Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Colleen M. Castille
Secretary

February 8, 2005

CERTIFIED MAIL
RETURN RECEIPT

Mr. Ken Shoemake
Environmental Health and Safety Manager
Perma-Fix of Florida, Inc.
1940 N.W. 67th Place
Gainesville, Florida 32653

Subject: Perma-Fix of Florida, Inc.; FLD 980 711 071;
Operating Permit Application 17680-009-HO
Alachua County

NOTICE OF DEFICIENCY AND ORDER FOR CORRECTIVE ACTION

Dear Mr. Shoemake:

Your application for a hazardous waste operation permit has been reviewed and found to be incomplete. The required information and amendments necessary to complete your application are itemized in the attached Notice of Deficiencies.

Procedurally, in accordance with Section 403.722, Florida Statutes (F.S.) and Rule 62-730.220, Florida Administrative Code (F.A.C.), all processing of the permit application is suspended when an application is found to be incomplete. Substantively, Section 403.722, F.S. and Rule 62-730.220, F.A.C., require a permit applicant to submit a complete permit application sufficient to provide the Department with reasonable assurances for issuance of the permit. Failure to provide complete and sufficient information is a violation of Florida law and Department rules and the Department is authorized by Section 403.121(2)(b), F.S. to institute an administrative proceeding to order ... appropriate corrective action." Therefore,

YOU ARE HEREBY ORDERED to complete closure application 17680-009-HO by submitting all requested information and complying with all Department comments in the Notice of Deficiency attached as Exhibit A and incorporated herein by reference, within 10 days of the date this Order becomes Final. This Order will become Final 21 days after you receive it, unless you exercise the rights explained in the document

attached as Exhibit B and incorporated herein by reference. Failure to submit a COMPLETE closure application within the time limit set forth herein shall constitute a violation of this Order and a violation of §403.727(1)(a), F.S.

Addressee

You are encouraged to take advantage of the "informal conference" provided by paragraph 4 of Exhibit B, the attached Notice of Rights. Staff in this office are available to discuss the deficiencies noted by the application review. This exchange of ideas will assist you in developing a complete and adequate response. During the informal conference, you will have the opportunity to provide the Department with a detailed schedule with dates when the incomplete information will be submitted, or request additional time. If you would like to arrange a meeting or have any questions, please contact Harold Register at (850)245-8796.

Very truly yours,

Dotty Diltz, Assistant, Director
Division of Waste Management

DD/hdr

Enclosure

cc (with enclosure):

Jon Johnson, EPA/Region 4
Ashwin Patel, DEP/Northeast District Office
Franklin Maddox, Schreiber, Yonley & Associates

EXHIBIT A
Perma-Fix of Florida, Inc. Review Application Comments
NOTICE OF DEFICIENCIES

1. Attachment I.D.1, page 4: Residual waste generated in the PF-1 and PF-II processes should include potential air emissions. (this clarification should also be made in Appendix II.B.1, page 3)

2. Fig. I.D.7: the drawing should include a cross sectional "B-B" view of the ramps and a "Drum Equivalent" information detail notation as shown in the PSB and TOB figures.

3. Fig. I.D.13: For clarification, eliminate the non-relevant contour lines and identify the VOC Collection System as being part of the air emission control system for treatment areas in the LSV process room and TOB.

4. Attachments I.D.2 & II.A.5: PFF must conduct an off-site consequence analysis(OCA) to demonstrate that the proposal to store hazardous waste with the additional waste codes will not constitute a "substantial modification" as defined by F.S. 403.7211. The OCA must be in accordance CAA section 112(r) procedures and must show that worst case scenario involving a release will not have a greater radius of impact than the facility's operation prior to the permit modification.

5. Attachment I.D.1, page 11: The statement that the proposed storage area will be protected by a 5.75 inch berm is misleading since the height of the secondary containment ramps are 2.75inches.

6. Attachment I.D.1, page 11 & Part II. B: PFF must conduct an off-site consequence analysis(OCA) to demonstrate that the proposal to increase the hazardous waste storage capacity at the facility, will not constitute a "substantial modification" as defined by F.S. 403.7211. The OCA must be in accordance CAA section 112(r) procedures and must show that worst case scenario involving a release will not have a greater radius of impact than the facility's operation prior to the permit modification.

7. Part II, A4d, page 5: For clarification, "will be assumed to be" should be changed to <u>will be managed as potentially ignitable waste until...</u>.

8. Part II, B4, page 5: The 4"D dimension for the B-25 and B-12 containers should be changed to 4'D.

9. Appendixes II.B.1,II.B.2 & Attachments C.1, C.2: Provide information as to the specific building and location each treatment process will be limited to. Additionally specify that prevention of releases to air will be achieved by conducting the treatment process within a confined room so that all fugitive emissions will be captured by the Air Emission Control System. (see PF-II description text)

10. Part II, K8, page 16: Please include the version date of the CostPro® software used to calculate the closure cost.

EXHIBIT B

NOTICE OF RIGHTS

1. This Order to Complete Application is a Final Order of the Department pursuant to Section 120.52(7), Florida Statutes, (F.S.), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, F.S. Upon the timely filing of a petition this Order will not be effective until further order of the Department.

2. If you dispute issues of material fact raised by this Order to Complete Application, you have the right to a formal administrative hearing pursuant to Sections 120.569 and 120.57(1), Florida Statutes (F.S.) At a formal hearing, you will have the opportunity to be represented by counsel, to present evidence and argument on all issues involved, to conduct cross-examination and submit rebuttal evidence, to submit proposed findings of fact and orders, and to file exceptions to any order or hearing officer's recommended order.

3. If you do not dispute issues of material fact raised by this Order to Complete Application, you have the right to an informal administrative proceeding pursuant to Sections 120.569 and 120.57(2), F.S. If an informal proceeding is held, you will have the opportunity to be represented by counsel, to present to the agency written or oral evidence in opposition to the Department's Order, or to present a written statement challenging the grounds upon which the Department is justifying its proposed action.

4. You may request an informal conference with the Department. Your rights will not be adjudicated at an informal conference. If you desire an informal conference, you must file a written "Request for an Informal Conference" within 10 days of receipt of this Order to Complete Application. The request must be made to Camille Stein at the address indicated in the body of this Order to Complete Application. The request is "filed" when it is received in the Department's Blair Stone Road office in Tallahassee. If no resolution of this matter results from the informal conference, you have the right to file a petition for a formal hearing or informal proceeding within 10 days of the date the conference is held.

