54
- **Reduction:**
  Up to 1 pint per gallon catalyzed material after induction as necessary to be compatible with the existing application and environmental conditions.
  NOTE: When using B60VA7, Eg Shel Hardener, catalyzed mixture may be reduced up to 20%.
- **Clean-up:**
  Use Reducer #54, R7K54, or Methyl Ethyl Ketone, following safety cautions.

PRECAUTIONS

DANGER! EYE AND SKIN IRRITANT.
CONTAINS XYLENE AND AROMATIC HYDROCARBONS.

Contents are FLAMMABLE. Keep away from heat, sparks and open flame. During use and until all vapors are gone: keep area ventilated; do not smoke; extinguish all flames, pilot lights and heaters; turn off stoves, electric tools, appliances and any other sources of ignition.

VAPOR HARMFUL. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches or dizziness, increase fresh air or wear respiratory protection (TC23C or equivalent) or leave the area.

Avoid contact with skin and eyes. If ingested, seek medical attention immediately. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

NOTICE: Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

DO NOT TAKE INTERNALLY.

KEEP OUT OF THE REACH OF CHILDREN.

NOTE: Not for immersion service.

SEE MATERIAL SAFETY DATA SHEET.

The information, rating and opinions stated here pertain to the material currently offered and represent the results of tests believed to be reliable. Published technical data and instructions are subject to change. Consult with your Sherwin-Williams Representative for coating recommendations.

FOR SHERWIN-WILLIAMS USE

		1's	5's
Gloss Hardener	B60V70	630-2905	630-2913
Eg-Shel Hardener	B60VA7	6401-60629	6401-60637
Hi Bild Metal Primer	B62N71	617-2126	617-2134
Black	B62B11	617-1920	
Pure White	B62W101	9143-99993	9157-99993
Midtone Base	B62W102	9162-99993	
Deeptone Base	B62W103	9181-99993	
Ultradeep Base	B62T104	6204-99993	
OSHA Orange*	B62E39	617-4060	
OSHA Red*	B62R38	617-4031	
OSHA Yellow*	B62Y39	617-4049	

Sherwin Williams

Industrial Maintenance Coatings

PRODUCT DATA

4.03

(MC-56, E1

TILE-CLAD® II EPOX

B62 Series (Par
B60V70 Gloss Hardener (Par
B60VA7 Eg-Shel Hardener (Par

PRODUCT DESCRIPTION

TILE-CLAD II® EPOXY is a polyamide/bisphenol A epoxy resin coating formulated for high performance.

USES:

- o Heavy duty interior structural coating
- o Abrasion and chemical resistant floor coating
- o Institutional/commercial high traffic, sanitary wall coating
- o Chemical resistant equipment coating
- o Chemical processing equipment and structures
- o Schools
- o Masonry construction
- o Paper mills
- o Storage tanks
- o Clean rooms
- o Laboratories
- o Refineries
- o Power plants
- o Lavatories
- o Offshore structures
- o Institutional kitchens

PERFORMANCE INFORMATION:

- o Chemical resistant
- o Resists bacterial attack
- o Abrasion resistant

PHYSICAL PROPERTIES:

- o Abrasion resistance (pure white) .... 132 mg. (ASTM D4060, CS-17 wheel, 1,000 cycles)
- o Direct impact resistance (ASTM G14) 84 in lbs.
- o Dry heat resistance .... 250°F (ASTM D2485, discolors)
- o Elcometer adhesion (ASTM D4541) ...... 750 psi
- o Exterior durability .... Excellent (with non-progressive chalk face developing in 3-6 months)
- o Flexibility .... Passes (ASTM D522, 180° bend, 1/4" mandrel)
- o Moisture condensation resistance ...... No failure (ASTM D4585, 100°F, 1500 hours)
- o Pencil hardness (ASTM D3363) 3H
- o Salt Fog Resistance .... Good (ASTM B117, 1000 hours)
- o Scrub resistance .... no gloss change (ASTM D2486, 9,700 cycles)
- o Thermal shock (ASTM D2246, 5 cycles) . Good
- o Washability and stain resistance .... max 25 cycles for complete removal of: lipstick, butter, tea, ketchup, coke, fruit juice
- o Wet heat resistance (not immersion) .... 100°F

RESISTANCE GUIDE:
(Resistance to fumes, splash and spillage - not immersion ASTM D3912)

- o Alcohols, select chlorinated solvents, formaldehyde, glycol ethers .... MODERATE
- o Aliphatic hydrocarbon solvents .... SEVERE
- o Alkalies .... SEVERE
- o Oils (cutting, vegetable, lubricating) ..... SEVERE
- o Aromatic hydrocarbon solvents ...... MODERATE
- o Fresh Water & Salt Water .... SEVERE
- o Weak solutions of mineral and organic acids .... MODERATE

CHARACTERISTICS

- o **Color/Finish:** *Wide range of colors possible /Gloss: 90 ± 10 units @60°. Eg-Shel: 25 ± 10 units @ 60° (*White, Black, Safety Colors, 4 Tinting Bases)
- o **Curing Mechanism:** Crosslink Polymerization
- o **Drying Schedule:** (temperature & humidity dependent) @ 77°F and 50% RH @ 9 mils wet:
  - To Touch: 1 hour
  - Tack Free: 4 hours
  - To Recoat: 6 hrs. min., 30 days max. If max. recoat time is exceeded, brush blast before recoating.
  - To Cure: 14 days
- o **Flash Point:** 90°F (catalyzed) (Pensky-Martens Closed Cup)
- o **Number of Components:** 2 (equal parts by volume)
- o **Packaging:** 1 and 5 gallon containers
- o **Pot Life:** 8 hours @ 77°F
- o **Recommended Spreading Rate:** wet mils: 7.0-9.0; dry mils: 3.0-4.0; approx. sq.ft./gal.: 185-245

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

- o **Spreading Rate Coverage:** 738 sq.ft./gal. @ 1 mil dry (theo., no loss)
- o **Shelf Life:** 36 months unopened @77°F
- o **Shipping Classification:**

	1's	5's
Part A	X002	X003
Part B	X002	X003

- o **Shipping Weight (Pure White):**

	1's(4/case)	5's
Part A	49.5 lbs.	60.1 lbs.
(B60V70) Part B	38.4 lbs.	46.3 lbs.
(B60VA7) Part B	46.9 lbs.	57.0 lbs.

- o **"Sweat-in" Time:** 1 hr @ 65-95°F; 2 hrs @ 55-65°F or when humidity is 60-85%
- o **VOC:** (Pure White) (catalyzed): 475 gms/ltr, or 4.0 lbs/gal
- o **Volume Solids:** 46 % ± 2% (catalyzed)
- o **Weight Solids:** 59 % ± 2% (catalyzed)
- o **Weight/Gallon:** 9.8 ± .1 lbs. (catalyzed) (Pure White)

Analysis (Pure White) (catalyzed)

Pigment by weight		26%
Titanium Dioxide (Class III)	17%	
Silicates	9%	
Vehicle by Weight		74%
Epoxy Resin	22%	
Polyamide Resin	11%	
Aromatic Hydrocarbons	33%	
Alcohols	7%	
Additives	1%	
Total	100%	100%

SURFACE PREPARATIO

Surface must be dry and in sound condition. Re oil, dust, dirt, mill-scale or other foreign substan ensure good adhesion. Use recommended prim

Iron and Steel: Surfaces are to be cleaned as o on the label for the appropriate recommended p

Aluminum: Remove all oil, grease, dirt, oxide and foreign material by Solvent Cleaning per SSPC Prime with Industrial Wash Primer, P60G2/R7K

Concrete Block: Surfaces should be thoroughly and dry. Surface temperature must be at least 55° Heavy Duty Block Filler, B42W46, or Kem Ca Epoxy Filler/Sealer, B42WA8/B42WA9. The fille be thoroughly dry before topcoating per manufac recommendations.

New Floors: Surface must be thoroughly clean. bleeding or peeling can occur because of im surface preparation. Sanding wood floors to a sound surface and brush blasting or a 10% Muriat etch on concrete floors is required. Concrete m aged at least 30 days @ 75°F and elimination of ure in or beneath the concrete is required coating. Reduce the first coat of catalyzed Tile Epoxy with 1 pint per gallon of Reducer No. 54, R

Galvanized Metal: The surface should be e weathered for 6 months prior to painting. Solvent per SSPC-SP1. Self Priming.
When weathering is not possible or the surface ha treated with chromates or silicates, Solvent Cle SSPC-SP1. Apply a test area. Allow paint to dry before testing adhesion. If adhesion is poor, brus ing is necessary to remove these treatments. Rusty galvanizing shall be hand tool cleaned per S SP2. Prime rusty areas with Tile-Clad II Hi-Bild B62N71/B60V70 or Recoatable Epoxy Primer, B B67V5.

Masonry: All masonry must be free of moisture, grease, loose paint, mortar, etc. Poured, trowele up concrete, plaster, mortar, etc. must be thor cured at least 30 days at 75°F. Form release comp and curing membranes must be removed by Blasting. Weathered masonry and soft or porc ment board must be Brush Blasted or Powe Cleaned to remove loosely adhering contaminat to get to a hard, firm surface. Surface temperatur be at least 55°F before painting. Prime interior and wallboard with 1 coat ProMar 200 Latex Wall B28W200.

Wood: Sand smooth and remove all dust and dir first coat of Tile-Clad II Epoxy reduced with 1 reducer No. 54, R7K54. Apply a second coat at fu

Previously Painted Surfaces: If in sound co clean the surface of all foreign material. Test forc bility to previous coating. If lifting or bleeding apply a barrier coat of Kem Kromik Universa Primer, B50NZ6, B50WZ1, B50HZ1, and foll Tile-Clad II Epoxy. Old epoxy films or previous Ti II Epoxy films which have exceeded their ma recoat time must be brush blasted or scuff sa assure adhesion. If paint is peeling or badly wea clean surface to sound substrate and treat as surface.

APPENDIX D

SECONDARY CONTAINMENT CERTIFICATION

DARABI
AND
ASSOCIATES, INC.

Environmental Consultants

Suite A, 730 North Waldo Road, Gainesville, Florida 32601 Phone: 904/376-6533

January 21, 1988

Mr. Ashwin Patel
Hazardoure Waste Section
Dept. of Environmental Regulation
3426 Bills Road
Jacksonville, Fl 32207

RE: Quadrex HPS
Secondary Containment Certification

Dear Mr. Patel:

Please be advised that we have examined and reviewed the secondary containment holding capacity for the 3000 gallon storage tank at the Quadrex Facility in Gainesville, Florida.

Our calculations indicate that the secondary containment should have a total capacity of 4152 gallons to contain the content of the tank (3000 gallons) and rainfall generated from a 25 year, 24 hour storm (7.66 inches or 1152 gallons). The secondary containment is capable of holding 4871 gallons of liquid.

The secondary containment structural integrity has been reviewed by the structural engineering consulting firm of Bodo and Associates. Their certificate is attached for your review.

Should you have any questions or require any additional information, please let me know.

Sincerely,

DARABI & ASSOCIATES, INC.

Frank A. Darabi

Frank Darabi, P.E.
President

FD/sb

xc: Ben Warren

3720 N.W. 43rd Street
Gainesville, Florida
Tel: (904) 378-8806

BODO & ASSOCIATES
Consulting Engineers

Mailing Address:
P.O. Box 698
Gainesville, FL 32602

January 11, 1988

Mr. Frank A. Darabi, PE
Darabi and Associates, Inc.
Suite A
730 North Waldo Road
Gainesville, FL 32601

RE: Containment Structure at Quadrex HPS
Gainesville, Florida

Dear Frank:

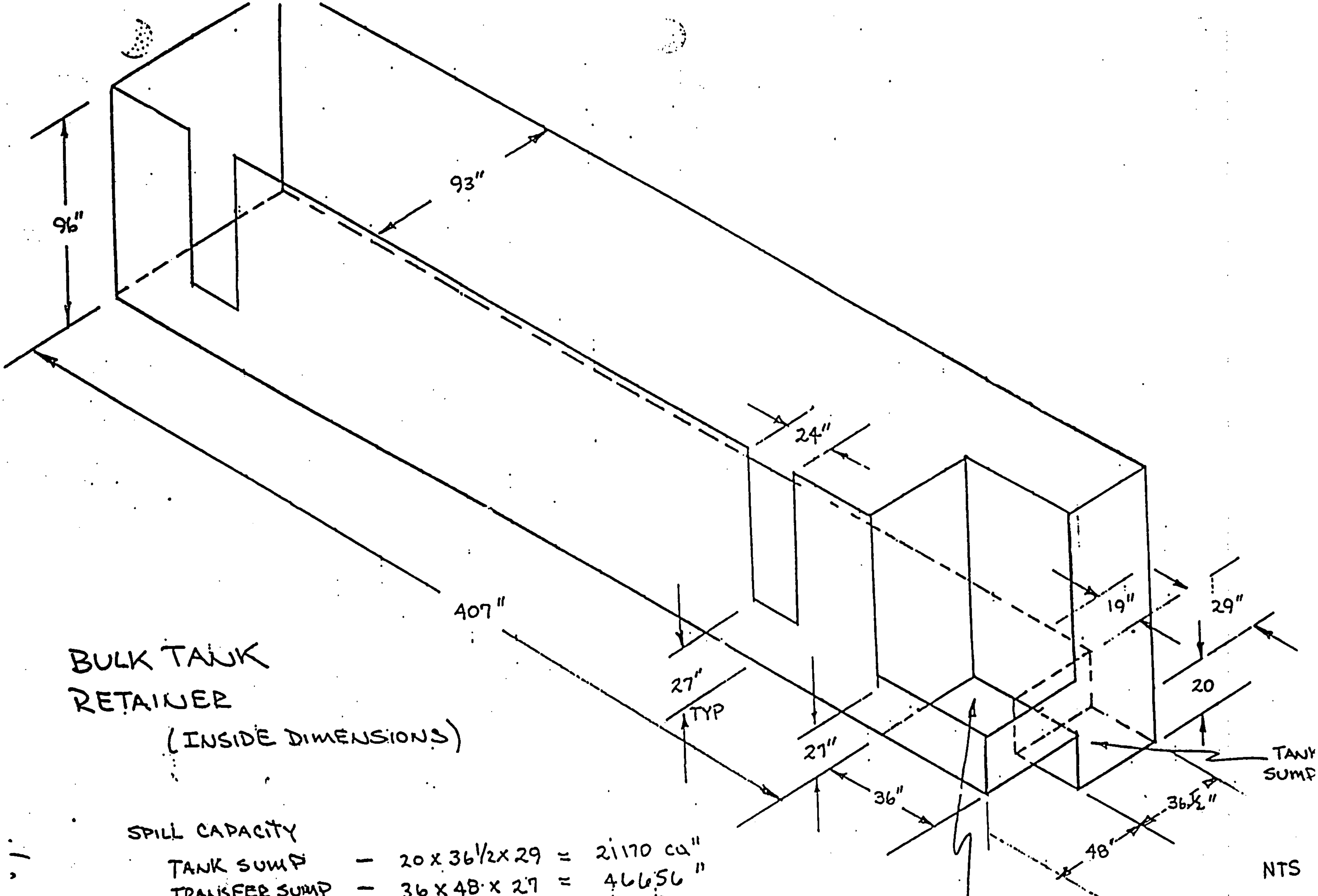
Pursuant to your request and authorization, Bodo & Associates, Inc. performed a structural evaluation of the existing containment structure referenced above. The evaluation was limited to a determination of the adequacy of the existing wall to withstand the lateral fluid pressure that would result from a rupture of the storage tank. Information and details of the structure were provided by you.

Based on our investigation we conclude that the wall will safely resist a lateral pressure due to a liquid height of 19 inches.

We appreciate this opportunity to provide our services to you. If you have any questions, or require any additional assistance, please do not hesitate to call.

Sincerely,
BODO & ASSOCIATES, INC.

Attila A. Bodo, PE
President

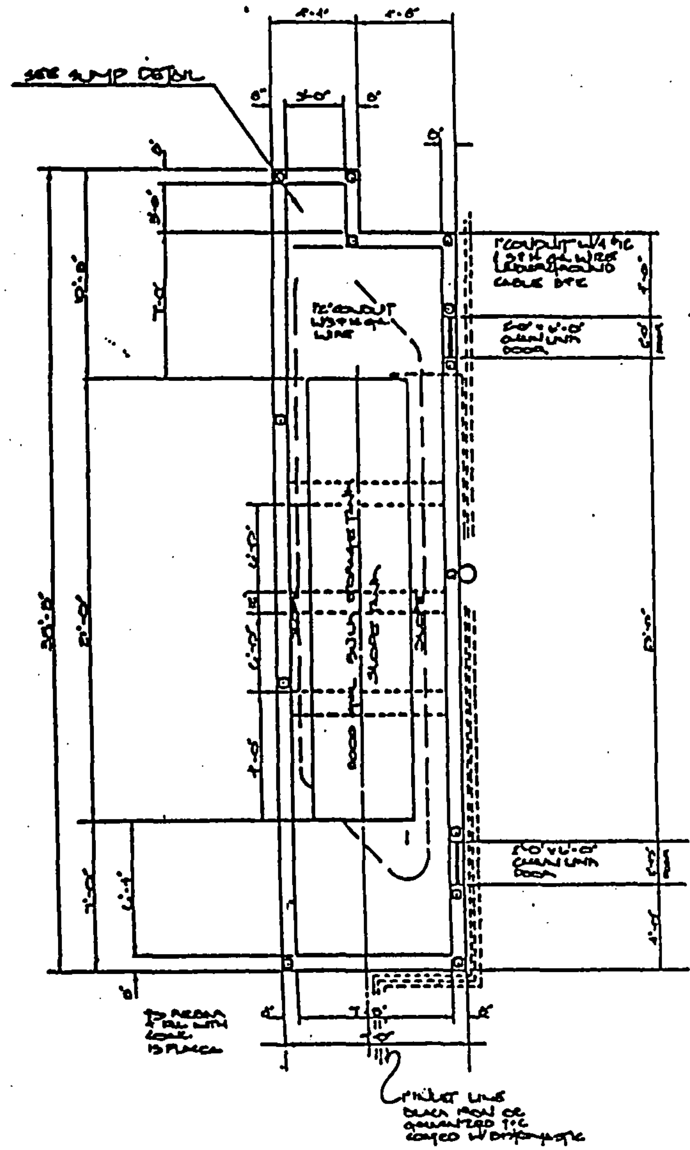


BULK TANK RETAINER
(INSIDE DIMENSIONS)

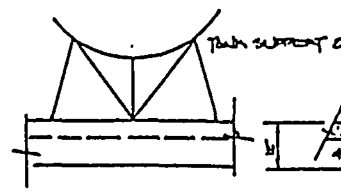
SPILL CAPACITY

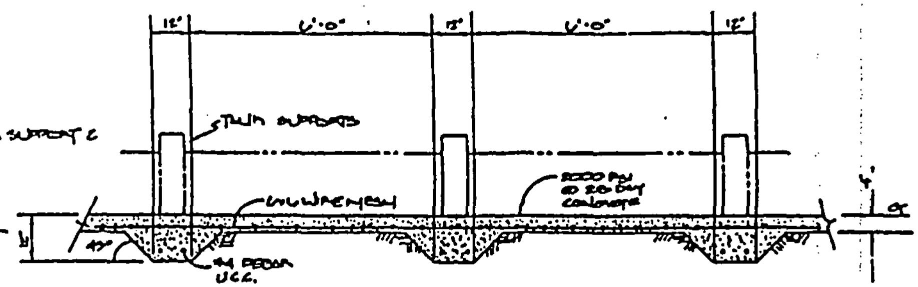
TANK SUMP	–	20 x 36½ x 29	=	21170 cu"
TRANSFER SUMP	–	36 x 48 x 27	=	46656 "
MAIN AREA	–	407 x 93 x 27	=	1,021,977
Above TANK SUMP	–	36½ x 36 x 27	=	35478
				1,125,281 / 231 cu"/gal

= 4871 gal

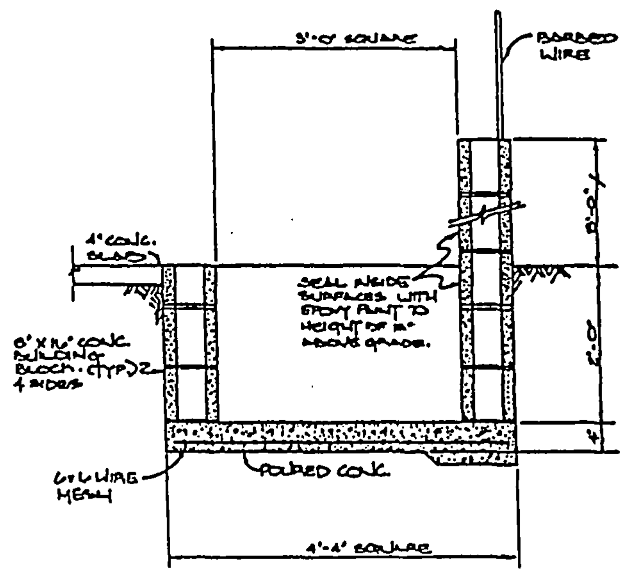


BULK STORAGE AREA PLAN
NOT TO SCALE





BULK TANK SUPPORTS
NOT TO SCALE



SUMP DETAIL
NOT TO SCALE

3000 GALLON STORAGE TANK

APPENDIX E

INSPECTION LOG

BULK TANK DAILY INSPECTION LOG

1 Date / Time	2 Inspected By	3 Area Clean	4 Evidence of Leak	5 Precipitation Present	6 Corrosion on Outer Surface	7 Plumbing in Good Condition	8 Concrete Bunker in Good Condition	9 Alarm and Overflow Functional	10 Comments on Discrepancy	11 Resolution of Discrepancy Date and Action Taken

Instructions:

Column 1 – Enter the date and time of the inspection.

Column 2 – Enter your initials. Print clearly.

Column 3 – Is the area clean of trash, debris, etc. Answer either yes or no. If no, describe the area in the comment section. Print clearly.

Column 4 – Is there any evidence of a leak in the bulk tank? Answer either yes or no. If yes, describe in the comment section the situation or evidence that indicates the leak.

Column 5 – Is any precipitation around the tank? Answer either yes or no. If yes, describe the precipitation's origin and quantity in the comment section.

Column 6 – Is there any corrosion on the tank? Answer either yes or no. If yes, describe in the comment section.

Column 7 – Is the plumbing in good condition? Answer either yes or no. If no, describe in the comment section.

Column 8 – Is the concrete berm in satisfactory condition? Answer either yes or no. If no, describe its conditions in the comment section.

Column 9 – Are the transfer pump and overflow devices functioning? Answer either yes or no. If no, indicate why not in the comment section.

Column 10 – This column should be used to describe any area or equipment from Columns 3 through 9 that require replacement, repair or cleaning. Print clearly.

Column 11 – Document the date and action that was taken to correct the discrepancy identified under Column 10. Print clearly.

APPLICATION FOR HAZARDOUS WASTE PERMIT

PART II

I MISCELLANEOUS UNITS

I.1 Description of Miscellaneous Units

This section describes a new hazardous waste treatment unit proposed for the PFF facility which may be identified as a miscellaneous unit regulated under 40 CFR 264 Subpart X. The unit will be used to physically and/or chemically treat hazardous wastes. This section of the permit application is intended to address the regulations for miscellaneous units applicable to the unit.

PFF proposes to conduct thermal desorption and/or chemical oxidation in a treatment unit currently being designed and built for installation and operation at the Facility. The proposed operation will consist of a proprietary process known as Perma-Fix® II. A detailed description of the proposed unit and its operation follows. ~~Bench scale testing currently under way may result in modifications to operations and equipment. Details regarding changes in the design, installation and operation of the treatment unit will be provided in an amendment to this permit application if necessary.~~

Process Description

The Perma-Fix II treatment process is appropriate for sludges and solids contaminated with volatile organic hazardous constituents. Soils and other contaminated media will constitute most of the waste to be treated using the Perma-Fix II Process. PFF estimates that approximately 80% of the wastes in its target market are at, or will be generated at Department of Energy (DOE) sites. Approximately 15-20% of the wastes in the target market will be generated at nuclear power generating facilities, and roughly 3-5% of the wastes will be generated at medical or research institutions. EPA estimates that current DOE sites have approximately 226,000 m^3 of waste which will require management over the next 20 years. Waste codes that may be assigned to materials targeted for treatment include D003-D008, D010, D011, D018, D019, D021, D022, D035, D038-D040, F001-F003 and F005.

The treatment objective in applying the Perma-Fix II Process to these wastes is to remove organic contaminants from the solid fractions of the wastes sufficiently for the remaining solids to comply with applicable organic constituent land disposal restriction (LDR) levels. Perma-Fix II treatment candidates are identified using the information provided by generators on waste (material) profile forms and accompanying support documentation such as LDR notification forms. Example material profile and LDR forms are included as Attachments II.I.5 and II.I.6. Upon arrival at the facility, wastes are evaluated for proper management (storage and/or treatment) in the manner illustrated in Figures I.D.11.1 – I.D.11.4.

Perma-Fix® II is a one or two-step batch process. The process consists of thermal desorption which may be followed by non-thermal chemical oxidation. Hazardous wastes may be treated with one or both process steps, depending on the characteristics of the waste stream. ~~Pre-treatment of waste consisting of size reduction of the waste stream may be necessary prior to application of the Perma-Fix® II process. In this case, the waste stream to be treated will be size reduced in the LSV Processing area using the LSV grinder/screw. Upon size reduction, the waste to be treated will be containerized (primarily in 55 gallon drums) and transferred to the Treatment and Operations Building where the Perma-Fix® II treatment equipment is to be installed. If size reduction is deemed unnecessary, the containers of waste to be treated will be received and transferred directly to the Treatment and Operations Building.~~ See Figure I.D.1 in Part I of this application for the general layout of the Treatment and Operations Building and the proposed location of the Perma-Fix® II process equipment and container storage areas. See Attachment II.I.3 of this permit application section for a detailed description and illustrations of equipment.

The Perma-Fix® II Process will be ~~carried out~~ conducted inside a Quonset hut located in the Treatment and Operations Building. Drum opening ~~and repackaging (if necessary) into five-gallon containers~~ will take place in the deheading area inside the Quonset Hut. Emissions from treatment activities inside the Quonset hut will be controlled using a negative pressure ventilated system consisting of a dust collector, three HEPA filters and a thermal oxidizer (collectively referred to as the "air emissions control system") ~~HEPA/GAC air filters~~.

~~Waste Stream Sorting and Loading~~

Waste Stream Receipt Sorting, and Loading

Containers (e.g., drums) of hazardous waste to be treated using the Perma-Fix II Process will be delivered into the Quonset hut on single drum roller rings, on a conveyor or by powered lift truck.

After the removal of the lid at grade, drums will be unloaded into the Perma-Fix II reactor vessel by a hydraulic drum lifter/dumper. The dumper will grip and lift the drum, pivot it into position for gravity unloading into an open hopper on top of the reactor vessel, scrape it clean, and return the empty drum to grade. The hopper will be unloaded into the reactor vessel by opening a pneumatic guillotine valve at the bottom of the hopper.

All drum unloading activity will take place at ambient temperature while the Quonset hut is under negative pressure. Fugitive emissions will be captured and controlled by the air emissions control system (thermal oxidizer).

~~If size reduction is not required, the w~~Waste streams intended for Perma-Fix II treatment may require ~~manual~~ sorting for the removal of debris that may be present and which would damage the treatment equipment. Sorting is accomplished using a vibrating screen hopper. Drums are lifted into the screen hopper using a hydraulic lift. The contents of the drum fall through a series of vibrating screens designed to capture any debris larger than two inches. The debris remains on the screen and materials suitable for Perma-Fix II treatment falls through the screen into a 55-gallon drum. The drum is then positioned onto the hydraulic lifter, lifted up and dumped into the reactor vessel feed opening. See Figure I.D.22.

Emissions generated during this operation will be directed to the emissions control system through a surge vent that is activated whenever the reactor vessel is loaded. The segregated (greater than 2 inches) debris will be containerized in 55-gallon drums and placed in storage in the container storage area located in the Treatment and Operations Building awaiting debris treatment and/or shipment to a permitted waste management facility. Empty 55-gallon drums will then be removed from the drum opening area and sent off site for disposal.

~~Any debris that is larger than two inches will be segregated. The sorted material two inches or smaller will be placed in 5 gallon buckets, and will be manually loaded into the plough share or reaction vessel where the Perma Fix® II process will be conducted. Emissions generated during this operation will be directed to HEPA/GAC unit B through a surge vent that is activated whenever the reaction vessel is loaded. The segregated (greater than 2 inches) debris will be containerized in 55 gallon drums and placed in storage in the container storage area located in the Treatment and Operations Building awaiting debris treatment and/or shipment to an authorized waste management facility. If not reused for debris management, the empty 55 gallon drum will then be removed from the drum opening area and sent off for disposal.~~

Thermal Desorption

As indicated above, ~~W~~waste will be ~~manually~~ loaded into the top of the reactor vessel using a hydraulic drum lift. ~~Water~~ As appropriate, water from a water make-up tank and/or city water will be added to the reactor vessel and thoroughly mixed with the waste to form a homogeneous mixture or slurry[1]. The slurry will be mixed and heated in the reactor vessel. Non-contact steam circulated through a temperature control jacket, will be used to heat the reactor vessel and its contents[2]. During this phase of the process the liquid portions of the waste will evaporate, and water and organic ~~vapors~~ constituents will pass through the heat exchanger (condenser) where ~~they will condense~~ part of the vaporized waste is condensed (liquid phase) and part remains in the vapor phase.

The vapor phase and condensate (liquid phase) will be discharged into a ~~non-volatile organic layer (e.g., non volatile mineral oil or another appropriate petroleum product such as diesel) in a~~ water separator tank containing a non-volatile organic layer (e.g., mineral oil or diesel). ~~The volume of this organic layer will depend on the initial concentration of~~

[1] Alternatively, some waste may already be in slurry form when introduced into the reactor vessel and will not require the addition of water. In addition, certain wastes may require the addition of surfactants or organic solvents (e.g., naptha) to the waste slurry to mobilize contaminants and facilitate the treatment process.
[2] Alternatively, hot water, cold water, or steam can be circulated through the system to control the temperature in the reactor vessel.

~~organic contaminants in the waste stream.~~ Discharge of the liquid phase into this tank from the condenser will take place through a liquid distributor that will disperse the liquid stream into droplets to allow a better diffusion of the organic compounds from the condensate into the non-volatile organic layer. Alternatively, if the waste stream to be treated has a high enough concentration of organic contaminants (e.g., solvents), or if it requires the addition of an organic solvent to mobilize certain contaminants, it will not be necessary to add water to slurry the waste and the use of a non-volatile organic layer in the separator tank will not be required. The separator ~~will~~ may be packed with steel packing (either Rasing rings, Pall rings, Intalox saddles or other functionally equivalent packing) if it is considered that for a particular waste a packing would improve mass transfer between phases. ~~Otherwise, no packing will be used.~~ The separator will be equipped with a level indicator that will sense the interphase between the organic layer and the aqueous layer formed, and will activate the separator pump to transfer the aqueous layer (water) from the separator tank to an ~~the~~ accumulation tank. ~~The separator and the accumulation tank will both vent to a HEPA/GAC B air pollution control system through conservation vents. This process will continue until most of the free water (or alternate liquid) in the waste matrix has been evaporated and condensed.~~

Discharge of the vapor phase from the condenser will be into the head space of the separator tank. From there, the vapor phase will immediately be drawn into an absorber. The absorber is a tank with a small diameter to height ratio that will contain a low vapor pressure (high boiling point) solvent (e.g., water or kerosene). The vapor phase coming from the separator tank will be mixed with the solvent and allowed to diffuse through the solvent, which will absorb the organic constituents contained in the vapor phase.

The process of heating the waste and removing the water and/or organic constituents from the vaporized waste will continue until most of the free water and organic constituents have been stripped from the waste and collected in the accumulation and absorber tanks. Both the absorber and accumulation tank will vent to the air emissions control system through conservation vents.

Next, the ~~non-volatile organic~~ condensed phase treatment residuals will be collected from the separator, accumulator and absorber tanks, containerized, characterized and sent off site to a permitted waste management facility. The condensed water (or other liquid, if applicable) collected in the accumulator tank will~~: 1)~~ be reused in the oxidation process step for continued treatment of the same batch (see below). ~~; 2)~~ Alternatively, it may be used in the thermal desorption step of a different batch of the same stream~~; 3)~~ or it may be used to prepare the solidification media if the waste removed from the reactor vessel is to be stabilized/solidified using the Perma-Fix® ~~microencapsulation~~ stabilization/fixation process. ~~; or 4) it may~~ Otherwise, it will be containerized, characterized and sent off site to a permitted waste management facility.

Once the thermal desorption step is complete, a sample of the treatment residual from the reactor vessel will be obtained and analyzed in accordance with the Facility Waste Analysis Plan. If the treated waste meets applicable land disposal restrictions, the residual waste will be dried by low temperature heating of the reactor vessel,

CONFIDENTIAL

containerized in 55 gallon drums and sent to a permitted waste management facility. If the treated waste does not meet land disposal restrictions for organic constituents, the chemical oxidation step will be carried out in the reactor vessel (see below). If the residual waste does not meet land disposal restrictions for inorganic constituents and needs to be stabilized/solidified using the Perma-Fix® Process, ~~microencapsulation process,~~ drying will not be required, and the stream will be containerized in 55 gallon drums and transferred to the Perma-Fix® Process ~~process~~ area inside the Quonset hut for further treatment or placed in the Treatment and Operations Building storage area pending further treatment.

Chemical Oxidation

Upon completion of the thermal desorption step, the reactor vessel will be allowed to cool to a preset temperature that will allow the addition of an oxidizer. The type and amount of oxidizer used will depend on the waste stream and on bench tests carried out on that particular stream. The possible oxidizers are: peroxydisulfate salts, persulfuric acid, and/or hydrogen peroxide. If using a peroxydisulfate salt, it may be added as a dry salt or as a solution. Water will be added to the reactor vessel if it is deemed necessary in order to dissolve the oxidizer. This water will either come from the accumulator tank or from city water. Mixing will resume, and the temperature of the vessel will be raised enough to allow the oxidation reaction to begin (approximately 75 to 85° C). Any vapors created during this step will be condensed in the heat exchanger and the condensate will be discharged ~~in~~ into the accumulation tank (bypassing the separator and absorber tanks). ~~tank).~~

An example oxidation chemical reaction is as follows:

$$\text{organics} + H_2O + S_2O_8^{-2} \rightarrow CO_2 + 2HSO_4^- + \text{inorganics}$$

$$\text{organics} + H_2O_2 \rightarrow CO_2 + H_2O + \text{inorganics}$$

Example using sodium peroxydisulfate and toluene as the organic contaminant:

$$C_7H_8 + 14H_2O \rightarrow 7CO_2 + 36H^+ + 36e^- \quad \text{(oxidation)}$$

$$18Na_2S_2O_8 + 36H^+ + 36e^- \rightarrow 36NaHSO_4 \quad \text{(reduction)}$$

$$C_7H_8 + 14H_2O + 18Na_2S_2O_8 \rightarrow 7CO_2 + 36NaHSO_4 \quad \text{(redox)}$$

Example using hydrogen peroxide:

$$C_7H_8 + 14H_2O \rightarrow 7CO_2 + 36H^+ + 36e^- \quad \text{(oxidation)}$$

$$18H_2O_2 + 36H^+ + 36e^- \rightarrow 36H_2O \quad \text{(reduction)}$$

$$C_7H_8 + 18H_2O_2 \rightarrow 7CO_2 + 22H_2O \quad \text{(redox)}$$

Water is also capable of reducing the oxidizer:

$$H_2O + S_2O_8^{-2} \rightarrow \tfrac{1}{2} O_2 + 2HSO_4^-$$

Oxygen will be produced during the oxidation step. Through bench tests, it has been determined that the amount of volatile and semi-volatile organic compounds left in the stream after the thermal desorption step is very low, consequently the amount of off-gasses produced from the oxidation of chlorinated organic compounds, namely hydrochloric acid and chlorine gas will also be very low.

The time required to complete the oxidation process will depend on temperature, the waste stream composition (matrix), and the amount of water added. Before the reaction is assumed completed, a sample of the aqueous phase will be titrated to determine the concentration of unreacted oxidizer. When the oxidizer has been depleted, the oxidation step will be considered complete.

Upon completion of the oxidation step, the reactor vessel will be allowed to cool and if necessary, either calcium hydroxide or sodium hydroxide will be added to adjust the pH of the mixture to within a range that will minimize corrosion of the Perma-Fix® II process equipment. The reactor vessel may be heated to the boiling point of water to dry the slurry as appropriate for further treatment and/or disposal. Other de-watering (e.g., filtration, settling, etc.) processes may be used to ~~streamline~~ facilitate the drying process. The water condensed from the drying of the oxidized stream will be discharged into the accumulation tank and reused in the reactor vessel for treatment of other batches of the same waste stream, or it may be used to prepare the solidification media if the waste needs to be stabilized/solidified using the Perma-Fix® microencapsulation process. Alternatively, it may not be necessary to remove the excess water from the processed stream if it is going to be treated with Perma-Fix® microencapsulation process. The degree of moisture remaining in the treated stream will depend on the requirements of the permitted facility receiving the waste.

The non-volatile solids treatment residual remaining in the reactor vessel will be discharged ~~from the reactor vessel~~ into 55-gallon drums through a pneumatic guillotine ~~knife gate~~ valve located beneath the reactor vessel. Drums are raised by a scissors lift to a gasketed position under the valve to receive the waste. Condensed/separated organic liquids recovered from the vaporized organic constituents will be collected in the separator and absorber tanks and pumped into drums when the treatment run is complete. The accumulator contents will be emptied into drums and managed as described below.

~~As appropriate, an~~ An inert atmosphere (e.g., nitrogen blanket) will be provided at all times during treatment operations to prevent explosions and fires.

Process Residuals Management

Several types of waste may be generated by the various steps in the Perma-Fix® II ~~p~~ Process. ~~as well as by the air pollution control system. Waste characterization will be conducted on these~~ These wastes will be characterized in accordance with the requirements of 40 CFR 262. Waste characterization ~~and~~ may include the application of knowledge of the Perma-Fix® II ~~p~~ Process and/or analytical testing pursuant to the Facility's Waste Analysis Plan. Generally, PFF will "carry through" all listed waste codes to each of the resulting treatment residual wastes generated by the Perma-Fix II Process. In other words, Perma-Fix II treatment residuals will be generated and manifested with the same listed waste codes assigned to the waste prior to its treatment. Appropriate characteristic waste codes will be retained or assigned to the treatment residual at the waste stream's final point of generation (prior to its being shipped off site). Residuals will be assumed to retain detectable radioactivity levels. The anticipated disposition of treatment residuals is discussed in further detail below. ~~; please note that alternate disposal options may be used if additional facilities become available.~~

- Wastes treated to meet the land disposal restrictions for hazardous waste constituents by thermal desorption, chemical oxidation, and/or stabilization/solidification, will be shipped to a permitted mixed waste facility (e.g., Envirocare) for disposal;

- The condensed volatiles separated by the thermal desorption process will be shipped to a permitted mixed waste facility (e.g., DSSI) for energy recovery;

- Water, no longer suitable for recycling in the thermal desorption process and not suitable for use in the Perma-Fix® ~~p~~ Process, will be shipped to a permitted mixed waste facility (e.g., DSSI).

- ~~Spent carbon will be shipped to a permitted mixed waste facility for disposal. (PFF intends to evaluate the feasibility of carbon regeneration or on-site processing after start-up of Perma-Fix II operations.)~~

- Spent HEPA filters containing hazardous constituents and radioactive contaminants will be shredded (or otherwise size reduced) and treated by the Perma-Fix process prior to disposal at permitted mixed waste facility (e.g., Envirocare).

~~As appropriate, an inert atmosphere (e.g., nitrogen blanket) will be provided during treatment operations to prevent explosions and fires.~~

Decontamination Procedures

Decontamination of Perma-Fix II Process equipment will be conducted whenever it would be inappropriate for treated wastes to come in contact with residuals from wastes previously treated in the equipment (e.g., when potentially incompatible wastes are involved or when it would be inappropriate for subsequent wastes to mix with and "pick up" waste codes from previously treated wastes). When necessary, Perma-Fix II Process equipment will be decontaminated in the following manner.

Prior to treating the final batch of a waste stream, the feed hopper surfaces will be scraped, swept, wiped, and/or rinsed with high pressure steam to remove surface contaminants into the reactor vessel. After treatment of the final batch of a waste stream, the bulk of the solids remaining in the reactor vessel will be unloaded from the reactor vessel as described above. Next, the interior of the reactor vessel will be scraped, swept and/or wiped out through the unloading valve at the bottom of the reactor vessel to remove most of the remaining solids that may be coating the walls, mixer, or other surfaces. Finally, the interior of the reactor vessel will be sprayed with high pressure steam to remove surface contaminants from the interior of the reactor vessel. The contact surfaces of the unloading valve will be scraped, wiped and rinsed once decontamination of the interior of the reactor vessel is complete.

Decontamination of the reactor vessel (including the feed hopper and discharge valve) will be deemed complete when no visible liquids, solids or sludges remain in or on the equipment.