5. If you desire a formal hearing or an informal proceeding, you must file a written "Petition for Administrative Proceeding" within 21 days of receipt of this Order or within 10 days of any timely requested informal conference held pursuant to paragraph 5 below. The petition must be in the form required by Rule 28-106.201 (for formal hearing) or Rule 28-106.301 (for informal proceeding), F.A.C. A petition is "filed" when it is received by the Department's Office of General Counsel, 2600 Blair Stone Road, MS 35, Tallahassee, Florida 32399-2400. A petition must specifically request a formal hearing or an informal proceeding, it must admit or deny each issue raised in this Order to Complete Application, and must state any defenses upon which you rely.

6. You will waive the right to a formal hearing or an informal proceeding if a petition is not filed with the Department within 21 days of the date of this Order to Complete Application or 10 days of the date of an informal conference if one is held. These time limits may be varied only by written consent of the Department.

7. A party who is adversely affected by this Order when it becomes Final is entitled to Judicial Review pursuant to Section 120.68, F.S. Review proceedings are governed by the Florida Rules of Appellate Procedure. Such proceedings are commenced by filing one copy of a Notice of Appeal with the Agency Clerk, Department of Environmental Protection, Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, and a second copy, accompanied by filing fees prescribed by law, with the First District Court of Appeal or with the District Court of Appeal in the Appellate District where the party resides. The Notice of Appeal must be filed within 30 days of rendition of the Order to be reviewed. The Order is rendered on the date it becomes Final.

8. If you fail to comply with the Order when it becomes Final, the Department is authorized to file suit in circuit court seeking a mandatory injunction to compel compliance with the Order, pursuant to Sections 120.69, 403.131 and 403.727, F.S. The Department may also seek to recover damages, all costs of litigation including reasonable attorney's fees and expert witness fees, and civil penalties of not more than $50,000 per day for each day that you failed to comply with the Final Order.

9. Copies of Department rules referenced in this Order to Complete Application may be examined at any Department office or may be obtained by written request to the person listed on the last page of this Order to Complete Application.

JR
205-8796

DRAFT

OFF-SITE CONSEQUENCE ANALYSIS AND AIR MODELING

PERMA-FIX OF FLORIDA, INC.

EPA ID NO. FLD 980 711 071,
PERMIT NO. 17680-003-HO

FEBRUARY 2005

PREPARED FOR:

PERMA-FIX OF FLORIDA
1940 N.W. 67TH PLACE
GAINESVILLE, FLORIDA 32653

PREPARED BY:

SCHREIBER, YONLEY & ASSOCIATES
271 WOLFNER DRIVE
FENTON, MISSOURI 63026

PROJECT NO. 040168

DRAFT

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1.0 INTRODUCTION

1.1 Purpose

Perma-Fix of Florida, Inc. (PFF) submitted a permit modification request in December 2004 to modify and to renew the facility's Resource Conservation and Recovery Act (RCRA) permit. Schreiber, Yonley & Associates (SYA) has prepared this Off-site Consequence Analysis (OCA) and conducted associated accidental release modeling on behalf of PFF in order to demonstrate that PFF has not proposed a "substantial modification" (as defined in F.S. 403.7211) in the RCRA Permit Application submitted in December 2004 to the Florida Department of Environmental Protection (FDEP).

1.2 Facility Description

PFF operates a commercial hazardous waste storage and treatment facility in Gainesville, Florida. Wastes currently managed on-site include a wide variety of hazardous industrial, mixed, and non-hazardous wastes. 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. Figure 1 shows the location of the Perma-Fix facility.

The activities currently permitted at the existing facility include storage and segregation of wastes for fuel blending, waste bulking and off-site shipment, hazardous/mixed waste container storage, bulk liquid storage, liquid scintillation vial (LSV) processing, treatment of hazardous waste using inorganic fixation/stabilization (PF-I), vacuum thermal desorption (PF-II), and miscellaneous physical treatment processes; non-hazardous waste segregation and storage; household waste collection; and miscellaneous waste storage and transfer. Figure 2 shows the facility site plan.

The proposed permit modifications include the addition of 54,350 gallons of storage capacity in the LSV processing and waste storage warehouse; the addition of solvent extraction capabilities; the addition of mercury amalgamation, non-elemental neutralization, and reactive waste deactivation capabilities; and a request for authorization to receive, treat, and store additional waste codes. The proposed additional waste codes are provided in Attachment 1.

2.0 OFF-SITE CONSEQUENCE ANALYSIS

2.1 Background

The purpose of the OCA is to demonstrate that the addition of the proposed new waste codes and increased storage capacity will not constitute a "substantial modification" as defined by F.S. 403.7211. The results of the OCA presented in this report show that a worst-case scenario involving a release from the facility as operated pursuant to the proposed RCRA permit modifications will not have a greater radius of impact than the current facility operations, as long as the quantities of certain key waste constituents in a single container do not exceed the quantities predicted by the modeling.

2.2 Off-Site Consequence Analysis Process Overview

The OCA was conducted to demonstrate that the potential off-site risk from this facility will not increase as a result of the proposed permit modification. The OCA examines the effect of short duration, unplanned events rather than the effect of normal operations. The OCA was conducted in a fashion similar to the USEPA Risk Management Program (RMP) standard at 40 CFR 68. It used the same methodology that was used for the August 1999 OCA conducted in support of the RCRA Part B permit application for the current facility RCRA permit. The results of the OCA for the modified plant were compared with the worst-case release scenario results identified for the existing facility to determine whether the radius of impact would increase and therefore indicate whether the proposed modification would or would not constitute a "substantial modification." A full analysis for the existing facility that includes the methodology employed to identify the worst-case scenario and to estimate the existing facility's potential off-site impact was included in the August 1999 OCA report prepared by Jones, Edmonds and Associates, Inc. and filed with the FDEP in support of the application for the existing RCRA Part B permit.

The first step in the process is to determine what constitutes the worst-case release scenario. The USEPA in 40 CFR 68.3 defines the worst-case release as "the release of the largest quantity of a regulated substance from a vessel or process line failure that results in the greatest distance to an endpoint." Many possible release scenarios exist. However, the USEPA has defined worst-case releases as nearly instantaneous releases for toxic effects and as a vapor cloud explosion for explosion effects. Other variables in the OCA include the quantity and the type of chemicals that may be involved in the release, atmospheric stability class, and wind speed.

The EPA "RMP Off-site Consequence Analysis Guidance" manual (May 24, 1996) (OCA Guidance manual) very clearly states that "for analysis of the worst case scenario, you must consider the largest quantity of a regulated substance handled on site in a single vessel at any one time, taking into account administrative controls." The greatest quantity that can be released in an event at the facility is the maximum quantity present in the largest storage vessel. The container that could possibly hold the largest amount of a flammable or toxic material containing the proposed new waste codes has a volume of 718 gallons (i.e., B-25 container) because new waste codes will not be stored or processed in a vessel larger than 718 gallons. The additional waste codes to be received will generally be in lab pack sizes or will be a constituent in a remediation waste stream consisting of contaminated soil. Hence, the worst-case scenario considered for this OCA is a release of the entire contents of the largest container stored at the site.