When necessary, the Perma-Fix II Process organic constitutent recovery system (i.e., condenser, separator, absorber, accumulator and associated piping) will be decontaminated in the following manner.

After treatment of the final batch of a waste stream, and after the reactor vessel has been decontaminated, the separator, absorber and accumulator tanks will be emptied and flushed with distilled water. Next, a nominal 10 gallons of distilled water will be heated and evaporated in the reactor vessel to, as it condenses, flush all the condensing surfaces (including the steel packing in the separator and absorber tanks) in the organic constituent recovery system. The emptied separator, absorber and accumulator tanks will be rinsed with distilled water as the reactor vessel flush water is heated, vaporized, condensed and recirculated through the system. If a visual inspection of the condensate in the separator, absorber or accumulator reveals phasing or discoloration of the rinsate after a flush, the unit(s) will be emptied and repeat flushes will be conducted until no phasing or discoloration is detected in any of the units.

Physical Characteristics, Materials of Construction, and Dimensions of the Unit

A list and description of equipment currently contained in the design of the Perma-Fix® II Process system is included as Attachment II.I.1.

The Perma-Fix® II Process equipment will be designed, located, constructed, operated, maintained, monitored, inspected and closed in accordance with the applicable requirements of 40 CFR 264[3]. All relevant procedures to prevent hazards, inspections,

[3] A copy of the proposed inspection schedule for the Perma-Fix® II processing area and equipment is included as Attachment II.I.2 of this section.

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testing and maintenance and closure procedures and containment requirements addressed in this permit application for tanks and containers will be applied to the construction and operation of the Perma-Fix® II Process equipment as well. Records of inspections, etc. will be maintained in the Facility Operating Record. The Perma-Fix® II Process equipment and location has been addressed in the Facility Closure Plan included in this permit application. ~~As indicated above, additional details, if appropriate, specific to the Perma-Fix® II Process will be provided upon completion of the design of the system.~~

Reactor Vessel

The reactor vessel is designed to process 150 to 200 gallons of slurry. The ideal waste to water ratio~~n~~ is estimated to range from 1:1 to 1:2. ~~Laboratory testing may indicate that~~ However, the optimal water content may vary for particular waste streams. The duration of the desorption process and the oxidation process depends on the organic contaminant loading of the particular wastes as well as the processing temperatures. The Perma-Fix II Process duration will also depend on the rate of addition and volume of oxidizer used. ~~;~~ ~~bench~~ Bench-scale testing indicates that a staged addition approach enhances organic contaminant destruction. ~~These variations will be monitored to optimize the effectiveness and safety of the process. A nitrogen purge system will be available for use when volatile contaminants are present in the waste stream.~~ The small batch nature of the process ~~system is designed for batch processing which~~ will minimize the total volume of waste in the system at any one time. An inert atmosphere (e.g., nitrogen blanket) will be provided at all times during treatment operations to prevent explosions and fires.

The jacket on the reactor vessel (plough share) unit has a design pressure of 72 psi and a design temperature of 304° F. The jacket is constructed of 304 SS, which is compatible with steam or hot water. To prevent damage to the jacket from excess pressure, a pressure relief valve has been installed on the boiler generating the steam for the jacket. The pressure relief valve will be set to release at 65 psi. At a set pressure of 65 psi, the maximum temperature the boiler will be able to produce is 279° F. If the boiler pressure goes above 65 psi, the pressure relief valve will vent excess pressure (steam) to the atmosphere. The pressure relief valve will be calibrated or replaced on an annual basis.

The reactor vessel itself is designed to operate at atmospheric pressue. The reactor vessel and its internal components (e.g., mixing shovels) are constructed of 304 SS, which is compatible with the wastes to be processed. To prevent damage to the reactor vessel from excess pressure, a pressure relief valve has been installed on the reactor vessel. The pressure relief valve will be set to release pressure at 12 psi. If pressure in the reactor vessel exceeds 12 psi, the pressure relief valve will vent any excess pressure to the HEPA/VOC air emission control systems. The pressure relief valve will be calibrated or replaced on an annual basis.

Propane Tank

The tank to be used to store propane for firing the Perma-Fix II Process boiler has a design pressure of 250 psi. To prevent damage to the propane tank from excess pressure, a pressure relief valve has been installed on the tank. The pressure relief valve will be set to release pressure at 225 psi. If the pressure in the tank exceeds 225 psi, the pressure relief valve will vent any excess pressure to the atmosphere. The pressure relief valve will be calibrated or replaced on an annual basis. Because the propane tank operates at ambient temperature, operating temperature limits do not apply. The materials of construction for the tank are compatible with propane.

Boiler

The boiler has a design pressure of 150 psi and a design temperature of 358° F. To prevent damage to the boiler from excess pressure, a pressure relief valve has been installed on the boiler. The pressure relief valve will be set to release pressure at 65 psi. At a set pressure of 65 psi, the maximum temperature the boiler can produce is 297° F. If the boiler pressure goes above 65 psi, the pressure relief valve will vent excess pressure to the atmosphere. The pressure relief valve will be calibrated or replaced on an annual basis.

Condenser

The shell and tubes of the condenser have a design pressure of 150 psi and a design temperature of 250° F. The unit was hydrostatically tested at 225 psi. The shell (non-waste contact) side of the condenser is constructed of carbon steel, which is compatible with the cooling water to be circulated through the condenser. The tube (waste contact) side of the condenser is constructed of 316 stainless steel (SS), which is compatible with the waste to be processed.

The centrifugal pump that is used to circulate water through the shell of the condenser has a maximum head pressure of 70 feet (approximately 30 psi). The pressure generated by the circulation pump is well within the design pressure of the shell of the condenser (150 psi).

To prevent damage to the tube side of the condenser from excess pressure, a pressure relief valve has been installed on the reactor vessel. The condenser, which is connected to the reactor vessel via a 2" schedule 40 pipe, will have the same pressure as the reactor vessel. The pressure relief valve will be set to release at 12 psi. If the pressure in the reactor vessel or tube side of the condenser exceeds 12 psi, the pressure relief valve will vent any excess pressure to the HEPA/VOC air emission control systems. The pressure relief valve will be calibrated or replaced on an annual basis.

Separator

The separator tank is designed to operate at atmospheric pressure. The tank is constructed out of 304 SS, which is compatible with the waste and separator medium to be contained in the tank. The separator wil be "hard-piped" to the absorber tank by an ejector.

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The separator will operate at ambient temperature and receive condensed liquids from the condenser with temperatures between approximately 85° F and 110° F. These low temperatures are well within the design limits of the tank.

Absorber

The absorber tank is designed to operate at atmospheric pressure. The tank will be constructed out of 304 SS, which is compatible with the waste and absorber medium to be contained in the tank. The absorber will be equipped with a conservation vent with a pressure setting of 1 psi and a vacuum setting of 4 oz.

If the pressure in the absorber exceeds 1 psi, the conservation vent will vent any excess prssure to the HEPA/VOC air emission control systems. The conservation vent will be calibrated or replaced on an annual basis. The absorber will operate at ambient temperature and receive vaporized steam and organic constituents from the separator with temperatures between approximately 85°F. and 120°F. These temperatures are well within the design limits of the tank.

Accumulator

The accumulator tank has a design pressure of 14.7 psi. The tank is constructed out of 304 SS, which is compatible with the material being contained in the accumulator. The tank is equipped with a conservation vent with a pressure setting of 1 psi and a vacuum setting of 4 oz. If the pressure inside the accumulator exceeds 1 psi, the conservation vent will vent any excess pressure to the HEPA/VOC air emission control systems. The conservation vent will be calibrated or replaced on an annual basis. The accumulator will operate at ambient temperature and receive liquids from the separator and absorber with temperatures between approximately 85° F and 110° F. These low temperatures are well within the design limits of the tank.

I.2 Environmental Performance Standards

Release Prevention

The hydrogeologic, geologic and meterologic factors of concern for the PFF Facility site and surrounding areas is addressed in Section A of this permit application. For purposes of ensuring protection of human health and the environment, PFF proposes to design and operate the Perma-Fix® Process equipment in conformance with applicable container and tank standards. Appropriate secondary containment and air emission controls will be incorporated into the design and operation of the equipment and run on and run off of precipitation or liquids from the Perma-Fix® II Process area will be controlled. See Part II, Section B of this permit application for details regarding containment, management of ignitable, reactive and incompatible wastes, condition and management of containers, inspections and prevention of run on and accumulation of precipitation in the Treatment and Operations Building where the Perma-Fix® II Process operations will take place.

Prevention of Releases to Groundwater or Subsurface Environment

Releases to groundwater or the subsurface environment from the Perma-Fix® II treatment process are extremely unlikely for the following reasons:

- The process will manage relatively small volumes of material; i.e., each treatment batch is approximately 150 to 200 gallons of waste.
- The unit is located within a secondary containment system designed to meet the requirements of 40 CFR Subparts I and J. The containment system is designed to contain the entire volume of the waste being treated plus the volume of containers staged for processing. The containment system will be coated with a chemically resistant material which is compatible with the waste streams designated for processing. Containment calculations are included as Attachment II.I.4.
- The Perma-Fix® II process area will be inspected daily in accordance with the ~~facility~~ Facility inspection plan. Leaks or spills from the system will be cleaned up immediately upon detection or as soon as it is practicable and safe to do so.
- The system will be located within the ~~quonset~~ Quonset hut inside the Treatment and Operations Building; i.e., the system is physically separated from the subsurface environment and groundwater.
- The Facility maintains a Contingency Plan to provide a framework for Facility responses to emergencies such as spills, fires, or explosions. This plan provides procedures to respond to ~~treats~~ threats to human health or the environment from the Perma-Fix® II process.

Prevention of Releases to Surface Water, Wetlands, or Soil Surface

Releases to surface water, wetlands, or soil surface from the Perma-Fix® II process are also extremely unlikely for the ~~same~~ reasons listed above.

Prevention of Releases to Air

Releases to air from the Perma-Fix® II ~~treatment train~~ Process are extremely unlikely for the following reasons:

- The system is located within the quonset hut inside the Treatment and Operations building and the quonset hut is equipped with an emissions control system. ~~a series of emissions control devices.~~ The emissions control system is designed to handle the volume of organic emissions anticipated from the process. See air emissions control system description below.

- Organic vapors released from the waste streams in the reactor vessel during processing will be ~~removed from the unit by a vacuum pump and~~ routed to a condenser. Liquids from the condenser ~~are~~ will be transferred to ~~an accumulation vessel~~ the separator while uncondensed vapors are routed through the absorber tank ~~a fluid-filled trap~~ which absorbs ~~condenses~~ additional vapors.

- Emissions at the reactor vessel loading point are minimized by limiting the time the containers are open prior to processing.

- Emissions during unloading of the reactor vessel are minimal because the potential air contaminants will be significantly removed or destroyed during processing.

Air Emissions Control System

PFF will install and operate an organic emissions control system consisting of a regenerative (heat recovering) thermal oxidizer designed to control the emission of volatile organic compounds (VOCs) from the LSV processing area and the Perma-Fix treatment operations area (Quonset hut) in the Treatment and Operations Building. The oxidizer will use thermal energy to destroy VOCs. The following provides an overview of the current system PFF proposes to install. Figures I.D.13 – I.D.18 are system layout, P&ID and general arrangement drawings detailing the proposed system.

Process VOCs will be delivered to the air emission control system (system) fan. This fan will provide the motive force for the system. From the fan, the airstream will move to a switching valve for distribution into one of two heat recovery chambers filled with ceramic media to provide heat transfer. Recovery of up to 95% of thermal energy is accomplished using ceramic media. The airstream travels upward through the ceramic media and is preheated by the heat previously deposited (retained in the ceramic media) to a temperature of approximately 1300°F prior to entry into the combustion chamber. In the combustion chamber, the temperature is raised to approximately 1500°F by a burner, and the VOCs in the airstream are destroyed.

After destruction in the combustion chamber the cleaned hot gases (airstream) pass downward through the second heat recovery chamber, where heat is given up or deposited in the ceramic media. The cooled airstream then discharges from the heat recovery chamber through a valve, where it is directed to the exhaust stack.

The destruction efficiency specified in the system design is 95% minimum. The system is based on the following design criteria:

Process	LSV Processing	Quonset Hut (Perma-Fix)	Combined
Airflow	4000 CFM	3600 CFM	7600 CFM
Temperature	70°F	70°F	70°F
VOC Concentration	571 ppm	500 ppm (est.)	500 ppm[1]

The regenerative thermal oxidizer will be designed, installed and operated in accordance with the applicable requirements of 40 CFR 264 Subpart AA (Air Emission Standards for Process Vents). See also Section II.R of this permit application.

Monitoring and Inspections

The Perma-Fix® II ~~process~~ Process will be monitored by PFF personnel during processing operations. ~~The system will be loaded and unloaded manually (or automated equipment will be manually operated) and is equipped with automatic shutoff system which will not automatically re-activate.~~ The Perma-Fix® II ~~process~~ Process area and equipment will be visually inspected each operating day for evidence of leaks or spills; the inspection will be in accordance with the requirements of the Facility inspection plan. The secondary containment system will also be inspected each operating day for evidence of cracks or breaches in containment as specified in the Facility inspection plan.

I.3 Potential Pathways of Exposure of Humans or Environmental Receptors

PFF workers within the quonset hut will be the most likely human receptors of exposure to chemicals or chemical constituents potentially released from the Perma-Fix® II ~~process~~ Process. The exposure is anticipated to be minimal because of the negative pressure ~~vacuum~~ maintained in the process area and because of the air emission control system to be provided for the ~~quonset~~ Quonset hut. The primary pathway for human exposure from the Perma-Fix® II ~~process~~ Process is air. ~~—specifically,~~ Specifically, air emissions (volatiles or particulates) generated during the loading and unloading of the reactor vessel. ~~processes.~~ Where appropriate, water may be added to the wastes prior to loading to minimize the generation of particulates.

Personnel operating the system (or personnel present in the ~~quonset~~ Quonset hut for any other reason) will be required to wear Personal Protective Equipment (PPE) selected to address the potential hazards identified for the wastes to be managed and the operating parameters of the system. The PPE selected will be in accordance with OSHA standards and may include use of particulate/radioactive/organic respirators (as appropriate).

1 It should be noted that the assumptions used for the design criteria (i.e., air flow and VOC concentration) are purposely conservative to ensure the effectiveness of the thermal oxidizer.

Environmental receptors outside of the quonset hut such as soil, surface water, groundwater, and air are unlikely to be impacted by the Perma-Fix® II system because of the air pollution control system to be provided for the ~~quonset~~ Quonset hut, the containment system and the location of process equipment within a building that is physically separated from ~~soils~~ groundwater and the subsurface environment and protected from precipitation, run-on and run-off.

I.4 Effectiveness of Perma-Fix® II Process

Information regarding the effectiveness of the Perma-Fix® II Process is currently being developed through the conduct of laboratory and R&D experiments. The manufacturer's specifications for the reactor vessel and condenser indicate a 67% recovery efficiency for freon. Bench scale testing has indicated worst case heat exchanger (condenser) efficiencies for typical organic constituents of 69% to 90%. The addition and operation of the separator and absorber tanks (liquid-liquid extraction) is expected to substantially improve organic constituent removal/recovery efficiency. Preliminary test results indicate that the thermal desorption and liquid-liquid extraction process ~~removes~~ will remove more than 90% of the organics contained in the ~~tested~~ treated wastes. This efficiency level has been achieved with low volatility organics such as PCBs as well. It is anticipated that subsequent chemical oxidation, when selected, will effectively destroy the remaining residual organic constituents. Volatile organic chemical (VOC) emissions from the process will be vented to and/or captured and destroyed by the air emissions control system (thermal oxidizer). The thermal oxidizer will reduce VOCs a minimum of 95%.

Ultimately, the effectiveness of the Perma-Fix II Process on individual waste streams and individual hazardous waste organic constituents is a function of time and temperature. Waste streams will be subjected to the Perma-Fix II Process until a sample of the treated waste indicates that it meets applicable land disposal restriction treatment levels.

Nevertheless, the treatment steps (component technologies) of the Perma-Fix II Process (i.e., thermal, desorption, condensation, organic separation and absorption, and chemical oxidation) are established technologies comprising the technology-based treatment standards of 40 CFR 268.42, Table 1. See CHOXD, DEACT, LLEXT, and RORGS descriptions at 40 CFR 268.42, Table 1. These organic waste treatment technologies are effective by definition, given their inclusion in Table 1.

I.5 Applicable Tank Standards

The Perma-Fix® II ~~process~~ Process ~~treatment train~~ contains several components which have been certified in accordance with certain tank standards as specified in 40 CFR 264.192. The assessment is included as Attachment II.I.3 to this permit application section. Management practices for ignitable, reactive, and incompatible wastes at the facility have been designed to minimize the potential for fires, explosions, gaseous emission, leaching, or other discharge of hazardous waste or hazardous waste constituents which could result from the mixing of incompatible wastes or materials if tank systems ruptured of failed. The permittee will not place incompatible wastes, or incompatible wastes and materials in the same tank or tank-like system unless the requirements of 40 CFR 264.17(b) are complied with. In addition, hazardous waste will not be placed in a tank or tank-like system which previously held an incompatible waste or material and has not been decontaminated unless the requirements of 40 CFR 264.17(b) are complied with.

Where ignitable or reactive waste will be stored or treated in a tank or tank-like system, the permittee will comply with the requirements for the maintenance of protective distances between the waste management area and any public ways, streets, alleys, or an adjoining property line that can be built upon as required in the NFPA code[4].

In addition, ignitable or reactive waste will not be placed in tank or tank-like systems, unless the waste is treated, rendered, or mixed before or immediately after placement in the tank system so that:

- The resulting waste, mixture, or dissolved material no longer meets the definition of ignitable or reactive waste under 40 CFR 261.21 or 261.23 and the requirements of 40 CFR 264.17(b) are complied with; or
- The waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to ignite or react; or
- The tank system is used solely for emergencies.

<u>New Tank Standards – Tank Assessment</u>

A written assessment, reviewed and certified by an independent, qualified, registered professional engineer, regarding the structural integrity and suitability of the Perma-Fix II ~~process~~ <u>Process</u> components for handling hazardous waste will be ~~added to this permit application document~~ <u>submitted to the DEP as an amendment to the existing components certification</u> prior to start-up of the unit. The assessment will show that the foundation, structural support, seams, connections and pressure controls (if applicable) are adequately designed and that the tank system has sufficient structural strength and compatibility with the waste to be managed to ensure that it will not collapse, rupture, or fail. Information provided in the assessment and associated documents will include the following:

- Design standards (where applicable) according to which tank and ancillary equipment is (or will be) constructed;

[4] National Fire Protection Association (NFPA), "Flammable and Combustible Liquids Code," Tables 2-1 through 2-6, 1990. NFPA Tables 2-1 through 2-6, 1977 or 1981, are incorporated by reference into 40 CFR 260.11.

- Hazardous characteristics of the wastes that are and will be handled;
- Corrosion assessment (where applicable);
- Documented or estimated age of tank system; and
- Design considerations to ensure that tank foundations will maintain the load of a full tank.

External Corrosion Protection

The Perma-Fix® II ~~process~~ Process equipment will be located indoors so protection from the weather is not necessary.

Tank Installation and Testing

Prior to placement of a tank or tank-like system in hazardous waste service, an independent, qualified installation inspector or an independent, qualified registered professional engineer will inspect the tank systems for the following items: 1) weld breaks; 2) punctures; 3) scrapes of protective coatings; 4) cracks; 5) corrosion; 6) other structural damage or inadequate construction/installation. In addition, the inspection will specify how all discrepancies were (or will be) repaired, how the tank system (including ancillary equipment) was (or will be) tightness tested, and how ancillary equipment will be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.

Dimensions and Capacity

Details regarding dimensions and capacity of the Perma-Fix II process unit and components are included ~~on~~ in the engineering certification provided as Attachment II.I.3 and in Attachment II.I.1 to this permit application section.

Descriptions of Feed Systems, Safety Cut-offs, Bypass Systems and Pressure Controls

The proposed Perma-Fix® II ~~process~~ Process includes enclosed vessels equipped with loading and unloading ports and vents. The reactor vessel is loaded at the top and contents are piped through downstream equipment via hard piping. The unloading of treatment residuals from the reactor vessel is accomplished from the bottom of the unit. As appropriate, manways are used for inspection and cleaning operations.

Piping between components are regulated by valves (or equivalent devices). Typically, the rigid lines are attached to the tanks by flange couplings. The pressure control system for components consists of thief hatches with a combination of normal venting and a vacuum breaker. A nitrogen purge system ~~may~~ will be used ~~for selected wastes~~ to minimize the potential for fires or explosions. Additional details of feed systems, safety cutoff, bypass systems, and pressure controls for tank systems are provided in this narrative and are shown in Figures 1.D.2, ~~and~~ 1.D.3 and I.D.12 in Part I of this permit application and Attachment II.I.3 to this section.

Piping, Instrumentation, and Process Flow

Details of piping, instrumentation, and process flow for the proposed Perma-Fix II system is provided in Figures 1.D.2, ~~and~~ 1.D.3 and I.D.12 in Part I of this permit application and Attachment II.I.3 to this section.

The normal process flow for the batch treatment is summarized in the process description provided above. See also Figures I.D1, ~~and~~ I.D.2 and I.D.12 through I.D.22 in Part I of this permit application.

High/Low Pressure Piping

The Perma-Fix II ~~process~~ Process will incorporate the use of flexible hoses as well as semi-rigid or rigid piping. Hazardous waste transfer on-site will be classified as low-pressure transfer.

Ancillary Equipment

Ancillary equipment consists of piping between the Perma-Fix® II system components as well as loading and unloading equipment and other container management equipment used in association with the process. Additional details regarding ancillary equipment are provided in Attachment II.I.3 and Figures I.D.12 through I.D.22.

Containment of Releases

The Perma-Fix II process line is located within secondary containment in accordance with the applicable requirements of 40 CFR 264.192. Facility operating procedures include inspections designed to identify accumulated liquids in a timely manner (detailed inspection logs are maintained in the Facility operating record until closure of the Facility). After discovery accumulated liquids will be removed from the collection area in as timely a manner as is necessary to prevent overflow of the collection system. Accumulated liquids will be identified by visual observation, review of facility records, and (if necessary) by chemical analysis. If required, analyses will be conducted in accordance with the Facility Waste Analysis Plan.

Attachment II.I.1

Perma-Fix® II Equipment List and Description

PERMA-FIX® II EQUIPMENT LIST AND DESCRIPTION

Equipment required

1. Reactor Vessel (Plough Share)
2. Condenser
3. Accumulator
4. Absorber
5. Boiler
6. Cooling Tower
7. HEPA Units A, B and C
8. Air Compressor
9. Pumps
10. Separator
11. Dust Collector
12. Hydraulic Drum Lifter
13. Screen Hopper
14. Thermal Oxidizer (air emissions control system)

~~4. Boiler~~
~~5. Cooling Tower~~
~~6. HEPA Units A and B~~
~~7. HEPA Unit C~~
~~8. Granulated Activated Carbon (GAC) – HEPA Unit A~~
~~9. Granulated Activated Carbon (GAC) – HEPA Unit B~~
~~10. Air Compressor~~
~~11. Pumps~~
~~12. Separator~~

Equipment "specifications" for currently envisioned components

1. Reactor Vessel (Plough Share)

- Lodige Mixer model FKM 1200D (batch) model built under license of Lodige of Germany by Matsuzaka Co., Ltd. Japan. 304 stainless steel construction.
- Mixer features 6 plough share shovels with half shovels at each end, treatment of shovel surface: none.
- Jacket for heating or cooling down mixture is rated at 72 psi with an effective area of 33 sq ft. Total capacity: 317 gallons;
- Working capacity of mixture: 158 gallons.
- Pressure relief valve.

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- Emissions from vessel to be controlled via a hood placed over the charging hopper and venting to ~~HEPA/GAC B filter.~~ a HEPA filter (particulate control) and thermal oxidizer (organic emissions control).
- ~~This unit may be replaced with functionally equivalent equipment.~~

2. Condenser

- Built by Ohmstede Co.
- 65 SQ. FT. shell and tube heat exchanger.
- TP316L stainless steel tubes, tube sheets and heads,
- carbon steel shell, 10" dia. × 48" long tube sheet.
- Number of tubes: 83.
- Number of passes: 1.
- Vertical mount with (4) lug supports.
- Both sides designed for 150 psi @ 250 F.
- ~~This heat exchanger may be substituted for a heat exchanger with different surface area, or different configuration, provided its efficiency is maintained or improved.~~

3. Accumulator

- 300 gallon vertical SS tank. 3' dia. × 5' straight side, welded dishes top and bottom. Openings: top 3-1 ½", 1-1"; side 1-12", 1-3", 1-1½"; bottom 1-2".
- Mounted on 4 legs.
- Emissions from this tank will be controlled through a conservation vent to the air emissions control system. ~~connected to HEPA/GAC B filter.~~
- ~~This tank may be substituted for functionally equivalent vessel.~~

4. Absorber

- Approximately 35 gallon vertical SS tank, 12" dia. x 72" straight side, welded dishes top and bottom.
- Tank fitted with equipment to detect the interphase between organic and aqueous layer and to activate pump for removing contents and "hard piped" to the absorber tank.
- This tank may be packed with steel packing, either Rasing rings, Pull rings, or Intalox saddles.

5. Boiler

- 10 HP Fulton Boiler
- 150 psi steam, vertical tubeless design
- Output: 335,000 Btu/hr
- Steam output: 1345 lbs/hr

Attachment II.I.1 (cont.)

- Fuel consumption: 170 FT^3/hr
- ~~This unit may be substituted with a functionally equivalent system.~~

6. Cooling Tower

- Marley Aquatower Model # 4821 - 20 ton, single cell induced draft cooling tower
- 1 HP TEFC 230/460
- 50 gpm of water cooled from 95 to 80° F (wet bulb temperature)
- ~~This unit may be substituted with a functionally equivalent system.~~

7. HEPA Units A, B and C ~~A and B~~

- Flanders Housing Model E-4 1X1 GGF^(409) type 1
- Pre-filters: T-001-1-04-00 IL size E-0281
- Filters # T-007-0-04-05-NU (99.98 % efficiency rating, Type B filters)
- Motor: Dayton 2 HP 230/460 V3 phase @ 3500 rpm
- Blower: Dayton # 4C239, 12.5" diameter, direct drive
- ~~These units may be substituted with a functionally equivalent system~~

~~7. HEPA Unit C~~

- ~~Forced air portable clean system FA2000HD with centrifugal fan powered by a 1.5 HP motor.~~
- ~~Uses filters and pre-filters as described for HEPA units A and B.~~
- ~~This unit may be replaced by a functionally equivalent system.~~

~~8. Granular Activated Carbon (GAC) HEPA Unit A~~

- ~~3, VentSorb PE canisters from Calgon, each containing 170 lbs. of activated carbon.~~
- ~~Parallel installation.~~
- ~~Flow rate per canister: 200 CFM.~~
- ~~Type of carbon: BPL 4X10 (30 lbs/ft3 carbon density).~~
- ~~The canisters and carbon may be substituted by other types provided efficiency is maintained or improved.~~

~~9. Granular Activated Carbon (GAC) HEPA Unit B~~

- ~~V 200 portable carbon adsorber from Barnebey and Sutcliffe Corporation, containing 2000 lbs. of BT 4X10 carbon.~~
- ~~Flow rate: 500 CFM.~~
- ~~This canister and activated carbon may be substituted by another type provided efficiency is maintained or improved.~~

Attachment II.I.1 (cont.)

8. Air Compressor

- Sullair model 10B-25 ACAC, serial number 003-65271~~,~~.
- Operating pressure of 115/125 psig.
- ~~This air compressor may be substituted for a functionally equivalent system if required.~~

9. Pumps

- 3, air-operated centrifugal pumps for the transfer of liquids.
- These pumps have not been specified yet.

10. Separator.

- Approximately 50 gallon vertical tank.
- 304 SS 16" dia. × 60" straight side, welded dishes, top and bottom.
- Tank fitted with equipment to detect the interphase between organic and aqueous layer and to activate the separator pump.
- This tank may ~~will~~ be packed with steel packing, either Rashing rings, Pall rings, or Intalox saddles.
- Discharge into this tank from the condenser will take place through a liquid distributor. Emissions from this tank will vent to the absorber tank. ~~be controlled through a conservation vent venting to HEPA/GAC B filter.~~
- ~~This tank has not been manufactured and an may be substituted with functionally equivalent equipment.~~

11. Dust Collector

- Manufactured by American Air Filter.
- Cartridge filter approximately 3 ft. x 3 ft. x 8 ft.

12. Hydraulic Drum Lifter

- Manufactured by ALM Corporation

13. Screen Hopper

- Manufactured by Perma-Fix Environmental Engineering
- Approximately 6 ft. x 4 ft. x 16 ft.

14. Thermal Oxidizer (air emissions control system)

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Attachment II.I.1 (cont.)

- Manufactured by Turner Envirologic
- Propane-fired burner
- 95% VOC reduction efficiency (minimum EPA method 25A)

Note: Figure I.D.12 (Process Flow Diagram) illustrates all of the key components and ancillary equipment associated with the Perma-Fix and Perma-Fix II treatment processes. In addition to process flow, Figure I.D.12 provides component specifications.

Attachment II.I.2

Perma-Fix II Inspection Schedule

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INSPECTION SCHEDULE
PERMA-FIX® II PROCESSING AREA / EQUIPMENT

Equipment used in the Perma-Fix® II process will be visually inspected at least once each operating day for cracks, leaks, corrosion, bulging , erosion, or other deterioration. An internal inspection of the reactor vessel and other tanks will be conducted by an independent engineer on a yearly basis.

SPECIFIC ITEM	TYPES OF PROBLEMS EXPECTED	FREQUENCY OF INSPECTIONS
Secondary containment	Spills, cracks, deterioration, uneven settlement.	Daily
Piping system (includes valves, pipes, flanges, fittings, hoses)	Corrosion , bulging, cracks, deterioration, discoloration, leaks.	Daily
Condenser	Leaks, cracks, deterioration, discoloration.	Daily
Separator tank (tank shell, top, bottom, manhole)	Corrosion, bulging, cracks, deterioration, discoloration, leaks.	Daily
Accumulator tank (tank shell, top, bottom, manhole)	Corrosion, bulging, cracks, deterioration, discoloration, leaks.	Daily
Reactor vessel (plough share unit) (heating/cooling jacket, discharge valve, cleanout doors locks and hinges)	Discoloration, cracks, leaks, deterioration of locks and hinges, corrosion.	Daily
Separator and Accumulator tanks (internal inspection)	Pitting, seam integrity, holes, depressions, thickness, cracking.	Yearly
Reactor vessel (internal inspection)	Pitting, seam integrity, holes, depressions, thickness, cracking.	Yearly

Attachment II.I.3

Certification Report

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Attachment II.I.3

Certification Report

INSPECTION AND CERTIFICATION REPORT: PERMA-FIX® II THERMAL DESORPTION/CHEMICAL OXIDATION SYSTEM

INTRODUCTION

At the request of Perma-Fix of Florida, Inc. and Bodo and Associates, Inc, Gainesville, Florida, a hazardous waste processing system, designated by the registered trademark name of Perma-Fix® II Thermal Desorption/Chemical Oxidation (PFII) process, physically located at Perma-Fix, 1940 N.W. 67th Place, Gainesville, Florida, was inspected for purposes of inspection and certification. Inspection procedures were performed to assess compliance of the system with EPA 40 CFR 264.190, Subpart J: Tank Systems, and 40 CFR 264.600, Subpart X: Miscellaneous Units. The Perma-Fix® II system is housed in a dedicated, self-contained, secure quonset hut structure, within the Treatment Operations Building at the above noted address.

A schematic plan view of the system, attached in Figure 1, describes the system confirguration and identifies the component parts. Prinicpal components of the system include, (1) the Lodige Model FKM 1200D batch mixer, also identified as the Plough Share Unit, drawing Item E, (2) an Ohmstede shell and tube condenser, Item F, (3) a vertical 300 gallon stainless steel Accumulator tank, Item G, and (4) HEPA granular activated carbon filters , Items A and B. Ancillary systems external to the Perma-Fix® II system quonset hut include a Marley® Model 4821 compact single cell cooling tower and a 10 HP propane fired Fulton boiler.

RESULTS OF INSPECTION

The construction and operation of the Perma-Fix® II Thermal Desorption/Chemical Oxidation system were reviewed with Perma-Fix personnel. The system was examined, and each component, to the best extent possible, was inspected and documented on October 19, 1998. The overall installation appeared to be relatively new and in good visual condition. It was reported that the system was installed for a previous waste processing project approximately 12 months prior the inspection date.

LODIGE BATCH MIXER

The principal component of the Perma-Fix® II system, is a Lodige Model FKM 1200D batch mixer designed by Gebruder Lodige Maschinenbau, Gmbh, Federal Republic of Germany, and manufactured under license in July, 1989, by the Matsuzada Company, Ltd., Japan. The mixer is designed for batch processing operations with a total capacity of 317 gallons, and a maximum working capacity of 158 gallons. Batch mixing of hazardous waste is accomplished within the horizontal drum of the mixer via rotating blades on a central shaft and fixed chopper blades attached to the inside of the drum. Six full blades and two half blades, one at each end, are attached to the rotating shaft. The blades, or shovels, are of a plough share design. The shovels are rotated at 115 rpm between the fixed chopper blades. The mixer drum and the plough shares are constructed from Type 304 stainless steel. The internal fixed choppers are fabricated from Type 316 stainless steel. An insulated heating/cooling jacket surrounding the drum is rated at 72 psi with an effective surface area of 33 square feet.

The Lodige mixer was inspected externally and internally. Two manual access doors located on the front of the mixer, as shown in Figure 5, allow close inspection of the interior of the mixer. Photographs in Figures 7 through 9 further describe the external appearance of the mixer and manufacturing placard information. The interior of the mixer was inspected via the two access doors. The rotating shaft and plough share blades are documented in the series of photographs in Figures 10 through 13.

The interior surface of the stainless steel drum and the stainless steel fixed and rotating mixing components were found to be in excellent condition. The original combination of welded and bolted construction as shown in the photographs was well executed and all surfaces were polished to a No.120, or better, finish. Some slight staining of the interior surface was present from previous use, but the effect is superficial and judged to be inconsequential to the long term corrosion performance of the mixer. All welds were smooth and polished and no crevices or occluded areas that could harbor foreign material were present. Overall, the Lodige mixer appeared to be in excellent condition.

VERTICAL SHELL AND TUBE CONDENSER

An Ohmstede Company vertical shell and tube condenser receives water vapor and volatilized solvents at the top which are condensed on the tube side via cooling tower water on the shell side. Shown schematically in Figure 3, the single pass condenser is constructed with T316 SS heads, tubes and tube sheets. A carbon steel shell approximately 10 inches in diameter by 48 inches long surrounds the tube bundle. The single pass heat exchanger is rated for 150 psi at 250 °F on both the shell and tube sides.

The condenser was not disassembled for internal inspection at the time of the site visit. The external appearance and condition were visually very good, consistent with the appearance of other system components. There were no external indications of corrosion or leaks at any of the flanged and gasketed inlet or outlet joints.

STAINLESS STEEL ACCUMULATOR TANK

The Accumulator tank, shown schematically in Figure 4, and in photographs in Figures 14 and 15, was found to be in very good condition. The flanged inspection port shown in Figure 14 was open and the tank had been cleaned prior to inspection. The interior shows no evidence of corrosion, either on the shell, the top and bottom heads, at inlet/outlet fittings, or at welds. All welds have been ground and finished to match the finish profile of the shell.

Slight rust staining is present variably on the outer surface of the tank. Close inspection confirmed that the effect was superficial, the depth of corrosion being no more than a few mils (0.001 inch). It will be recommended that the tank surface be mechanically abraded to restore the appearance and minimize further corrosion. Otherwise, the tank appears to be in very good serviceable condition.

ANCILLARY EQUIPMENT

The dedicated single cell Marley cooling tower located outside the walls of the Treatment Operations Building is shown in Figure 16. Inspection of the tower and review of the operating procedures with Perma-Fix personnel confirmed that tower has been maintained in very good condition. No operational problems were reported.

A Fulton propane fired 10 HP boiler system located adjacent to the Marley cooling tower and underneath a protective roof structure is shown in Figure 17. Up to 345 pounds of steam per hour is supplied by the boiler to the heating/cooling jacket of the Lodige mixer. The boiler, Model FB-010-A was manufactured in 1986, but has been well maintained.

Water treatment for both the cooling tower and the boiler have previously been monitored and administered by a Perma-Fix chemist as reported by operations personnel. It was reported that future use of both systems will rely upon contracted water treatment services.

A series of hoses and pipes transmit both steam and cooling water to the Perma-Fix® II system. The entry point at the east wall of the Treatment Operations Building is shown in Figure 18. All pipe, hoses and control valves, both inside and outside the building, are clearly identified, color coded and appear to be well maintained.

The two HEPA carbon absorption filter systems, Filter A and B in Figure 1, were observed to have been well maintained and in good condition consistent with all other equipment in the Perma-Fix® II system. Installation of the Perma-Fix® II system within the quonset hut structure located completely within the Treatment Operations Building provides a secure, dedicated environment in which to operate and confine the thermal desorption/chemical oxidation process.

DISCUSSION

The condition of all of the primary components and the associated piping, valves and support structure for the Perma-Fix® II Thermal Desorption/Chemical Oxidation system was found to be very good and well maintained. The materials of construction of all wetted components exposed to the thermally desorbed water vapor/solvent stream was confirmed to be, at a minimum, corrosion resistant T304 stainless steel. All of the stainless steel surfaces that could be examined were found to be in very good condition with no visible indication of pitting or crevice corrosion. The exposed surfaces of all welded joints on the process side had been ground and polished consistent with the nominal 2B mill finish on the Lodige mixer drum and the

Accumulator tank shell.

External to the process, all structural and piping components were painted and in good condition. A color code scheme following a typical chemical process industry convention for identifying cooling water, steam, compressed air and process streams had been employed, as well as labeling, for clear identification of all piping and piping related components. All electrical wiring and pneumatic control tubing was neatly loomed and strain relieved to other structural or piping elements to maintain a safe operating environment and a neat, orderly appearance of the system.

All ancillary equipment, such as the dedicated Marley cooling tower and the Fulton steam boiler were found to be well maintained and in good operating condition.

CONCLUSIONS AND RECOMMENDATIONS

1. The Perma-Fix® II Thermal Desorption/Chemical Oxidation system was inspected for compliance with the requirements and intent of EPA 40 CFR 264.190, Subpart J: Tank Systems, and 40 CFR 264.600, Subpart X: Miscellaneous Units for operators of hazardous waste treatment facilities. Each component was inspected for the presence of, (1) weld breaks, (2) punctures, (3) scrapes of protective coatings, (4) cracks, (5) corrosion and (6) other structural damage or inadequate construction/installation.

2. In addition to a visual inspection and documentation of the system components, information was provided for review consisting of the Perma-Fix® II system process description and manufacturer's documents regarding materials of construction.

3. The entire Perma-Fix® II system, with the exception of an ancillary cooling tower and steam boiler, is housed within a dedicated, secure quonset hut constructed within the Treatment Operations Building at the Perma-Fix site on NW 67th Place, Gainesville, Florida.

4. The Perma-Fix® II system in its present form was installed in October, 1997, for a specific waste treatment project. The primary component in the system, the Lodige batch mixer was manufactured in 1989 and purchased by Perma-Fix from a previous owner.

5. All wetted process components and piping are constructed from either corrosion resistant T304 or T316 stainless steel. The interior surface condition of all components but the condenser was inspected and found to be in very good condition with no visual indication of pitting or crevice corrosion present. All wetted parts of the condenser in contact with the process stream are constructed

from T316 stainless steel.

6. Color coding and marking of piping and piping components effectively identified the material contained and flow direction. All painted surfaces were found to be well maintained and in in very good condition.

7. All pneumatic control system hoses and electrical conduits were loomed and strain relieved in a neat and orderly manner.

8. It is my opinion, after having conducted a comprehensive inspection and review of the Perma-Fix® II Thermal Desorption/Chemical Oxidation system, that the overall system construction and condition of the components is very good. The system appears to have been well maintained during its initial 12 month service life at Perma-Fix. It should provide safe and reliable service for the intended treatment of hazardous wastes if operated by knowledgeable personnel in a safe and workmanlike manner.

9. From a corrosion engineering perspective, the only recommendations regarding the future intended use of the Perma-Fix® II thermal desorption/chemical oxidation system for treatment of hazardous wastes is that, (1) the Accumulator Tank be mechanically abraded to remove the light rust stain visible on some of the exterior surface and restore the surface finish to the original condition, and (2) solid wastes to be treated should be limited to less than 500 ppm soluble chloride content, on a routine basis, to minimize the possibility of stress corrosion cracking of the Lodige stainless steel drum in the event that hazardous wastes are treated to complete dryness. Intermittent use at higher chloride concentrations would be acceptable if frequent, thorough cleaning and detailed inspection of the drum for incipient cracking is performed.

As required by EPA 40 CFR 270.11(d):

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 vilolations.

Respectfully submitted,

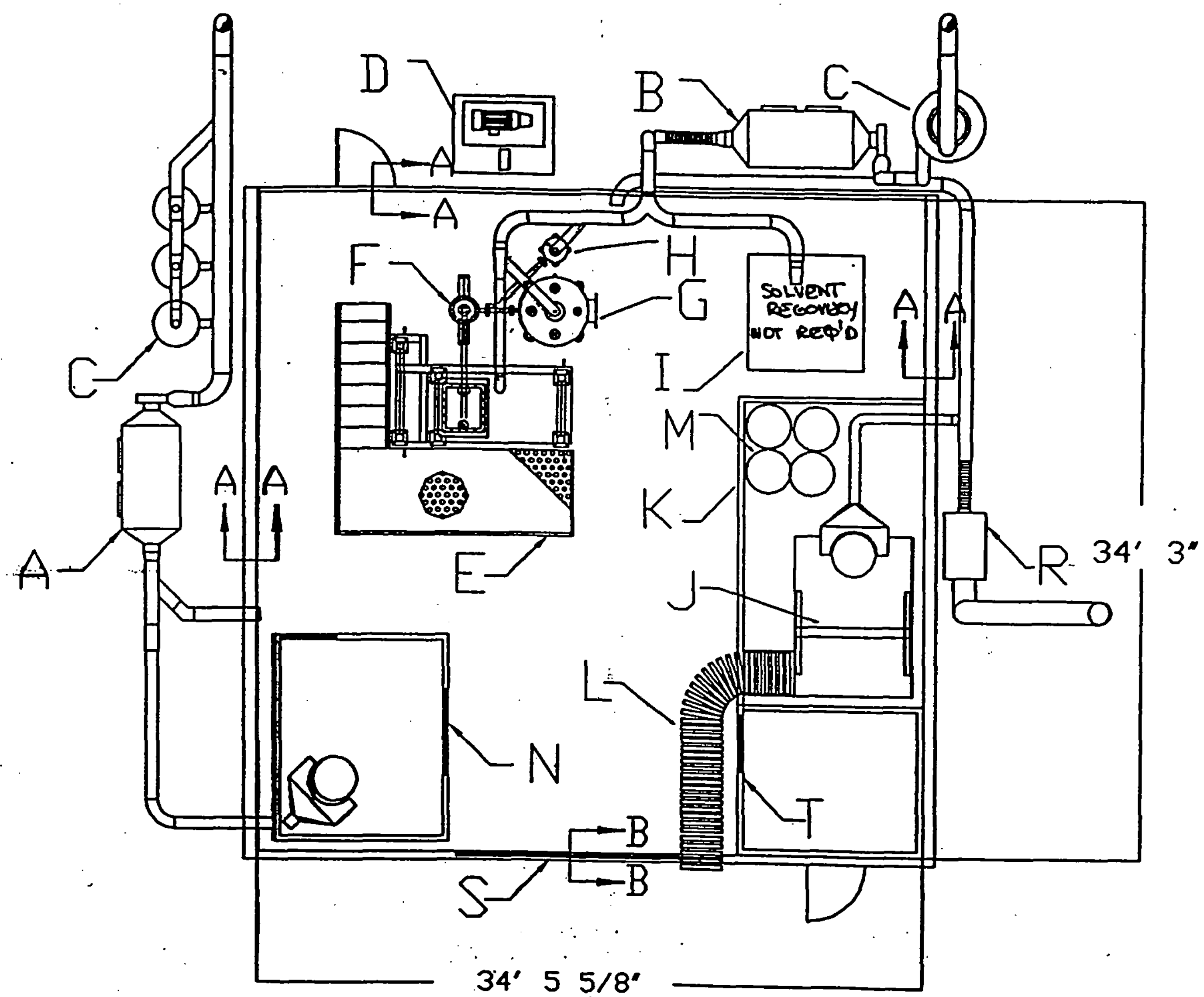
Richard O. Lewis

Richard O. Lewis, P.E.
November 9, 1998

11-17-98

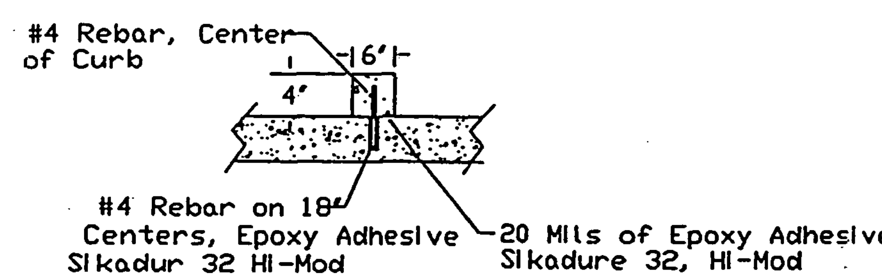
FIGURES

TO BE INSTALLED

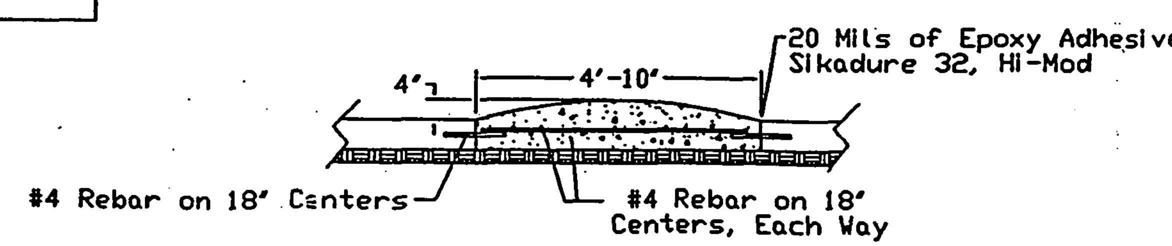


LEGEND

A	HEPA A
B	HEPA B
C	Carbon
D	Hydraulic System
E	Plough Share Unit
F	Condensor
G	Accumulator
H	Separator Tank
I	Distillation Unit
J	Skid Mixer
K	Perma-Fix Process Area
L	Gravity Rollers
M	Drum Storage
N	Repacking Area
R	HEPA C
S	Containment Building
T	Dress Out Room



Section A-A
(N.T.S.)



Section B-B
(N.T.S.)

TITLE: QUONSET HUT EQUIPMENT LAYOUT		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC.		
SCALE: N.T.S.	APPROVED BY:	DRAWN: B.J.R./ N.J.
DATE: 9/23/98		REVISED:
ACAD FILE:		DRAWING NUMBER:

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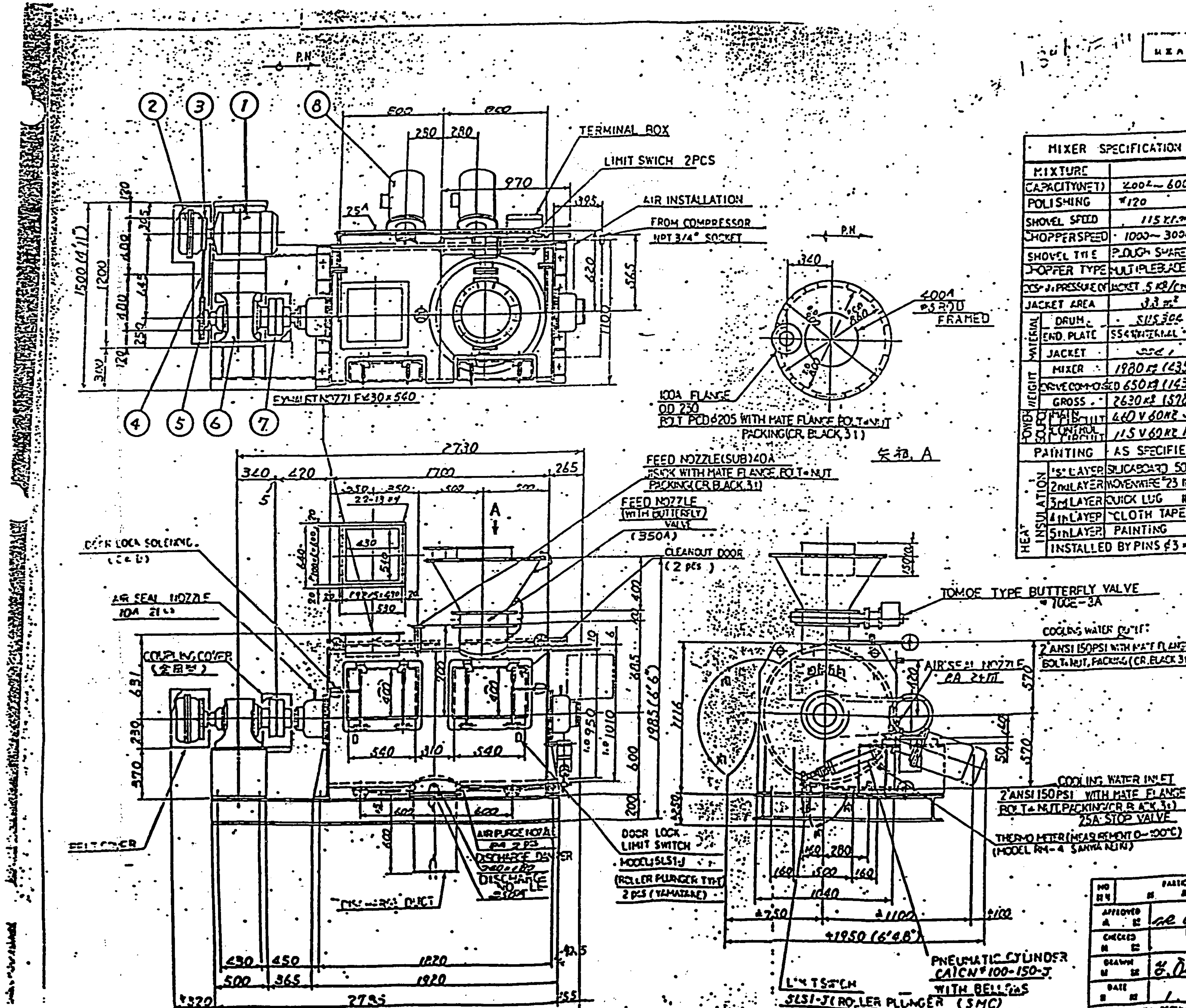


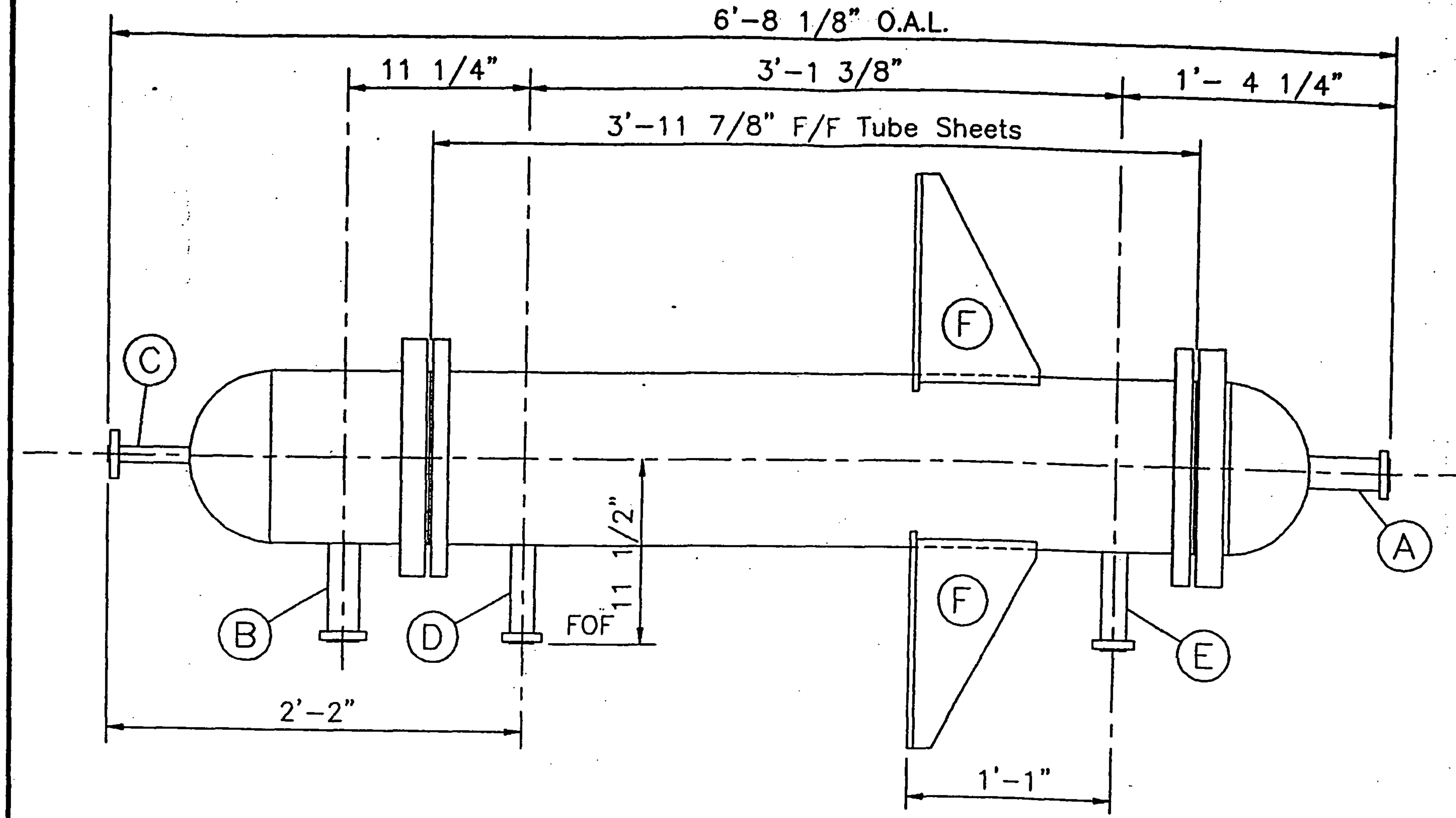
MIXER SPECIFICATION		
MIXTURE		
CAPACITY(NET)		200ℓ~600ℓ
POLISHING		#120
SHOVEL SPEED		115 r.p.m.
CHOPPER SPEED		1000~3000 rpm
SHOVEL TYPE		PLOUGH SHARE(SUS304)
CHOPPER TYPE		MULTIPLE BLADE(SUS316)
DESIGN PRESSURE OF JACKET		5 kg/cm²G
JACKET AREA		3.3 m²
MATERIAL	DRUM	SUS304
	END. PLATE	SS41(MATERIAL SUS304)
	JACKET	SS41
WEIGHT	MIXER	1980 kg (4356 lb)
	DRIVE COMPOSED	650 kg (1430 lb)
	GROSS	2630 kg (5786 lb)
POWER SOURCE	MAIN CIRCUIT	440 V 60Hz 3φ
	CONTROL CIRCUIT	115 V 60Hz 1φ
PAINTING		AS SPECIFIED
HEAT INSULATION	1st LAYER	SILICABOARD 50mm Th.
	2nd LAYER	WOVEN WIRE 23 16mm MESH
	3rd LAYER	QUICK LUG 10 th
	4th LAYER	CLOTH TAPE
	5th LAYER	PAINTING
		INSTALLED BY PINS φ3×75L

	PARTICULAR	SPECIFICATIONS
1	MIXER MOTOR	11 kw, 4P (CUSTOMER'S SUPPLY)
2	FLUID COUPLING	MODEL: ST-05-12 (MIKI PULLEY)
3	V-PULLEY (MOTOR SIDE)	φ250×5V-3
4	V-BELT	MODEL: POWER ACE 5V900×3 (BANDO CHEMICAL IND)
5	V-PULLEY (REDUCER SIDE)	φ380×5V-3
6	REDCER	MODEL: SFC-630 REDUCTION RATIO: 1/10 (SEIKI KOGYO)
7	SHAFT COUPLIG	FLEXIBLE COUPLING MODEL CZ315 JIS B 1452 (KANEMITSU SANGYO)
8	CHOPPER MOTOR	5.5kw 2P (CUSTOMER'S SUPPLY)

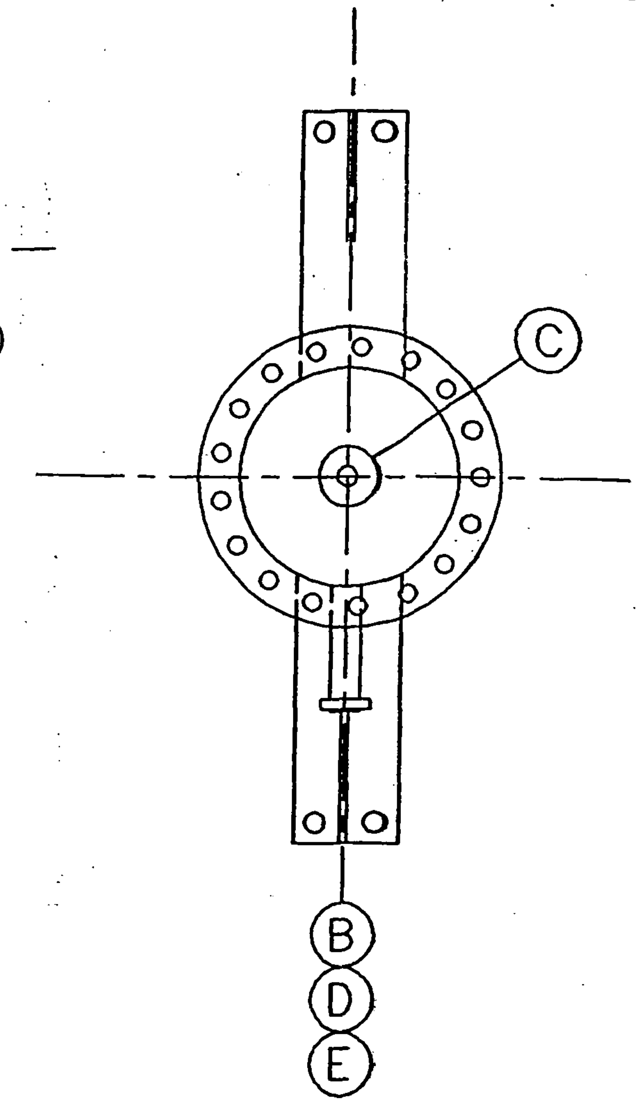
DATE	NAME
△1 1989. 7. 8	K.M
△2 1989. 7. 25	
△ 19 . .	

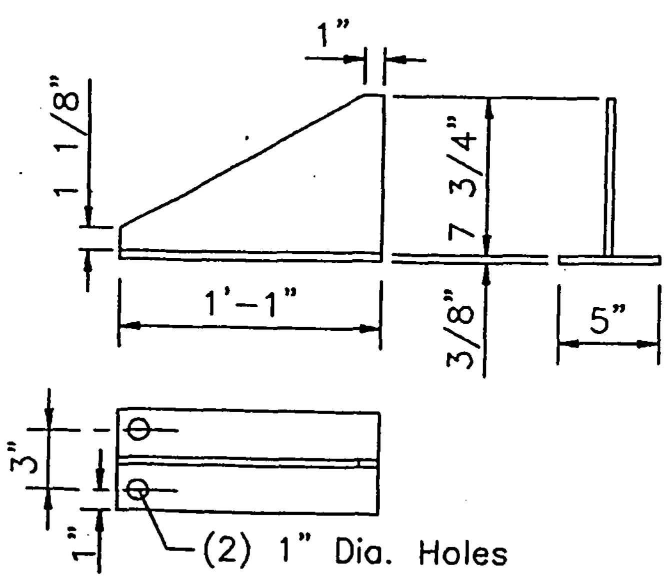
PLANT NAME	TP PLANT
USER NAME	KSMA
DATE	1989. 6. 15
BLOCK No	1F
KSMA MANAGE. No	
HMC MANAGE. No	021734 B - HB - △
ITEM No	15-MX-1
FLOW No	15-07
機器名称	가 添混合機
NAME	GENERAL ASY. LODIGE MIXER FKM 1200D

NO	PARTICULAR	MATERIAL	QTY	WEIGHT	REMARKS
APPROVED	[illegible]	MESSRS. ... AMICHE ...
CHECKED		TITLE	LODIGE MIXER FKM1200D GENERAL ASSEMBLY
DRAWN	[illegible]		
DATE	1. 1. 18		



Mark	Size	Flanged	Description
A	2"	150 Lb. RFWN	
B	2"	150 Lb. RFWN	
C	1"	150 Lb. RFWN	
D	1.5"	150 Lb. RFWN	
E	1.5"	150 Lb. RFWN	
F			Mounting Lug (2x)

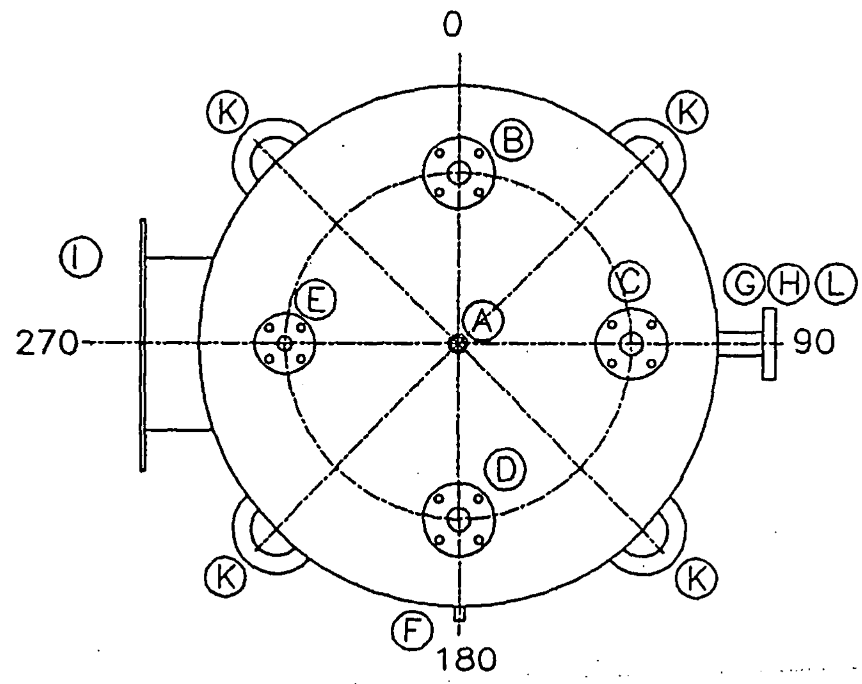




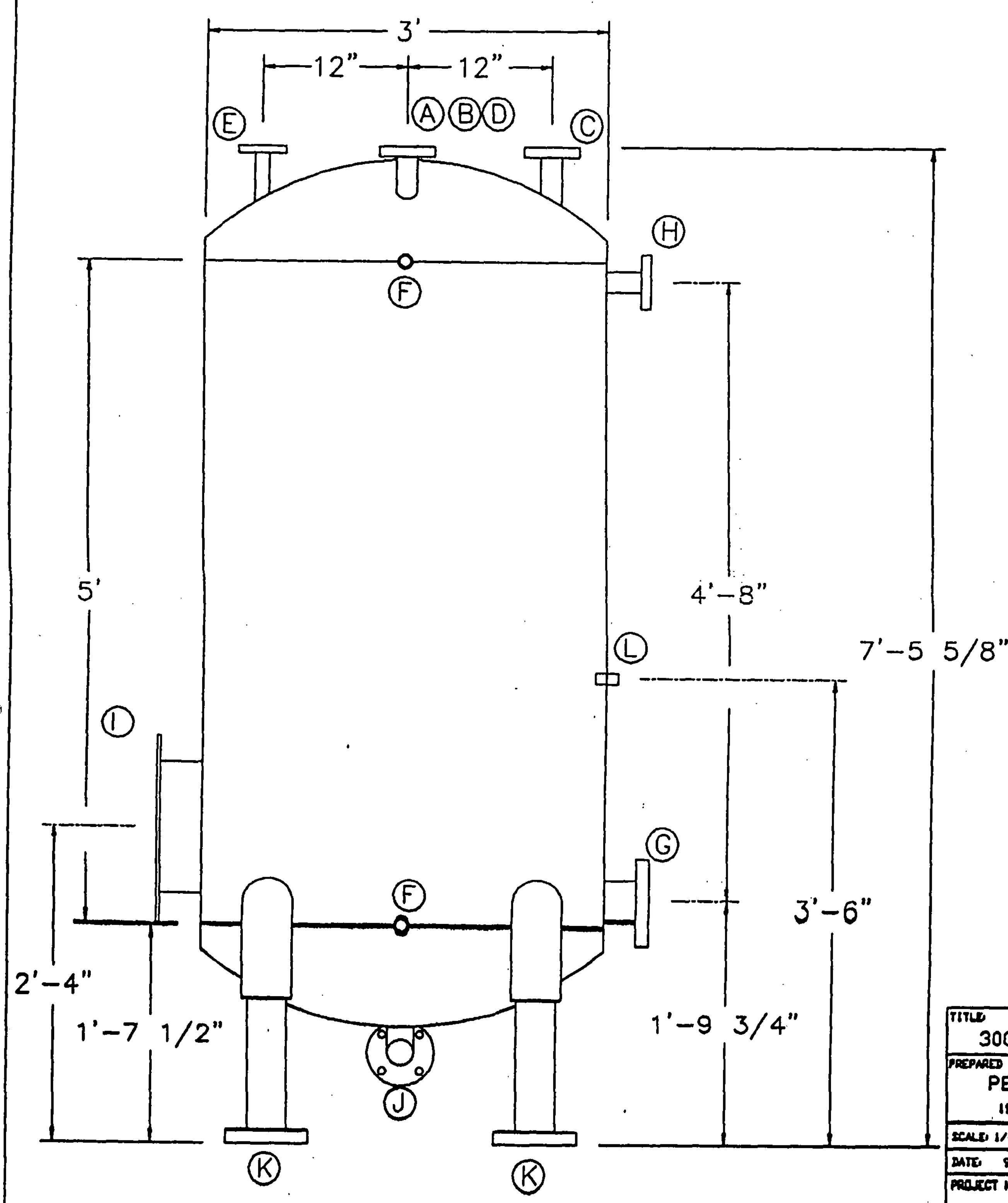
Mounting Lug

	Shell	Tube
Design Press (PSI)	150	150
Test Press (PSI)	225	225
Design Temp (°F)	250	250

TITLE: FIGURE ????? 65 SQ. FT. CONDENSOR		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 N.W. 67th Place, Gainesville, Florida 32653		
SCALE: 1/4" = 1'-0"	APPROVED BY:	DRAWN: DJR
DATE: 9/10/98	M. Jones	REVISED:
PROJECT NUMBER: PFFLA 970343	TANK NUMBER:	DRAWING NUMBER: 65CONDENSOR



NOZZLE LIST N.O.	SERVICE	SIZE	RATING	ORENTATION
A		3/4"	Coupling	0 Top
B		1 1/2"	Flanged	0 Top
C		1 1/2"	Flanged	90 Top
D		1 1/2"	Flanged	180 Top
E		1"	Flanged	270 Top
F		3/4"	Coupling	180 Side
G		3"	Flanged	90 Side
H		1 1/2"	Flanged	90 Side
I		12"	Flanged	270 Side
J		2"	Flanged	0 Bottom
K		3"		45, 135, 225, 315
L		1 1/2"	Coupling	90 Side



TITLE	FIGURE ?????	
300 GALLON SS ACCUMULATOR		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 N.W. 67th Place, Gainesville, Florida 32653		
SCALE: 1/4" = 1'-0"	APPROVED BY: M. Jones	DRAWN: BJR
DATE: 9/10/99		REVISED:
PROJECT NUMBER: PFIFLA 970343	TANK NUMBER:	DRAWING NUMBER: Accum

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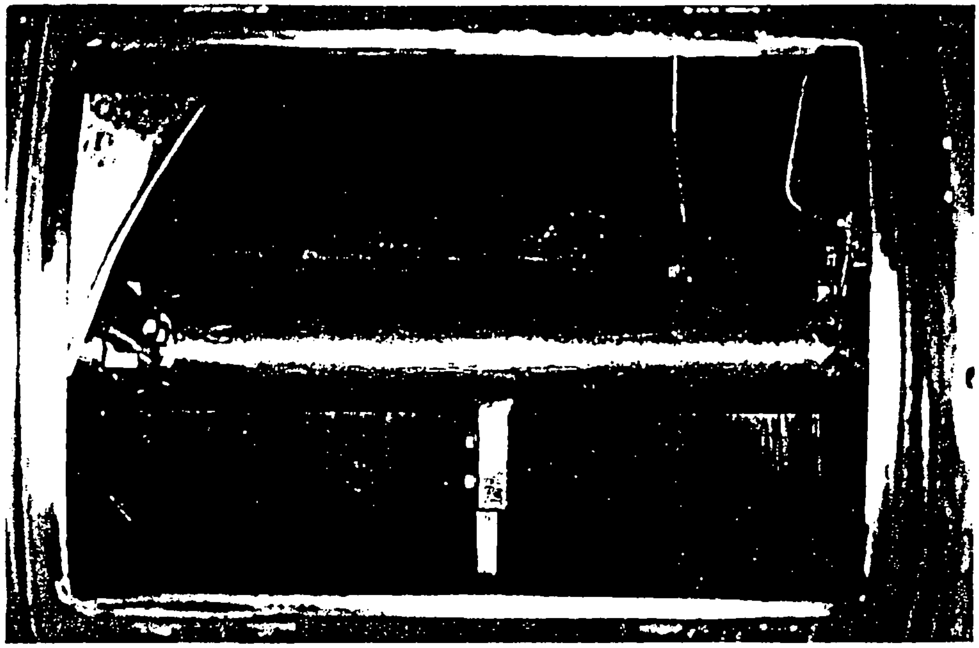

Figure 9. Interior view of Lodige Mixer via access door at front; visible is the axial shaft and 3 of 6 plough attachments. Neg. No. 981022-1/2-9.

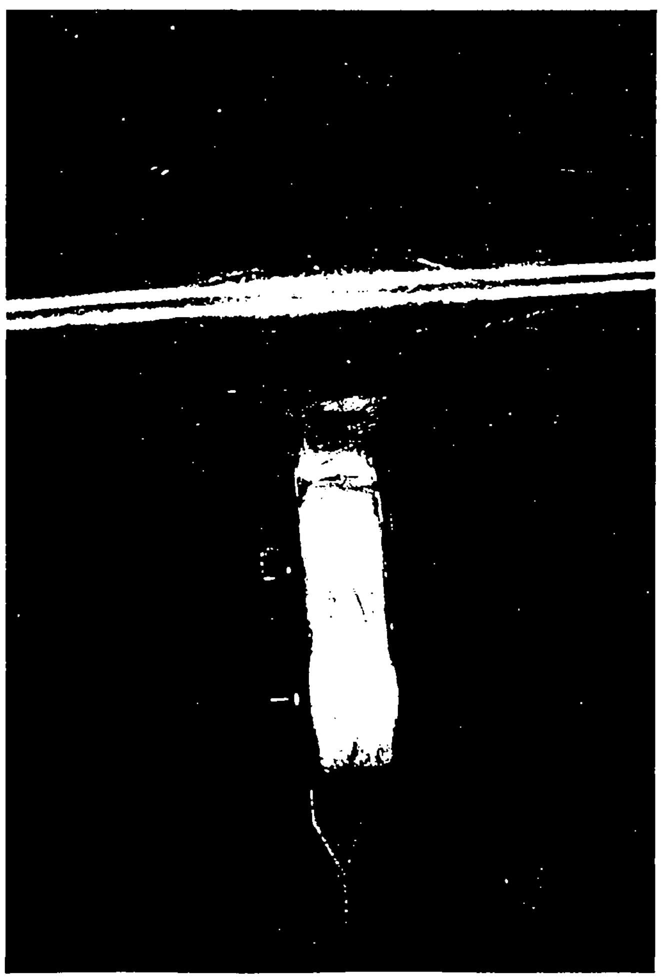

Figure 10. Close view of plough attachment to axial shaft. Neg. No. 981022-1/2-23.

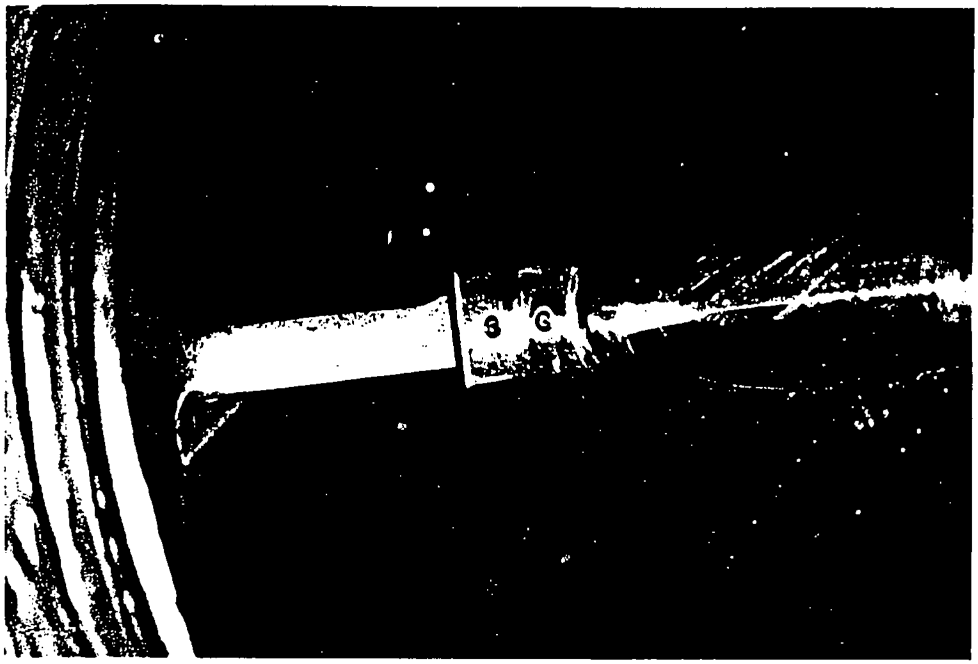

Figure 11. Interior view of Lodige Mixer looking north through south access door; shows ploughs and plough attachment to shaft.
Neg. No. 981022-1/2-13

Figure 12. Plan view of plough blade attached to central rotating shaft.
Neg. No. 981022-1/2-11.

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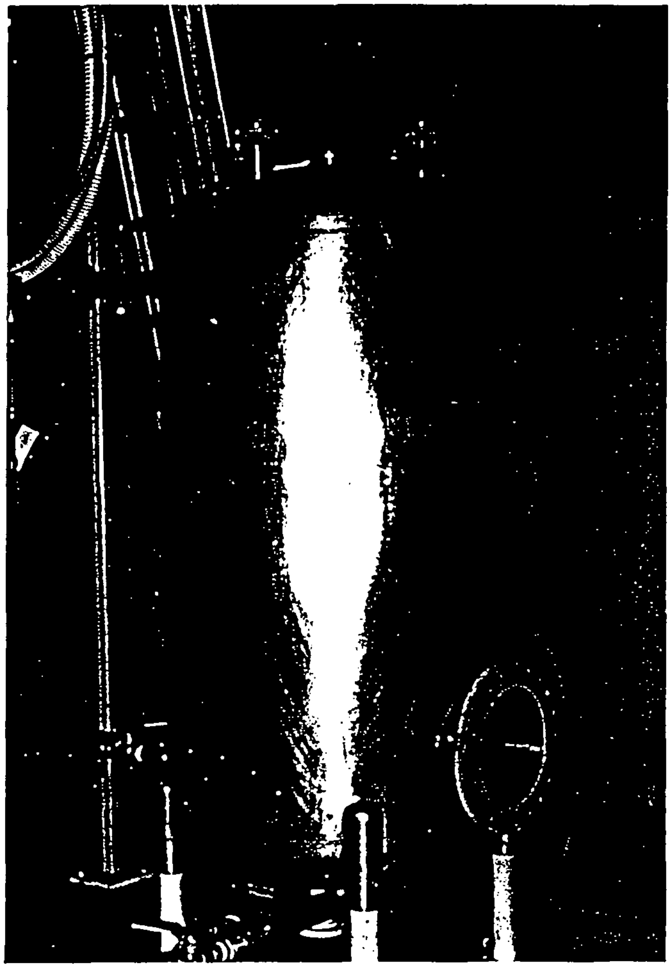

Figure 13. View of stainless steel Accumulator Tank from southwest showing inlet from condenser at top left (green), discharge valves at north side and bottom, and open inspection port on south side. Neg. No. 981022-1/2-8

Figure 14. View of stainless steel Accumulator Tank from north showing bottom of condenser (green) and discharge valves on north side. Neg. No. 981022-1/2-6

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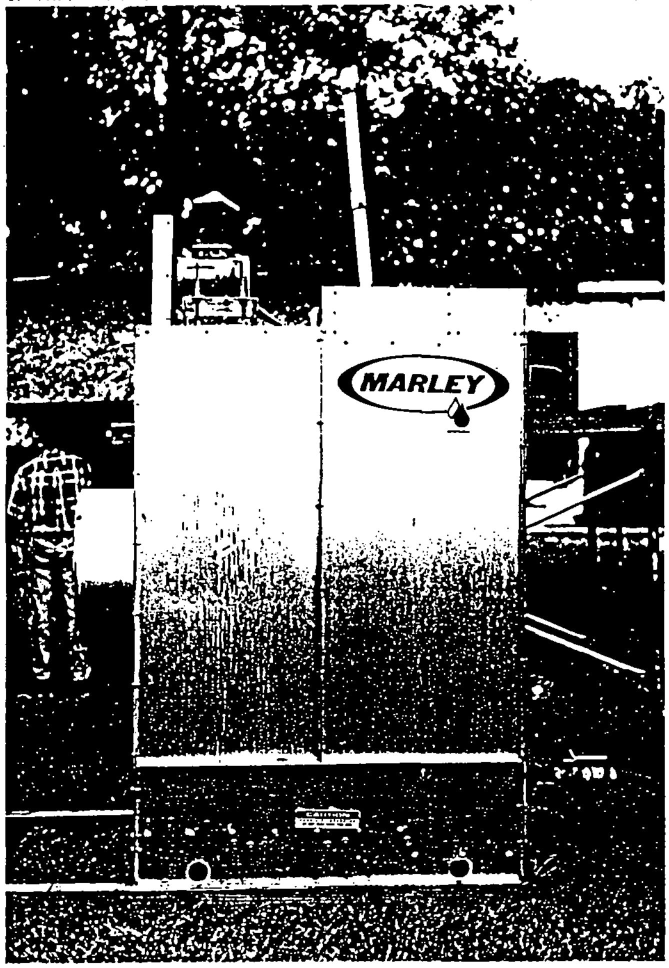

Figure 15. Marley Cooling Tower located outside building housing Perma-Fix® II process system; supplies cooling water to system.
Neg. No. 981022-2/2-2

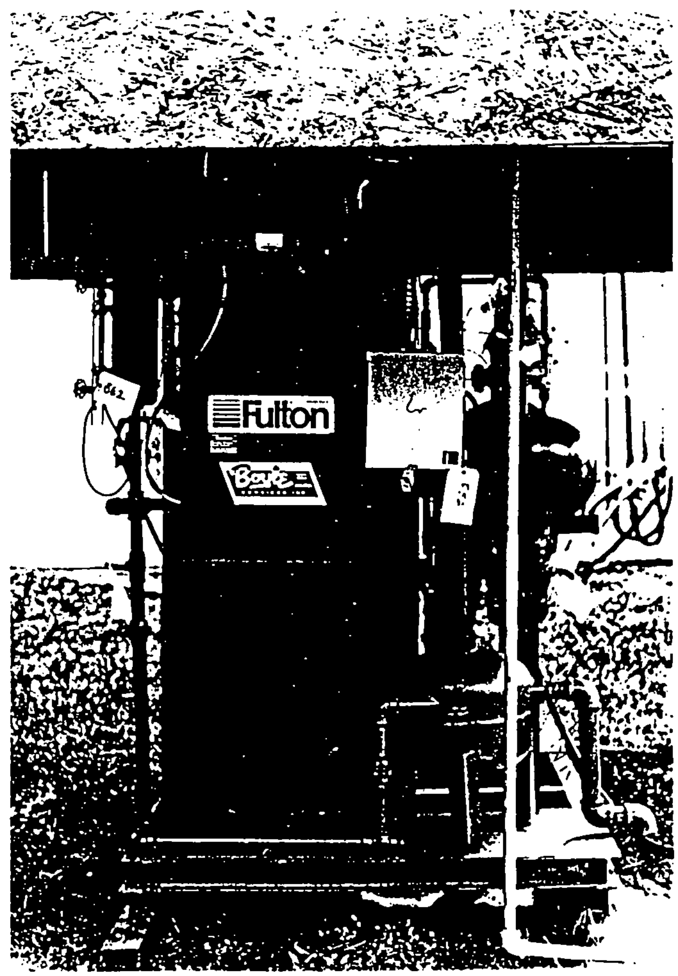

Figure 16. Fulton propane fired steam boiler located under shelter adjacent to cooling tower; supplies steam to the Perma-Fix® II Thermal Desorption System.
Neg. No. 981022-2/2-3