After the worst-case release scenario was identified, models were selected to characterize the effects of a worst-case scenario release. The ALOHA (Areal Locations of Hazardous Atmospheres) and ARCHIE (Automated Resource for Chemical Hazard Incident Evaluations) models were used in the 1999 baseline OCA and therefore were selected for use in the current OCA analysis. The ALOHA model is a dispersion model used to predict how a hazardous cloud might disperse in the atmosphere after an accidental liquid

or gaseous chemical release. Since ALOHA does not have the capability of predicting effects of fires or explosions, ARCHIE is used for assessing fire and explosion impacts related to discharges of liquid or gaseous hazardous chemicals. Appendix A of the OCA Guidance manual provides information on several public domain models that are acceptable for use in OCAs. Both ALOHA and ARCHIE models are included in this list.

The results of the baseline OCA were compared to the results of the OCA comducted by SYA for the proposed operations in order to determine whether the permit modification will constitute a "significant modification" as defined by F.S. 403.7211.

2.3 Off-Site Consequence Analysis Assumptions and Results

In the container storage area, the largest single container can hold 718 gallons (i.e., B-25 container), which primarily will contain contaminated soil with some organic contamination. The worst-case toxic release is the largest quantity of a regulated substance from a single container that results in the greatest distance from the point of release to a specified toxic endpoint. The level of concern (LOC) is used to define the toxic endpoint. The preferred LOC for this analysis is 1/10th of the level given in the Immediate Danger to Life and Health (IDLH) index, since the baseline OCA had utilized the same criteria.

The chemicals that could be involved in a release were obtained from the tables in 40 CFR 261.33 (e) and (f) for U-listed and P-listed waste codes. Appendix VII to 40 CFR Part 261 was utilized to obtain hazardous constituents for F-listed waste codes. The hazardous substances that could potentially be found in the waste are listed in Attachment 2.

The database included with the ALOHA program (Version 5.3.1) provides IDLH values for many chemicals. The program also allows the user to input a "User-Specified LOC," such as a value of 10% of the IDLH. If the ALOHA program database did not provide an IDLH value, then IDLH values were obtained from the National Institute for Occupational Safety and Health (NIOSH) revised IDLH values (3/1/95). These values are provided in Attachment 3. If neither source had an IDLH value for a specific chemical, then the Emergency Response Planning Guideline (ERPG) values from the ALOHA program were used, if available. The ERPGs are intended to provide estimates of concentration ranges where one might reasonably anticipate observing adverse effects. The ERPGs are utilized in the RMP program off-site consequence analysis for many chemicals. The ERPG values were developed by the American Industrial Hygiene Association (AIHA). If the ALOHA program did not provide an ERPG for a given chemical, then the ERPG value from the AIHA database was used. These are provided in Attachment 4. Three levels of ERPGs are available. ERPG-2 was selected, which is defined as "the maximum concentration in air below which it is believed nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action."

If neither IDLH or ERPG values were available for a chemical from the above-mentioned sources, then the Temporary Emergency Exposure Limit (TEEL-2) values were used for the LOC, if available in the ALOHA program. The TEEL values are used by the Department of Energy and are derived using a rigorous, peer-reviewed methodology comparable to the ERPG generation process. TEEL-2 values are typically the same as ERPG-2, where both values have been determined. TEEL-2 is defined as "the maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action."

RMP guidance for the OCA states that the substance chosen for the consequence analysis should be the substance that has the potential to cause the greatest off-site consequences. All chemicals listed in Attachment 2 were modeled if LOC values could be found in the resources described above. This conservative approach should ensure that PFF has complied with the RMP guidance. In addition, it should be noted that the approach using one-tenth of the IDLH value for the endpoint is much more conservative as compared to RMP guidance, which recommends using ERPG-2 values.

2.3.1 ALOHA Model Results

The highest ambient concentrations and greatest distances to the endpoint are generated from an instantaneous release. The ALOHA model defines instantaneous as occurring in one minute. The USEPA has defined, in its RMP guidance, the following meteorological conditions as worst-case for OCA:

- Wind speed of 1.5 meters per second (m/s);
- Stability class F (most stable);
- Cloud cover of 50%;
- Air temperature of 77 degrees Fahrenheit; and
- Relative humidity of 50 percent.

Tables 1 and 2 list the chemicals considered in the worst-case toxics analysis as well as the predicted distance to the endpoint for each chemical. Table 1 provides data for the baseline scenario and Table 2 provides similar data for the proposed facility operations.

The predicted distances to the endpoints for the proposed operations were compared to the baseline distances. The baseline worst-case toxic release scenario is the instantaneous release of 7,075 pounds of ethanol from the 3,000-gallon storage tank. The distance to the toxic endpoint for this scenario is 1,164 yards, as shown in Table 1. In the event the distance to the endpoint for a proposed constituent exceeded 1,164 yards, the model was run with a smaller amount of material released, and a new distance was calculated. The process was repeated until the distance was less than or equal to 1,164 yards. Table 2 provides the maximum quantity of the amount present in a single container that will result in a distance to the endpoint to be 1,164 yards or less.

TABLE 1

EXISTING FACILITY WORST-CASE RELEASE SCENARIO ALOHA MODELING RESULTS

Constituent	Source	Amount Released (lbs)	Maximum Distance (yds)	IDLH (ppm)	LOC (ppm)
Ethanol	3,000-gallon tank	7,075	1,164	3,300	330