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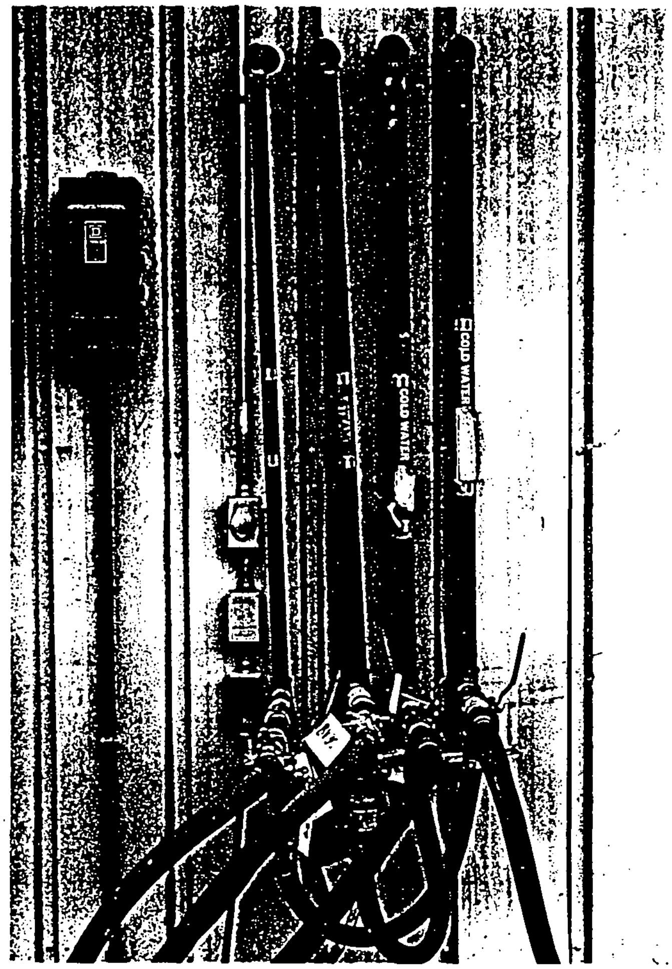


Figure 17. Piping and hose connections supplying steam and cooling water through east wall of building housing Perma-Fix® II Thermal Desorption System. Neg. No. 981022-2/2-6

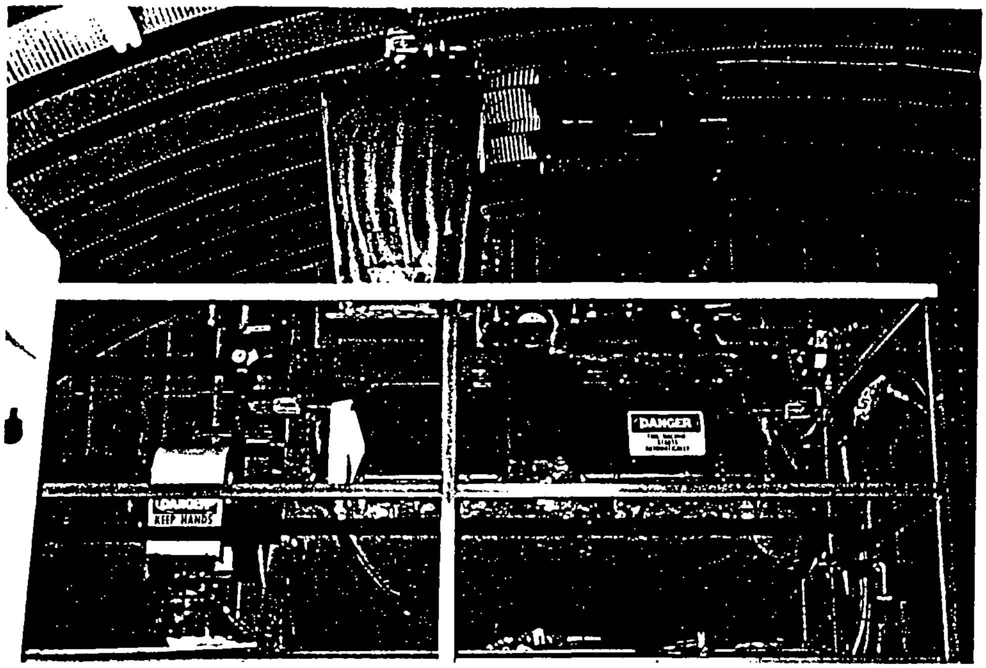


Figure 5. Front (west) view of Lodige Batch Mixer Model FKM 1200D, manufactured by Matsuzaka Company, Ltd., Japan, in 1989. Neg. No. 981022-1/2-1

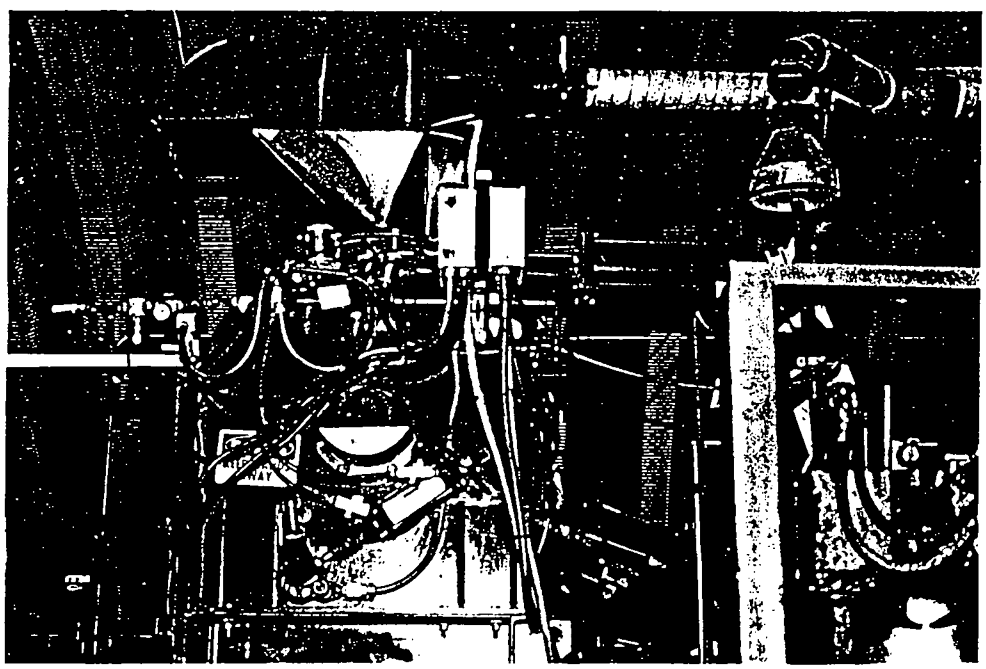


Figure 6. End (south) view of Lodige Batch Mixer as installed at Perma-Fix, Gainesville, Florida. Neg. No. 981022-1/2-2.

CONFIDENTIAL

Attachment II.I.4

Secondary Containment Calculations

Perma Fix® II Processing Area Secondary Containment Calculations

CONFIDENTIAL

List of equipment situated inside secondary containment, elevated 4" or more from the floor:

Unit	Volume/gal.
Reactor Vessel	317
Separator tank	50
Condenser	16
Accumulator tank	300
Distillation equipment	110
Skid mixer	----
Gravity rollers	----
Up to 10 drums of waste	550
Total	1343

The volume these units displace is considered negligible, since only legs and support rails are in contact with the floor.

List of equipment situated inside secondary containment not elevated from the floor:

Up to ten 55-gal drums staged for processing displacing a total of approximately 60 gal.

Approximate dimensions of Quonset Hut:

$$34.5' \times 34.25' = 1181.625 \text{ ft}^2$$

Spill volume contained by 4" berm:

$$1181.625 \text{ ft}^2 \times .3 \text{ ft} = 354.4875 \text{ ft}^3$$

$$354.4875 \text{ ft}^3 \times 7.481 \text{ gal/ft}^3 = 2651.9209 \text{ gal}$$

Actual spill volume contained by 4" berm:

$$2651.9209 \text{ gal} - 60 \text{ gal} = 2591.9209 \text{ gal}$$

Percent of total unit volume contained by the secondary containment:

$$2591.9209 / 793 = 3.268 \quad (326\ \%)$$

Conclusion:

Adequate capacity exists to contain 10% of the total potential volume of waste (134.3 gal) and the volume of the largest container (317 gal) to be placed in the Perma-Fix II® process area.

Attachment II.I.4

Secondary Containment Calculations

Attachment II.I.4

Perma Fix® II Processing Area
Secondary Containment Calculations

List of equipment situated inside secondary containment, elevated 4" or more from the floor:

Unit	Volume/gal.
Reactor Vessel	317
Separator tank	50
Absorber tank	35
Condenser	16
Accumulator tank	300
Distillation equipment	110
Skid mixer	----
Gravity rollers	----
Up to 10 drums of waste	550
Total	1,378

The volume these units displace is considered negligible, since only legs and support rails are in contact with the floor.

List of equipment situated inside secondary containment not elevated from the floor:

Up to ten 55-gal drums staged for processing displacing a total of approximately 60 gal.

Approximate dimensions of Quonset Hut:

$$34.5' \times 34.25' = 1181.625 \text{ ft}^2$$

Spill volume contained by 4" berm:

$$1181.625 \text{ ft}^2 \times .3 \text{ ft} = 354.4875 \text{ ft}^3$$

$$354.4875 \text{ ft}^3 \times 7.481 \text{ gal/ft}^3 = 2651.9209 \text{ gal}$$

Actual spill volume contained by 4" berm:

$$2651.9209 \text{ gal} - 60 \text{ gal} = 2591.9209 \text{ gal}$$

Percent of total unit volume contained by the secondary containment:

$$2591.9209 / \cancel{793}\ \underline{1378} = 3.268\ \underline{(188\%)}\ \cancel{(326\ \%)}$$

Attachment II.I.4

Conclusion:

Adequate capacity exists to contain 10% of the total potential volume of waste (137.8 gal) ~~(134.3 gal)~~ and the volume of the largest container (317 gal) to be placed in the Perma-Fix II® process area.

Attachment II.I.4 (cont.)

Perma-Fix II Processing Area
Containment Calculations

Professional Engineer Certification

This is to certify that the containment calculations for this hazardous waste management unit have been reviewed by me and found to be true and accurate to the best of my knowledge.

Signature

George Harder
Name (please print or type)

47340
Florida Registration Number

Mailing Address: **1940 NW 67th Place**
Street or P.O. Box

City	State	Zip Code
Gainesville	**Florida**	**32653**

Date: **June 6, 1999** Telephone: **(352) 373-6066**

Affix Seal Below

Attachment II.I.5

Example Waste (Material) Profile Sheet

PERMA-FIX ENVIRONMENTAL SERVICES
1 800 365-6066

Mixed Waste Profile Form (MWPF)

Control No. ___

Please complete and return to Perma-Fix, Attention: Mixed Waste Manager

Broker Name:

A. GENERAL INFORMATION

Generator: USEPA Erna Waterman
Address: Region 8, 999 18th St #500
City: Denver Co State: CO Zip: 80202-2466
Phone: (303)312-6762
Fax: (303)312-6897
E-mail:
USEPA ID No.

B. WASTE DESCRIPTION *(A separate MWPF is required for each description)*

- ☐ Liquid Scintillation Vials
- ☐ Liquid Scintillation Fluids *(bulk drum)*
- ☐ Bulk Organic Liquids *(other than Liquid Scintillation Media)*
- ☒ Other *(describe)* Fines containing Liquid Scin Residue
- ☐ Lab Pack

C. GENERAL CHARACTERISTICS *(at 70 ° unless otherwise specified)*

COLOR ___
ODOR: ☐ None ☒ Strong ☐ Mild

☐ Liquid ___ %
☐ Solid 100 %
☐ Sludge ___ %

PHASES: ☐ Single Layer ☐ Double Layer ☐ Multi Layer ☐ Other ___

D. BENZENE EXEMPTION

Is this waste subject to Benzene Waste Operations NESHAP? ☐ Yes ☒ No *(If yes, contact Perma-Fix to obtain Generator's Benzene NESHAP worksheet)*

E. RCRA INFORMATION *(List all applicable waste codes)*

USEPA Hazardous Waste ☐ Yes ☐ No
(Please give USEPA hazardous waste codes:)
Conditionally F002 + F005 (charge pending) to Liquid Scin. Contained Material

F. SHIPPING INFORMATION

DOT Hazardous Material ☐ Yes ☐ No
Proper Shipping Name: Environmentally Hazardous Substance
Hazard Class: 9
Anticipated Volume: 5 gal ☐ gals ☐ lbs
☒ One Time ☐ Other ___

G. PHYSICAL/CHEMICAL PROPERTIES *(Check appropriate boxes for items 1-5)*

1. Specific Gravity	2. Viscosity (centipoise)	3. pH	4. BTUs (000/lb.)	5. Flash Point (closed cup)	6. Halogens (%)
☐ < 0.8	☐ 1 - 100	☐ < 2 ☐ ___ Actual	☐ < 1	☐ < 100 F	Chlorine ___
☐ 0.8 - 1.0	☐ 100 - 1000	☐ 2 - 6	☐ 1 - 4	☐ 100-140	Bromine ___
☐ 1.0 - 1.2	☐ 1000 - 10,000	☐ 6 - 8	☐ 4 - 8	☐ 141 - 200 F	Fluorine ___
☐ 1.2 - 1.4	☐ >10,000	☐ 8 - 10 ___ Constituent	☐ 8 - 12	☐ > 200 F	Iodine ___
☐ 1.4 - 1.7		☐ 10 - 12.5	☐ 12 - 16		Total ___
☐ > 1.7		☐ > 12.5	☐ > 16		

7. Hazardous Characteristics and Other Components *(This box must be completed)*

REACTIVITY: ☐ Shock Sensitive ☐ Water Reactive ☐ Explosives ☐ Pyrophoric ☐ PCBs ___ (ppm) ☒ None

8. Fuel Data

Water ___ Sodium ___
Potassium ___ Phosphorus ___
Ash Content ___ *(in weight percent)*

9. Metals & Other Inorganics *(Please indicate what metals your waste contains if metals are present)*

☐ Arsenic (As) ___ ppm	☐ Lead (Pb) ___ ppm	☐ Zinc (Zn) ___ pp
☐ Barium (Ba) ___ ppm	☐ Selenium (Se) ___ ppm	☐ Antimony (Sb) ___ pp
☐ Cadmium (Cd) ___ ppm	☐ Silver (Ag) ___ ppm	☐ Beryllium (Be) ___ pp
☐ Chromium (Cr) ___ ppm	☐ Copper (Cu) ___ ppm	☐ Thallium (Tl) ___ pp
☐ Mercury (Hg) ___ ppm	☐ Nickel (Ni) ___ ppm	

PERMA-FIX ENVIRONMENTAL SERVICES

Mixed Waste Profile Form (MW[illegible])

Control No. ____

Please complete and return to Perma-Fix, Attention: Mixed Waste Manager

11. CHEMICAL COMPOSITION *(must total 100%)*

Name	Organic / Inorganic	%	Name	Organic / Inorganic	%
Toluene					
See attached LSC # 18 Summary Sheet					

12. SPECIAL HANDLING INSTRUCTIONS *(If special handling techniques are required, i.e. overpacking, specify. If none, so state.)*

Handle with proper respiratory PPE

13. SPECIFIC RADIOACTIVITY [illegible]

☐ Check here if data is based on an estimate ☐ Check here if data is based on analytical results *(attach analytical results)*

Radionuclide	Specific Radioactivity (µCi/g)	Total Radioactivity (mCi)	Radionuclide	Specific Radioactivity (µCi/g)	Total Radioactivity (mCi)
See attached letter					

14. GENERATOR CERTIFICATION *(Mixed Waste Profile Form cannot be processed unless completed and signed.)*

I certify that

1. All information submitted in this and all attached documents contains true and accurate descriptions of this waste and all relevant information regarding known or suspected hazards in the possession of the generator, have been disclosed.
2. Perma-Fix is authorized to obtain a sample from any waste shipment for purposes of recertification.
3. If this certification is made by a broker, the undersigned signs as an authorized agent for the generator. Please attach authorization by the generator (one time requirement only). Eric Waterman EPA OSC/RPM generator E Waterman 3/10/98

Laurie A Holst — Certification Signature *(required)*

Laurie A. Holst — Print Name

3/13/98 — Date

☑ Check here if additional information is attached and indicate the number of attached pages 3

FOR PERMA-FIX USE ONLY

☐ Accepted ☐ Not Accepted *(if not accepted, explain)* ____

(Waste "accepted" certifies that Perma-Fix has the appropriate permits for, and will accept the waste the generator is shipping) 40CFR264.12(b)

PERMA-FIX PRICING: $ ____

Signature ____ Date ____

LSC #18 (18059) SUMMARY SHEET					
Analysis	**Analyte**	**Value**	**Regulatory Level**	**20 X RuleValue**	**Remarks**
Radiological	beta/gamma	300 to 400 dpm/cm²			Screen inside LSC.
TCLP Metals	lead lead lead	0.761 mg/L 0.15 mg/L 0.012 mg/L	5.0 mg/L 5.0 mg/L 5.0 mg/L		Historical Only lead analyzed Composite 8, 9, 10, 16, 17, 18, 19, 20 Unique 12/17/97
TCLP VOAs	chloroform	0.035 mg/L	6.0 mg/L		Historical All others ND, Composite 8, 9, 10, 16, 17, 18, 19, 20
TCLP VOAs<¼"		Non-Detect			Unique 12/17/97
TCLP SVOAs<¼"		Non-Detect			Unique 12/17/97
Total VOAs Fines	chloroform	280 ppm		120 ppm	Historical, Benzene NA, contains toluene, ethylbenzene, & xylene
Total VOAs Fines	Toluene Ethylbenzene m,p-Xylenes o-Xylene Cumene n-Propylbenzene 1,3,5-Trimethylbenzene 1,2,4-Trimethylbenzene Naphthalene	8400 ppm 4300 ppm 27000 ppm 6700 ppm 670 ppm 1600 ppm 2800 ppm 33000 ppm 3900 ppm			Unique baseline sample for CDPHE treatability on 12/18/97.
Total VOAs Debris	chloroform	52 ppm		120 ppm	Historical, Benzene NA, contains toluene, ethylbenzene, & xylene
	chloroform	52 ppm		120 ppm	——
Total SVOAs Fines					Historical, Three analyzed
Total SVOAs>¼"					Historical, One analyzed
Herb/Pest/PCBs					
	dicamba	.052 ppm			Historical
	aldrin	.00045 ppm			Historical
	dieldrin	.00032 ppm			Historical
Headspace Target Compounds			NIOSH TWA	OSHA	Contains BTEX
	chloroform	13 ppm	ST 2 ppm	C 50 ppm	Respirator
	benzene	1 ppm	0.1 ppm & ST 1 ppm	1 ppm & ST 5 ppm	Respirator
Characterization Volatile Organics	FID PID	5,000 ppm 6,000 ppm			

Contents consist of crushed drums and rings at surface (20%) with some PPE and vermiculite. This is underlain by predominantly vermiculite (56%), PPE (16%), and plastic bottles (10%). Traces of white powder and liquids were also observed.

Samples were collected of the fines for TCLP analyses for VOAs, Semi-VOAs, and Lead. TCLP results were non-detect for VOAs and Semi-VOAs and below regulatory limits for Lead. Drum-scale treatability tests were performed on fines from this LSC on 12/18/97 by CDPHE Chemist Ken Niswonger.

NA = not analyzed
ND = not detected

C = ceiling
E = exceeds calibration range

PERMA-FIX

Control No.

Please complete and return to Perma-Fix, Attention: Mixed Waste Manager D Page 1 of 2

A GENERAL INFORMATION Broker Name: Commercial Waste Services

Generator [redacted] Phone [redacted]
Address [redacted] Fax [redacted]
CWS [redacted]
City Richland State Wa. Zip 99352 USEPA ID NO. [redacted]

B WASTE DESCRIPTION *(A separate MWPP is required for each description)*

☐ Liquid Scintillation Vials ☐ Bulk Organic Liquids (other than Liquid Scintillation Media) ☐ Lab Pack
☐ Liquid Scintillation Fluids (bulk drum) ☒ Other (describe) Paint Related Waste

C GENERAL CHARACTERISTICS *(at 70°F unless otherwise specified)*

COLOR Gray ☒ Liquid 2 % PHASES: ☐ Single Layer
ODOR ☐ None ☒ Solid 95 % ☐ Double Layer
☒ Strong ☒ Sludge 3 % ☒ Multi Layer
☐ Mild ☐ Other

D BENZENE EXEMPTION Is this waste subject to Benzene Waste Operations NESHAP? ☐ Yes ☒ No *(If yes, contact Perma-Fix to obtain Generator's Benzene NESHAP worksheet)*

E RCRA INFORMATION *(List all applicable waste codes)*
USEPA Hazardous Waste ☒ Yes ☐ No
(Please give USEPA hazardous waste codes:)
F003 F005 D001 D035

F SHIPPING INFORMATION Waste, Paint Related Material 3, UN1263 PG II RQ
DOT Hazardous Material ☒ Yes ☐ No
Proper Shipping Name ~~Waste Radioactive Material~~ LSA N.O.S. UN2912
Hazard Class 7 Anticipated Volume 30 ☒ gals ☐ lbs
☒ One Time ☐ Other

G PHYSICAL/CHEMICAL PROPERTIES *(Check appropriate boxes for items 1-6)*

1 Specific Gravity	2 Viscosity (centipoise)	3 pH	4 BTUs (000's)	5 Flash Point (closed cup)	6 Halogens (%)
☐ <0.8	☐ 1-100	☐ <2 ☐ ____ Actual	☐ <1	☒ <100 F	Chlorine 0
☐ 0.8-1.0	☐ 100-1000	☐ 2-6	☐ 1-4	☐ 100-140	Bromine 0
☐ 1.0-1.2	☒ 1000-10,000	☐ 6-8 NA	☐ 4-8	☐ 141-200 F	Fluorine 0
☐ 1.2-1.4	☐ >10,000	☐ 8-10 Constituent	☐ 8-12	☐ >200 F	Iodine 0
☒ 1.4-1.7		☐ 10-12.5	☐ 12-16		Total 0
☐ >1.7		☐ >12.5	☐ >16		

7 Hazardous Characteristics and Other Components *(This box must be completed)*

REACTIVITY ☐ Shock Sensitive ☐ Water Reactive ☐ Explosive
☐ Pyrophoric ☐ PCBs ____ (ppm) ☒ None

8 Fuel Data

Water 0 Sodium 0
Potassium 0 Phosphorus 0
Ash Content ____ *(in weight percent)*

9 Metals & Other Inorganics *(Please indicate what metals your waste contains if metals are present)*

☐ Arsenic (As) < 5.0 ppm	☐ Lead (Pb) < 5.0 ppm	☐ Zinc (Zn) < 5.0 ppm
☐ Barium (Ba) < 100.0 ppm	☐ Selenium (Se) < 1.0 ppm	☐ Antimony (Sb) < 1.0 ppm
☐ Cadmium (Cd) < 1.0 ppm	☐ Silver (Ag) < 5.0 ppm	☐ Beryllium (Be) < 1.0 ppm
☐ Chromium (Cr) < 5.0 ppm	☐ Copper (Cu) < 5.0 ppm	☐ Thallium (Tl) < 1.0 ppm
☐ Mercury (Hg) < 0.2 ppm	☐ Nickel (Ni) < 5.0 ppm	

PERMA-FIX ENVIRONMENTAL SERVICES

(Control No. _______) D

Please complete and return to Perma-Fix, Attention: Mixed Waste Manager

H CHEMICAL COMPOSITION *(must total 100%)*

Name Organic / Inorganic	%	Name Organic / Inorganic	%
EPOXY COATING MAT'LS:	96	XYLENE	.75
(AMINES, RESINS, SILICON DIOXIDE,		ETHYL BENZENE	.25
PROPYLENE GLYCOL)		TOLUENE	.05
MEK	1.50	STODDARD SOLVENT	2.75
ACETONE	.30		

I. SPECIAL HANDLING INSTRUCTIONS *(If special handling techniques are required, i.e. overpacking, specify. If none, so state.)* NONE

J SPECIFIC RADIOACTIVITY (S.A.) AND TOTAL RADIOACTIVITY

☐ Check here if data is based on an estimate ☒ Check here if data is based on analytical results *(attach analytical results)*

Radionuclide	Specific Radioactivity (µCi/g)	Total Radioactivity (mCi)	Radionuclide	Specific Radioactivity (µCi/g)	Total Radioactivity (mCi)
CO-60	4.18E-07	8.03E-05			
CO-58	8.72E-08	1.67E-05			
CS-137	7.05E-08	1.35E-05			
Mn-54	1.16E-07	2.23E-05			
Sb-125	7.78E-08	1.49E-05			
Zn-65	1.42E-07	2.73E-05			
Nb-95	4.40E-08	8.45E-06			

K GENERATOR'S CERTIFICATION *(Mixed Waste Profile Form cannot be processed unless completed and signed.)*

I certify that

1. All information submitted in this and all attached documents contains true and accurate descriptions of this waste and all relevant information regarding known or suspected hazards in the possession of the generator, have been disclosed.
2. Perma-Fix is authorized to obtain a sample from any waste shipment for purposes of recertification.
3. If this certification is made by a broker, the undersigned signs as an authorized agent for the generator. Please attach authorization by the generator *(one time requirement only)*.

[redacted] [redacted] 7-15-98

Certification Signature (required) Print Name Date

☐ Check here if additional information is attached and indicate the number of attached pages ____

FOR PERMA-FIX USE ONLY

☐ Accepted ☐ Not Accepted *(if not accepted, explain)* ____

(Waste "accepted" certifies that Perma-Fix has the appropriate permits for, and will accept the waste the generator is shipping) 40CFR264.12(b)

(____)

Signature ____ Date ____

PERMA-FIX ENVIRONMENTAL SERVICES

Mixed Waste Profile Form (MWPF)

Control No. ______

Please complete and return to Perma-Fix, Attention: Mixed Waste Manager

Broker Name:

A. GENERAL INFORMATION

Generator [redacted]
Phone [redacted]
Address [redacted]
Fax [redacted]
E-mail [redacted]
City Portland State OR Zip 97201
USEPA ID No. ______

B. WASTE DESCRIPTION *(A separate MWPF is required for each description)*

- ☐ Liquid Scintillation Vials
- ☐ Liquid Scintillation Fluids *(bulk drum)*
- ☐ Bulk Organic Liquids *(other than Liquid Scintillation Media)*
- ☐ Lab Pack
- ☒ Other *(describe)* Solid mixed waste 6.2 lbs

C. GENERAL CHARACTERISTICS *(at 70° unless otherwise specified)*

COLOR —

ODOR ☒ None ☐ Strong ☐ Mild

☐ Liquid ______ %
☒ Solid 100 %
☐ Sludge ______ %

PHASES: ☒ Single Layer ☐ Double Layer ☐ Multi Layer ☐ Other ______

D. BENZENE EXEMPTION

Is this waste subject to Benzene Waste Operations NESHAP? ☐ Yes ☒ No *(If yes, contact Perma-Fix to obtain Generator's Benzene NESHAP worksheet)*

E. RCRA INFORMATION *(List all applicable waste codes)*

USEPA Hazardous Waste ☒ Yes ☐ No
(Please give USEPA hazardous waste codes:)
F003

F. SHIPPING INFORMATION

DOT Hazardous Material ☒ Yes ☐ No
Proper Shipping Name ______
Hazard Class ______ Anticipated Volume 6.2 ☐ gals ☒ lbs
☒ One Time ☐ Other ______

G. PHYSICAL/CHEMICAL PROPERTIES *(Check appropriate boxes for items 1-5)*

1. Specific Gravity	2. Viscosity (centipoise)	3. pH	4. BTUs (000/lb)	5. Flash Point (closed cup)	6. Halogens (%)
☐ < 0.8	☐ 1 - 100	☐ < 2 ☐ ______ Actual	☐ < 1	☐ < 100 F	Chlorine ______
☐ 0.8 - 1.0	☐ 100 - 1000	☐ 2 - 6	☐ 1 - 4	☐ 100-140	Bromine ______
☐ 1.0 - 1.2	☐ 1000 - 10,000	☒ 6 - 8	☐ 4 - 8	☐ 141 - 200 F	Fluorine ______
☐ 1.2 - 1.4	☐ > 10,000	☐ 8 - 10 ______ Constituent	☐ 8 - 12	☐ > 200 F	Iodine ______
☐ 1.4 - 1.7	N/A	☐ 10 - 12.5	☐ 12 - 16	☒ > 141 F	Total none
☒ > 1.7		☐ > 12.5	☐ > 16		

7. Hazardous Characteristics and Other Components *(This box must be completed)*

REACTIVITY: ☐ Shock Sensitive ☐ Water Reactive ☐ Explosives ☐ Pyrophoric ☐ PCBs ______ (ppm) ☒ None

8. Fuel Data

Water ______ Sodium ______
Potassium ______ Phosphorus ______
Ash Content ______ *(in weight percent)*

9. Metals & Other Inorganics *(Please indicate what metals your waste contains if metals are present)*

☐ Arsenic (As) — ppm	☐ Lead (Pb) — ppm	☐ Zinc (Zn) — ppm
☐ Barium (Ba) — ppm	☐ Selenium (Se) — ppm	☐ Antimony (Sb) — ppm
☐ Cadmium (Cd) — ppm	☐ Silver (Ag) — ppm	☐ Beryllium (Be) — ppm
☐ Chromium (Cr) — ppm	☐ Copper (Cu) — ppm	☐ Thallium (Tl) — ppm
☐ Mercury (Hg) — ppm	☐ Nickel (Ni) — ppm		

ENVIRONMENTAL SERVICES

Control No. ____________

Please complete and return to Perma-Fix, Attention: Mixed Waste Manager

H. CHEMICAL COMPOSITION *(must total 100%)*

Name	Organic / Inorganic	%	Name	Organic / Inorganic	%
polypropylene		72	Charcoal + alumina		56%
Off the shelf filtration material		25	ion exchange resins		44%
polyether		3	700 ppm MeOH		
			1500 ppm acetonitrile		

I. SPECIAL HANDLING INSTRUCTIONS *(If special handling techniques are required, i.e. overpacking, specify. If none, so state)* none

J. SPECIFIC RADIOACTIVITY (S.A.) AND TOTAL RADIOACTIVITY

☐ Check here if data is based on an estimate ☐ Check here if data is based on analytical results *(attach analytical results)*

Radionuclide	Specific Radioactivity (µCi/g)	Total Radioactivity (mCi)	Radionuclide	Specific Radioactivity (µCi/g)	Total Radioactivity (mCi)
3H		128			
14C		0.3			

K. GENERATOR'S CERTIFICATION *(Mixed Waste Profile Form cannot be processed unless completed and signed.)*

I certify that

1. All information submitted in this and all attached documents contains true and accurate descriptions of this waste and all relevant information regarding known or suspected hazards in the possession of the generator, have been disclosed.
2. Perma-Fix is authorized to obtain a sample from any waste shipment for purposes of recertification.
3. If this certification is made by a broker, the undersigned signs as an authorized agent for the generator. Please attach authorization by the generator *(one time requirement only)*

[redacted] [redacted] 8/11/98

Certification Signature *(required)* Print Name Date

☐ Check here if additional information is attached and indicate the number of attached pages ______

FOR PERMA-FIX USE ONLY

☐ Accepted ☐ Not Accepted *(if not accepted, explain)* ____________

(Waste "accepted" certifies that Perma-Fix has the appropriate permits for, and will accept the waste the generator is shipping) 40CFR264.12(b)

PERMA-FIX PRICING: $ ____________

____________ ____________

Signature ***Date***

PERMA-FIX

Mixed Waste Profile Form (MWPF)

(Control No. ____________)

Please complete and return to Perma-Fix, Attention: Mixed Waste Manager

Page 1 of 2

A GENERAL INFORMATION

Broker Name: Commercial Waste Services

Generator [redacted] Phone [redacted]
Address [redacted] Fax [redacted]
CWS [redacted]
City Richland State Wa. Zip [redacted] USEPA ID No. [redacted]

B WASTE DESCRIPTION (A separate MWPF is required for each description)

- ☐ Liquid Scintillation Vials
- ☐ Liquid Scintillation Fluids (bulk drum)
- ☐ Bulk Organic Liquids (other than Liquid Scintillation Media)
- ☒ Other (describe) FREON LAUNDRY UNIT DISTILLATION BOTTOMS
- ☐ Lab Pack

C GENERAL CHARACTERISTICS (at 70° unless otherwise specified)

COLOR Dark Brown
ODOR ☐ None ☐ Strong ☒ Mild

☐ Liquid 5 %
☐ Solid ___ %
☒ Sludge >95 %

PHASES: ☐ Single Layer ☒ Double Layer ☐ Multi Layer ☐ Other____

D BENZENE EXEMPTION Is this waste subject to Benzene Waste Operations NESHAP? ☐ Yes ☒ No (If yes, contact Perma-Fix to obtain Generator's Benzene NESHAP worksheet)

E RCRA INFORMATION (List all applicable waste codes)

USEPA Hazardous Waste ☒ Yes ☐ No
(Please give USEPA hazardous waste codes.)

F002 D039 D028

F SHIPPING INFORMATION HAZARDOUS WASTE LIQUID, N.O.S. (TRICHLORO...) 9 NA3082 PG III

DOT Hazardous Material ☒ Yes ☐ No
Proper Shipping Name ~~Waste Radioactive Material LSA, N.O.S., UN2912~~
Hazard Class 7 Anticipated Volume 100 ☒ gals ☐ lbs
☒ One Time ☐ Other____

G PHYSICAL/CHEMICAL PROPERTIES (Check appropriate boxes for items 1-5)

1 Specific Gravity	2 Viscosity (centipoise)	3 pH	4 BTUs (000/lb.)	5 Flash Point (closed cup)	6 Halogens (%)
☐ <0.8	☐ 1-100	☐ <2 ☐ ____ Actual	☐ <1	☐ <100 F	Chlorine 5
☐ 0.8-1.0	☐ 100-1000	☐ 2-6	☐ 1-4	☐ 100-140	Bromine ____
☐ 1.0-1.2	☒ 1000-10,000	☒ 6-8	☐ 4-8	☐ 141-200 F	Fluorine ____
☐ 1.2-1.4	☐ >10,000	☐ 8-10 ____ Constituent	☐ 8-12	☒ >200 F	Iodine ____
☐ 1.4-1.7		☐ 10-12.5	☐ 12-16		Total 5
☒ >1.7		☐ >12.5	☐ >16		

7 Hazardous Characteristics and Other Components (This box must be completed)

REACTIVITY: ☐ Shock Sensitive ☐ Water Reactive ☐ Explosives ☐ Pyrophoric ☐ PCBs ____ (ppm) ☒ None

8 Fuel Data

Water 1% Sodium 0
Potassium 0 Phosphorus 0
Ash Content ____ (in weight percent)

9 Metals & Other Inorganics (Please indicate what metals your waste contains if metals are present)

☐ Arsenic	(As)	< 5.0 ppm	☐ Lead	(Pb)	< 5.0 ppm	☐ Zinc	(Zn)	< 5.0 ppm
☐ Barium	(Ba)	< 100.0 ppm	☐ Selenium	(Se)	< 1.0 ppm	☐ Antimony	(Sb)	< 1.0 ppm
☐ Cadmium	(Cd)	< 1.0 ppm	☐ Silver	(Ag)	< 5.0 ppm	☐ Beryllium	(Be)	< 1.0 ppm
☐ Chromium	(Cr)	< 5.0 ppm	☐ Copper	(Cu)	< 5.0 ppm	☐ Thallium	(Tl)	< 1.0 ppm
☐ Mercury	(Hg)	< 0.2 ppm	☐ Nickel	(Ni)	< 5.0 ppm			

(Control No. ________) (C)

Please complete and return to Perma-Fix, Attention: Mixed Waste Manager

H CHEMICAL COMPOSITION *(must total 100%)*

Name Organic / Inorganic	%	Name Organic / Inorganic	%
1,1,2-Trichloro-1,2,2 Trifluoroethane	5	Oil/Grease/Dirt	95
Tetrachloroethane	.0012		
Tetrachloroethane	.0013		
Water	1		

I. SPECIAL HANDLING INSTRUCTIONS *(If special handling techniques are required, i.e. overpacking, specify. If none, so state)* None

J SPECIFIC RADIOACTIVITY (S.A.) AND TOTAL RADIOACTIVITY

☐ Check here if data is based on an estimate ☒ Check here if data is based on analytical results *(attach analytical results)*

Radionuclide	Specific Radioactivity (µCi/g)	Total Radioactivity (mCi)	Radionuclide	Specific Radioactivity (µCi/g)	Total Radioactivity (mCi)
Co-60	5.84E-04	2.57E-02			
Cs-137	7.45E-06	1.30E-03			
Sb-125	1.79E-05	7.74E-04			

K GENERATOR'S CERTIFICATION *(Mixed Waste Profile Form cannot be processed unless completed and signed.)*

I certify that

1. All information submitted in this and all attached documents contains true and accurate descriptions of this waste and all relevant information regarding known or suspected hazards in the possession of the generator, have been disclosed.
2. Perma-Fix is authorized to obtain a sample from any waste shipment for purposes of recertification.
3. If this certification is made by a broker, the undersigned signs as an authorized agent for the generator. Please attach authorization by the generator *(one time requirement only)*.

Donald R. Cooper ____ Donald R. Cooper ____ 7-15-98
Certification Signature (required) Print Name Date

☐ Check here if additional information is attached and indicate the number of attached pages ____

FOR PERMA-FIX USE ONLY

☐ Accepted ☐ Not Accepted *(If not accepted, explain)* ________
(Waste "accepted" certifies that Perma-Fix has the appropriate permits for, and will accept the waste the generator is shipping) 40CFR264.12(b)

(________)

________ ________
Signature Date

Attachment II.I.6

Example Land Disposal Restriction and Certification Forms

PERMA-FIX
ENVIRONMENTAL SERVICES

LAND DISPOSAL RESTRICTION & CERTIFICATION FORM

ıse check the facility you are shipping to:

❑ **Perma-Fix of Florida, Inc.**	❑ **Perma-Fix of Dayton, Inc.**	❑ **Perma-Fix of Memphis, Inc.**	❑ **Perma-Fix Treatment Services, Inc.**
Hazardous and Mixed Waste	Hazardous Waste/ Wastewater	Hazardous Waste	Hazardous Waste/Wastewater
1940 NW 67th Place	*300 South West End Ave.*	*901 East Bodley*	*2700 South 25th West Ave.*
Gainesville, FL 32653	Dayton, OH 45427	Memphis, TN 38106	Tulsa, OK 74107
(352) 373-6066	(937) 268-6501	(901) 774-2050	(918) 582-9595
EPA ID # FLD 980 711 071	**EPA ID # OHD 004 274 031**	**EPA ID # TND 991 279 480**	**EPA ID # OKD 000 402 396**

Generator Name____________________ **Generator USEPA ID No.**____________________

Generator Address____

State Manifest No.____________________ **Manifest Doc. No.**____________________

INSTRUCTIONS

- **In Column 1 identify all USEPA hazardous waste codes that apply to this waste shipment.**
- **In Column 2, choose the appropriate treatability group: Non-Wastewater (NWW) or Wastewater (WW).**
- **In Column 3, enter the appropriate Subcategory, if applicable, and also enter "Contaminated Soil" or "Debris" if the waste *will be treated using one of the alternative treatment technologies provided by 268.49(c) (soil) or 268.45 (debris).***
- **In Column 4, circle the letter of the appropriate LDR management categories on the back of this form.**
- **In Column 5, for F001-F005, D001-D043, Debris & Contaminated Soil wastes, enter the Reference Number(s) from the attached LDR/UHC Constituent Table for any constituents subject to treatment in your waste stream.**

MANIFEST LINE ITEM #	1. USEPA HAZARDOUS WASTE CODE(S)	2. NWW or WW	3. SUBCATEGORY	4. HOW MUST THE WASTE BE MANAGED *(Circle one)*	5. REFERENCE NUMBER(s) of Hazardous Constituents contained in the waste. *Complete for F001-F005, D001 - D043, Soil & Debris wastes*
11.A		❑ NWW ❑ WW		A B C D E F G H S	
11.B		❑ NWW ❑ WW		A B C D E F G H S	
11.C		❑ NWW ❑ WW		A B C D E F G H S	
11.D		❑ NWW ❑ WW		A B C D E F G H S	

I hereby certify that all information submitted on this and all associated documents is complete and accurate to the best of my knowledge and information.

Generator Signature____________________ **Title**____________________

Printed Name____________________ **Date**____________________

Rev 2/99

HOW MUST THE WASTE BE MANAGED?

LDR MANAGEMENT CATEGORIES

A. THIS RESTRICTED WASTE REQUIRES TREATMENT TO THE APPLICABLE STANDARD. *This waste must be treated to the applicable* performance based treatment standard set forth in 40CFR Part 268 Subpart C, 268.32, Subpart D, 268.40 or RCRA Section 3004(d) prior to land disposal.

B. THIS HAZARDOUS DEBRIS IS SUBJECT TO THE DEBRIS ALTERNATIVE TREATMENT STANDARDS OF 40 CFR 268.45. I certify under penalty of law that I personally have examined and am familiar with the waste and that the statement above is true and that thiswaste meets the definition of debris and can be treated using the alternate methods specified in 40 CFR 268.45. I am aware that there are significant penalties for submitting a false certification including possibility of fine or imprisonment.

C. THIS RESTRICTED WASTE, FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY, HAS BEEN TREATED BY THE SPECIFIED TECHNOLOGY. I certify under penalty of law that the waste has been treated in accordance with the *requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of a* fine and imprisonment.

D. THIS RESTRICTED DEBRIS HAS BEEN TREATED IN ACCORDANCE WITH 40 CFR 268.45. I certify under penalty of law that the debris has been treated in accordance with the requirements of 40 CFR 268.45. 1 am aware that there are significant penalties for making false certification, including the possibility of a fine and imprisonment.

E. THIS LAB PACK DOES NOT CONTAIN ANY WASTES IDENTIFIED AT APPENDIX IV TO PART 268. I certify under penalty of law that I personally have examined and am familiar with the waste and that the statement above is true and that this lab pack will be sent to a combustion facility in compliance with the alternative treatment standards for lab packs at 40 CFR 268.42(c). I am aware that there are significant penalties for submitting a false certification including possibility of fine or imprisonment.

F. THIS RESTRICTED WASTE HAS BEEN TREATED TO REMOVE THE HAZARDOUS CHARACTERISTIC. I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

G. THIS RESTRICTED WASTE HAS BEEN TREATED TO REMOVE THE HAZARDOUS CHARACTERISTIC AND BEEN TREATED FOR UNDERLYING HAZARDOUS CONSTITUENTS. I certify under penalty of law that the waste has been treated in accordance with the *requirements of 40 CFR 268.40 to remove the hazardous characteristic, and that underlying hazardous constituents, as defined in 268.48* Universal Treatment Standards. I am aware that there are significant, penalties for submitting false certification, including the possibility of fine and imprisonment.

H. THIS RESTRICTED WASTE IS SUBJECT TO AN EXEMPTION FROM LAND DISPOSAL. *(Please include the date the waste is subject to the prohibitions in Column 5)* This waste is subject to an exemption from a prohibition on the type of land disposal method utilized for the waste (such as, but not limited to, a case-by-case extension under 40 CFR Part 268.5, or an exemption under 40 CFR 268.6.

For S, circle the appropriate response for the 3 *italicized* options:

S. THIS CONTAMINATED SOIL ☐*DOES* ☐*DOES NOT* CONTAIN LISTED HAZARDOUS WASTE AND ☐*DOES* ☐*DOES NOT* EXHIBIT A CHARACTERISTIC OF HAZARDOUS WASTE AND ☐ *IS SUBJECT TO* ☐ *COMPLIES WITH* THE SOIL TREATMENT STANDARDS AS PROVIDED BY 268.49(c) OR THE UNIVERSAL TREATMENT STANDARDS. I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process Used to support this certification and believe that it his been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Resource Guide - Underlying Hazardous Constituents (UHC) LDR (Land Disposal Restriction) Constituents

Ref. #	Hazardous Constituent	CAS NO.	NWW mg/Kg	WW mg/Kg	Concentration
1	Acenaphthene	83-32-9	3.4	0.059	
2	Acenaphthylene	208-96-8	3.4	0.059	
3	Acetone	67-64-1	160	0.28	
4	Acetonitrile	75-05-8	38	5.6	
5	Acetophenone	96-86-2	9.7	0.010	
6	2-Acetylaminofluorene	53-96-3	140	0.059	
7	Acrolein	107-02-8	NA	0.29	
8	Acrylonitrile	107-13-1	84	0.24	
9	Acrylamide	79-06-1	23	19	
10	Aldrin	309-00-2	0.066	0.021	
11	4-Aminobiphenyl	92-67-1	NA	0.13	
12	Aniline	62-53-3	14	0.81	
13	Anthracene	120-12-7	3.4	0.059	
14	Aramite	140-57-8	NA	0.36	
15	alpha-BHC	319-84-6	0.066	0.00014	
16	beta-BHC	319-85-7	0.066	0.00014	
17	delta-BHC	319-86-8	0.066	0.023	
18	gamma-BHC (Lindane)	58-89-9	0.066	0.0017	
19	Benz(a)anthracene	56-55-3	3.4	0.059	
20	Benzal chloride	98-87-3	6	0.055	
21	Benzene	71-43-2	10	0.14	
22	Benzo(a)pyrene	50-32-8	3.4	0.061	
23	Benzo(b)fluoranthene	205-99-2	6.8	0.11	
24	Benzo(k)fluoranthene	207-08-9	6.8	0.11	
25	Benzo(g,h,i)perylene	191-24-2	1.8	0.0055	
26	bis(2-Chloroethoxy)methane	111-91-1	7.2	0.036	
27	bis(2-Chloroethyl)ether	111-44-4	6	0.033	
28	bis(2-Chloroisopropyl) ether	39638-32-9	7.2	0.055	
29	bis(2-Ethylhexyl) phthalate	117-81-7	28	0.28	
30	Bromodichloromethane	75-27-4	15	0.35	
31	Bromomethane (Methyl bromide)	74-83-9	15	0.11	
32	4-Bromophenyl phenyl ether	101-55-3	15	0.055	
33	n-Butyl alcohol	71-36-3	2.6	5.6	
34	Butyl benzyl phthalate	85-68-7	28	0.017	
35	2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	88-85-7	2.5	0.066	
36	Carbon disulfide	75-15-0	4.8*	3.8	
37	Carbon tetrachloride	56-23-5	6	0.057	
38	Chlordane (alpha and gamma isomers)	57-74-9	0.26	0.0033	
39	p-Chloroaniline	106-47-8	16	0.46	
40	Chlorobenzene	108-90-7	6	0.057	
41	Chlorobenzilate	510-15-6	NA	0.10	
42	2-Chloro-1, 3-butadiene (Chloroprene)	126-99-8	0.28	0.057	
43	Chlorodibromomethane	124-48-1	15	0.057	
44	Chloroethane	75-00-3	6	0.27	
45	Chloroform	67-66-3	6	0.046	
46	p-Chloro-m-cresol	59-50-7	14	0.018	
47	2-Chloroethyl vinyl ether	110-75-8	NA	0.062	

Resource Guide - Underlying Hazardous Constituents (UHC) LDR (Land Disposal Restriction) Constituents

Ref. #	Hazardous Constituent	CAS NO.	NWW mg/Kg	WW mg/Kg	Concentration
48	Chloromethane (Methyl chloride)	74-87-3	30	0.19	
49	2-Chloronaphthalene	91-58-7	5.6	0.055	
50	2-Chlorophenol	95-57-8	5.7	0.044	
51	3-Chloropropylene (Allyl Chloride)	107-05-1	30	0.036	
52	Chrysene	218-01-9	3.4	0.059	
53	o-Cresol (2-Methyl phenol)	95-48-7	5.6	0.11	
54	m-Cresol (3-Methyl phenol)	108-39-4	5.6	0.77	
55	p-Cresol (4-Methyl phenol)	106-44-5	5.6	0.77	
56	Cyclohexanone	108-94-1	0.75*	0.36	
57	o,p'-DDD	53-19-0	0.087	0.023	
58	p,p'-DDD	72-54-8	0.087	0.023	
59	o,p'-DDE	3424-82-6	0.087	0.031	
60	p,p'-DDE	72-55-9	0.087	0.031	
61	o,p'-DDT	789-02-6	0.087	0.0039	
62	p,p'-DDT	50-29-3	0.087	0.0039	
63	Dibenz(a,h)anthracene	53-70-3	8.2	0.055	
64	Dibenz(a,e)pyrene	192-65-4	NA	0.061	
65	1,2-Dibromo-3-chloropropane	96-12-8	15	0.11	
66	1,2-Dibromoethane (Ethylene dibromide)	106-93-4	15	0.028	
67	Dibromomethane	74-95-3	15	0.11	
68	m-Dichlorobenzene (1,3-Dichlorobenzene)	541-73-1	6	0.036	
9	o-Dichlorobenzene (1,2-Dichlorobenzene)	95-50-1	6	0.088	
70	p-Dichlorobenzene (1,4-Dichlorobenzene)	106-46-7	6	0.090	
71	Dichlorodifluoromethane	75-71-8	7.2	0.23	
72	1,1-Dichloroethane	75-34-3	6	0.059	
73	1,2-Dichloroethane	107-06-2	6	0.21	
74	1,1-Dichloroethylene	75-35-4	6	0.025	
75	trans-1,2-Dichloroethylene	156-60-5	30	0.054	
76	2,4-Dichlorophenol	120-83-2	14	0.044	
77	2,6-Dichlorophenol	87-65-0	14	0.044	
78	2,4-Dichlorophenoxyacetic acid (2.4-D)	94-75-7	10	0.72	
79	1,2-Dichloropropane	78-87-5	18	0.85	
80	cis-1,3-Dichloropropylene	10061-01-5	18	0.036	
81	trans-1,3-Dic6loropropylene	10061-02-6	18	0.036	
82	Dieldrin	60-57-1	0.13	0.017	
83	Diethyl phthalate	84-66-2	28	0.2	
84	p-Dimethylaminoazobenzene	60-11-7	NA	0.13	
85	2,4-Dimethyl phenol	105-67-9	14	0.036	
86	Dimethyl phthalate	131-11-3	28	0.047	
87	Di-n-butyl phthalate	84-74-2	28	0.057	
88	1,4-Dinitrobenzene	100-25-4	2.3	0.32	
89	4,6-Dinitro-o-cresol	534-52-1	160	0.28	
90	2,4-Dinitrophenol	51-28-5	160	0.12	
91	12,4-Dinitrotoluene	121-14-2	140	0.32	
92	2,6-Dinitrotoluene	606-20-2	28	0.55	
93	Di-n-octyl phthalate	117-84-0	28	0.017	
94	Di-n-propylnitrosamine	621-64-7	14	0.40	

Resource Guide - Underlying Hazardous Constituents (UHC) LDR (Land Disposal Restriction) Constituents

Ref. #	Hazardous Constituent	CAS NO.	NWW mg/Kg	WW mg/Kg	Concentration
95	1,4-Dioxane	123-91-1	170	12	
96	Diphenylamine	122-39-4	13	0.92	
97	Diphenylnitrosamine	86-30-6	13	0.92	
98	1,2-Diphenyihydrazine	122-66-7	NA	0.087	
99	Disulfoton	298-04-3	6.2	0.017	
100	Endosulfan 1	959-98-9	0.066	0.023	
101	jEndosulfan 11	33213-65-9	0.13	0.029	
102	Endosulfan sulfate	1031-07-8	0.13	0.029	
103	Endrin	72-20-8	0.13	0.0028	
104	Endrin aldehyde	7421-93-4	0.13	0.025	
105	2-Ethoxyethanol (F005)+		INCIN	INCIN	
106	Ethyl acetate	141-78-6	33	0.34	
107	Ethyl benzene	100-41-4	10	0.057	
108	Ethyl ether	60-29-7	160	0.12	
109	Ethyl methacrylate	97-63-2	160	0.14	
110	Ethylene oxide	75-21-8	NA	0.12	
111	Famphur	52-85-7	15	0.017	
112	Fluoranthene	206-44-0	3.4	0.068	
113	Fluorene	86-73-7	3.4	0.059	
114	Heptachlor	76-44-8	0.066	0.0012	
115	Heptachlor epoxide	1024-57-3	0.066	0.016	
16	Hexachlorobenzene	118-74-1	10	0.055	
117	Hexachlorobutadiene	87-68-3	5.6	0.055	
118	Hexachlorocyclopentadiene	77-47-4	2.4	0.057	
119	HxCDDs (All Hexachlorodibenzo-p-dioxins)	NA	0.001	0.000063	
120	HxCDFs (All Hexachlorodibenzofurans)	NA	0.001	0.000063	
121	Hexachloroethane	67-72-1	30	0.055	
122	Hexachloropropylene	1888-71-7	30	0.035	
123	Indeno (1,2,3-c,d) pyrene	193-39-5	3.4	0.0055	
124	Iodomethane	74-88-4	65	0.19	
125	Isobutyl alcohol (Isobutanol)	78-83-1	170	5.6	
126	Isodrin	465-73-6	0.066	0.021	
127	Isosafrole	120-58-1	2.6	0.081	
128	Kepone	143-50-0	0.13	0.0011	
129	Methacrylonitrile	126-98-7	84	0.24	
130	Methanol	67-56-1	0.75*	5.6	
131	Methapyrilene	91-80-5	1.5	0.081	
132	Methoxychlor	72-43-5	0.18	0.25	
133	3-Methylchloroanthrene	56-49-5	15	0.0055	
134	4,4-Methylene bis (2-chloroaniline)	101-14-4	30	0.5	
135	Methylene chloride	75-09-2	30	0.089	
136	Methyl ethyl ketone	78-93-3	36	0.28	
137	Methyl isobutyl ketone	108-10-1	33	0.14	
138	Methyl methacrylate	80-62-6	160	0.14	
139	Methyl methansulfonate	66-27-3	NA	0.018	
140	Methyl parathion	298-00-0	4.6	0.014	
141	Naphthalene	91-20-3	5.6	0.059	

Resource Guide - Underlying Hazardous Constituents (UHC) LDR (Land Disposal Restriction) Constituents

Ref. #	Hazardous Constituent	CAS NO.	NWW mg/Kg	WW mg/Kg	Concentration
142	2-Naphthylamine	91-59-8	N/A	0.52	
143	o- Nitroaniline	88-74-4	14	0.27	
144	p-Nitroaniline	100-01-6	28	0.028	
145	Nitrobenzene	98-95-3	14	0.068	
146	5-Nitro-o-toluidine	99-55-8	28	0.32	
147	o-Nitrophenol	88-75-5	13	0.028	
148	p-Nitrophenol	100-02-7	29	0.12	
149	2-Nitropropane (F005)+		INCIN	INCIN	
150	N-Nitrosodiethylamine	55-18-5	28	0.4	
151	N-Nitrosodimethylamine	62-75-9	2.3	0.4	
152	N-Nitroso-di-n-butylamine	924-16-3	17	0.4	
153	N-Nitrosomethylethylamine	10595-95-6	2.3	0.4	
154	N-Nitrosomorpholine	59-89-2	2.3	0.4	
155	N-Nitrosopiperidine	100-75-4	35	0.013	
156	N-Nitrosopyrrolidine	930-55-2	35	0.013	
157	Parathion	56-38-2	4.6	0.014	
158	Total PCBs	1336-36-3	10	0.1	
159	Pentachlorobenzene	608-93-5	10	0.055	
160	PeCDDs (All Pentachlorodibenzo-p-dioxins)	NA	0.001	0.000063	
161	PeCDFs (All Pentachlorodibenzofurans)	NA	0.001	0.000035	
162	Pentachloroethane	76-01-7	6	0.055	
.63	Pentachloronitrobenzene	82-68-8	4.8	0.055	
164	Pentachlorophenol	87- 86-5	7.4	0.089	
165	Phenacetin	62-44-2	16	0.081	
166	Phenanthrene	85-01-8	5.6	0.059	
167	Phenol	108-95-2	6.2	0.039	
168	Phorate	298-02-2	4.6	0.021	
169	Phthalic acid	100-21-0	28	0.055	
170	Phthalic anhydride	85-44-9	28	0.055	
171	Pronamide	23950-58-5	1.5	0.093	
172	Propanenitrile (Ethyl cyanide)	107-12-0	360	0.24	
173	Pyrene	129-00-0	8.2	0.067	
174	Pyridine	110-86-1	16	0.014	
175	Safrole	94-59-7	22	0.081	
176	Silvex (2,4,5-TP)	93-72-1	7.9	0.72	
177	1,2,4,5-Tetrachlorobenzene	95-94-3	14	0.055	
178	TCDDs (All Tetachlorodibenzo-p-dioxins)	NA	0.001	0.000063	
179	TCDFs (All Tetrachlorodibenzofurans)	NA	0.001	0.000063	
180	1,1,1,2-Tetrachloroethane	630-20-6	6	0.057	
181	1, 1,2,2-Tetrachloroethane	79-34-5	6	0.057	
182	Tetrachloroethylene	127-18-4	6	0.056	
183	2,3,4,6-Tetrachlorphenol	58-90-2	7.4	0.03	
184	Toluene	108-88-3	10	0.080	
185	Toxaphene	8001-35-2	2.6	0.0095	
186	Tribromomethane (Bromoform)	75-25-2	15	0.63	
187	1,2,4-Trichlorobenzene	120-82-1	19	0.055	
188	1, 1, 1 -Trichloroethane	71-55-6	6	0.054	

Resource Guide -
Underlying Hazardous Constituents (UHC)
LDR (Land Disposal Restriction) Constituents

Ref. #	Hazardous Constituent	CAS NO.	NWW mg/Kg	WW mg/Kg	Concentration
189	1, 1,2-Trichloroethane	79-00-5	6	0.054	
190	Trichloroethylene	79-01-6	6	0.054	
191	Trichloromonofluoromethane	75-69-4	30	0.02	
192	2,4,5-Trichlorophenol	95-95-4	7.4	0.18	
193	2,4,6-Trichlorophenol	88-06-2	7.4	0.035	
194	2,4,5-Trichlorophenoxyacetic acid/2,4,5-T	93-76-5	7.9	0.72	
195	1,2,3-Trichloropropane	96-18-4	30	0.85	
196	1,1,2-Trichloro- 2,2,2-trifluoroethane	76-13-1	30	0.057	
197	tris-(2,3-Dibromopropyl) phosphate	126-72-7	0.1	0.011	
198	Vinyl chloride	75-01-4	6	0.27	
199	Xylenes	1330-20-7	30	0.32	
200	Antimony	7440-36-0	1.15*,‡	1.9	
201	Arsenic	7440-38-2	5.0*	1.4	
202	Barium	7440-39-3	21*,‡	1.2	
203	Beryllium	7440-41-7	1.22*,‡	0.82	
204	Cadmium	7440-43-9	0.11*,‡	0.69	
205	Chromium (Total)	7440-47-3	0.60*,‡	2.77	
206	Cyanides (Total)	57-12-5	590	1.2	
207	Cyanides (Amenable)	57-12-5	30	0.86	
208	Fluoride	16984-48-8	NA	35	
209	Lead	7439-92-1	0.75*,‡	0.69	
210	Mercury (retort residues)	7439-97-6	0.20*	NA	
211	Mercury (all others)	7439-97-6	0.025*	0.15	
212	Nickel	7440-02-0	11 *,‡	3.98	
213	Selenium	7782-49-2	5.7*,**	0.82	
214	Silver	7440-22-4	0.14,‡	0.43	
215	Sulfide	18496-25-8	NA	14	
216	Thallium	7440-28-0	0.20*,‡	1.4	
217	Vanadium	7440-62-2	1.6*,**,‡	4.3	
218	Zinc	7440-66-6	4.3*,**,‡	2.61	
219	A2213	30558-43-1	1.4	0.042***	
220	Aldicarb sulfone	1646-88-4	0.28	0.056	
221	Barban	101-27-9	1.4	0.056	
222	Bendiocarb	22781-23-3	1.4	0.056	
223	Bendiocarb phenol	22961-82-6	1.4	0.056	
224	Benomyl	17804-35-2	1.4	0.056	
225	Butylate	2008-41-5	1.4	0.042***	
226	Carbaryl	63-25-2	0.14	0.006	
227	Carbenzadim	10605-21-7	1.4	0.056	
228	Carbofuran	1563-66-2	0.14	0.006	
229	Carbofuran phenol	1563-38-8	1.4	0.056	
230	Carbosulfan	55285-14-8	1.4	0.028	
231	m-Cumenyl methylcarbamate	64-00-6	1.4	0.056	
232	Cycloate**	1134-23-2	1.4	0.042***	
233	Diethylene glycol, dicarbamate	5952-26-1	1.4	0.056	
234	Dimetilan	644-64-4	1.4	0.056	
235	Dithiocarbarnates (total)	137-30-4	28	0.028	

Resource Guide - Underlying Hazardous Constituents (UHC) LDR (Land Disposal Restriction) Constituents

Ref. #	Hazardous Constituent	CAS NO.	NWW mg/Kg	WW mg/Kg	Concentration
236	EPTC	759-94-4	1.4	0.042	
237	Formetanate hydrochloride	23422-53-9	1.4	0.056	
238	Formparanate	17702-57-7	1.4	0.056	
239	3-lodo-2-propynyl n-butylcarbamate**	55406-53-6	1.4	0.056	
240	Isolan	119-38-0	1.4	0.056	
241	Methiocarb	2032-65-7	1.4	0.056	
242	Methomyl	16752-77-5	0.14	0.028	
243	Metolcarb	1129-41-5	1.4	0.056	
244	Mexacarbate	315-18-4	1.4	0.056	
245	Molinate	2212-67-1	1.4	0.042	
246	Oxarnyl	23135-22-0	0.28	0.056	
247	Pebulate	1114-71-2	1.4	0.042	
248	o-Phenylenediamine	95-54-5	5.6	0.056	
249	Physostigmine	57-47-6	1.4	0.056	
250	Physostigmine salicylate	57-64-7	1.4	0.056	
251	Prornecarb	2631-37-0	1.4	0.056	
252	Propharn	122-42-9	1.4	0.056	
253	Propoxur	114-26-1	1.4	0.056	
254	Prosulfocarb	52888-80-9	1.4	0.042	
255	Thiodicarb	59669- 26-0	1.4	0.019	
256	Thiophanate-methyl	23564-05-8	1.4	0.056	
257	Tirpate	26419-73-8	0.28	0.056	
258	Triallate	2303-17-5	1.4	0.042	
259	Triethylarnine-	101-44-8	1.5	0.081	
260	Vernolate	1929-77-7	1.4	0.042	
*	"Concentration in mg/l TCLP"				
**	Not Underlying Hazardous Constituents. (See 60 FR, Jan. 3,1995)				
***	The preamble to the final rule (61 FIR 15584) clearly indicates that the wastewater treatment standard for thiocarbamate constituents has been revised to 0.042mg/l. However, the §268.48 universal treatment standards table still shows 0.003 mg/l.				
‡	These UTS levels are effective on August 24, 1998 as established in 63 FIR 28556-28753) the finalized Phase IV-Part 2 land disposal restrictions (LDR) rule.				

APPLICATION FOR HAZARDOUS WASTE PERMIT

PART II

K CLOSURE PLAN

K1 Introduction

This section contains a discussion of the steps that shall be taken should PESI decide to partially or completely close hazardous waste operations at the PFF Facility during the intended operating life. Procedures to be used for an unplanned partial closure are, as applicable, similar to the procedures outlined for final closure.

The Closure Plan has been prepared to meet the requirements of Subpart G of 40 CFR 264. This written plan for closure of hazardous waste management units will be amended, and written notification of or request for a permit modification to authorize the change in the approved closure plan will be submitted to the department, whenever:

- Changes in operating plans or facility design affect the closure plan; or
- In conducting partial or final closure activities, unexpected events require a modification of the approved closure plan.

Any modifications to this Closure Plan after the Part B permit is issued to the facility will be made in accordance with the requirements of 40 CFR 270.42. Copies of the approved Closure Plan for the facility will be maintained at the facility office until the FDEP have notified the facility of satisfactory closure after reviewing the closure certification.

PFF will submit the notification or request for a permit modification including a copy of the amended closure plan, for approval by the Department, at least sixty (60) days prior to any proposed change in facility design or operation, or no later than sixty (60) days after an unexpected event has occurred which has affected the closure plan. If an unexpected event occurs during the partial or final closure period, PFF will request a permit modification no later than thirty (30) days after the unexpected event.

In accordance with FAC 62-730.260, PFF will submit a closure permit application to the Department at least 180 days before final facility closure is anticipated to begin. A closure schedule is provided in Section K5. PFF will close hazardous waste tank and container management units in accordance with this closure plan unless an alternate partial or final closure plan has been approved by the Department. In accordance with 40 CFR 264.112(e), this closure plan shall not preclude PFF from removing hazardous wastes and decontaminating or dismantling equipment in accordance with the approved partial or final closure plan at any time before or after notification of partial or final closure.

At the time of closure, all regulated hazardous waste management units and ancillary equipment will be decontaminated and left in place, or dismantled and disposed of properly. Within 180 days of receipt of the final waste shipment, the complete waste inventory will be taken for off-site treatment, storage, or disposal, as appropriate. Closure of the regulated units will be completed within 180 days of initiation of closure. In accordance with the requirements of 40 CFR 264.115, PFF will submit to the department, by registered mail, a certification that the hazardous waste facility has been closed in accordance with specifications in the approved closure plan. The certification, to be submitted within 60 days of the completion of final closure, will be signed by PFF and by an independent, Florida registered professional engineer.

PFF will close the facility in a manner that minimizes the need for further maintenance; controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground, surface waters or to the atmosphere; and complies with the closure requirements of 40 CFR 264.

A description of the closure procedures to be used to close the existing hazardous waste container storage areas and tank is located in Section K7. Closure procedures for the proposed units identified in Section K2.1 are also presented in Section K7. Closure of the hazardous waste container storage areas and tank and proposed units will be conducted such that no post-closure care should be necessary.

In the event that the clean closure criteria presented in Section K6 cannot be achieved, a closure/post-closure plan will be submitted to the FDEP. The Closure Cost Estimate presented in Attachment K-2 conservatively assumes that hazardous waste inventory will be treated or disposed of off-site; closure activities will be carried out by third party personnel; and decontaminated equipment will remain on-site. This scenario assumes a "worst case" closure situation.

There is no on-site disposal activity of hazardous waste at the PFF facility; therefore, there is no disposal capacity to be exhausted and no specific date on which the facility will cease to have waste management capacity. It is anticipated that the PFF facility will remain in operation at least until the year 2050.

K2 FACILITY DESCRIPTION

The PFF facility is located in Gainesville, Florida. The street and the mailing address for the operation is:

Perma-Fix of Florida, Inc.

1940 N.W. 67th Place
Gainesville, Florida 32653

A copy of the Closure Plan or the most recent plan revision is maintained at the facility.

It is intended that all closure work will be completed and final with processing and/or removal of all hazardous waste, followed by cleaning and decontamination of facilities and equipment used in hazardous waste receipt, storage, processing, transfer and handling; and disposing off wastes generated during closure activities.

K2.1 Identification of RCRA Permitted Units

Closure procedures will be performed on the following RCRA units which are/will be utilized for the storage and treatment of hazardous waste during operation of the RCRA facility:

Processing and Storage Building

Existing Units: Container Storage Area
3,000 Gallon Storage Tank
Ancillary Equipment

LSV Building

Existing Units: 100 Gallon Toluene Fines Tank
200 Gallon Ethanol Fines Tank
350 Gallon Test Tank
Shredder
Ancillary Equipment

Treatment and Operations Building

Proposed Units: 317 Gallon Plough Share (reactor vessel)
50 Gallon Separator Tank
300 Gallon Accumulator Tank
35 Gallon Absorber Tank
16 Gallon Condenser
Activated Carbon Units
Container Storage Area
Ancillary Equipment

The locations of the existing and proposed units are shown in Figures K1, K2 and K3 (see also Figure I.B.2 in Part I of this application).

Ancillary equipment scheduled for closure will consist of the following:

- Pumps
- Piping
- Hoses
- Connectors
- Valves

- Flanges
- Grinders
- Strainers
- Forklifts
- Conveyors
- Screens
- Sorting Table

K2.2 Operating Records

The operating records associated with the closure plan include:

- Closure Plan (A copy of the Closure Plan and current amendments are maintained in the Facility operators record);

- Closure Cost Estimate (The closure cost estimate and all amendments or annual adjustments for inflation will be maintained in the Closure Plan and the Facility operating record); and

- Certifications of Closure Completeness (The closure certification including the certification of an independent professional engineer, will be submitted to the FDEP. Copies will be maintained in the Facility operating record.

K3 MAXIMUM CLOSURE INVENTORY

The required estimate for maximum waste inventory at the time of closure is based on the condition that Facility tanks and container storage areas are full of material. The maximum capacity of the existing facility is 75,755 gallons of liquid hazardous waste. The maximum capacity of proposed units is ~~36,509~~ 36,544 gallons. The maximum capacity upon completion of the proposed expansion to the facility is ~~112,264~~ 112,299 gallons of liquid hazardous waste. The tabulated compilation of this maximum inventory may be found in Table K-1 below.

TABLE K-1

MAXIMUM INVENTORY

DESCRIPTION	CAPACITY (Gal)
EXISTING UNITS	
Container Storage Area (Processing and Storage Building) 1311 equivalent 55 gallon drums	72,105
Storage Tank (Processing and Storage Building)	3,000
Storage tanks (LSV Processing Area)	650
Subtotal	75,755
PROPOSED UNITS	
Container Storage Area (Treatment and Operations Building) 640 equivalent 55 gallon drums	35,200
Plough Share (Treatment and Operations Building)	317
Treatment Tank (Separator Tank, Treatment and Operations Building)	50
Treatment Tank (Condenser)	16
Treatment Tank (Accumulator Tank, Treatment and Operations Building)	300
Treatment Tank (Absorber Tank, Treatment and Operations Building	35
HEPA/GAC Filters A & B (Treatment & Operations Bldg.)	626
Subtotal	~~36,509~~ 36,544
TOTAL	~~112,264~~ 112,299

K4 CLOSURE TIME SCHEDULES

An outline of the Closure Time Schedule is summarized as follows:

Closure Activity	Timing Requirements
Remove all hazardous waste from unit being closed	Within 90 days after receipt of the known final volume of waste
Complete closure plan activities	Within 180 days after receipt of the known final volume of waste
Submit certificate of closure completeness	Within 60 days of completion of facility closure work

If it is expected that closure activities will take longer than 180 days to complete, PFF will apply for an extension to the closure period from the FDEP Director. This request will be made at least 30 days prior to the expiration of the allowable 180 day period.

Table K-2 below presents a facility closure schedule for the different closure activities. As indicated in Table K-2, some of the closure activities will be occurring simultaneously.

TABLE K-2

FACILITY CLOSURE SCHEDULE

Closure Activity	Days Elapsed
Submittal of Closure Permit Application in accordance with FAC 62-730.260 to the Department	-180
Notification in writing to the Department of intent to begin closure activities.	-45
Receipt of known final volume of hazardous waste into container or tank management unit or receipt of Department approval of closure plan, whichever is later[1].	0
Begin treatment and/or removal of all hazardous wastes from container or tank management unit(s)[2].	30
Complete treatment and/or removal of all hazardous wastes from container or tank management unit(s).	90
Complete removal and decontamination of ancillary equipment, miscellaneous units, tanks and empty containers that have contacted hazardous waste.	120
Complete decontamination of secondary containment structures.	135
Conduct soil sampling activities.	165
Complete final closure activities.	180
Submit certification to the Department (signed by PFF and a registered professional engineer) that the hazardous waste management unit/facility has been closed in accordance with the specifications of the approved closure plan.	240

[1]If an unexpected event during closure of a hazardous waste management unit requires modification of the approved closure plan, PFF will request a permit modification within 30 days of the unexpected event.

[2]In event that there is a reasonable possibility that the hazardous waste management unit will receive additional hazardous wastes, PFF will initiate closure activities no later than one year after the date on which the unit received the most recent volume of hazardous waste as specified under 40 CFR 264.112(d)(2).

K5 AMENDMENTS TO CLOSURE PLAN

PFF can foresee possible future needs for modifications to this closure plan. These could be associated with changes in facility design or in operating plans. Specific requirements for amending the closure plan, if applicable, are contained in 40 CFR §264.112(c)(3) and will be adhered to. Written requests for approval of closure plan amendments, if required, will be in accordance with 40 CFR 264.112 (d). In case an unexpected event affects the closure plan, a written request for a modification to the plan will be submitted within 60 days of the event.

K6 CLOSURE PERFORMANCE STANDARDS

Closure procedures will be performed on the RCRA units, identified in Section K2.1, which are/will be utilized for the processing and/or storage of hazardous waste during operation of the RCRA facility.

The RCRA units will be closed in a manner that will eliminate the need for further post-closure maintenance or remediation and be protective of human health and the environment. The potential for release of hazardous waste or hazardous waste constituents to groundwater, surface water, soil or to the atmosphere after final closure of the facility will be eliminated as a result of successful implementation of this closure plan.

During closure, all wastes which exist on-site will be shipped off-site for proper treatment and/or disposal. The contaminated equipment will either be decontaminated as appropriate to provide for future reuse, recycled as scrap, or disposed of off-site. The decontamination residues generated will be disposed Off-site for proper treatment and/or disposal.

If, due to naturally-occurring or pre-hazardous waste operating conditions the following clean closure standards cannot be applied, an alternate (hybrid) closure standard may be established for individual units. PFF will submit to the FDEP copies of analytical results obtained during closure activities and proceed with additional investigations around suspect sample locations, if deemed necessary. Any additional subsurface investigations will define the extent and magnitude, as is practical, for that unit.

Additional investigation procedures will be similar to those specified in Attachment K-1 and will continue until the extent of potential contamination is assessed. Once the additional investigation activities are completed, the resulting data will be evaluated to determine if a risk assessment will be performed or if corrective action activities will be implemented. The risk assessment, if deemed necessary, will be submitted with the closure certification report. Closure verification data, analytical results and certification reports will be submitted to the FDEP.

Prior to conducting additional investigation activities or performing a risk assessment, the Facility will submit a written work plan with a permit modification request.

All final rinsewater samples will exhibit constituent concentrations that meet Florida's groundwater standards and minimum criteria listed in Chapter 62-520 and Chapter 62-550, Florid Administrator Code (F.A.C.). For the parameters which are not listed in these Chapters, final rinsewater samples shall exhibit constituent concentrations that are protective of human health and the environment.

Adequate protection of human health and the environment may be demonstrated either by using Florida's risk assessment methodology found in Chapter 62-785, F.A.C., or alternatively PFF may propose Florida's groundwater and/or soil guidance concentrations listed in Chapter 62-785, F.A.C.

K6.1 Tank Closure Standards

In order to verify that the tanks have been properly decontaminated, the tanks shall be considered clean-closed when the sampling verifies that each final rinsate sample exhibits constituent concentrations below those levels listed in "Table I: Groundwater Cleanup Target Levels for Chapter 62-785, F.A.C." for the rinsate water used during final rinsate activities (See Table K-3 for a summary of closure performance standards for tanks).

Final rinsate samples will be collected and analyzed for constituents identified in 40 CFR 261 Appendix VIII which have been stored at the facility. To achieve the clean closure standard, each tank and associated ancillary equipment will be initially emptied of all hazardous wastes (i.e., liquids and solids). Subsequently, each tank and associated equipment will be cleaned and rinsed adequately to achieve the clean closure standard. Rinsates generated during tank and equipment cleaning will be managed as a hazardous waste, with the exception of final rinsates that meet the clean closure performance standard.

TABLE K-3

CLOSURE PERFORMANCE STANDARDS

UNIT	CLOSURE PERFORMANCE STANDARDS	
	Media Sampled	**Closure Standard**
Tanks	Rinsewater	Table I Groundwater Cleanup Target Levels for Chapter 62-785, F.A.C., or the risk Assessment Methodology provided in Chapter 62-785, F.A.C.
Container Storage Area's Secondary Containment	Rinsewater	Table I Groundwater Cleanup Target Levels for Chapter 62-785, F.A.C., or the risk Assessment Methodology provided in Chapter 62-785, F.A.C.
	Concrete	Table II Soil Cleanup Target Levels for Chapter 62-785, F.A.C., or the Risk Assessment Methodology provided in Chapter 62-785, F.A.C.
Subsurface Investigations	Soil	Table II Soil Cleanup Target Levels for Chapter 62-785, F.A.C., or the Risk Assessment Methodology provided in Chapter 62-785, F.A.C.
Ancillary Equipment & Miscellaneous RCRA Units	Rinsewater	Table I Groundwater Cleanup Target Levels for Chapter 62-785, F.A.C., or the Risk Assessment Methodology provided in Chapter 62-785, F.A.C.

Following final tank and equipment rinsing, the following options, dependent upon rinsate analysis, may be exercised:

1) If the final rinsate meets the clean closure standard, no end use restrictions shall be placed on decontaminated tanks or process equipment and closure of each tank unit will be deemed final;

2) Tanks or process equipment that cannot meet the clean closure standard will be recycled as scrap metal.

The secondary containment structures associated with tanks will also undergo decontamination activities and will be decontaminated to the standards identified in Section K6.2. Detailed closure procedures for tanks are further discussed in Section K7.1.1.

K6.2 Secondary Containment Closure Standards

In order to verify that secondary containment areas have been properly decontaminated, the units shall be considered clean-closed when sampling verifies that either 1) the final rinsewater demonstrates compliance with either Table I Groundwater Cleanup Target Levels for Chapter 62-785, F.A.C., or the Risk Assessment Methodology provided in Chapter 62-785, F.A.C. 2) Concrete samples shall demonstrate clean closure upon meeting the Table II Soil Cleanup Target Levels for Chapter 62-785, F.A.C., or the Risk Assessment Methodology provided in Chapter 62-785, F.A.C. See Table K-3 for a summary of closure performance standards for secondary containment areas.

Final rinsate samples or concrete samples will be collected and analyzed for hazardous constituents identified in 40 CFR 261, Appendix VIII which have been previously stored at the facility. To achieve the clean closure standard, the secondary containment areas will be decontaminated by scrubbing down all surfaces, and subsequently pressure washing the surfaces.

Rinsates generated during decontamination activities will be managed as a hazardous waste, with the exception of the final rinsates that meet the clean closure standard.

Following final rinsing, the following options, dependent upon rinsate analysis and/or concrete analysis, may be exercised:

1) If the final rinsate or concrete samples meet the clean closure criteria, no end use restrictions shall be placed on the decontaminated units and closure of the unit will be deemed final;

2) Concrete that cannot meet the clean closure criteria will be removed and disposed of as a hazardous waste, or addressed under the Risk Assessment Methodology provided in Chapter 62-785, F.A.C.

Detailed closure procedures for secondary containment areas are further discussed in Section K7.1.2.

K6.3 Ancillary Equipment and Miscellaneous RCRA Units Closure Standards

In order to verify that ancillary equipment and miscellaneous RCRA units have been properly decontaminated, the equipment shall be considered clean closed when field sampling verifies that the final rinsate sample exhibits constituent concentrations below the Table I Groundwater Cleanup Target Levels for Chapter 62-785, F.A.C., or the Risk Assessment Methodology provided in Chapter 62-785, F.A.C. See Table K-3 for a summary of closure performance standards for ancillary equipment.

Final rinsate samples will be collected and analyzed for constituents identified in 40 CFR 261, Appendix VIII which have been previously stored at the facility. To achieve the clean closure standard, the ancillary equipment and miscellaneous RCRA units will be initially emptied of all hazardous wastes (i.e., liquids and solids). Subsequently, the equipment will be cleaned and rinsed adequately to achieve the clean closure standard. Rinsates generated during equipment cleaning will be managed as a hazardous waste, with the exception of final rinsates that meet the clean closure standard. Following final equipment rinsing, the following options, dependent upon rinsate analysis, may be exercised:

1) If the final rinsate meets the clean closure standard, no end use restrictions shall be placed on decontaminated equipment and closure of the ancillary equipment or miscellaneous RCRA unit will be deemed final;

2) Equipment (composed of steel) that cannot meet the clean closure standard will be recycled as scrap metal. Non-ferrous equipment will be disposed of as hazardous waste.

Detailed closure procedures for ancillary equipment and miscellaneous RCRA units are further discussed in Section K7.1.3.

K6.4 Subsurface Investigation Closure Standards

Subsurface investigations will be conducted at the secondary containment areas where hazardous wastes were previously stored. In order to verify that the soil underlying these areas has not been impacted with hazardous waste or hazardous waste constituents, the soil underlying these units shall be considered clean closed when representative soil samples exhibit constituent concentrations below the Table II Soil Cleanup Target Levels for Chapter 62-785, F.A.C., or the Risk Assessment Methodology provided in Chapter 62-785, F.A.C. See Table K-3 for a summary of closure performance standards for subsurface investigations.

Soil samples will be collected and analyzed for constituents identified in 40 CFR 261, Appendix VIII which have been previously stored at the facility. To verify clean closure of the secondary containment areas, a subsurface investigation will be conducted at these areas as presented in Attachment K-1.

Following receipt of analytical results, the following options may be exercised:

1) If the soil results meet the clean closure standard, no end use restrictions shall be placed on the units;

2) if soil results exceed the clean closure standard, additional subsurface investigations will be performed to define the extent and magnitude of constituent contamination, or the Facility may utilize the Risk Assessment Methodology provided in Chapter 62-785, F.A.C.

3) upon defining the extent and magnitude of constituent contamination, a risk assessment will be performed or corrective action activities will be conducted.

Detailed subsurface investigation activities are discussed in detail in Attachment K-1.

K7 CLOSURE PROCEDURES

The following subsections outline the procedures for partial and permanent closure of the regulated units at the PFF facility. During partial and permanent closure of the regulated units, a decontamination area/station will be set up for the cleaning of equipment used during closure (tools, machines, material handling equipment, etc.). Shower facilities, cleaning equipment, and decon supplies will be available to workers performing closure activities. All potentially contaminated rinsewater, debris and personal protective equipment (PPE) will be containerized in a tank(s), or deposited in drums for subsequent characterization and disposal at an off-site TSDF. A separate Closure Sampling and Analysis Plan is presented in Attachment K-1.

K7.1 Partial Closure Activities

Required partial closure notices will be submitted as specified in 40 CFR §264.112(d) to the following:

Waste Program Administrator
Florida Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

K7.1.1 Tank Closure

Standard tank cleaning activities associated with tank closure shall consist of the following procedures:

- Drain all liquid materials from the tank through the lowest fitting on the tank. Transfer the liquid contents to a different container for transportation off-site.