TABLE 2

PROPOSED FACILITY WORST-CASE TOXIC RELEASE SCENARIO ALOHA MODELING SUMMARY

Constituent	Waste Code	Amount Released (lbs)	Distance to Endpoint (yds)	LOC (ppm except as noted	LOC Criteria
Allyl alcohol	P005	11.4	1,141	2	10% IDLH
Bromoacetone	P017	46.5	1,164	1.5	TEEL-2
Benzyl chloride	P028	20.2	1,163	1	ERPG-2
Cyanogen	P031	97	1,164	10	TEEL-2
Cyanogen chloride	P033	2.1	1,164	0.4	ERPG-2
Fluorine	P056	7.5	1,161	2.5	10% IDLH
Hydrogen cyanide	P063	30.5	1,163	5	10% IDLH
Methyl hydrazine	P068	20.8	1,143	2	10% IDLH
Nickel carbonyl	P073	7.7	1,164	0.1	10% IDLH
Nitrogen dioxide	P078	8	1,164	2	10% IDLH
N-nitrosodimethylamine	P082	105	1,164	19 mg/m^3	TEEL-2
Phosgene	P095	1.9	1,163	0.2	10% IDLH
Phosphine	P096	13	1,162	5	10% IDLH
Propargyl alcohol	P102	38	1,164	5	TEEL-2
Tetranitromethane	P112	47.3	1,164	1	TEEL-2
Acetyl chloride	U006	0.32	1,164	0.05	TEEL-2
Acrylic acid	U008	180	1,164	8.5	10% IDLH
Acrylonitrile	U009	75.8	1,166	8.5	10% IDLH
Benzenesulfonyl chloride	U020	1,105	1,164	200 mg/m^3	TEEL-2
Bis(2-chloroethoxy)methane	U024	235	1,164	6	TEEL-2
Trichloroacetaldehyde (Chloral)	U034	750	1,164	50 mg/m^3	10% IDLH
Epichlorohydrin	U041	250	1,161	7.5	10% IDLH
Vinyl chloride	U043	49.5	1,164	5	TEEL-2
Chloromethane (methyl chloride)	U045	5,000	1,164	200	10% IDLH
Chloromethyl methyl ether	U046	21	1,164	1	ERPG-2
2-chlorphenol	U048	523	1,164	7.5	TEEL-2
1,2-dibromo-3-chloropropane	U066	0.25	1,164	0.005	TEEL-2
Ethylene dibromide (1,2-dibromomethane)	U067	1490	1,164	10	TEEL-2
1,4-dichloro-2-butene	U074	70	1,164	2.5	TEEL-2
Dichlorodifluoromethane	U075	68,500	1,161	1500	10% IDLH

TABLE 2 (continued)

PROPOSED FACILITY WORST-CASE TOXIC RELEASE SCENARIO ALOHA MODELING SUMMARY

Constituent	Waste Code	Amount Released (lbs)	Distance to Endpoint (yds)	LOC (ppm except as noted	LOC Criteria
1,1-dichloroethylene (vinylidend chloride)	U078	1175	1,163	20	TEEL-2
1,2-dichloroethylene	U079	6000	1,157	100	10% IDLH
1,2:3,4-diepoxybutane	U085	1,152	1,164	1	TEEL-2
Dimethylamine	U092	760	1,160	50	10% IDLH
Dimethylcarbamoyl chloride	U097	95	1,164	4	TEEL-2
1,1-dimethylhydrazine	U098	20.4	1,164	1.5	10% IDLH
1,2-dimethylhydrazine	U099	47	1,164	3.5	TEEL-2
Dimethyl sulfate	U103	11.3	1,157	0.7	10% IDLH
Ethyl acrylate	U113	1,970	1,163	30	10% IDLH
Ethylene oxide	U115	1,300	1,160	80	10% IDLH
Ethyl methacrylate	U118	815	1,164	12.5	TEEL-2
Formic acid	U123	12.4	1,146	3	10% IDLH
Furfural	U125	391	1,163	10	10% IDLH
Glycidylaldehyde	U126	8	1,164	0.5	TEEL-2
Hydrazine	U133	11.6	1,163	5	10% IDLH
Hydrogen fluoride	U134	13.5	1,161	3	10% IDLH
Hydrogen sulfide	U135	27.7	1,156	10	10% IDLH
Methacrylonitrile	U152	58	1,163	5	TEEL-2
Methyl methacrylate	U162	6,300	1,163	100	10% IDLH
Paraldehyde	U182	710	1,164	50 mg/m^3	10% IDLH
Pentachloroethane	U184	8,900	1,164	500 mg/m^3	TEEL-2
Toluene-2,4-di-isocyanate	U223	5.5	1,151	0.25	10% IDLH
Toluene-2,6-di-isocyanate	U223	3	1162	0.15	TEEL-2
Bromoform (tribromomethane)	U225	14,360	1,163	85	10% IDLH
Triethylamine	U404	1,260	1,162	20	10% IDLH

2.3.2 ARCHIE Model Results

For flammable substances, USEPA's guidance defines the worst-case scenario as the vapor cloud explosion containing the largest quantity of the regulated flammable substance from a vessel or process pipeline failure resulting in the greatest distance to an overpressure endpoint of one pound per square inch (psi). The ARCHIE model was used to estimate the effect of an explosion of a vapor cloud with the entire mass of the organic compound present in the waste container. The maximum weight of a liquid constituent that a 718-gallon container could hold was calculated and this amount was used as the amount released in the ARCHIE (Version 1.0) model. Two thousand pounds was typically used as the maximum amount of a material that is a gas at standard

conditions. Waste material carrying the proposed new waste codes will not be stored in tanks or containers larger than 718 gallons.

The primary purpose of ARCHIE is to provide emergency preparedness personnel with several estimation methods to assess vapor dispersion, fire, and explosion impacts of a hazardous material release. Option I of ARCHIE evaluates vapor cloud explosion hazards, which is required for the RMP worst-case analysis for flammable gases and liquids.

The ARCHIE program assumes that 1,000 pounds or more of a flammable substance is present. The user will be warned if (s)he attempts to model an amount less than 1,000 pounds since the probability of a completely unconfined vapor cloud explosion (based on historical data) is very low in such cases.

The model provides a table that lists distances from the explosion center and associated degrees of injury and damage to people and property. Table 3 relates these effects to peak overpressure (psia). Tables 4 and 5 list the distances to endpoints for the chemicals considered for the worst-case flammable event and the distance to the endpoint.