- Remove any solids that may have settled out of the liquid at the bottom of the tank. This may include the use of self-priming, high-clearance centrifugal pump(s) or rental vacuum pump unit(s). Some more compacted solids may have to be removed manually within the tank and pumped to externally located roll-off bins for temporary on-site storage and final disposal at an off-site TSDF. Removal procedures will follow standard confined space entry procedures.

- Use a high pressure wash with detergent for cleaning the interior of each tank and associated fittings and piping. After use, transfer the potentially contaminated rinse water to a transport container for transportation off-site.

- Open the tank access ports. Allow the tank to dry out.

- Test for explosive vapors and oxygen content using standard instrument procedures.

- Inspect the tank interior for visual cleanliness. Repeat the above steps, if necessary.

- Analyze the final rinse water, using methods outlined in Attachment K-1, to check for presence of constituents identified in Section K6.1. The tank will be certified as clean closed (decontaminated) when analytical results on the final rinse water indicate that levels of constituents are below the closure criteria identified in Table K-3.

The tank cleaning procedures listed above will also be followed during final closure to decontaminate the associated tank appurtenances (piping, fittings, nozzles, valves, pumps etc.). A partial closure of these items may occur during the normal operations of the facility and may include washing in parts washers and/or power washing and other methods to remove visible signs of contamination prior to reuse or scrapping for metal recovery.

Following cleaning/decontamination activities, one of the options identified in Section K6.1 will be initiated.

K7.1.2 Container Storage Facilities and Secondary Containment Area Closure

- Standard cleaning activities associated with container storage facilities and secondary containment areas closure shall consist of the following procedures:

- Dispose of all empty containers through an authorized drum recycler/disposal facility.
- Process all existing wastes stored in containers or ship the containers to an off-site RCRA permitted TSD facility.

- Examine the containment structures for evidence of cracks, stains, spills or residuals as well as review past operating records for information on past spills or leaks. These activities will form the basis for selection of sampling locations.

- Decontaminate the units by scrubbing down all surfaces and subsequently pressure washing the surfaces with detergent solution followed by a clean water rinse.

- Collect a final rinse water sample and analyze the sample, using methods outlined in Attachment K-1, to check for the presence of constituents identified in Section K6.1. The structures will be certified as clean closed when analytical results on the final rinse water indicate that levels of constituents are below the closure criteria identified in Table K-3, or PFF may elect to forgo collecting a rinse water sample and collect a concrete sample.

The concrete sample will be collected and analyzed utilizing the methods outlined in Attachment K-1, to check for the presence of constituents identified in Section K6.1. The structures will be certified clean closed when analytical results of the concrete indicate that levels of constituents are below the closure criteria identified in Table K-3.

Following cleaning/decontamination activities, one of the options identified in Section K6.2 will be initiated.

K7.1.3 Ancillary Equipment and Miscellaneous Unit Closures

Routine operational replacement of ancillary equipment such as filter canisters and baskets, shredders, grinders, pumps, valves, piping, hoses and fittings, etc. may require removal and partial closure during the life of the facility. This section addresses the "partial closure" of these items during the normal routine operations of the facility, prior to reuse, recycle for scrap metal recovery or disposal as non-hazardous waste. Additionally, this section addresses the closure of the proposed miscellaneous RCRA unit (i.e., Perma-Fix® II process).

<u>ANCILLARY EQUIPMENT</u>

Standard cleaning activities associated with ancillary equipment replacement include the following procedures:

- Isolate and remove all liquid holdup from the equipment through the fitting(s) situated at the lowest level to ensure proper drainage. A vacuum pump may be used, if necessary. Transfer the liquid contents to a tank/container which is in hazardous waste service for further processing and/or proper disposal.

- Remove any solids/slurry that may have settled out at the bottom sections, using a vacuum pump, if necessary. Transfer the solids/slurry contents to a tank/container which is in hazardous waste service for further processing and/or proper disposal.

- Cleaning of the parts and/or equipment using parts washers; recirculation of virgin, waste or recycled solvents such as alcohols, ketones, aliphatic hydrocarbons etc.; and/or high pressure wash with detergent solution and other methods to remove visible signs of contamination.

- Inspect the equipment for visual cleanliness. Repeat the above steps, if necessary. Visual cleanliness will be the adequate closure criteria for ancillary equipment, prior to disposal as scrap metal.

- If rinse water is used, analyze the rinse water, using methods outlined in Attachment K-1, to check for presence of constituents identified in Section K6.1. The equipment will be certified as clean closed when analytical results of the final rinse water indicate that levels of constituents are below the closure criteria identified in Table K-3.

- Equipment that meets the clean closure criteria will be removed from service. Equipment that does not meet the criteria will have the cleaning steps repeated until they meet the requirements or will be disposed at an off-site facility as hazardous waste, or it will be disposed of as scrap metal.

Cleaning solutions, rinse waters and other liquids resulting from cleaning activities will be collected and sent off site for proper treatment or disposal. Following cleaning and decontamination, the parts and/or equipment will be available for reuse, recycle for scrap metal recovery or disposal as non-hazardous waste.

MISCELLANEOUS UNIT CLOSURE

- Drain all liquid materials from each piece of equipment listed in Attachment II.I.1 that is associated with the Perma-Fix® II process (i.e., miscellaneous unit). Drain liquids from the lowest fitting on the equipment or tank.

- Transfer the liquid contents to a different container (if required) for transportation off-site.

- Remove any hazardous waste solids or liquids that may have settled out of the treated waste materials. This may include the use of self-priming, high-clearance centrifugal pump(s) or rental vacuum pump unit(s). Compacted sludge solids may have to be removed manually from each piece of the unit and transported to externally located roll-off bins for temporary on-site storage and final disposal at an off-site TSDF. Removal procedures will follow standards confined space entry procedures by qualified individuals.

- Pressure wash with appropriate detergent for cleaning and decontaminating the interior of each piece of equipment and all associated valves, fittings, piping and pumps.

- Transfer the potentially contaminated rinse/wash water to a transport container for transport off-site.

- Open all access parts, drains, valves, etc. Allow the equipment's interior and exterior to dry out.

- Test for explosive vapors and oxygen content using standard instrument and industrial hygiene/safety procedures.

- Inspect the interior of each tank, reservoir or piece of ancillary equipment.

- Gather a composite final rinsewater sample from the miscellaneous unit.

- Analyze the final rinsewater, using methods outlined in Attachment K-1, to check for the presence of constituents identified in Section K6.1. The miscellaneous unit will be certified as clean closed (i.e., decontaminated) when analytical results of the final rinse water indicates that levels of hazardous constituents are below the closure performance standard specified in Table K-3.

- Equipment that meets the clean closure criteria will be removed from service. Equipment that does not meet the criteria will have the cleaning steps repeated until they meet the requirements or will be disposed at an off-site facility as hazardous waste, or it will be disposed of as scrap metal.

Cleaning solutions, rinse waters and other liquids resulting from cleaning activities will be collected and sent off site for proper treatment or disposal. Following cleaning and decontamination, the parts and/or equipment will be available for reuse, recycle for scrap metal recovery or disposal as non-hazardous waste.

K7.1.4 Subsurface Investigation Activities

As a means of demonstrating that hazardous constituents have not impacted soils underlying and surrounding the container storage facilities, a subsurface investigation will be conducted at these units.

Detailed subsurface investigation activities are provided in Attachment K-1.

K7.2 Permanent Closure Activities

It is anticipated that the PFF Facility will remain open and in operation until at least the year 2050. Permanent closure work would follow the procedures presented in this section.

Permanent closure activities will basically follow the same procedures described in Section K7. However, prior to permanent closure of the complete facility, the FDEP will be notified of the intent to close the facility. After receiving approval from the Agency to implement the Closure Plan, final closure will start and waste will no longer be accepted at the facility. An independent professional engineer will provide general oversight over the Closure Activities.

No environmental impact on surrounding land surfaces and soil areas is expected, because of the widespread use of concrete for secondary containment, use of welded flanged steel piping, frequent inspection of operations and prompt corrective action.

The miscellaneous residues from facility decontamination work, including debris, absorbents, supplies and used personal protective clothing will be collected and accumulated on-site in containers. Full containers will be sent off-site for treatment or disposal, as appropriate, to permitted hazardous waste facilities.

PFF will submit a certification of final closure as per the requirements of 40 CFR 264.115. All supporting documentation for the certification will be made available to the Director of PFF upon request, until PFF is released from financial assurance requirements. Supporting documents to be maintained will minimally consist of the following :

(a) A copy of the certification report prepared by the registered professional engineer;

(b) Results of all sampling and analyses;

(c) Activities conducted by the professional engineer or his/her designee(s) during site visits and inspections;

(d) Field reports documenting each site visit;

(e) List of facility records that were reviewed in preparing the certification report.

K8 CLOSURE COST ESTIMATE

The Closure Cost Estimate is presented as Attachment K-2 to this Closure Plan. This cost estimate has been prepared utilizing Costpro software. It should be noted that non-default values were used in the closure cost estimate in certain instances to estimate labor and disposal costs as well as to estimate the time it will take to conduct certain closure activities. In every instance, the non-default labor cost and time estimates are based on the actual, recent experience of an engineering firm (Schreiber, Yonley & Associates) conducting these activities. A note to that effect has been added to the appropriate Cost Pro worksheet (see SA-3, Page 3 of 3 for the Treatment and Operations Building – Perma-Fix II Tank System). Sources of non-default cost-estimates for treatment, disposal, or transportation costs are noted on the appropriate Cost Pro worksheets.

The closure cost estimate shall be reviewed whenever a change in the closure plan increases or decreases the cost of closure. Copies of the original closure cost estimate or a revised cost estimate (if applicable); and the latest annual inflation adjusted estimate required by 40 CFR 264.142(b), shall be kept at the facility during its operating life.

The cost of closure for the existing facility and the proposed facility is detailed in Attachment K-2.

K9 POST-CLOSURE PLAN

A Post Closure Plan is not required at this time. However, if "clean closure" in accordance with 40 CFR 264.197(b) cannot be achieved for closure of the tank and container storage area, then PFF will submit a closure/post-closure plan in accordance with the requirements for landfills (§264.310).

Attachment K-1

Closure Sampling and Analysis Plan

CLOSURE SAMPLING AND ANALYSIS PLAN

1.0 PURPOSE

The purpose of this plan is to provide an outline of the sampling and analysis that will be performed during closure of the facility and also define the criteria for "clean" closure.

2.0 MEDIA TO BE SAMPLED AND ANALYZED

Samples of soil, rinse water and possibly concrete will be collected during the performance of closure activities.

All analyses will be performed in accordance with USEPA SW 846 or standard ASTM methods.

Soil, rinsewater and concrete samples (if applicable) will be analyzed for 40 CFR 261 Appendix VIII constituents which have been stored at the facility.

3.0 FIELD SAMPLING PROCEDURES

3.1 Rinsate Samples

The rinsate sampling procedure will consist of collecting samples of the final rinsate from each tank, secondary containment areas, and ancillary equipment.

Rinsewater samples will be collected utilizing standard sample collection techniques and placed into an appropriate sample jar. QA/QC samples will also be collected as described in Section 5.0. Appropriate personnel protective equipment (PPE) and sample collection procedures will be utilized in order to minimize exposure and potential cross-contamination of samples.

3.2 Concrete Samples

Concrete samples may be collected as a means of verifying clean closure of concrete surfaces. Concrete chip samples if collected, will be obtained utilizing a drill with a concrete bit. The concrete dust and chips will be collected and placed into an appropriate sample jar. QA/QC samples will be collected as described in Section 5.0.

3.3 Subsurface Investigation

Subsurface investigation activities will be conducted at the following areas:

Existing Areas:

Processing and Storage Building (see Figure K-1)
LSV Processing Area (see Figure K-2)

Proposed Areas:
Treatment and Operations Building (see Figure K-3)

Soil boring samples will be collected utilizing standard soil sample collection techniques at the locations identified on Figures K1-K3 The proposed soil borings are located so as to provide qualitative information for characterizing the shallow surface where hazardous waste could have potentially migrated. The proposed soil borings will extend to a depth of two feet. Two soil samples will be collected throughout the two foot sampling interval; one immediately beneath the gravel surface, at the soil surface (at approximately six inches) and the second at a depth from approximately eighteen inches to two feet. The sample collected from the lower interval (18-24 inches) will be preserved and retained at the laboratory and analyzed only if the first soil sample result indicates concentrations above the Closure Performance Standard (Section K6).

If the eighteen inch to two foot depth sample at any of the given locations indicate concentrations above the Closure Performance Standards, additional soil samples will be collected during a subsequent sampling event at intervals to be determined in the field until the extent of contamination has been determined.

Prior to conducting additional subsurface investigations, a written work plan with a permit modification request will be submitted to the Florida DEP for review and approval.

4.0 SAMPLING METHODS, EQUIPMENT AND DECONTAMINATION PROCEDURES

Split spoon, stainless steel tube and/or other comparable sampling equipment will be used to collect the soil samples. Water samples will be collected with a Coliwasa or similar device. Concrete chip samples will be collected using a chisel and hammer. Proper cleaning and decontamination of all sampling implements which contact the samples will be ensured to prevent cross contamination and assure valid analytical results.

Workers who clean or use the sampling implements must wear protective gloves to protect themselves and to prevent the equipment from being contaminated. During the decontamination procedures, all rinsate material will be accumulated for disposal as hazardous waste, in accordance with all applicable regulations.

4.1 SAMPLE PRESERVATION AND HOLDING TIMES

The samples will be collected in clean glass containers with teflon-lined lids. The samples will be preserved by refrigeration at 4°C until extraction and analysis. The maximum allowable holding time prior to extraction will be 7 days from the date the samples are taken. Extracts will be analyzed within 14 days following extraction.

5.0 QA/QC

5.1 QA/QC Plan for Field Sampling

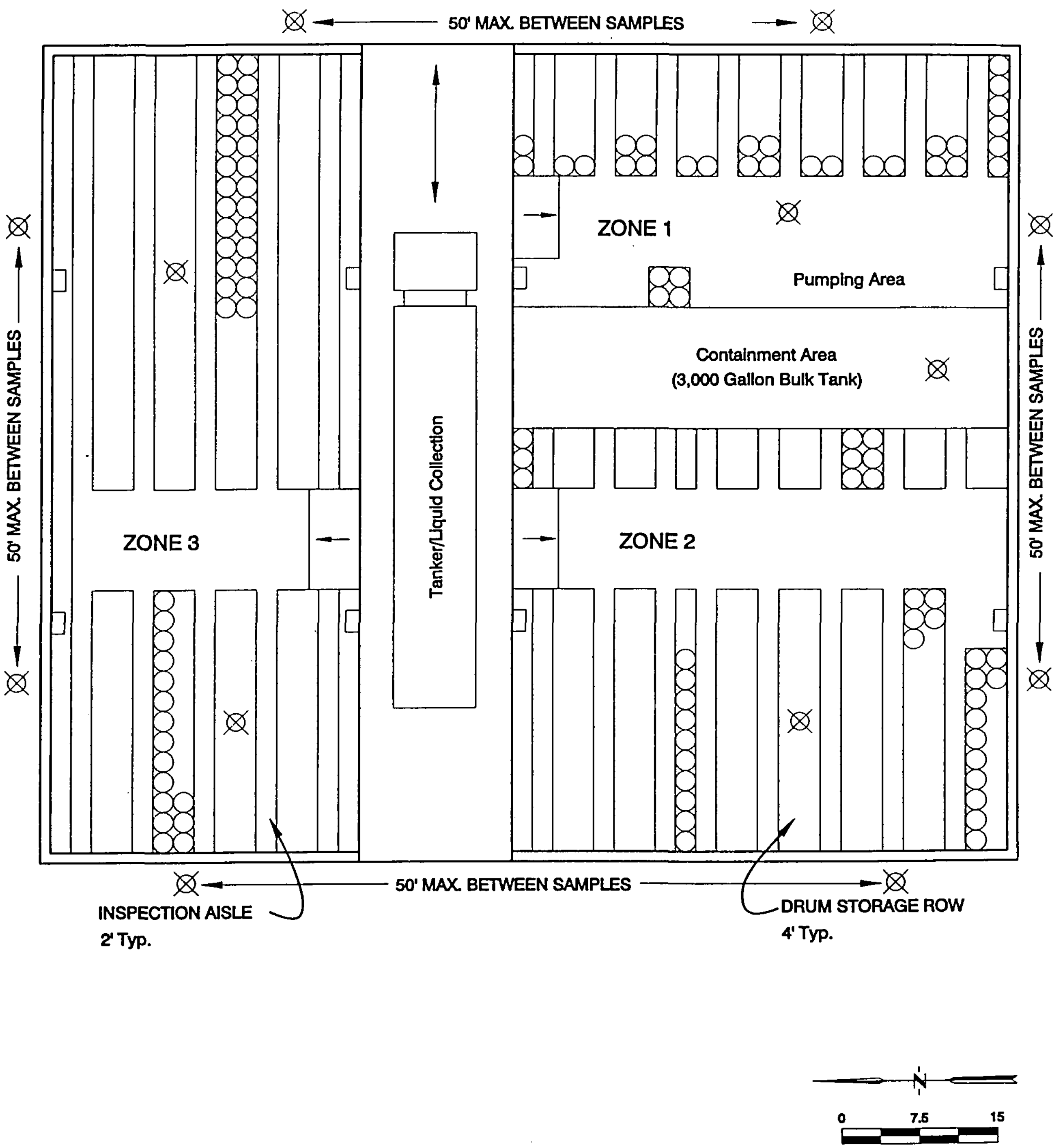
In order to ensure reliable sampling results, trip blanks, field blanks and duplicate samples will be taken at least once with each analytical media batch with a minimum of once for every twenty samples in each media batch. Strict Chain-of-Custody procedures would be followed in transferring the samples to the selected analytical laboratory.

5.2 QA/QC PLAN FOR LABORATORY ANALYSIS

In order to ensure reliable analytical results, an independent laboratory that has a written Florida DEP-approved QA/QC Plan will be retained to perform the analyses on all rinsewater, concrete and soil samples collected for closure purposes.

FIGURE K1

BORING LOCATION DIAGRAM
PROCESSING AND STORAGE BUILDING



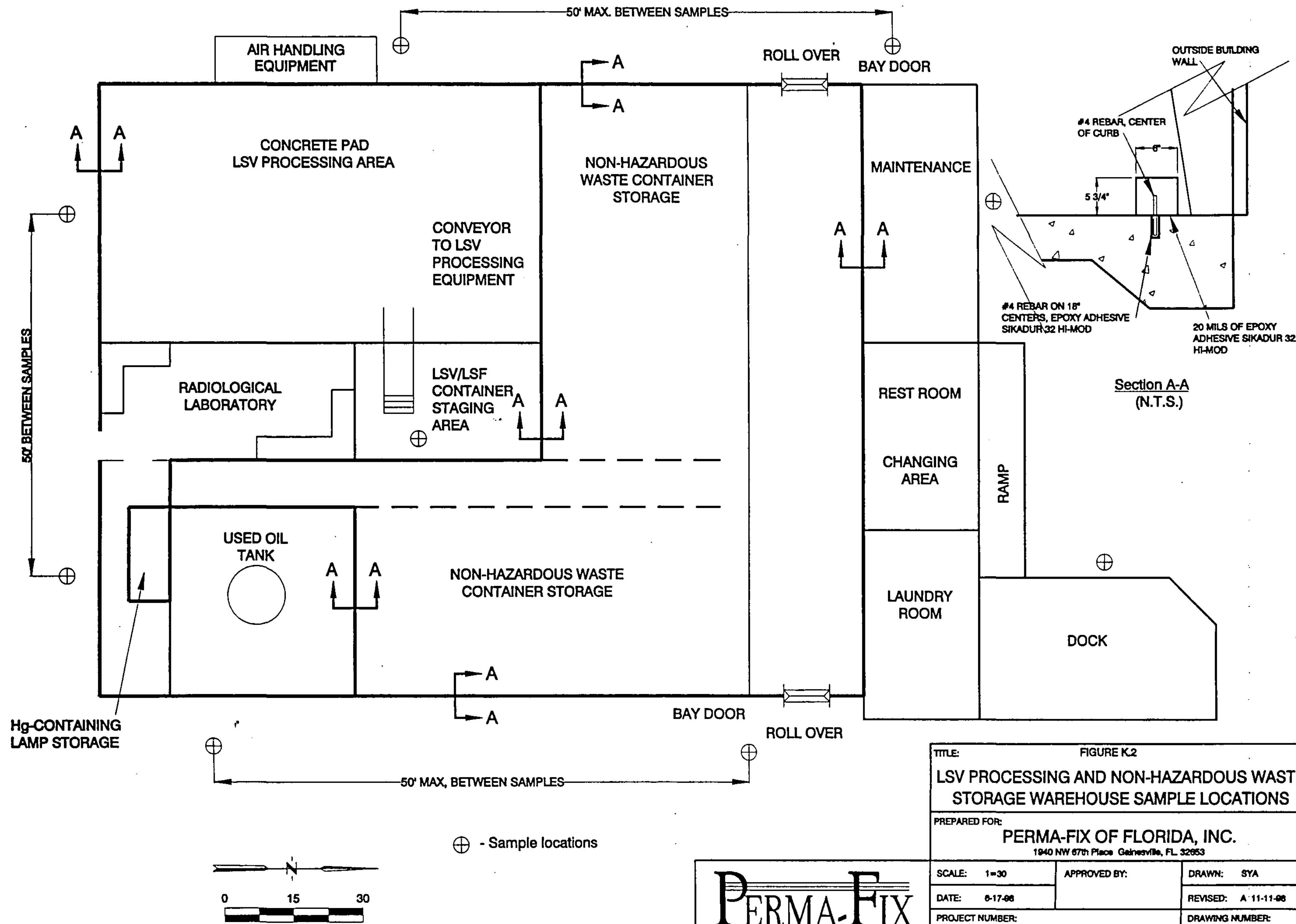
- Sample locations

TITLE: FIGURE K.1 PROCESSING AND STORAGE BUILDING SAMPLE LOCATIONS		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 NW 67th Place Gainesville, FL 32653		
SCALE: 1=15	APPROVED BY:	DRAWN: SYA
DATE: 6-11-98		REVISED: A 11-11-98
PROJECT NUMBER: PFFLA 970343NOD		DRAWING NUMBER: CLOZ-K1

PERMA-FIX
ENVIRONMENTAL SERVICES

FIGURE K2

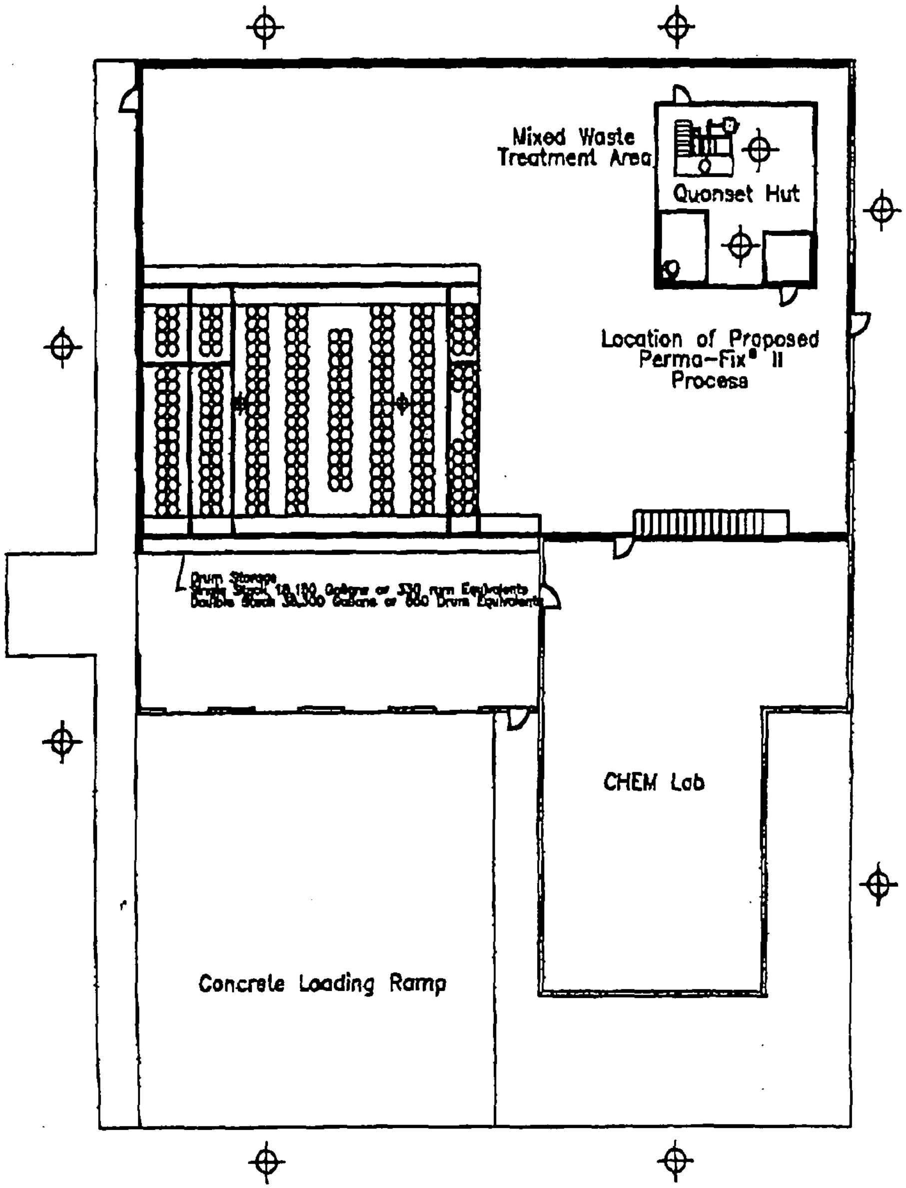
BORING LOCATION DIAGRAM
LSV PROCESSING AREA



TITLE: FIGURE K.2 LSV PROCESSING AND NON-HAZARDOUS WASTE STORAGE WAREHOUSE SAMPLE LOCATIONS		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 NW 67th Place Gainesville, FL 32653		
SCALE: 1=30	APPROVED BY:	DRAWN: SYA
DATE: 8-17-98		REVISED: A 11-11-98
PROJECT NUMBER: PFIFLA 970343NOD		DRAWING NUMBER: CLOZ-K2

FIGURE K3

BORING LOCATION DIAGRAM
TREATMENT AND OPERATIONS BUILDING
(PROPOSED AREA)



CONFIDENTIAL

⌖ – Sample Locations
Note: Perimeter sample locations around building to be ≤ 50' between borings

TITLE: TREATMENT AND OPERATING BUILDING SAMPLE LOCATIONS

PREPARED FOR: PERMA-FIX OF FLORIDA, INC.

PERMA-FIX ENVIRONMENTAL SERVICES

SCALE: NOT TO SCALE	APPROVED BY:	DRAWN:
DATE:		REVISED: 11-11-98
ACADFILE: PFFLA 970343 NOO		DRAWING NUMBER:

Attachment K-2

Closure Cost Estimate

CLOSURE COST ESTIMATE

SUMMARY

Existing Units:

Container and Storage Building:	$439,795.00
LSV Building	$76,787.00
	$516,582.00

Proposed Units:

Treatment and Operations Building: (Perma-Fix II Process)	$1,014,592.00

CLOSURE COST ESTIMATE

PROCESSING AND STORAGE BUILDING

Existing Units: Container Storage Area (1,311 drums)
Storage Tank (3,000 gallons)

Enclosed Costpro Worksheets:

CONTAINER STORAGE AREA

Container Storage Area
- CS-1 – Inventory
- CS-2 – Summary Worksheet
- CS-6 – Certification of Closure

Decontamination
- DC-1 – Summary Worksheet
- DC-2 – Decontamination of Unit by Steam Cleaning

Sampling and Analysis
- SA-1 – Inventory
- SA-2 – Summary Worksheet
- SA-3 – Boring and Subsurface Soil Sample
- SA-6 – Aqueous Sample

Treatment and Disposal
- TD-1 – Summary Worksheet
- TD-3 – Disposal of Decontamination Fluids

Transportation
- TR-1 – Transportation of Waste

TANK SYSTEMS

Tank Systems
- TS-1 – Inventory
- TS-2 – Summary Worksheet
- TS-3 – Removal of Waste
- TS-4 – Tank System Purging
- TS-5 – Flushing the Tank and Piping
- TS-6 – Evacuation, Disassembly and Loading
- TS-10 – Certification of Closure

Decontamination
- DC-1 – Summary Worksheet
- DC-2 – Decontamination of Unit by Steam Cleaning

Sampling Analysis
- SA-1 – Inventory
- SA-2 – Summary Worksheet
- SA-3 – Burning and Subsurface Soil Sample
- SA-6 – Aqueous Samples

Treatment and Disposal
- TD-1 – Summary Worksheet
- TD-3 – Disposal of Decontamination Fluids

Transportation
- TR-1 – Transportation of Waste

CLOSURE COST ESTIMATE

LSV BUILDING

Existing Units: 100 Gallon Toluene Fines Tank
200 Gallon Ethanol Fines Tank
350 Gallon Test Tank

Enclosed Costpro Worksheets:

TANK SYSTEMS

Tank Systems
- TS-1 – Inventory
- TS-2 – Summary Worksheet
- TS-3 – Removal of Waste
- TS-4 – Tank System Purging
- TS-5 – Flushing the Tank and Piping
- TS-6 – Evacuation, Disassembly and Loading
- TS-10 – Certification of Closure

Decontamination
- DC-1 – Summary Worksheet
- DC-2 – Decontamination of Unit by Steam Cleaning

Sampling Analysis
- SA-1 – Inventory
- SA-2 – Summary Worksheet
- SA-3 – Burning and Subsurface Soil Sample
- SA-6 – Aqueous Samples

Treatment and Disposal
- TD-1 – Summary Worksheet
- TD-3 – Disposal of Decontamination Fluids

Transportation
- TR-1 – Transportation of Waste

CLOSURE COST ESTIMATE

TREATMENT AND OPERATIONS BUILDING

Existing Units:
Container Storage Area
317 Gallon Plough Share
50 Gallon Separator Tank
16 Gallon Condenser
300 Gallon Accumulator Tank
Activated Carbon Units

Enclosed Costpro Worksheets:

CONTAINER STORAGE AREA

Container Storage Area
- CS-1 – Inventory
- CS-2 – Summary Worksheet
- CS-6 – Certification of Closure

Decontamination
- DC-1 – Summary Worksheet
- DC-2 – Decontamination of Unit by Steam Cleaning

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- SA-2 – Summary Worksheet
- SA-3 – Burning and Subsurface Soil Sample
- SA-6 – Aqueous Samples

Treatment and Disposal
- TD-1 – Summary Worksheet
- TD-2 – Treatment and Disposal
- TD-3 – Disposal of Decontamination Fluids

Transportation
- TR-1 – Transportation of Waste

Activity Description & Assumptions	Current Facility Estimated Cost	Proposed Facility Estimated Cost
1. CLOSURE INITIATION		
Make notifications of intent to closure (administrative and secretarial labor; lump sum)	150	150
2. OFF-SITE MANAGEMENT OF WASTE INVENTORY		
• LOADING AND TRANSPORTATION COSTS		
LSV Drums (existing)		
435 drums @ 190 drums/truckload = 3 truckloads		
$1.45/mile x 1,200 miles x 3 truckloads	5,220	5,220
3 personnel x 4 hours each x $35/hour x 3 truckloads	1,260	1,260
Hazardous Drums (existing)		
876 drums @ 88 drums/truckload = 10 truckloads		
$1.45/mile x 325 miles x 10 truckloads	4,713	4,713
3 personnel x 4 hours each x $35/hour x 10 truckloads	4,200	4,200
Hazardous drums (proposed)		
160 drums @ 88 drums/truckload - 2 truckloads		
$1.45/mile x 325 miles x 2 truckloads	---	943
3 personnel x 4 hours each x $35/hour x 2 truckloads	---	840
Other Mixed Waste (proposed)		
500 drums @ 88 drums/truckload = 6 truckloads		
$1.45/mile x 1,200 miles x 6 truckloads	---	10,440
3 personnel x 4 hours each x $35/hour x 6 truckloads	---	2,520

Tank Inventory (existing)		
3,000 gal @ 5,000 gal/truckload = 1 truckload		
\$1.45/mile x 325 miles x 1 truckload	471	471
1 person x 2 hours x \$35/hour x 1 truckload	70	70
160 gal or 3 drums = 1 truckload		
\$1.45/mile x 1,200 miles x 1 truckload	1,740	1,740
1 person x 1 hour x \$35/hour x 1 truckload	35	35
Tank inventory (proposed)		
1669 gal @ 5,000 gal/truckload = 1 truckload		
\$1.45/mile x 1,200 miles x 1 truckload	---	1,740
1 person x 2 hours x \$35/hour x 1 truckload	---	70
• DISPOSAL COSTS		
LSV drums (existing)		
435 drums of which 15% will be at \$675/drum and 85% will be at \$187.50/drum		
65 drums x \$675/drum	43,875	43,875
370 drums x \$187.50/drum	69,375	69,375
Hazardous Drums (existing)		
876 drums distributed as follows:		
Fuel blend basic (60%) 525 drums @ \$32/drum	16,800	16,800
Fuel blend with (15%) sludge 132 drums @ \$80/drum	10,560	10, 560
Drums with solids (15%) 135 drums @ \$200/drum	26,400	26,400
Water drums (10%) 87 drums x 55 gal/drum = 4,785 gallons @ \$1.25/gal	5,981	5,981
Hazardous drums (proposed)		
160 Drums @ \$90/drum	---	14,400
Other Mixed Waste (proposed)		
500 drums @ \$1300/ drum	---	650,000
Tanks (existing)		
3,000 gal @ \$12.27 gal		
160 gal @ \$12.27 gal	38,773	38,773
Tanks (proposed)	---	39,455
1,669 gal @ \$23.64gal		

3. DECONTAMINATION OF TANKS

Prepare tanks for decontamination: open manways, perform initial visual inspection (existing: 3 tanks; proposed: 5 tanks; .5 hr/tank; 1 person; $35/hr-person	53	140
Rinse and clean tank interiors (existing: 3 tanks; proposed 5 tanks; surface area: approx. 330 sq. ft (existing); approx. 442 sq.ft (proposed) 800 sq. ft/day; 1 person; $35/hr-person)	175	280
Decontamination equipment rental (existing: 1 day; proposed 1 day; $115 /day)	115	115
Transportation of rinse waters for off-site treatment (existing: 3 tanks; proposed 5 tanks; surface area: approx. 330 sq. ft (existing); approx. 442 sq. ft. (proposed); rinse water generated: 4 gal/sq. ft; 5,500 gal; truck $1.45 /loaded mile; 325 miles)	471	471
Off-site treatment of rinse waters (existing: 3 tanks; proposed: 5 tanks; 1320 gal (existing) ; 1768 gal (proposed); $1.25 /gal)	1650	3860
Decontamination verification (existing: 3 tanks: proposed: 5 tanks; 1 sample/tank + 1 sample/tank equipment + 3 background water samples; $2,000/sample collection and analyses)	14,000	24,000

4. DECONTAMINATION OF SECONDARY CONTAINMENT AND AUXILIARY EQUIPMENT

Clean concrete surfaces in the following areas: Processing and Storage Building (existing) 7,513 sq. ft. Treatment and Operations Building (Proposed)3,250 sq. ft. LSV Building (existing) 1,488 sq. ft. @ 2,000 sq. ft./day: 2 person $35/hr.	2,520	3,430
Decontamination Equipment Rental (existing: 5 days; proposed: 2 days; @ $115/day)	575	805
Transportation of rinse waters for off-site treatment (existing 9001 sq. ft.; proposed 3250 sq. ft.; rinse water generated: 2 gal./sq. ft; 5,500 gal/truck; $1.45/loaded mile; 325 miles	1,885	2,356

Off-site treatment of rinse water (existing: 18,002 gal; proposed 6,500 gal; $1.25 /gal)	22,502	30,627
Decontamination verification (existing: 2 areas; proposed 1 area; 1 sample/area; 3 background water samples; $2,000 /sample collection and analysis	10,000	12,000
5. SUBSURFACE INVESTIGATION		
Processing and Storage Building (existing)		
- concrete coring, sample collection; concrete repair (5 cores; 10 samples)	2,000	2,000
- Soil verification (10 soil samples; 3 background soil samples; 1 QA/QC sample; $2,000 /sample	28,000	28,000
Treatment and Operations Building (proposed)		
- concrete coring, sample collection; concrete repair (2 cores; 4 samples)	---	1,000
- Soil verification (4 soil samples; 0 background soil samples; 1 QA/QC sample; $2,000 /sample	---	10,000
LSV Building (existing)		
- concrete coring, sample collection; concrete repair (2 cores; 4 samples)	---	1,000
- Soil Verification (4 soil samples; 0 background soil samples; 1 QA/QC sample; $2,000/sample	10,000	10,000
6. CLOSURE SUPERVISION AND CERTIFICATION		
Supervision by Professional Engineer or his/her designee of key steps during closure activities (24 hrs, $75/hr) (existing); 16 hrs, $75/hr (proposed)	1,800	3,000
Preparation of Certification Report by Professional Engineer (lump sum)	15,000	15,000

SUMMARY	150	150
1. Closure Initiation		
2. Off-site Management of Waste Inventory	229,473	949,881
3. Decontamination of Tanks	16,464	28,866
4. Decontamination of Secondary Containment Ancillary Equipment	37,482	49,218
5. Subsurface Investigation	40,000	52,000
6. Closure Supervision and Certification	16,800	16,800
TOTAL	$340,369	$1,096,915

APPLICATION FOR A HAZARDOUS WASTE PERMIT

PART II

R. SUBPART AA - AIR EMISSIONS STANDARDS FOR PROCESS VENTS

R1 Applicability

These standards apply to process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous waste with organic content of at least 10 ppm by weight.

PFF currently operates an affected process vent in association with the Liquid Scintillation Vial (LSV) waste treatment unit. The proposed Perma-Fix® II process vent will also meet the definitions of "distillation" and "steam stripping operations" as ~~applicable~~ defined in Subpart AA. Hence, Subpart AA will apply to operation of each of these two units when hazardous waste of at least 10 ppm organic content by weight is processed.

In addition, PFF plans to operate a solvent distillation process at the facility. Although this process will be exempt from permitting requirements, it will be subject to Subpart AA requirements because the unit will be located at a TSDF otherwise subject to permitting requirements of Part 270. The unit will be located in an area equipped with vapor recovery system in accordance with the requirements of 40 CFR 264.1033. Another future facility process potentially subject to AA requirements may be the chemical extraction operations planned for debris treatment as described in Part I of this permit application. If applicable, this process will be conducted in an area equipped with control equipment as required under applicable AA requirements.

R1 Emissions Control

Under the provisions of 40 CFR §264.1032(a), total facility organic emissions from affected process vents must be either reduced with a control device by 95 weight percent or limited to 3 pounds/hour and 3.1 tons/year.

PFF proposes to install a closed-vent system and air pollution control device on the Perma-Fix® II unit prior to equipment startup in order to control volatile organic compounds (VOC). ~~total organic compounds (TOC) emissions.~~ The Perma-Fix® II process is designed to vent minimal concentrations of VOCs, ~~TOC~~ which do not collect in the condenser, separator and absorber units to a regenerative thermal oxidizer (RTO). ~~through a granular activated carbon adsorption system. The Perma-Fix® II pollution control device will, at a minimum, consist of granular activated carbon canisters operating at the HEPA/GAC Vents A and B. HEPA/GAC Vent A will control TOC emissions from the Quonset hut, ambient air, and the HEPA/GAC Vent B will control~~

~~TOC emission from the closed vent reactor vessel.~~ The RTO is described in detail in Part II.I of this permit application. The planned location of the Quonset hut with the Perma-Fix® II ~~process~~ Process equipment is the facility's Treatment and Operations building. See Part I, Figure 1.D.1.

The Liquid Scintillation Vial unit currently operates as a closed-vent system, as defined in 40 CFR §264.1031, with activated carbon pollution control devices at the process vent outlet. ~~Both~~ The RTO will be designed and operated to capture and control both Perma-Fix® II and LSV VOC air emissions. ~~control systems will be designed to operate with a TOC~~ The minimum VOC control (oxidation)/removal efficiency of the RTO will be 95%. ~~,and each will operate continuous VOC~~ A continuous NOC emission monitors ~~to~~ will allow instantaneous efficiency verification.

R2 Compliance Documentation for Process Vent Air Emission Standards

To demonstrate compliance with the 95% efficiency requirements of ~~§~~ 40 CFR 264.1033(c), ~~(b) for carbon adsorption,~~ PFF will implement volumetric flow monitoring for each the LSV and Perma-Fix® II processes according to ~~§~~ 40 CFR 264.1033(f)(1). Flow monitors will be located upstream of the granular activated carbon waste gas inlet and each process vent volumetric air flow will be recorded at least once per operating hour. In addition, a temperature monitoring device equipped with a continuous recorder will be installed in accordance with 40 CFR 264.1033(f)(2)(i).

R2A Operational Data for Affected Process Vents

The affected vent from the planned Perma-Fix® II ~~process~~ Process will be the RTO exhaust stack. ~~"HEPA/GAC B" stack, emitting uncondensed total organic compounds from the condenser/accumulator and treated by the carbon adsorption control device (granular activated carbon).~~

As the Perma-Fix® II ~~process~~ Process is currently a proposed emission unit, the annual throughput and operating hours of the affected process vent can only be estimated. Operations are planned, for the purpose of calculating air emissions, at 5 batches of waste material processed per day and 160 gallons per batch, which corresponds to 6,000 pounds per day. PFF plans to annually operate at 350 days per year with approximately 2,100,000 lbs process waste material throughput. ~~Estimated~~ Given the above, estimated emission rates for the Perma-Fix® II process vent are 11.8 tons TOC per year and 67.5 pounds TOC per operating day.

S. SUBPART BB - AIR EMISSIONS STANDARDS FOR EQUIPMENT LEAKS

S1 Applicability

Pursuant to the requirements of 40 CFR §264.1050, the air emissions standards for equipment leaks apply to the equipment at the Facility that contain or come in direct contact with hazardous waste with organic chemical concentrations of 10 % by weight or higher.

The Facility manages hazardous waste with organic chemicals that range in concentration from 0 to 100 percent by weight. Therefore, all of the equipment (as defined in 40 CFR 264.1031) at the Facility that contain or are in direct contact with hazardous waste are conservatively assumed to be subject to the leak detection and monitoring standards.

As per the requirements of 40 CFR §264.1050, the Facility has identified and marked each piece of existing equipment to which the equipment leak standards apply. The Facility has developed process and instrumentation diagrams (P&IDs) to identify the location of each piece of equipment and the associated hazardous waste management units. The diagrams have been provided as Exhibits S-1 through S-6. These exhibits include all equipment regulated under Subpart BB. A comprehensive list of the equipment subject to the standards of 40 CFR 264 Subpart BB has been included in Attachments S-1, S-2, and S-3. The majority of the equipment subject to Subpart BB is located in the Treatment and Operations Building (Quonset Hut) and the LSV Processing area. Piping and connections associated with the 3,000-gallon mixed waste storage tank and fuel blending operations are also subject to Subpart BB.

S2 Pumps in Light Liquid Service

The existing pumps that manage hazardous wastes at the Facility have been identified in the equipment list. All of these pumps are designated for light liquid service at this time and are subject to the requirements of 40 CFR §264.1052.

Each pump identified will be visually inspected for leaks (drips from the pump seal) each calendar week and monitored monthly for organic vapor leaks using a portable organic vapor analyzer (OVA). If a pump shows visual signs of liquid dripping from the pump seal or the OVA shows an instrument reading of 10,000 ppm or greater above the background concentration, then it is considered to be a leaking pump as described in 40 CFR §264.1052 (b)(1) & (2) and requires repairs as follows:

- The leaking pump (seal) will be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected. In addition, the first attempt at repair (e.g., tightening the packing gland) will be made within 5 calendar days of detection. Repair of a leaking pump may extend beyond 15 days if at least one of the conditions identified in the subsequent Subsection titled "Delay of Repair" is met.

- The leak detection and repair described above is conducted for all pumps in hazardous waste liquid service. There are no pumps at the facility that are equipped with closed-vent systems.

S3 Compressor

The Facility does not have any compressors that are in direct contact with hazardous waste. Therefore, 40 CFR §264.1053 is not applicable.

S4 Pressure Relief Devices in Gas/Vapor Service

~~There are no pressure relief devices in gas/vapor service subject to Subpart BB requirements at the Facility. Hence, the requirements of 40 CFR 264.1054 do not apply.~~

Pressure relief devices (i.e., valves and conservation vents) will be employed on the Perma-Fix II reactor vessel (valve) absorber (conservation vent) and accumulator (conservation vent). However, since each of these pressure relief devices will be part of a closed vent system (see previous regenerative thermal oxidizer discussion) capable of capturing and transporting leakage from devices, the requirements of 40 CFR 264.1054 do not apply.

S5 Sampling Connecting Systems

The Facility does not have any sampling connecting systems or in-situ sampling systems. The samples for analysis are collected through open-ended valves or lines. Hence, the requirements of 40 CFR §264.1055 are not applicable.

S6 Open-ended Valves or Lines

The open-ended valves and lines that are subject to the requirements of 40 CFR §264.1056 are identified in the equipment list. These pieces of equipment are either equipped with caps, blind flanges, plugs or second valves which seal the open end at all times except during operations requiring hazardous waste flow through the open-ended valve or line. Each open-ended valve or line equipped with a second valve is operated so that the valve on the hazard waste side is closed first before the second valve is closed.

S7 Valves in Gas/Vapor Service or in Light Liquid Service

All existing valves that come into direct contact with hazardous waste liquid are designated for light liquid service at this time and are identified in the equipment list. All valves in light liquid service and in gas/vapor service will meet the standards specified at 40 CFR 264.1057. These valves will be monitored monthly using a portable organic vapor analyzer. If the instrument reading is 10,000 ppm or greater above the background, the valve will be considered leaking. When a leak is detected, it will be repaired as soon as practicable, but no later than 15 calendar days after the leak is detected. Delay of repair beyond 15 calendar days may occur if at least one of the conditions specified in the subsequent Subsection titled "Delay of Repair" is met. A first attempt at repair will be made within 5 calendar days after leak detection and will include the following, if applicable:

- tightening of bonnet bolts
- replacement of bonnet bolts
- tightening of packing gland nuts
- injection of lubricant into lubricated packing.

No valve has been designated as unsafe-to-monitor or difficult-to-monitor.

S8 Pumps and Valves in Heavy Liquid Service, Pressure Relief Devices in Light Liquid or Heavy Liquid Service, and Flanges and other Connectors

At the present time, all pumps and valves, in contact with hazardous waste liquid are designated for light liquid service. There are no pressure relief devices in liquid service at the facility. Flanges and other connectors subject to the requirements of 40 CFR §264.1058 are identified in the equipment list and will be monitored within 5 days if evidence of a potential leak is found by a visual, audible, or olfactory method during the daily inspection of piping.

If a leak is detected (i.e., an instrument reading of 10,000 ppm or greater above the background), the flange or connector will be repaired as soon as practicable but no later than 15 calendar days. The first attempt at repair will be made within 5 days of detection. Repair of a leaking flange/other connector may extend beyond 15 days if at least one of the conditions specified in the Subsection titled "Delay of Repair" is met.

S9 Recordkeeping Requirements

Pursuant to the requirements of 40 CFR §264.1064, the facility has identified each affected piece of equipment by number and location (See Attachments S-1, S-2 and S-3).

The following information will be maintained at the facility to demonstrate compliance with the requirements of 40 CFR 264 Subpart BB.

1. Type of equipment - valve, pump, flange, etc.
2. Service - designated as light liquid at this time, based on knowledge of hazardous waste received and managed at the facility for all equipment contacting liquids.
3. Percent-by-weight of total organics is not necessary for the affected equipment because the facility has determined applicability and consequently designed the compliance program based on the fact that it manages hazardous waste up to 100% organics by weight.
4. Method of compliance with the standard.
5. Leak monitoring results and any repairs conducted at the facility.
6. Notification record(s) to the Florida DEP if a detected leak is not repaired within the designated time period.

7. Records associated with the Test Methods and Procedures outlined in 40 CFR §264.1063. These records typically include VOC Analyzer Calibration, Response Time and Calibration Precision Logs (typical forms included in Attachment S-2). A copy of Reference Method 21 (40 CFR Part 60) has been included in Attachment S-3. Copies of sample inspection forms and the VOC analyzer calibration, response time, and precision logs for the last two inspections are included in Attachment S-4.

S10 Delay of Repair

All detected leaks will be repaired as soon as practicable, but not later than 15 days after detection unless the following conditions arise:

- The repair is not technically feasible without shutdown of a hazardous waste management unit. In such a case, the leak repair will be completed before the end of the next shutdown of the hazardous waste management unit.
- The leaking equipment is isolated and does not continue to contain or contact hazardous waste with an organic concentration of at least 10%.
- The emissions resulting from immediate repair of a leaking valve are greater than the emissions likely to result from delay of repair.
- The repair of a leaking pump requires the use of a dual mechanical seal system which includes a barrier fluid system. In such a case, the repair will be completed as soon as practical, but no later than six months after leak detection.

S11 Reporting Requirements

For each semi-annual reporting period designated by the Florida DEP Director, a report will be submitted including the information required by 40 CFR §264.1065(a) if the following condition occurs during that reporting period:

- Leak repair is not performed within 15 calendar days of leak detection and/or the first attempt at repair is not performed within 5 calendar days of the leak detection for valves in gas/vapor service or in light liquid service and pumps in light liquid service.

This report will include:

- EPA identification number, name and address of the facility;
- Dates of hazardous waste management unit shutdowns that occurred during the reporting period; and

- Equipment identification number of each pump or valve for which leak repair was not performed within 15 calendar days after leak detection or the first attempt at repair was not performed within 5 calendar days.

SUBPART CC - AIR EMISSIONS STANDARDS FOR TANKS AND CONTAINERS

Applicability

The Facility storage tank is exempt from Subpart CC tank requirements because the 3,000 gallon tank is used to manage ~~solely~~ only mixed waste. The Perma-Fix® II ~~process unit~~ Process components, although considered tank-like for permitting requirement, ~~is~~ are also exempt from Subpart CC requirements because ~~it is~~ they are also designated soley for the management of mixed wastes. Because subpart CC container requirements do not apply to containers or tanks holding mixed waste. The LSV processing equipment will not be subject to Subpart CC so long as only mixed wastes are processed in the equipment. For containers up to 110 gallons holding hazardous wastes with a volatile organic content of ≥500 ppm and which are not radioactive, the facility will meet the Level 1 control requirement regulations specified in 40 CFR 264.1086 (c) within 24 hours of receipt at the facility. For any container greater than 110 gallons (e.g., totes) holding hazardous waste which is not radioactive, the facility will meet the Level 2 control requirements specified at 40 CFR 264.1086(d). It should be noted that the Perma-Fix ® stabilization and fixation process will be used to treat characteristic hazardous wastes having an average volatile organic constituent concentration of less than 500 ppmw. Therefore, Subpart CC does not apply to the Perma-Fix process.

Attachment S-1

List of Equipment Subject to 40 CFR 264 Subpart BB
~~Waste~~ Processing and Storage Building

Attachment S-1

Equipment I.D. #	Exhibit #	Type of Equipment/Description	Location
VA-28	S-1	Valve (1.5" shutoff valve at end of supply piping)	Hazardous waste process area
VA-29	S-1	Valve (1.5 shutoff valve at pump discharge end)	Hazardous waste process area
E-61	S-1	Elbow (90° elbow)	Hazardous waste process area
E-62	S-1	Elbow (90° elbow)	Hazardous waste process area
E-63	S-1	Elbow (90° elbow)	Hazardous waste process area
E-64	S-1	Elbow (45° elbow at pump discharge)	Hazardous waste process area
E-65	S-1	Elbow (90° elbow at pump discharge)	Hazardous waste process area
U-40	S-1	Connector (1.5" Union)	Hazardous waste process area
U-41	S-1	Connector (1.5" Union)	Hazardous waste process area
CA-16	S-1	Connector (2" camlock)	Hazardous waste process area
CA-17	S-1	Connector (2" camlock)	Hazardous waste process area
CP-5	S-1	Connector (1.5" coupling)	Hazardous waste process area
CP-6	S-1	Connector (1.5" coupling)	Hazardous waste process area
CA-19	S-2	Connector (2" camlock at total/tanker discharge)	Hazardous waste process area

Attachment S-1 (cont.)

Equipment I.D. #	Exhibit #	Type of Equipment/Description	Location
VA-31	S-2	Valve (2" shutoff valve above the totes)	Hazardous waste process area
E-70	S-2	Connector (2" 90° elbow)	Hazardous waste process area
U-43	S-2	Flange	Hazardous waste process area
U-42	S-2	Flange	Hazardous waste process area
E-69	S-2	Connector (2" 90° elbow)	Hazardous waste process area
E-68	S-2	Connector (2" 45° elbow)	Hazardous waste process area
E-67	S-2	Connector (2" 45° elbow)	Hazardous waste process area
E-66	S-2	Connector (2" 45° elbow)	Hazardous waste process area
VA-30	S-2	Valve (2" shutoff valve)	Hazardous waste process area
CA-18	S-2	Connector (2" camlock at pump discharge end)	Hazardous waste process area
E-114	S-3	Connector (1" 90° elbow)	Hazardous waste process area
T-23	S-3	Connector (1" tee)	Hazardous waste process area
VA-68	S-3	Valve (1" valve on pump suction side)	Hazardous waste process area
U-47	S-3	Flange (1" union)	Hazardous waste process area

Attachment S-1 (cont.)

Equipment I.D. #	Exhibit #	Type of Equipment/Description	Location
E-115	S-3	Connector (1" 90° elbow)	Hazardous waste process area
PU-17	S-3	Pump (sandpiper pump)	Hazardous waste process area
E-116	S-3	Connector (1" 90° elbow)	Hazardous waste process area
U-48	S-3	Flange (1" union)	Hazardous waste process area
E-117	S-3	Connector (1" 90° elbow)	Hazardous waste process area
VA-69	S-3	Valve (1" valve on pump discharge side)	Hazardous waste process area
T-24	S-3	Connector (1" tee)	Hazardous waste process area
E-118	S-3	Connector (1" 45° elbow)	Hazardous waste process area
VA-70	S-3	Valve	Hazardous waste process area
CA-20	S-3	Connector (1" camlock)	Hazardous waste process area

Attachment S-2

List of Equipment Subject to 40 CFR 264 Subpart BB LSV Processing Area

Attachment S-2

LSV Processing Area – Equipment List
Waste Line – 1 Inch Pipe
(See Exhibit S-4)

Tees		Connections		Elbows		Valves	
W T-1	Tee for Air Purge	WC-1	Union	WE 1	90°	WV 1	Waste Line Valve on Discharge Side of Pump
		WC-2	Union	WE 2	90°	WV 2	Waste Line Valve at Tee
		WC-3	Union	WE 3	90°	WV 3	Test Tank Valve Connection to Test Tank
		WC-4	Union	WE 4	90°	WV 4	Valve on Air Purge Line
		WC-5	Union	WE 5	45°		
		WC-6	Union	WE 6	45°		
		WC-7	Union	WE 7	45°		
		WC-8	Union	WE 8	90°		
		WC-9	1" PVC Threaded Coupling	WE 9	90°		
				WE 10	90° Last Elbow in Air Handling Room		
				WE 11	45° First Elbow Outside		
				WE 12	45°		

Attachment S-2 (cont.)

LSV Processing Area – Equipment List
Waste Line – 1 Inch Pipe
(See Exhibit S-4)

Tees		Connections		Elbows		Valves	
				WE 13	90°		
				WE 14	90°		
				WE 15	90°		

Attachment S-2 (cont.)

LSV Processing Area – Equipment List
Ethanol System
(See Exhibit S-5)

Tees		Elbows		Connectors		Valves		Pumps	
ET-1	Connection to Ethanol Fines Unit 2" Galvanized	EE-1	45° Elbow	EC-1	2" to ½" Threaded Bushing Connection to Air Purge	EV-1	Ethanol Fines Unit Drain Valve	P-2	Ethanol Supply Pump
ET-2	Diverts Discharge from P2 to Wash System or Test Tank 2"Galvanized	EE-2	45° Elbow	EC-2	2" Camlock with Plug	EV-2	Site Gauge Valve (needs to be piped back to the tank)	P-3	Screw 2 Return Pump
ET-3	Ethanol Return Discharge 1	EE-3	90° Elbow	EC-3	Camlock	EV-3	Valve to Air Purge	P-4	Screw 1 Return Pump
ET-4	Ethanol Supply	EE-4	90° Elbow Connects Ethanol Supply Hose to 2" Galvanized Pipe	EC-4	Camlock	EV-4	Ethanol Supply Line Valve at Pump	P-5	Waste Line Pump
ET-5	Ethanol Return Discharge 2	EE-5	90° Elbow Connects Ethanol Test Tank Hose to Galvanized Pipe	EC-5	2" Galvanized Union	EV-5	Ethanol Supply Hose Valve		
ET-6	Divides Flow From Ethanol Manifold to Ethanol Collection Boxes of Screw 1 & 2	EE-6	45° Elbow	EC-6	Camlock	EV-6	Test Tank Line at Pump		
ET-7	Air Purge Line Tee Screw 2 Return	EE-7	45° Elbow	EC-7	2" Threaded Coupling with Plug	EV-7	Ethanol Test Tank Line Valve		

Attachment S-2 (cont.)

LSV Processing Area – Equipment List
Ethanol System
(See Exhibit S-5)

Tees		Elbows		Connectors		Valves		Pumps	
ET-8	Air Purge Line Tee Screw 1 Return	EE-8	Ethanol Supply	EC-8	2" Union	EV-8	Ethanol Test Tank Hose Valve		
ET-9	Bridge between Toluene and Ethanol System at Test Tank	EE-9	90° Elbow Connects Discharge 1 Hose to Pipe	EC-9	2" Threaded Coupling with Plug	EV-9	Ethanol Manifold Supply Valve		
ET-10		EE-10	45°	EC-10	2" Threaded Coupling with Plug	EV-10	Ethanol Supply Hose Valve		
		EE-11	45°	EC-11	1 ½ x 2" Rec. Threaded Reducer	EV-11	Ethanol Supply to Center of Screw 2		
		EE-12	90°	EC-12	Camlock	EV-12	Air Purge to Ethanol Manifold		
		EE-13	45° Center Supply Ethanol Screw 2	EC-13	Camlock	EV-13	Ethanol manifold Valve to Lower Screw 2		
		EE-14	45° Elbow Between Lower Supply and Manifold of Screw 2	EC-14	Camlock	EV-14	Supply Valve to Ethanol Collection Box of Screw 2 at Manifold		
		EE-15	45°	EC-15	Camlock	EV-15	Hose Valve of supply to Ethanol Collection Box of Screw 2		

Attachment S-2 (cont.)

LSV Processing Area – Equipment List
Ethanol System
(See Exhibit S-5)

Tees		**Elbows**		**Connectors**		**Valves**		**Pumps**	
		EE-16	45°	EC-16	Camlock	EV-16	Supply Valve to Ethanol Collection Box of Screw 1		
		EE-17	45°	EC-17	Camlock	EV-17	Hose Valve of Supply Line to Ethanol Collection Box of Screw 1		
		EE-18	45° Connection to Screw 2 Ethanol Collection Box	EC-18	Union	EV-18	Supply Valve to Upper Ethanol Supply of Screw 1		
		EE-19	45° Connection to Screw 1 Ethanol Box	EC-19	Camlock	EV-19	Ethanol Supply Manifold Valve to Lower Screw 1		
		EE-20	45°	EC-20	Union	EV-20	Screw 2 Return Line Valve at Collection Box		
		EE-21	45° Connection to Upper Ethanol Supply Screw 1	EC-21	Camlock	EV-21	Valve to Air Purge		

Attachment S-2 (cont.)

LSV Processing Area – Equipment List
Ethanol System
(See Exhibit S-5)

Tees		**Elbows**		**Connectors**		**Valves**		**Pumps**	
		EE-22	45° Connection to Lower Ethanol Supply of Screw 1	EC-22	Camlock	EV-22	Return Hose Valve		
		EE-23	45°	EC-23	Camlock	EV-23	Valve at Ethanol Collection Box of Screw 1		
		EE-24	90° Connection to Intake of P3	EC-24	Threaded 2"	EV-24	Air Purge Valve		
		EE-25	45° P3 Discharge	EC-25	Union	EV-25	Screw 1 Return Line Valve at P4		
		EE-26	45°	EC-26	Union	EV-26	Screw 1 Return Hose Valve		
		EE-27	45°	EC-27	Union	EV-27	Test Tank Supply Valve at Tank for Ethanol System		
		EE-29	90°	EC-28	Union	EV-28	Ethanol System Test Tank Supply		
		EE-29	45° Intake Connection to P4	EC-29	2" Threaded Coupling with Plug	EV-29	Ethanol System Test Tank Supply above Union		
		EE-30	90°						

Attachment S-2 (cont.)

LSV Processing Area – Equipment List
Ethanol System
(See Exhibit S-5)

Tees		Elbows		Connectors		Valves		Pumps	
		EE-31	45° Connection to Test Tank						
		EE-32	45°						
		EE-33	90°						
		EE-34							

Attachment S-2 (cont.)

LSV Processing Area – Equipment List
Toluene System
(See Exhibit S-5)

Tees		Connections		Elbows		Valves		Pumps	
TT-1	2" Galvanized Treaded Tee	TC-1	2" Camlock	TE-1		TV-1	Discharge Valve on Toluene Fines Unit	P-1	Toluene Pump
TT-2	2" Galvanized Treaded Tee	TC-2	2" Camlock	TE-1		TV-2	Discharge Valve on Toluene Fines Unit		
TT-3	2" Galvanized Treaded Tee	TC-3	2" Hose to Treaded Brass	TE-2?		TV-3	Purge Air Inlet Valve		
		TC-4	2" Camlock			TV-4	Valve on Toluene Fines Discharge Hose		
		TC-5	2" – ½" Bushing			TV-5	Valve on intake Line Tee for P-1		
		TC-6	2" Galvanized to Hose			TV-6	Purge Air Inlet Valve		
		TC-7	2" Hose to Threaded Brass			TV-7	Valve at Toluene Collection Box		
		TC-8	Camlock			TV-8	Pump P-1 Discharge Valve		
						TV-9	Pump P-1 Valve on Pipe to Toluene Fines Unit		
						TV-10	Valve on Hose to Toluene Fines Unit		

Attachment S-2 (cont.)

LSV Processing Area – Equipment List

Toluene System

(See Exhibit S-5)

Tees		Connections		Elbows		Valves		Pumps	
						TV-11	Valve on Discharge of Pump P-1 on Test Tank Supply Line		
						TV-12	Valve on Hose to Test Tank		
						TV-13	Sample Port Should be Plugged		

Attachment S-3

List of Equipment Subject to 40 CFR 264 Subpart BB ~~LSV~~ Perma-Fix®II Processing Area

Attachment S-3

PERMA-FIX II PROCESSING AREA
List of Equipment Subject to 40 CFR 264 Subpart BB

Equipment ID #	Type of equipment	Description / location
WV-01	Valve (2" shutoff)	Distillate to condenser line
WV-02	Valve (2" shutoff)	Distillate to PI line
WV-03	Valve (1" shutoff)	Condenser drain
WV-04	Valve (1 1/2" shutoff)	Condenser to separator line
WV-05	Valve (1 1/2" shutoff)	Separator bypass from condenser
WV-06	Valve (1 1/2" shutoff)	Separator- discharge line
WV-07	Valve (1 1/2" shutoff)	Separator - upper discharge line
WV-08	Valve (1 1/2" shutoff)	Separator - bottom discharge line
WV-09	Valve (1 1/2" shutoff)	Condenser to accumulator line
WV-10	Valve (1 1/2" pump suction)	Separator to accumulator line Pump#P-2
WV-11	Valve (1 1/2" shutoff)	Separator to absorber line-to vacuum breaker
WV-12	Valve (1 1/2" shutoff)	Separator to absorber line
WV-13	Valve (1 1/2" shutoff)	Separator bypass to absorber line
WV-14	Valve (1 1/2" pump discharge)	Solvent recycle line for ejector (Pump#P-4)
WV-14-A	Valve (1 1/2" pump recycle)	Solvent recycle line for ejector (Pump#P-4)
WV-15	Valve (1 1/2" shutoff)	Absorber lower inlet (ejector)
WV-16	Valve (1 1/2" shutoff)	Absorber-discharge drum vent
WV-17	Valve (1 1/2" shutoff)	Absorber-upper discharge solvent line
WV-18	Valve (1 1/2" shutoff)	Absorber-solvent recycle discharge
WV-19	Valve (1 1/2" shutoff)	Absorber-bottom discharge line
WV-20	Valve (1 1/2" pump discharge)	Condenser accumulator line Pump#P-2
WV-21	Valve (1 1/2" shutoff)	Accumulator-bottom inlet line
WV-22	Valve (1 1/2" shutoff)	Accumulator mid discharge
WV-23	Valve (1 1/2" shutoff)	Accumulator lower discharge
WV-24	Valve (1 1/2" pump suction)	Recycled water discharge line-Pump#P-3
WV-25	Valve (1 1/2" pump discharge)	Recycled water discharge line-Pump#P-3
WV-26	Valve (3/4" shutoff)	Accumulator upper end of sight glass
WV-27	Valve (3/4" shutoff)	Accumulator lower end of sight glass
WV-28	Valve (1 1/2" shutoff)	Multipurpose liquid line
WV-29	Valve (1 1/2" shutoff)	Multipurpose liquid line
WV-30	Valve (1 1/2" shutoff)	Multipurpose line (vent)
WV-31	Valve (solenoid knife gate)	Plough share discharge valve
WC-01	Flange 2"	Condenser-distillate inlet
WC-02	Flange 2"	Condenser-condensate discharge
WC-03	Flange 1"	Condenser bottom drain

Attachment S-3

WC-08	Flange 2”	Accumulator upper inlet
WC-09	Coupling 1 1/2”	Accumulator mid discharge
WC-10	Flange 3”	Accumulator lower discharge
WC-11	Flange 2”	Accumulator bottom inlet
WC-12	Flange 2”	Plough share inlet
WC-13	Coupling 2” PVC	Multipurpose liquid line
WC-14	Union 2” PVC	Multipurpose liquid line
WC-15	Coupling 2”	Condensate line (TI)
WAC-01	Camlock 1 1/2”	Separator lower discharge
WAC-02	Camlock 1 1/2”	Separator upper discharge
WAC-03	Camlock 1 1/2”	Absorber bottom discharge
WAC-04	Camlock 1 1/2”	Absorber upper discharge vent
WAC-05	Camlock 1 1/2”	Absorber upper discharge
WAC-06	Camlock 2”	Accumulator mid discharge
WAC-07	Camlock 1 1/2”	Recycled water discharge
WAC-08	Camlock 1 1/2”	Recycled water discharge
WAC-09	Camlock 1” PVC	Multipurpose liquid line
WE-01	Connector (2” 90° elbow)	Distillate line
WE-02	Connector (2” 90° elbow)	Distillate line
WE-03	Connector (1 1/2” 90° elbow)	Separator to absorber line
WE-04	Connector (1 1/2” 90° elbow)	Separator bypass line
WE-05	Connector (1 1/2” 90° elbow)	Separator bypass line
WE-06	Connector (1 1/2” 90° elbow)	Separator bottom discharge line
WE-07	Connector (1 1/2” 90° elbow)	Condenser to absorber line
WE-08	Connector (1 1/2” 90° elbow)	Condenser to absorber line
WE-09	Connector (1 1/2” 90° elbow)	Condenser to absorber line
WE-10	Connector (1 1/2” 90° elbow)	Absorber - solvent recycle line
WE-11	Connector (1 1/2” 90° elbow)	Absorber - solvent recycle line
WE-12	Connector (1 1/2” 90° elbow)	Absorber - solvent recycle line
WE-13	Connector (1 1/2” 90° elbow)	Absorber - solvent recycle line
WE-14	Connector (1 1/2” 90° elbow)	Absorber - solvent recycle line
WE-15	Connector (1 1/2” 90° elbow)	Absorber - bottom discharge line
WE-18	Connector (1 1/2” 90° elbow)	Accumulator-lower discharge line
WE-19	Connector (1 1/2” 90° elbow)	Accumulator-lower discharge line
WE-20	Connector (1 1/2” 90° elbow)	Condenser to accumulator line
WE-21	Connector (1” 90° elbow)	Multipurpose liquid line
WE-22	Connector (1” 90° elbow)	Multipurpose liquid line
WE-23	Connector (1” 90° elbow)	Multipurpose liquid line
WE-24	Connector (1” 90° elbow)	Multipurpose liquid line
WT-01	Connector (2” tee)	Condenser to separator line
WT-02	Connector (1 1/2” tee)	Separator to absorber line
WT-03	Connector (1 1/2” tee)	Separator bypass line
WT-04	Connector (1 1/2” tee)	Condenser to accumulator line

Attachment S-3

WT-05	Connector (1 1/2" tee)	Condenser to absorber line
WT-07	Connector (1 1/2" tee)	Multipurpose liquid line
WT-08	Connector (1 1/2" tee)	Absorber recycle line
WT-09	Connector (1 1/2" tee)	Absorber recycle line
WP-02	Pump #2	Recycle water pump (inlet to accumulator)
WP-03	Pump #3	Recycle water pump (accumulator discharge)
WP-04	Pump #4	Absorber solvent recycle pump
EC-04	Coupling (1 1/2")	Absorber top
EC-05	Coupling (1 1/2")	Absorber top
EC-06	Coupling (1 1/2")	Absorber top
EC-08	Flange (2")	Accumulator top
EC-09	Flange (2")	Accumulator top
EC-10	Flange (2")	Accumulator top
EC-11	Flange (2")	Accumulator top
EC-12	Coupling (1 1/2")	Separator top
EC-13	Coupling (1 1/2")	Separator top
EC-14	Coupling (1 1/2")	Separator top
EE-01	Elbow (2" 90°)	Emissions vent line from plough share
EE-02	Elbow (2" 90°)	Emissions vent line from plough share
EE-03	Elbow (2" 90°)	Emissions vent line from plough share
EE-04	Elbow (2" 90°)	Emissions vent line from plough share
EE-05	Elbow (2" 90°)	Emissions vent line from screen hopper
EE-06	Elbow (2" 90°)	Emissions vent line to dust collector
EE-07	Elbow (2" 90°)	Emissions vent line to dust collector
EE-08	Elbow (2" 90°)	Emissions from dust collector to HEPA/RTO
EE-09	Elbow (2" 90°)	Emissions vent line from accumulator
EE-10	Elbow (2" 90°)	Emissions vent line from drum shroud
EE-17	Elbow (1 1/2" 90°)	Emissions vent line from absorber
ET-01	Connector (2" tee)	Emissions vent line from plough share
ET-02	Connector (2" tee)	Emissions vent line from plough share
ET-03	Connector (2" tee)	Emissions vent line from screen hopper
ET-04	Connector (2" tee)	Emissions vent line from accumulator
ET-06	Connector (1 1/2" tee)	Emissions vent line from absorber

Attachment S-4

Sample Forms
VOC Analyzer Response Time Log
VOC Analyzer Quarterly Calibration Precision Log
VOC Analyzer Calibration Log

METHOD 21 LEAK DETECTION MONITORING

VOC ANALYZER RESPONSE TIME LOG

THIS TEST MUST BE CONDUCTED BEFORE FIRST USE OF VOC ANALYZER AND AT SUBSEQUENT 3 MONTH (QUARTERLY) INTERVALS

Initial Testing **Subsequent Quarterly Testing** **After modification to VOC Analyzer Set Up**

(1) Introduce "zero gas" into VOC Analyzer sample probe until the instrument readings have stabilized.

(2) Switch to the "test gas" (concentration = 10,000 ppmv). Take stable instrument reading.

(3) Repeat steps (1) and (2) for 3 cycles.

Time to Reach a Reading of 10,000 ppmv (seconds)			Average Response Time (seconds)
(1)	**(2)**	**(3)**	$\frac{(1)+(2)+(3)}{3}$ =

Is Average Response Time > 30 seconds?

YES - <u>Do not</u> use VOC Analyzer for further testing.
NO - Proceed with monitoring.

Name (Print) **Signature**

Test Date **Time**

METHOD 21 LEAK DETECTION MONITORING

VOC ANALYZER QUARTERLY CALIBRATION PRECISION LOG

THIS TEST MUST BE CONDUCTED BEFORE FIRST USE OF VOC ANALYZER AND AT SUBSEQUENT THREE MONTH INTERVALS.

Initial Testing **Subsequent Quarterly Testing**

(1) **Introduce "zero gas" into VOC Analyzer sample probe until the instrument readings have stabilized.**

(2) **Switch to the "test gas" (concentration = 10,000 ppmv). Take stable instrument reading.**

(3) **Repeat steps (1) and (2) for 3 cycles.**

Analyzer Reading (ppmv)	Difference from Actual (ppmv)
(1)	[10,000 - Reading (1)] =
(2)	[10,000 - Reading (2)] =
(3)	[10,000 - Reading (3)] =
Total	
Average Difference (= Total/3)	
Calibration Precision (%) (= $\frac{\text{Average Difference}}{10,000}$ X 100)	

Is Calibration Precision 90% or Better?

YES - Proceed with monitoring.
NO - <u>Do not</u> use VOC Analyzer for further testing.

Name (Print) ____________ **Signature** ____________

Test Date ____________ **Time** ____________

METHOD 21 LEAK DETECTION MONITORING

VOC ANALYZER CALIBRATION LOG

CALIBRATION TEST MUST BE PERFORMED PRIOR TO EACH USE OF THE VOC ANALYZER.

(1) Switch on the VOC Analyzer. Allow instrument to "warm up". Introduce "zero gas" into VOC Analyzer sample probe until the instrument readings have stabilized.

(2) Introduce "test gas" (concentration = 10,000 ppmv) and adjust meter until it corresponds to 10,000 ppmv.

VOC Analyzer adjusted to 10,000 ppmv?

YES - Proceed with monitoring

NO - Do not use VOC Analyzer for further testing until repaired.

______________________ ______________________

Name (Print) **Signature**

______________________ ______________________

Calibration Date **Time**

Attachment S-5

Reference Method 21

METHOD 21—DETERMINATION OF VOLATILE ORGANIC COMPOUNDS LEAKS

1. *Applicability and Principle*

1.1 Applicability. This method applies to the determination of volatile organic compound (VOC) leaks from process equipment. These sources include, but are not limited to, valves, flanges and other connections, pumps and compressors, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals.

1.2 Principle. A portable instrument is used to detect VOC leaks from individual sources. The instrument detector type is not specified, but it must meet the specifications and performance criteria contained in Section 3. A leak definition concentration based on a reference compound is specified in each applicable regulation. This procedure is intended to locate and classify leaks only, and is not to be used as a direct measure of mass emission rates from individual sources.

2. *Definitions*

2.1 Leak Definition Concentration. The local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is present. The leak definition is an instrument meter reading based on a reference compound.

2.2 Reference Compound. The VOC species selected as an instrument calibration basis for specification of the leak definition concentration. (For example: If a leak definition concentration is 10,000 ppmv as methane, then any source emission that results in a local concentration that yields a meter reading of 10,000 on an instrument calibrated with methane would be classified as a leak. In this example, the leak definition is 10,000 ppmv, and the reference compound is methane.)

2.3 Calibration Gas. The VOC compound used to adjust the instrument meter reading to a known value. The calibration gas is usually the reference compound at a concentration approximately equal to the leak definition concentration.

2.4 No Detectable Emission. Any VOC concentration at a potential leak source (adjusted for local VOC ambient concentration) that is less than a value corresponding to the instrument readability specification of section 3.1.1(c) indicates that a leak is not present.

2.5 Response Factor. The ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the application regulation.

2.6 Calibration Precision. The degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration to the known concentration.

2.7 Response Time. The time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 percent of the corresponding final value is reached as displayed on the instrument readout meter.

3. *Apparatus*

3.1 Monitoring Instrument.

3.1.1 Specifications.

a. The VOC instrument detector shall r
spond to the compounds being processed. D
tector types which may meet this requir
ment include, but are not limited to, cat
lytic oxidation, flame ionization, infrare
absorption, and photoionization.

b. Both the linear response range and th
measurable range of the instrument for eac
of the VOC to be measured, and for the VO
calibration gas that is used for calibratio
shall encompass the leak definition co
centration specified in the regulation. A d
lution probe assembly may be used to bri
the VOC concentration within both range
however, the specifications for instrume
response time and sample probe diamet
shall still be met.

c. The scale of the instrument meter sha
be readable to ±2.5 percent of the specifi
leak definition concentration when perform
ing a no detectable emission survey.

d. The instrument shall be equipped wi
an electrically driven pump to insure that
sample is provided to the detector at a co
stant flow rate. The nominal sample flo
rate, as measured at the sample probe ti
shall be 0.10 to 3.0 liters per minute when th
probe is fitted with a glass wool plug or filt
that may be used to prevent plugging of th
instrument.

e. The instrument shall be intrinsical
safe as defined by the applicable U.S.
standards (e.g., National Electric Code
the National Fire Prevention Associatio
for operation in any explosive atmospher
that may be encountered in its use. The i
strument shall, at a minimum, be intrin
cally safe for Class 1, Division 1 condition
and Class 2, Division 1 conditions, as defin
by the example Code. The instrument sh
not be operated with any safety device, su
as an exhaust flame arrestor, removed.

f. The instrument shall be equipped with
probe or probe extension for sampling not
exceed ¼ in. in outside diameter, with a si
gle end opening for admission of sample.

3.1.2 Performance Criteria.

(a) The instrument response factors f
each of the VOC to be measured shall be le
than 10. When no instrument is availab
that meets this specification when ca
brated with the reference VOC specified
the applicable regulation, the available i
strument may be calibrated with one of t
VOC to be measured, or any other VOC,
long as the instrument then has a respon
factor of less than 10 for each of the VOC
be measured.

(b) The instrument response time shall
equal to or less than 30 seconds. The instr
ment pump, dilution probe (if any), samp
probe, and probe filter, that will be used du
ing testing, shall all be in place during t
response time determination.

c. The calibration precision must be equal to or less than 10 percent of the calibration gas value.

d. The evaluation procedure for each parameter is given in Section 4.4.

3.1.3 Performance Evaluation Requirements.

a. A response factor must be determined for each compound that is to be measured, either by testing or from reference sources. The response factor tests are required before placing the analyzer into service, but do not have to be repeated at subsequent intervals.

b. The calibration precision test must be completed prior to placing the analyzer into service, and at subsequent 3-month intervals or at the next use whichever is later.

c. The response time test is required prior to placing the instrument into service. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required prior to further use.

3.2 Calibration Gases. The monitoring instrument is calibrated in terms of parts per million by volume (ppmv) of the reference compound specified in the applicable regulation. The calibration gases required for monitoring and instrument performance evaluation are a zero gas (air, less than 10 ppmv VOC) and a calibration gas in air mixture approximately equal to the leak definition specified in the regulation. If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manufacturer to be within ±2 percent accuracy, and a shelf life must be specified. Cylinder standards must be either reanalyzed or replaced at the end of the specified shelf life. Alternately, calibration gases may be prepared by the user according to any accepted gaseous standards preparation procedure that will yield a mixture accurate to within ±2 percent. Prepared standards must be replaced each day of use unless it can be demonstrated that degradation does not occur during storage.

Calibrations may be performed using a compound other than the reference compound if a conversion factor is determined for that alternative compound so that the resulting meter readings during source surveys can be converted to reference compound results.

4. *Procedures*

4.1 Pretest Preparations. Perform the instrument evaluation procedures given in Section 4.4 if the evaluation requirements of Section 3.1.3 have not been met.

4.2 Calibration Procedures. Assemble and start up the VOC analyzer according to the manufacturer's instructions. After the appropriate warmup period and zero internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value.

NOTE: If the meter readout cannot be adjusted to the proper value, a malfunction of the analyzer is indicated and corrective actions are necessary before use.

4.3 Individual Source Surveys.

4.3.1 Type I—Leak Definition Based on Concentration. Place the probe inlet at the surface of the component interface where leakage could occur. Move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time. If the maximum observed meter reading is greater than the leak definition in the applicable regulation, record and report the results as specified in the regulation reporting requirements. Examples of the application of this general technique to specific equipment types are:

a. Valves—The most common source of leaks from valves is at the seal between the stem and housing. Place the probe at the interface where the stem exits the packing gland and sample the stem circumference. Also, place the probe at the interface of the packing gland take-up flange seat and sample the periphery. In addition, survey valve housings of multipart assembly at the surface of all interfaces where a leak could occur.

b. Flanges and Other Connections—For welded flanges, place the probe at the outer edge of the flange-gasket interface and sample the circumference of the flange. Sample other types of nonpermanent joints (such as threaded connections) with a similar traverse.

c. Pumps and Compressors—Conduct a circumferential traverse at the outer surface of the pump or compressor shaft and seal interface. If the source is a rotating shaft, position the probe inlet within 1 cm of the shaft-seal interface for the survey. If the housing configuration prevents a complete traverse of the shaft periphery, sample all accessible portions. Sample all other joints on the pump or compressor housing where leakage could occur.

d. Pressure Relief Devices—The configuration of most pressure relief devices prevents sampling at the sealing seat interface. For those devices equipped with an enclosed extension, or horn, place the probe inlet at approximately the center of the exhaust area to the atmosphere.

e. Process Drains—For open drains, place the probe inlet at approximately the center of the area open to the atmosphere. For covered drains, place the probe at the surface of the cover interface and conduct a peripheral traverse.

f. Open-Ended Lines or Valves—Place the probe inlet at approximately the center of the opening to the atmosphere.

g. Seal System Degassing Vents and Accumulator Vents—Place the probe inlet at approximately the center of the opening to the atmosphere.

h. Access Door Seals—Place the probe inlet at the surface of the door seal interface and conduct a peripheral traverse.