TABLE 3

EXAMPLE OUTPUT FROM EXPLOSION MODELS

Peak Overpressure (psia)	Expected Damage
0.03	Occasional breakage of large windows under stress
0.30	Some damage to home ceilings; 10% window breakage
1.00 – 0.50	Windows usually shattered; some frame damage
1.00	Partial demolition of homes; made uninhabitable
8.00 – 1.00	Range serious/slight injuries from flying glass/objects
2.00	Partial collapse of home walls/roofs
3.00 – 2.00	Non-reinforced concrete/cinder block walls shattered
12.2 – 2.40	Range 90-1% eardrum rupture among exposed population
2.50	50% destruction of home brickwork
4.00 – 3.00	Frameless steel panel buildings ruined
5.00	Wooden utility poles snapped
7.00 – 5.00	Nearly complete destruction of houses
10.0	Probable total building destruction
29.0 – 14.5	Range for 99-1% fatalities among exposed populations due to direct blast effects

TABLE 4

EXISTING FACILITY WORST-CASE FLAMMABLE RELEASE SCENARIO ARCHIE MODELING RESULTS

Chemical	Amount Released (lbs)	Lower Heat of Combustion (Btu/lb)	Yield Factor	Distance to Endpoint (yd)
ETX	11,497	14,161	0.03	187

TABLE 5

PROPOSED FACILITY WORST-CASE FLAMMABLE RELEASE SCENARIO ARCHIE MODELING SUMMARY

Constituent	Waste Code	Amount Released (lbs)	Lower Heat of Combustion (Btu/lb)	Yield Factor	Distance to Endpoint (yd)
Allyl alcohol	P005	5,106	13,748.60	0.03	142
Benzyl chloride	P028	6,577	12,638.64	0.03	150
Cyanogen (gas)	P031	2,000	8,958.95	0.03	90
Phosgene (gas)	P095	2,000	472.99	0.03	34
Acrylonitrile	U009	4,828	11,123.73	0.03	129
Chloromethane (gas) (methyl chloride)	U045	2,000	6,519.13	0.03	81
Di-n-butyl phthalate	U069	6,260	13,405.37	0.03	150
1,1-Dichloroethylene (vinylidene chloride)	U078	7,252	4,870.9	0.03	113
Diethyl phthalate	U088	6,636	11,526.69	0.03	146
Dimethylamine	U092	5,608	16,684.36	0.03	156
1,1-Dimethyl hydrazine	U098	4,732	14,184.28	0.03	139
Ethyl acrylate	U113	5,626	11,682.91	0.03	138
Ethylene oxide (gas)	U115	2,000	12,378.69	0.19	185
Formic acid	U123	7,234	2,386.50	0.03	89
Furfural	U125	6,929	10,509.73	0.03	143
Hydrazine	U133	6,583	8,363.5	0.03	131
Isosafrole	U141	6,696	13,731.75	0.03	155
2-Picoline	U191	5,638	15,812.23	0.03	153
n-Propylamine	U194	4,287	17,261.87	0.03	129
Bromoform (tribromomethane)	U225	17,279	930.42	0.03	87
Triethylamine	U404	4,353	18,493.85	0.03	148

To determine if the proposed permit modification represents a significant modification, the predicted distances to the endpoints were compared to the baseline OCA distances. The worst-case baseline flammable scenario is an explosion of the ethanol, toluene, and xylene mixture in the 3,000-gallon storage tank. The predicted distance to the endpoint in that scenario is 187 yards. All predicted distances for the proposed facility are less than 187 yards, provided the facility does not store in a single container amounts greater than those listed in the column titled "Amount Released" in Table 5.

3.0 CONCLUSION

The current facility worst-case toxic release scenario is the instantaneous release of 7,075 pounds of ethanol from the 3,000-gallon storage tank. ALOHA modeling predicted a distance to the toxic endpoint of 1,164 yards. Fifty-five constituents, representing the most highly toxic chemicals associated with the new waste codes, were modeled using ALOHA Version 5.3.1. None of the predicted distances exceeded the endpoint of 1,164 yards for the quantities in Table 2.

The baseline worst-case flammable scenario is an explosion of the ethanol, toluene, and xylene mixture in the 3,000-gallon storage tank. The predicted distance to the endpoint in that scenario is 187 yards. This is greater than the worst-case scenario associated with proposed operations, i.e., 185 yards for a 2,000-pound container containing ethylene oxide gas. Therefore, this extremely conservative scenario demonstrates that the off-site impact of the proposed changes due to flammable materials does not result in a substantial modification.

For containers holding the proposed new waste codes, PFF proposes to limit the maximum amount of associated toxic liquid and gasseous chemicals listed in Table 2 in a single container to the quantity in the "amount released" column in Table 2. PFF also proposes to limit the maximum amount of associated flammable liquid chemicals listed in Table 5 in a single container to the quantity in the "amount released" column in Table 5. PFF proposes to limit the largest amount of a compressed flammable gas to 2,000 pounds per container. In the event the same chemical is listed in both Table 2 and Table 5, the maximum amount stored in a single container will be the smaller of the two values. For example, the waste code U225, bromoform, has a toxic limit of 14,360 pounds in Table 2 and a flammable limit of 17,279 pounds in Table 5. In this case, the smaller limit of 14,360 pounds will apply.

A comparison of the 1999 baseline OCA results with the OCA results addressing the proposed operations indicates that the modification does not constitute a "substantial modification" under F.S. 403.7211, as long as the facility does not store in a single container the amount greater than that represented in the column titled "Amount Released" in Table 2 or Table 5.

Figure 1 – Facility Location

Figure 2 – Facility Site Plan

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ATTACHMENT 1

PROPOSED WASTE CODE LIST

List of Waste Codes Proposed for Storage and Treatment

F006	P037	P082	P127	U026	U085	U130	U170	U219
F007	P038	P084	P128	U028	U086	U131	U172	U221
F008	P039	P085	P185	U030	U087	U132	U173	U222
F009	P040	P087	P188	U032	U088	U133	U174	U223
F039	P041	P088	P189	U033	U090	U134	U176	U225
P001	P043	P089	P190	U034	U091	U135	U177	U234
P002	P044	P092	P191	U036	U092	U136	U178	U235
P004	P045	P093	P192	U038	U093	U137	U179	U236
P005	P046	P094	P194	U039	U094	U138	U180	U238
P006	P047	P095	P196	U041	U095	U141	U181	U240
P007	P048	P096	P197	U042	U096	U142	U182	U243
P008	P049	P097	P198	U043	U097	U143	U183	U244
P009	P050	P098	P199	U045	U098	U144	U184	U246
P010	P051	P099	P201	U046	U099	U145	U185	U247
P011	P054	P101	P202	U047	U101	U146	U186	U248
P012	P056	P102	P203	U048	U102	U147	U188	U249
P013	P057	P103	P204	U049	U103	U148	U189	U271
P014	P058	P104	P205	U050	U105	U149	U190	U278
P015	P059	P105	U005	U051	U106	U151	U191	U279
P016	P060	P106	U006	U060	U107	U152	U192	U280
P017	P062	P108	U007	U061	U109	U153	U193	U364
P018	P063	P109	U008	U062	U111	U155	U194	U367
P020	P064	P110	U009	U063	U113	U156	U197	U372
P021	P065	P111	U011	U064	U114	U157	U203	U373
P023	P066	P112	U014	U066	U115	U158	U204	U387
P024	P067	P113	U015	U067	U116	U160	U205	U389
P026	P068	P114	U016	U069	U118	U162	U207	U394
P027	P069	P115	U017	U073	U119	U163	U214	U404
P028	P070	P116	U018	U074	U120	U164	U215	U409
P029	P071	P118	U020	U075	U123	U166	U216	U410
P030	P072	P119	U021	U078	U125	U167	U217	U411
P031	P073	P120	U022	U079	U126	U168	U218	
P033	P074	P121	U023	U081	U127			
P034	P077	P122	U024	U082	U128			
P036	P078	P123	U025	U084	U129			

[Note: The list of hazardous constituents associated with F039 waste code is extremely long. Dispersion modeling for these constituents is not practical.]