4.3.2 Type II—"No Detectable Emission".

Determine the local ambient concentration around the source by moving the probe inlet randomly upwind and downwind at a distance of one to two meters from the source. If an interference exists with this determination due to a nearby emission or leak, the local ambient concentration may be determined at distances closer to the source, but in no case shall the distance be less than 25 centimeters. Then move the probe inlet to the surface of the source and determine the concentration described in 4.3.1. The difference between these concentrations determines whether there are no detectable emissions. Record and report the results as specified by the regulation.

For those cases where the regulation requires a specific device installation, or that specified vents be ducted or piped to a control device, the existence of these conditions shall be visually confirmed. When the regulation also requires that no detectable emissions exist, visual observations and sampling surveys are required. Examples of this technique are:

(a) Pump or Compressor Seals—If applicable, determine the type of shaft seal. Preform a survey of the local area ambient VOC concentration and determine if detectable emissions exist as described above.

(b) Seal System Degassing Vents, Accumulator Vessel Vents, Pressure Relief Devices—If applicable, observe whether or not the applicable ducting or piping exists. Also, determine if any sources exist in the ducting or piping where emissions could occur prior to the control device. If the required ducting or piping exists and there are no sources where the emissions could be vented to the atmosphere prior to the control device, then it is presumed that no detectable emissions are present. If there are sources in the ducting or piping where emissions could be vented or sources where leaks could occur, the sampling surveys described in this paragraph shall be used to determine if detectable emissions exist.

4.3.3 Alternative Screening Procedure. A screening procedure based on the formation of bubbles in a soap solution that is sprayed on a potential leak source may be used for those sources that do not have continuously moving parts, that do not have surface temperatures greater than the boiling point or less than the freezing point of the soap solution, that do not have open areas to the atmosphere that the soap solution cannot bridge, or that do not exhibit evidence of liquid leakage. Sources that have these conditions present must be surveyed using the instrument techniques of 4.3.1 or 4.3.2.

Spray a soap solution over all potential leak sources. The soap solution may be a commercially available leak detection solution or may be prepared using concentrated detergent and water. A pressure sprayer or a squeeze bottle may be used to dispense the solution. Observe the potential leak sites to determine if any bubbles are formed. If no bubbles are observed, the source is presumed to have no detectable emissions or leaks as applicable. If any bubbles are observed, the instrument techniques of 4.3.1 or 4.3.2 shall be used to determine if a leak exists, or if the source has detectable emissions, as applicable.

4.4 Instrument Evaluation Procedures. At the beginning of the instrument performance evaluation test, assemble and start up the instrument according to the manufacturer's instructions for recommended warmup period and preliminary adjustments.

4.4.1 Response Factor. Calibrate the instrument with the reference compound as specified in the applicable regulation. For each organic species that is to be measured during individual source surveys, obtain or prepare a known standard in air at a concentration of approximately 80 percent of the applicable leak definition unless limited by volatility or explosivity. In these cases, prepare a standard at 90 percent of the saturation concentration, or 70 percent of the lower explosive limit, respectively. Introduce this mixture to the analyzer and record the observed meter reading. Introduce zero air until a stable reading is obtained. Make a total of three measurements by alternating between the known mixture and zero air. Calculate the response factor for each repetition and the average response factor.

Alternatively, if response factors have been published for the compounds of interest for the instrument or detector type, the response factor determination is not required, and existing results may be referenced. Examples of published response factors for flame ionization and catalytic oxidation detectors are included in Bibliography.

4.4.2 Calibration Precision. Make a total of three measurements by alternately using zero gas and the specified calibration gas. Record the meter readings. Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and mutiply by 100 to express the resulting calibration precision as a percentage.

4.4.3 Response Time. Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly

Attachment S-6

Sample Inspection Forms and VOC Analyzer Logs

MONTHLY MONITORING LOG
FOR SUBPART BB EQUIPMENT

Equipment ID	VOC Monitoring Reading, ppm (Actual – Background)
PU-1	
PU-2	
PU-3	
PU-17	
VA-1	
VA-2	
VA-3	
VA-4	
VA-5	
VA-6	
VA-7	
VA-8	
VA-9	
VA-10	
VA-11	
VA-12	
VA-13	
VA-14	
VA-15	
VA-16	
VA-18	
VA-19	
VA-20	
VA-21	
VA-22	
VA-23	
VA-28	
VA-29	
VA-30	
VA-31	
VA-44	
VA-45	
VA-46	
VA-47	
VA-48	
VA-68	
VA-69	
VA-70	

If any reading is > 10,000 ppm, leaking equipment must be repaired within 15 days with first attempt to repair within 5 days. If leak is detected, complete the Repair Log.

Inspected by ______________________________ (signature) Date ____________________

SUBPART BB EQUIPMENT REPAIR LOG

Equipment ID	Date Leak is Detected	Expected Date of Repair	Actual Repair Date	Repair Successful? (i.e., VOC monitoring shows < 10,000 ppm)	Method of Repair	Reason for Delay

MONTHLY MONITORING LOG
FOR SUBPART BB EQUIPMENT / PERMA-FIX®II PROCESSING AREA

Equipment ID	VOC Monitoring Reading, ppm (Actual - Background)
WV-01	
WV-02	
WV-03	
WV-04	
WV-05	
WV-06	
WV-07	
WV-08	
WV-09	
WV-10	
WV-11	
WV-12	
WV-13	
WV-14	
WV-15	
WV-16	
WV-17	
WV-18	
WV-19	
WV-20	

MONTHLY MONITORING LOG (cont.)
FOR SUBPART BB EQUIPMENT / PERMA-FIX®II PROCESSING AREA

Equipment ID	VOC Monitoring Reading, ppm (Actual - Background)
WV-21	
WV-22	
WV-23	
WV-24	
WV-25	
WV-26	
WV-27	
PU-01	
PU-02	
PU-03	

If any reading is > 10,000 ppm, leaking equipment must be repaired within 15 days with first attempt to repair within 5 days. If leak is detected, complete the Repair Log.

Inspected by __________________________ (signature) Date _______________________

EXHIBITS

Process and Instrumentation Diagrams

CT-1
Marley 4821 Aquatower 20 ton
50 gpm of water to be cooled from 85°F to 85°F. Based on 80°F wet bulb temperature.

P-1
Ingersoll Dresser SMP 1000
Size 1.25 x 1.25 x 4
centrifugal pump. 50 gpm at 40' TDH

P-2
1/4" ARO Air Diaphragm Pump
Model PD02P-APS-PTT
Max GPM 4.8

P-3
1 1/2" ARO Air Diaphragm Pump
Model 668151-244C, SS
Max GPM 80

P-4
Ingersoll Dresser IDP SMP
1.25 x 0.75 x 8
centrifugal pump. 20 gpm at 80 psi, 138' TDH

T-1
Heat Sink Tank
350 gal SS tote tank

T-2
Propane tank
500 gallon, CS

T-3
Accumulator Tank
Nominal 300 gallon, 304SS
3' dia. x 5' straight side

T-4
Separator Tank
Nominal 50 gallon, 304SS
18" dia. x 6' straight side

T-5
Absorber Tank
Nominal 35 gallon, 304SS
12" dia. x 6' straight side

C-1
Condenser 85°F mfg. by Chemdodo Co.
316 SS, 63 tubes single pass
10" dia x 48" long tube sheets

B-1
10 Hp Fulton boiler package,
150 psi steam PRV set at 65 psi.
Capacity 345 lbs/hr for 335,000 BTU/hr
Fuel consumption 170 ft/hr

HEPA-A
Flanders Model E-4 1X1 CGF(409) type 1
Pre-Filter T-00A-D-04-00-IU-12-13-E0281
Prefilter Bag PVC-Y-TSP-8 Size 70C x 108
Filter T-007-W-04-05-NU-51-13-GG-FUS
Filter Bags PVC-Y-TSP-8 Size 90C x 108
Motor 2 HP 230/460 V 3 Phase @ 3,500 rpm
Rated for 1,050 cfm

HEPA-B
Flanders Model E-4 1X1 CGF(409) type 1
Pre-Filter T-00A-D-04-00-IU-12-13-E0281
Prefilter Bag PVC-Y-TSP-8 Size 70C x 108
Filter T-007-W-04-05-NU-51-13-GG-FUS
Filter Bags PVC-Y-TSP-8 Size 90C x 108
Motor 2 HP 230/460 V 3 Phase @ 3,500 rpm
Rated for 1,050 cfm

HEPA-C
Forced Air System Model FA2000HD
Pre-Filter H2001-50
Secondary Filter H2002-12
HEPA Filter H2010E
Motor 1.5 HP 230/460 V 3 Phase @ 3,500 rpm
Rated for 1,050 cfm

PS-1
Lodige Mixer Model FKM 1200 D, 304SS
Jacket Rated at 72 psi @ 304°F
Working Capacity 150 Gallons @ 50% Loading.

SH-1
Screen Hopper with Vibrating Screen
Mfg. by Perma-Fix Environmental Engineering

HLD-1
High Level Dumper
Mfg. by ALM Corporation or equal

ELL-01
Penberthy Jet Pump
Model ELL-1 1/4

CONFIDENTIAL

SL-1
Scissor Lift Table
Mfg. by Presto
Model # XS24-10

SL-2
Scissor Lift Table
Mfg. by Presto
Model # XS24-10

SK-1
PF-1 Process - Skid Mixer Unit
Mfg. by Perma-Fix Environmental Engineering

DS-1
Drum Shroud @ the Drum Opening Station
Mfg. by Perma-Fix Environmental Engineering

DS-2
Drum Shroud @ the Skid Mixer
Mfg. by Perma-Fix Environmental Engineering

DS-3
Drum Shroud @ the Lodige Unloading
Mfg. by Perma-Fix Environmental Engineering

FM-1
Dwyer Flow Meter
Model #RMC-107-BV
Range 120-1200 SCFH

RV-01
Victory Regulator
Model # VTS250A-580

AAF-1
American Air Filter Dust Collector
Mfg. by American Air Filter Model AR-35

CV-01
Groth Pressure/Vacuum Relief
Model # 1220A-02-555-T-00
Pressure Setting 1 psig
Vacuum Setting 4 oz.

HPU-1
Hydraulic Power Unit
Rexroth Pressure Compensated Pump
20 gpm @ 1750 RPM
With a 80 Gallon Reservoir

LC-01
Drexelbrook Multipoint 8 Level Control
Model # 506-3000-704

LC-02
Drexelbrook Z-tron Level Control
Model # 502-3000-801

PRV-01
Pressure Relief Valve Mfg. by Consolidated
Model # 1905 FC-1XMY42
Set @ 12 psi

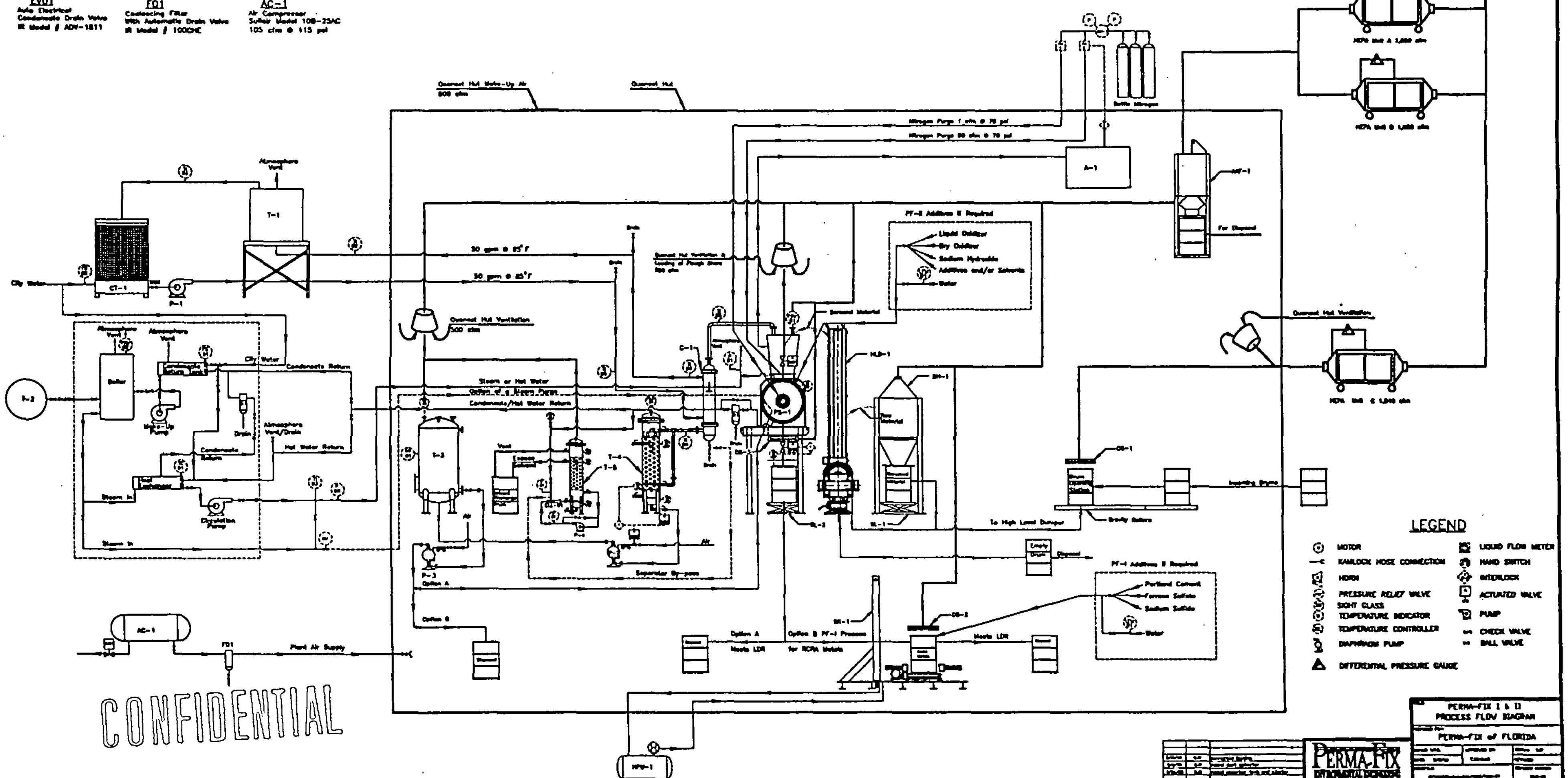
PRV-02
Pressure Relief Valve Mfg. by Watts
Figure # 31
Set @ 65 psi

A-1
Rosemount Oxygen Analyzer
Model # 755 or equal

EV01
Auto Electrical
Condensate Drain Valve
IR Model # ADV-1811

F01
Coalescing Filter
With Automatic Drain Valve
IR Model # 100CHE

AC-1
Air Compressor
Sullair Model 10B-25AC
105 cfm @ 115 psi



CONFIDENTIAL

LEGEND

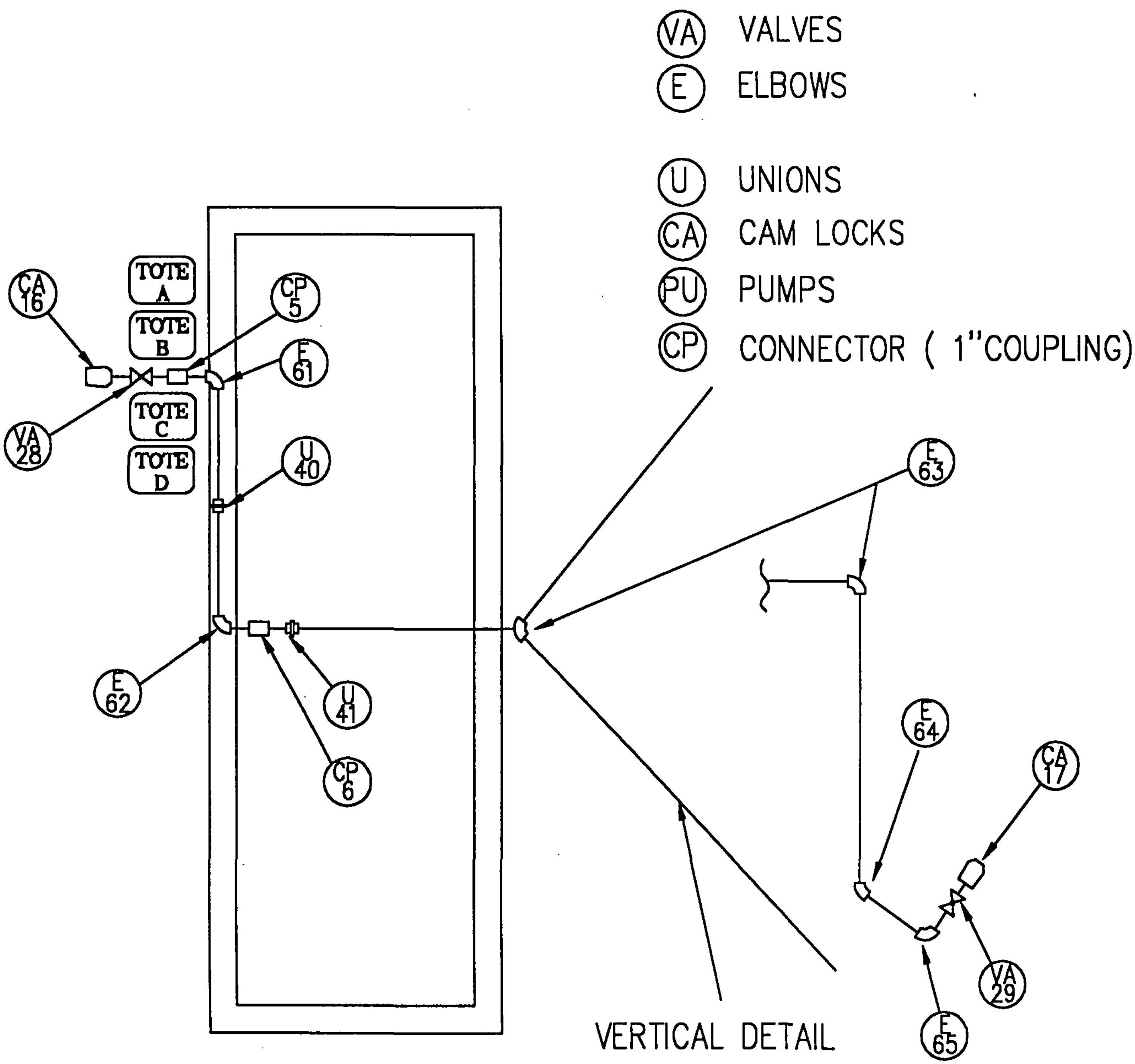
	MOTOR		LIQUID FLOW METER
	KAMLOCK HOSE CONNECTION		HAND SWITCH
	HORN		INTERLOCK
	PRESSURE RELIEF VALVE		ACTUATED VALVE
	SIGHT GLASS		PUMP
	TEMPERATURE INDICATOR		CHECK VALVE
	TEMPERATURE CONTROLLER		BALL VALVE
	DIAPHRAGM PUMP		
	DIFFERENTIAL PRESSURE GAUGE		

PERMA-FIX I & II
PROCESS FLOW DIAGRAM

PERMA-FIX of FLORIDA

PERMA-FIX
ENVIRONMENTAL ENGINEERING

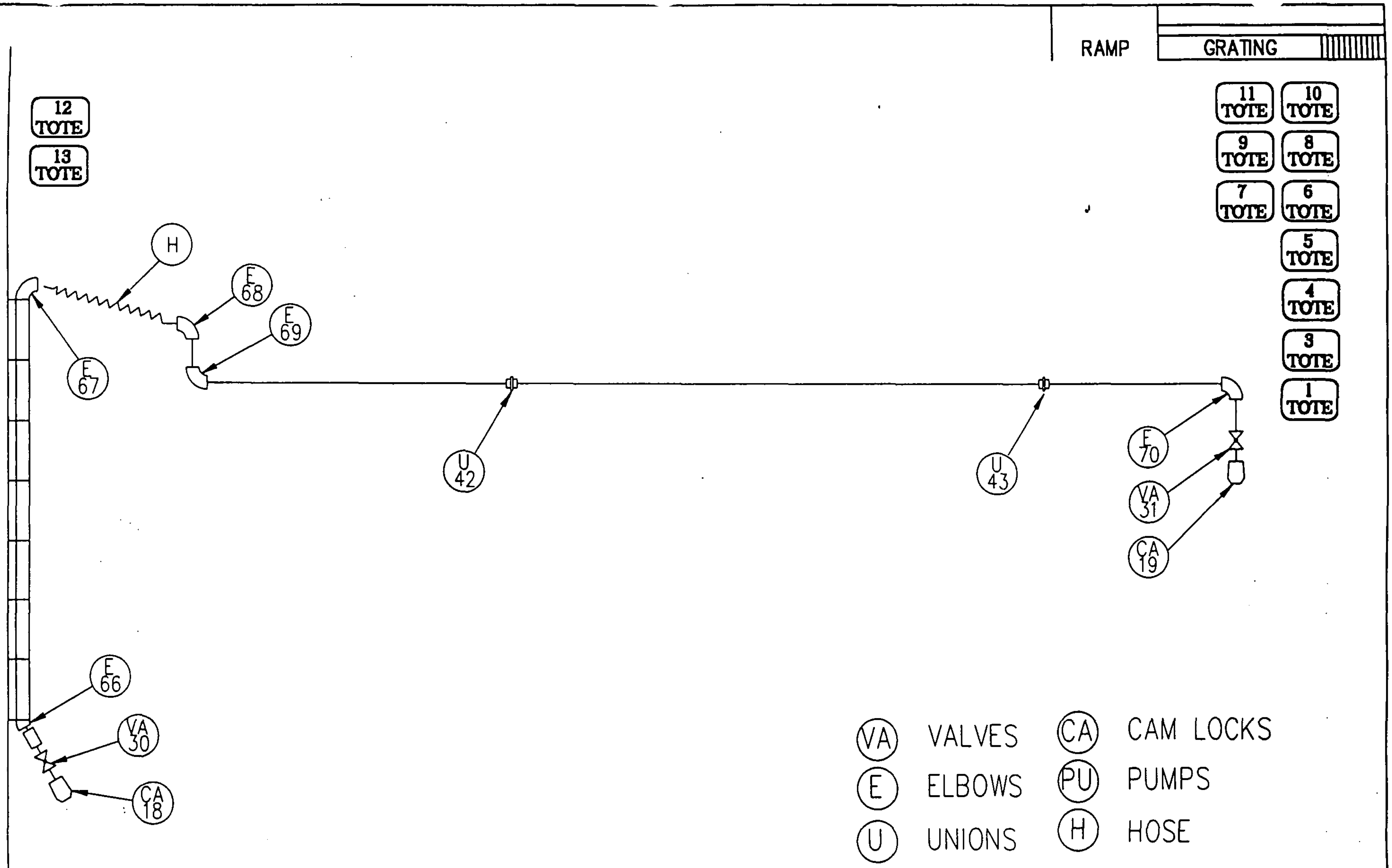
Exhibit S-1



PERMA-FIX ENVIRONMENTAL SERVICES

TITLE: EXHIBIT S-1 TOTE FILL LINE PROCESSING AND STORAGE BUILDING		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 N.W. 67th Place, Gainesville, Florida 32653		
SCALE: NONE	APPROVED BY:	DRAWN: Y.V.
DATD 6-13-98		REVISED
ACADFILD PFIFLA 970343		DRAWING NUMBER:

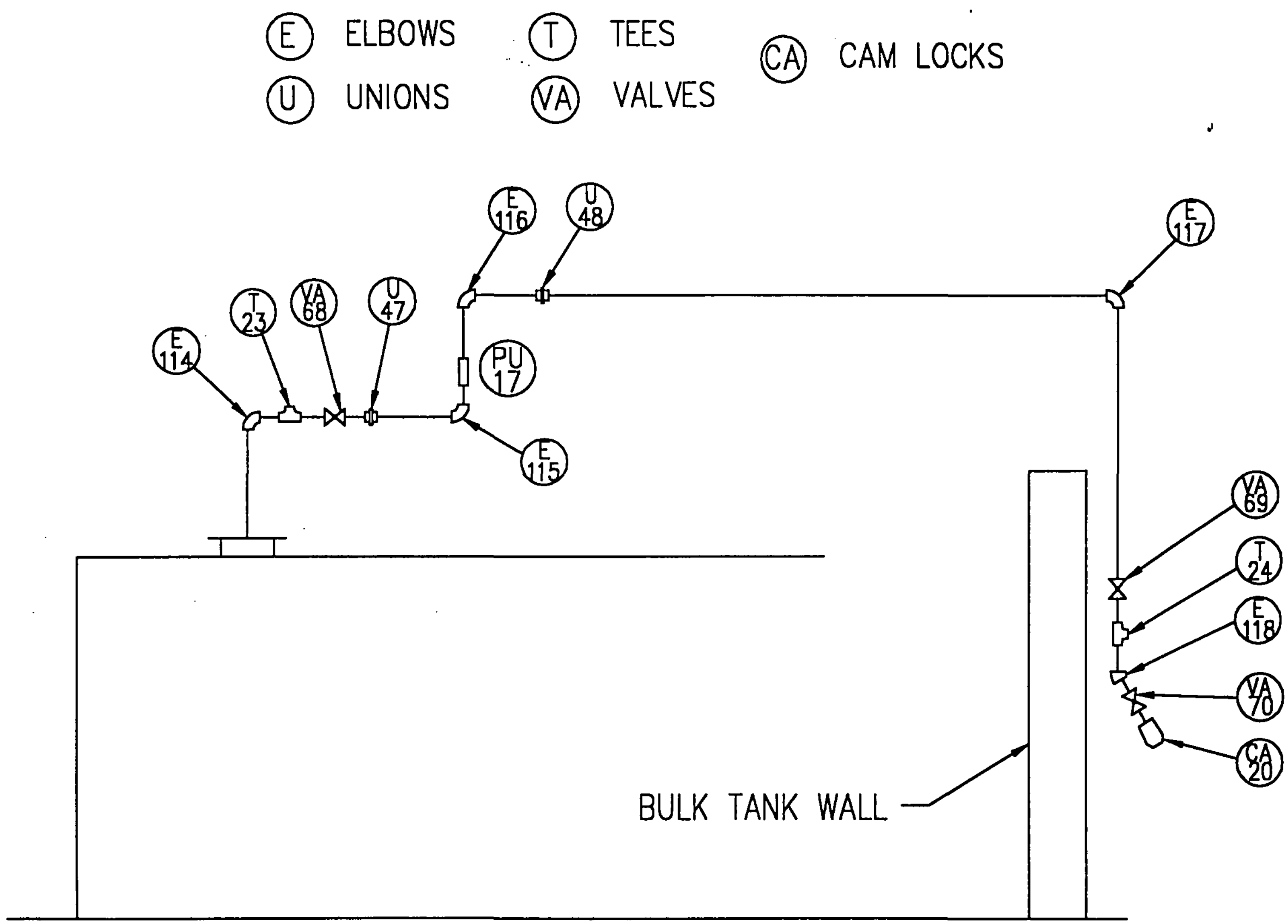
Exhibit S-2



PERMA-FIX
ENVIRONMENTAL SERVICES

TITLE: EXHIBIT 8-2 TANKER FILL LINE PROCESSING AND STORAGE BUILDING		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 N.W. 67th Place, Gainesville, Florida 32653		
SCALE: NONE	APPROVED BY:	DRAWN: Y.V.
DATE: 6-13-98		REVISED
ACADFILE PFIFLA 970343		DRAWING NUMBER:

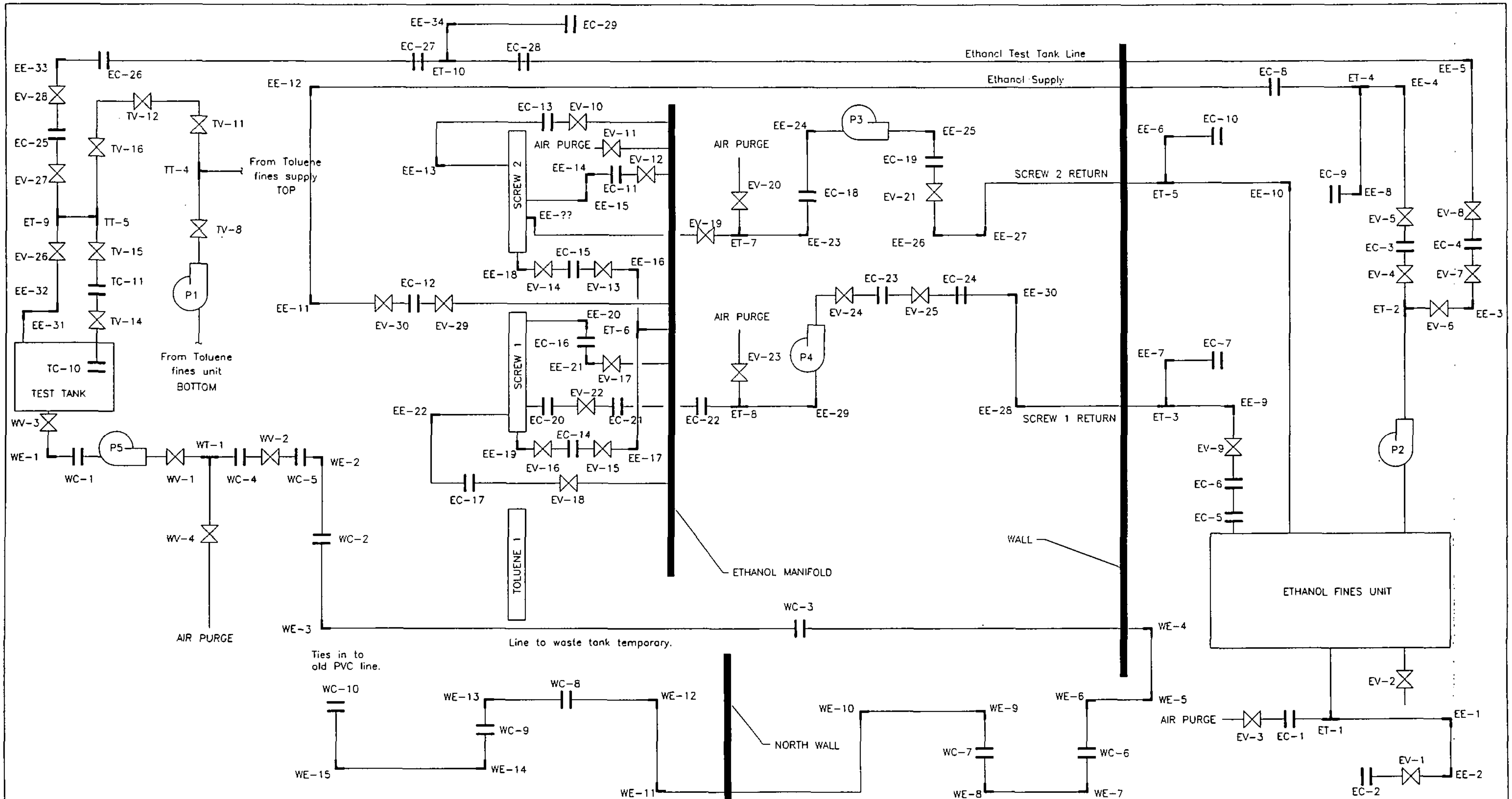
Exhibit S-3



PERMA-FIX
ENVIRONMENTAL SERVICES

TITLE: EXHIBIT S-8 PROCESSING AND STORAGE BUILDING		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 N.W. 67th Place, Gainesville, Florida 32653		
SCALE: NONE	APPROVED BY:	DRAWN: Y.V.
DATE: 6-13-98		REVISED
ACADFILE: PFIFLA 978243		DRAWING NUMBER:

Exhibit S-4



ETHANOL LEGEND

EV-1	ETHANOL VALVE
P1	PUMP
EE-1	ETHANOL ELBOW
EC-1	ETHANOL CONNECTOR
ET-1	ETHANOL TEE

TOLUENE LEGEND

TV-1	TOLUENE VALVE
P1	PUMP
TE-1	TOLUENE ELBOW
TC-1	TOLUENE CONNECTOR
TT-1	TOLUENE TEE

WASTE LEGEND

WV-1	WASTE VALVE
P1	PUMP
WE-1	WASTE ELBOW
WC-1	WASTE CONNECTOR
WT-1	WASTE TEE

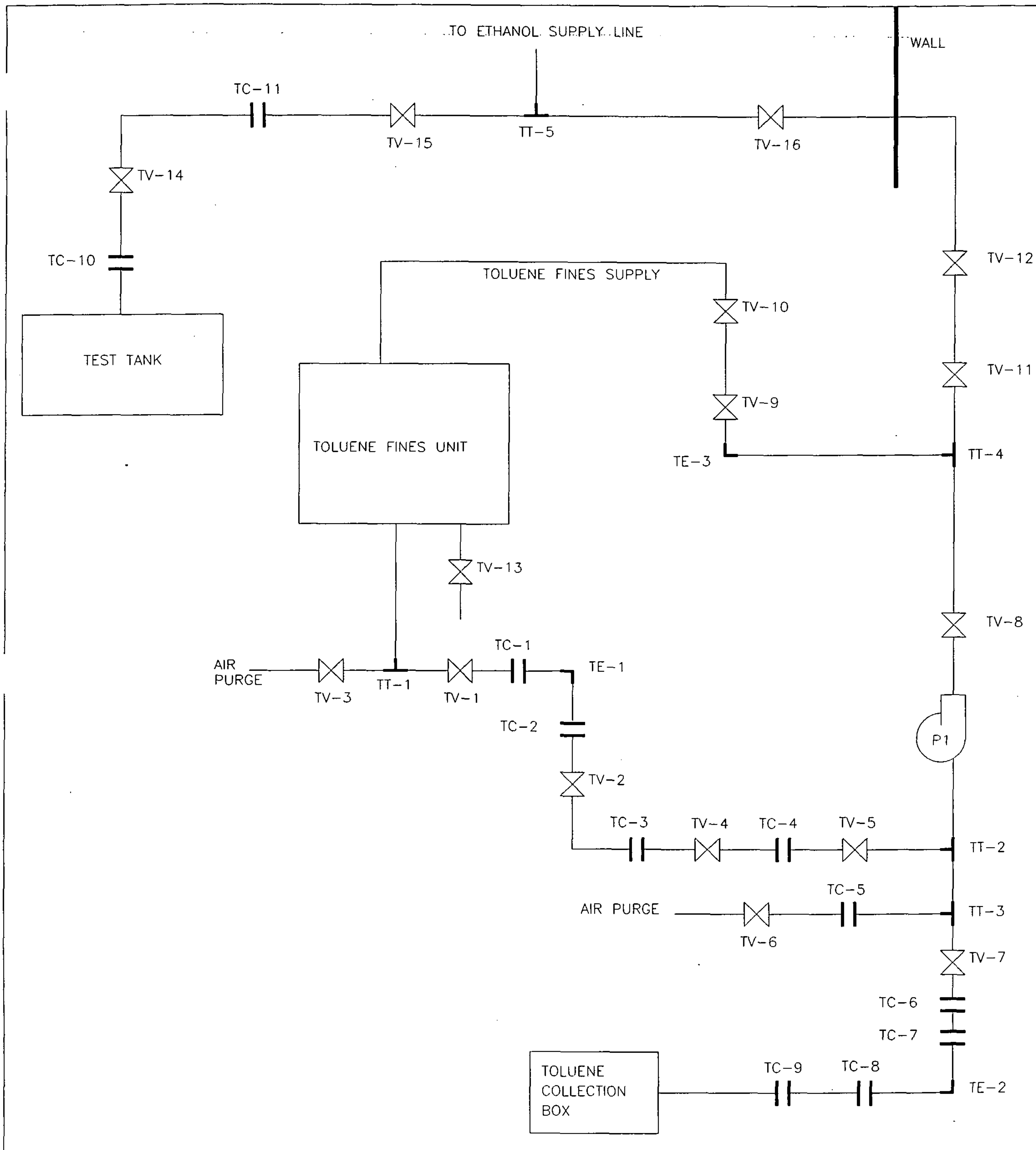
PERMA-FIX ENVIRONMENTAL SERVICES

TITLE: Figure 5-4
LSV PROCESSING AREA
WASTE & ETHANOL SYSTEMS

PREPARED FOR:
PERMA-FIX OF FLORIDA, INC.
1940 NW 67th Place Gainesville, FL 32653

SCALE: NTS	APPROVED BY:	DRAWN: SXG
DATE: 9-25-98	D.L.V.	REVISED:
PROJECT NUMBER: PFIFLA970343		DRAWING NUMBER: 5_4

Exhibit S-5



TV-1 TOLUENE VALVE

P1 PUMP

TE-1 TOLUENE ELBOW

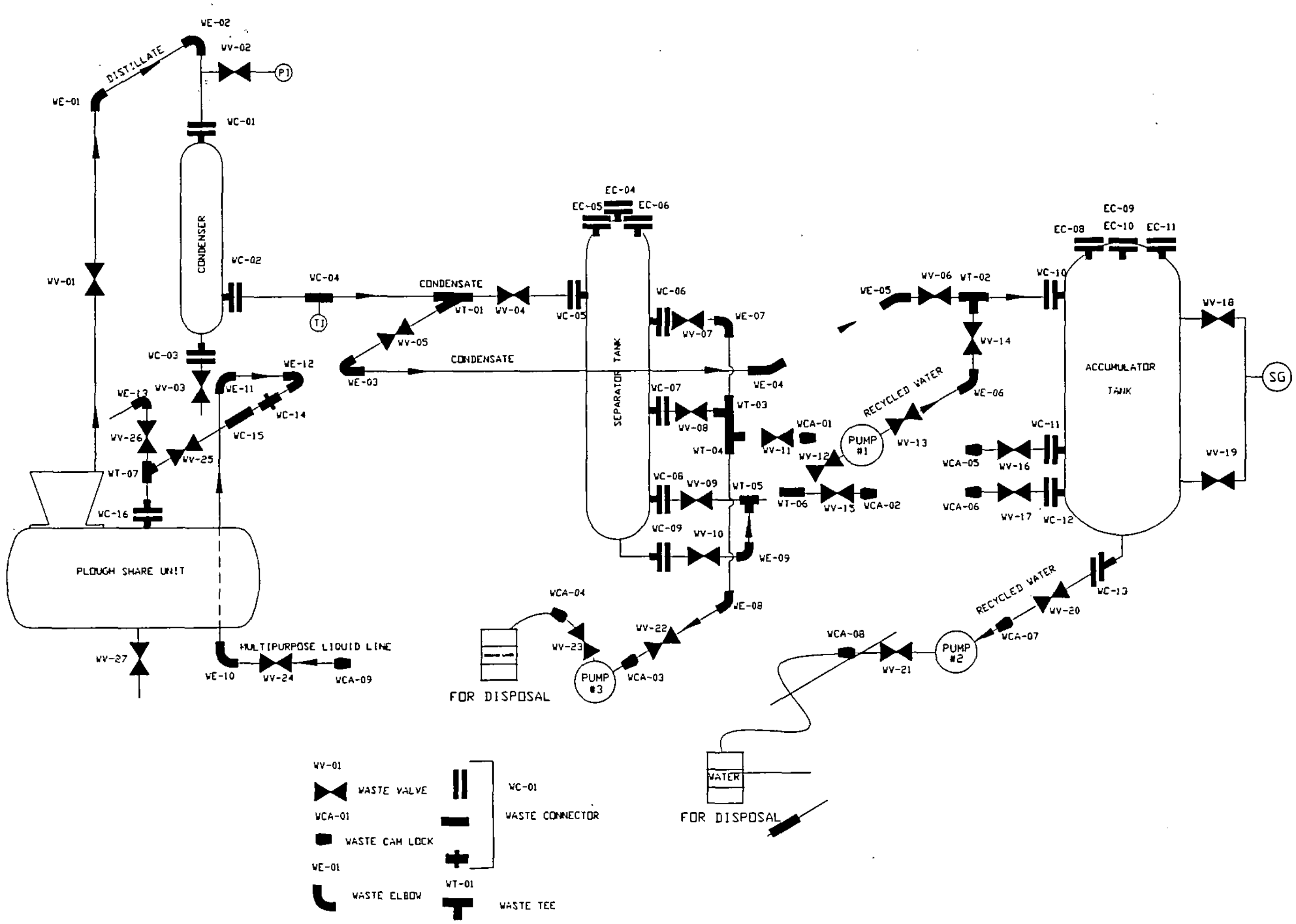
TC-1 TOLUENE CONNECTOR

TT-1 TOLUENE TEE

TITLE: Figure S-5 LSV PROCESSING AREA TOLUENE SYSTEM		
PREPARED FOR: PERMA-FIX OF FLORIDA, INC. 1940 NW 67th Place Gainesville, FL. 32653		
SCALE: NTS	APPROVED BY:	DRAWN: SKG
DATE: 10-2-98	D.L.W.	REVISED:
PROJECT NUMBER: PFIFLA970343		DRAWING NUMBER: S_5

PERMA-FIX ENVIRONMENTAL SERVICES

Exhibit S-6



TITLE: Figure S-6
PERMA-FIXII PROCESS
WASTE SYSTEM

PREPARED FOR:
PERMA-FIX OF FLORIDA, INC.
1940 NW 67th Place Gainesville, FL. 32653

SCALE: NTS	APPROVED BY:	DRAWN: MJ
DATE: 9-28-98		REVISED:
PROJECT NUMBER: PFIFLA970343		DRAWING NUMBER: S_6

PERMA-FIX
ENVIRONMENTAL SERVICES