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ATTACHMENT 2

HAZARDOUS WASTE CONSTITUENTS OF PROPOSED WASTE CODES

Waste Code	Description
F-Codes	
F006	Wastewater treatment sludges from certain electroplating operations, cadmium, hexavalent chromium, nickel, and cyanide (complexed)
F007	Cyanide salts
F008	Cyanide salts
F009	Cyanide salts
F039	Leachate resulting from the disposal of more than one restricted waste classified as hazardous under Subpart D of this part. *[Note: The list of hazardous constituents associated with this waste code is extremely long. Dispersion modeling for these constituents is not practical.]*
P-Codes	
P001	Warfarin & salts; 2H-1-Benzopyran-2-on, 4-hydroxy-3-(3-oxo-1-phenylbutyl), when present at concentrations >0.3%
P002	Acetamide, N-(aminothioxomethyl)-; 1-Acetyl-2-thiourea
P004	Aldrin; 1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a-hexahydro-
P005	Allyl alcohol; 2-Propen-1-ol
P006	Aluminum phosphide (R, T)
P007	5-(Aminomethyl)-3-isoxazolol; 3(2H)-Isoazolone, 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 As_2O_5; Arsenic pentoxide
P012	Arsenic trioxide
P013	Barium cyanide
P014	Benzenethiol; Thiophenol
P015	Beryllium powder
P016	Dichloromethyl ether; Methane, oxybis[chloro-
P017	Bromoacetone; 2-Propanone, 1-bromo-
P018	Brucine; Strychnidine-10-one, 2,3-dimethoxy-; Strychnine & salts
P020	Dinoseb; Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P021	Calcium cyanide $Ca(CN)_2$
P023	Acetaldehyde, chloro-; Chloroacetaldehyde
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
P030	Cyanides (soluble cyanide salts), not otherwise specified
P031	Cyanogen; Ethanedinitrile
P033	Cyanogen chloide (CN)Cl
P034	2-Cyclohexyl-4,6-dinitrophenol; Phenol, 2-cyclohexyl-4,6-dinitro-

Waste Code	Description
P036	Arsonous dichloride, phenyl-; Dichlorophenylarsine
P037	Dieldrin; 2,7:3,6-Dimethanonaphth[2,3-b]oxirine
P038	Arsine, diethyl-; Diethylarsine
P039	Disulfoton; Phosphorodithioic acid, o,o-diethyl s-[2-(ethylthio)ethyl] ester
P040	O,O-Diethyl O-pyrazinyl phosphorothioate; Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P041	Diethyl-p-nitrophenyl phosphate; Phosphoric acid, diethyl 4-nitrophenyl ester
P043	Diisopropylfluorophosphate; Phosphorofluoridic acid, bis(1-methylethyl) ester
P044	Dimethoate; Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester
P045	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[methylamino)carbonyl] oxime; Thiofanox
P046	Benzeneethanamine, a,a-dimethyl-; a,a-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; Thionidodicarbonic diamide $[(CH_2N)C(S)]_2NH$
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; Endosulfan sulfate
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-; Endrin & metabolites; Endrin aldehyde
P054	Aziridine; Ethyleneimine
P056	Fluoride, Fluorine
P057	Acetamide, 2-fluoro-; Fluoroacetamide
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-; Heptachlor epoxide
P060	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a-hexahydro-; Isodrin
P062	Hexaethyl tetraphosphate; Tetraphosphoric acid, hexaethyl ester
P063	Hydrocyanic acid; Hydrogen cyanide
P064	Methane, isocyanato-; Methyl isocyanate
P065	Fulminic acid, mercury (2+) salt; Mercury fulminate
P066	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester; Methomyl
P067	Aziridine, 2-methyl-; 1,2-Propylenimine
P068	Hydrazine, methyl-; Methyl hydrazine
P069	2-Methyllactonitrile; Propanenitrile, 2-hydroxy-2-methyl-
P070	Aldicarb; Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P071	Methyl parathion; Phosphorothioic acid, O,O,-dimethyl O-(4-nitropheynl) ester

Waste Code	Description
P072	a-Naphthylthiourea; Thiourea, 1-naphthalenyl-
P073	Nickel carbonyl $Ni(CO)_4$
P074	Nickel cyanide $Ni(CN)_2$
P077	Benzenamine, 4-nitro-; P-Nitroaniline
P078	Nitrogen dioxide
P082	Methanamine, n-methyl-n-nitroso-; n-Nitrosodimethylamine
P084	n-Nitrosomethylvinylamine; Vinylamine, n-methyl-n-nitroso-
P085	Diphosphoramide, octamethyl-; Octamethylpyrophosphoramide
P087	Osmium tetroxide; Osmium oxide OsO_4, (T-4)-
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-; Phenylmercury acetate
P093	Phenylthiourea; Thiourea, phenyl-
P094	Phorate; Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P095	Carbonic dichloride; Phosgene
P096	Hydrogen phosphide; Phosphine
P097	Famphur; Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester
P098	Potassium cyanide K(CN)
P099	Argentate(1-), bis(cyano-C)-, potassium; Potassium silver cyanide
P101	Ethyl cyanide; Propanenitrile
P102	Propargyl alcohol; 2-Propyn-1-ol
P103	Selenourea
P104	Silver cyanide
P105	Sodium azide
P106	Sodium cyanide
P108	Strychnidin-10-one, & salts; Strychnine, & salts
P109	Tetraethyldithiopyrophosphate; Thiodiphosphoric acid, tetraethyl ester
P110	Lead; Plumbane, tetraethyl-; Tetraethyl lead
P111	Diphosphoric acid, tetraethyl ester; Tetraethyl pyrophosphate
P112	Methane, tetranitro-; Tetranitromethane
P113	Thallic oxide; Thallium oxide Tl_2O_3
P114	Selenious acid, dithallium (1+) salt; Thallium selenite
P115	Sulfuric acid, dithallium (1+) salt; Thallium sulfate
P116	Hydrazinecarbothioamide; Thiosemicarbazide
P118	Methanethiol, trichloro-; Trichloromethanethiol
P119	Ammonium vanadate; Vanadic acid, ammonium salt
P120	Vanadium pentoxide
P121	Zinc cyanide
P122	Zinc phosphide Zn_3P_2, when present at conc. >10%
P123	Toxaphene
P127	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate

Waste Code	Description
P128	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester)
P185	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O-[(methylamino) carbonyl] oxime
P188	Physostigminesalicylate
P189	Carbamic acid, [(dibutylamino) thio] methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester
P190	Carbamic acid, methyl-, 3-methylphenyl ester
P191	Carbamic acid, dimethyl-, 1- [(dimethylamino) carbonyl]-5-methyl-1H-pyrazol-3-yl ester
P192	Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H-pyrazol-5-yl ester
P194	Ethanimidothioc acid, 2-(dimethylamino)-N-[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester
P196	Manganese, bis(dimethylcarbamodithioato-S,S')-
P197	Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[(methylamino) carbonyl]oxy]phenyl]-
P198	Methanimidamide, N,N-dimethyl-N'-[3-[[(methylamino) carbonyl]oxy]phenyl]-, monohydrochloride
P199	Phenol, (3,5-dimethyl-4-(methylthio)-, methyl carbamate
P201	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate
P202	Phenol, 3-(methylethyl)-, methyl carbamate
P203	Propanal, 2-methyl-2-(methylsulfonyl)-, O-[(methylamino) carbonyl] oxime
P204	Pyrrolo[2,3-b]indol-5-01, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbmate (ester), (3aS-cis)-
P205	Zinc, bis(dimethylcarbamodithioato-S,S')-, (T-4)-
U-Codes	
U005	Acetamide, n-9h-fluoren-2-yl-; 2-Acetylaminofluorene
U006	Acetyl chloride
U007	Acrylamide; 2-Propenamide
U008	Acrylic acid; 2-Propenoic acid
U009	Acrylonitrile; 2-propenenitrile
U011	Amitrole; 1H-1,2,4-Triazol-3-amine
U014	Auramine; Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-
U015	Azaserine; L-Serine, diazoacetate (ester)
U016	Benz(c)acridine
U017	Benzal chloride; Benzene, (dichloromethyl)-
U018	Benz(a)anthracene
U020	Benzenesulfonic acid chloride; Benzenesulfonyl chloride
U021	Benzidine; [1,1'-Biphenyl]-4,4'-diamine
U022	Benzo(a)pyrene
U023	Benzene, (trichloromethyl)-; Benzotrichloride
U024	Dichloromethoxy ethane; Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-

Waste Code	Description
U025	Dichloroethyl ether; Ethane, 1,1'-oxybis[2-chloro-
U026	Chlornaphazin; Naphthalenamine, N,N'-bis(2-chloroethyl)-
U028	1,2-Benzenedicarboxylic acid, bis(2-Ethylhexyl) ester; Diethylhexyl phthalate
U030	Benzene, 1-bromo-4-phenoxy-; 4-Bromophenyl phenyl ether
U032	Calcium chromate; Chromic acid H_2CrO_4, calcium salt
U033	Carbon oxyfluoride; Carbonic difluoride
U034	Acetaldehyde, trichloro-; Chloral
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-
U038	Benzeneacetic acid, 4-chloro-a-(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-chloroethoxy)-
U043	Ethene, chloro-; Vinyl chloride
U045	Methane, chloro-; Methyl chloride
U046	Chloromethyl methyl ether; Methane, chloromethoxy-
U047	b-Chloronaphthalene; Naphthalene, 2-chloro-
U048	o-Chlorophenol; Phenol, 2-chloro-
U049	Benzenamine, 4-chloro-2-methyl-, hydrochloride; 4-Chloro-o-toluidine, hydrochloride
U050	Chrysene
U051	Creosote; Lead; Naphthalene; Pentachlorophenol; Phenanthrene; Pyrene; Toluene; m-Xylene; p-Xylene; p-Xylene
U060	O,P'-DDD; Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-
U061	O,P'-DDD; P,P'-DDD; O,P'-DDE; P,P'-DDD; O,P'-DDT; Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-; P,P'-DDT; DDT
U062	Carbamothioic acid, bis (1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester; Diallate
U063	Dibenz(a,h)anthracene
U064	Benzo(rst)pentaphene; Dibenzo(a,i)pyrene
U066	1,2- Dibromo-3-chloropropane; Propane, 1,2-dibromo-3-chloro-
U067	Ethane, 1,2-dibromo; Ethylene dibromide
U069	1,2- Benzenedicarboxylic acid, dibutyl ester; Dibutyl phthalate
U073	[1,1'- Biphenyl]-4,4'-diamine, 3,3'-dichloro-; 3,3'-Dichlorobenzidine
U074	2-Butene, 1,4-dichloro-; 1,4- Dichloro-2-butene
U075	Dichlorodifluoromethane; Methane, dichlorodifluoro-
U078	1,1- Dichloroethylene; Ethene, 1,1-dichloro
U079	1,2- Dichloroethylene; Ethene, 1,2-dichloro
U081	2,4- Dichlorophenol; Phenol, 2,4-dichloro-
U082	2,6- Dichlorophenol; Phenol, 2,6-dichloro-
U084	1,3-Dichloropropene; 1-Propene, 1,3-dichloro-; 1,3-Dichloropropene (cis); 1,3- Dichloropropene (trans)

Waste Code	Description
U085	2,2'-Bioxirane; 1,2:3,4-Diepoxybutane
U086	N,N'-Diethylhydrazine; Hydrazine, 1,2-diethyl-
U087	O,O-Diethyl s-methyl dithiophosphate; Phosphorodithioic acid, O,O-diethyl s-methyl ester
U088	1,2-Benzenedicarboxylic acid, diethyl ester; Diethyl phthalate
U090	Benzodioxole, 5-propyl-1,3-; Dihydrosafrole
U091	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-; 3,3'-Dimethoxybenzidine
U092	Dimethylamine; Methanamine, n-methyl-
U093	Benzenamine, N,N-dimetyl-4-(phenylazo)-; p-Dimethylaminoazobenzene
U094	Benz(a)anthracene, 7,12-dimethyl-; 7,12-Dimethylbenz[a]anthracene
U095	[1,1'- Biphenyl]-4,4'-diamine, 3,3'-dimethyl-; 3,3'-Dimethylbenzidine
U096	a,a-Dimethylbenzylhydroperoxide; Hydroperoxide, 1-methyl-1-phenylethyl-
U097	Carbamic chloride, dimethyl-; Dimethylcarbamoyl chloride
U098	1,1-Dimethylhydrazine; Hydrazine, 1,1-dimethyl-
U099	1,2-Dimethylhydrazine; Hydrazine, 1,2-dimethyl-
U101	2,4-Dimethylphenol; Phenol, 2,4-dimethyl-
U102	1,2-Benzenedicarboxylic acid, dimethyl ester; Dimethyl phthalate
U103	Dimethyl sulfate; Sulfuric acid, dimethyl ester
U105	Benzene, 1-methyl-2,4-dinitro-; 2,4-Dinitrotoluene
U106	Benzene, 2-methyl-1,3-dinitro-; 2,6-Dinitrotoluene
U107	Di-n-octyl phthalate;
U109	1,2-Diphenyl hydrazine; Hydrazine, 1,2-diphenyl-
U111	1-Propanamine, n-nitroso-n-propyl-; Di-n-propylnitrosamine
U113	Ethyl acrylate; 2-Propenoic acid, ethyl ester
U114	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters; Ethylenebisdithiocarbamic acid; Ethylenebisdithiocarbamic acid, salts & esters
U115	Ethylene oxide; Oxirane
U116	Ethylenethiourea; 2-Imidazolidinethione
U118	Ethyl methacrylate; 2-Propenoic acid, 2-methyl-, ethyl ester
U119	Ethyl methanesulfonate; Methanesulfonic acid, ethyl ester
U120	Fluoranthene
U123	Formic acid
U125	2-Furancarboxaldehyde; Furfural
U126	Glycidylaldehyde; Oxiranecarboxyaldehyde
U127	Benzene, hexachloro-; Hexachlorobenzene
U128	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-; Hexachlorobutadiene
U129	a-BHC; b-BHC; d-BHC; g-BHC; Cyclohexane, 1,2,3,4,5,6-hexachloro-; Lindane
U130	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro; Hexachlorocyclopentadiene

Waste Code	Description
U131	Ethane, hexachloro-; Hexachloroethane
U132	Hexachlorophene; Phenol, 2,2'-methylenebis[3,4,6-trichloro-
U133	Hydrazine
U134	Fluoride (as hydrogen fluoride); Hydrofluoric acid; Hydrogen fluoride
U135	Hydrogen sulfide
U136	Arsenic acid, dimethyl-; Cacodylic acid
U137	Indeno(1,2,3-cd)pyrene
U138	Methane, iodo-; Methyl iodide
U141	Benzodioxole, 5-(1-propenyl)-1,3-; Isosafrole
U142	Kepone; 1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5a,5b,6-decachlorooctahydro-
U143	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]]-; Lasiocarpine
U144	Acetic acid, lead(2+) salt; Lead acetate
U145	Lead phosphate; Phosphoric acid, lead (2+) salt (2:3)
U146	Lead subacetate; Lead, bis(acetato-o)tetrahydroxytri-
U147	2,5-Furandione; Maleic anhydride
U148	Maleic hydrazide; 3,6-Pyridazinedione, 1,2-dihydro-
U149	Malononitrile; Propanedinitrile
U151	Mercury
U152	Methacrylonitrile; 2-Propenenitrile, 2-methyl-
U153	Methanethiol; Thiomethanol
U155	1,2-Ethanediamine, N,N-dimethyl-n'-2-pyridinyl-n'-(2-thienylmethyl)-; Methapyrilene
U156	Carbonochloridic acid, methyl ester; Methyl chlorocarbonate
U157	Benz(j)aceanthrylene, 1,2-dihydro-3-methyl-; 3-Methylcholanthrene
U158	Benzenamine, 4,4'-methylenebis[2-chloro-; 4,4'-Methylenebis(2-chloroaniline)
U160	2-Butanone, peroxide; Methyl ethyl ketone peroxide
U162	Methyl methacrylate; 2-Propenoic acid, 2-methyl-, methyl ester
U163	Guanidine, n-methyl-n'-nitro-n-nitroso-; MNNG
U164	Methylthiouracil; 4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U166	1,4-Naphthalenedione; 1,4-Naphthoquinone
U167	1-Naphthalenamine; a-Naphthylamine
U168	2-Naphthalenamine; b-Naphthylamine
U170	p-Nitrophenol; Phenol, 4-nitro-
U172	1-Butanamine, n-butyl-n-nitroso-; N-Nitrosodi-n-butylamine
U173	Ethanol, 2,2'-(nitrosoimino)bis-; N-Nitrosodiethanolamine
U174	Ethanamine, n-ethyl-n-nitroso-; N-Nitrosodiethylamine
U176	N-Nitroso-n-ethylurea; Urea, n-ethyl-n-nitroso-
U177	N-Nitroso-n-methylurea; Urea, n-methyl-n-nitroso-

Waste Code	Description
U178	Carbamic acid, methylnitroso-, ethyl ester; N-Nitroso-n-methylurethane
U179	N-Nitrosopiperidine; Piperidine, 1-nitroso-
U180	N-Nitrosopyrrolidine; Pyrrolidine, 1-nitroso-
U181	Benzenamine, 2-methyl-5-nitro-; 5-Nitro-o-toluidine
U182	Paraldehyde; 1,3,5-Trioxane, 2,4,6-trimethyl-
U183	Benzene, pentachloro-; Pentachlorobenzene
U184	Ethane, pentachloro-; Pentachloroethane
U185	Benzene, pentachloronitro-; Pentachloronitrobenzene (PCNB)
U186	1-Methylbutadiene; 1,3-Pentadiene
U188	Phenol
U189	Phosphorus sulfide; Sulfur phosphide
U190	1,3-Isobenzofurandione; Phthalic anhydride
U191	2-Picoline; Pyridine, 2-methyl-
U192	Benzamide, 3,5-dichloro-n-(1,1-dimethyl-2-propynyl)-; Pronamide
U193	1,2-Oxathiolane, 2,2-dioxide; 1,3-Propane sultone
U194	1-Propanamine; N-Propylamine
U197	P-Benzoquinone; 2,5-Cyclohexadiene-1,4-dione
U203	Benzodioxole, 5-(2-propenyl)-1,3-; Safrole
U204	Selenious acid; Selenium dioxide
U205	Selenium sulfide SeS_2
U207	Benzene, 1,2,4,5-tetrachloro-; 1,2,4,5-Tetrachlorobenzene
U214	Acetic acid, thallium(1+) salt; Thallium acetate
U215	Carbonic acid, dithallium (1+) salt; Thallium carbonate
U216	Thallium chloride
U217	Nitric acid, thallium (1+) salt; Thallium nitrate
U218	Ethanethioamide; Thioacetamide
U219	Thiourea
U221	Benzenediamine, ar-methyl-; Toluenediamine
U222	Benzenamine, 2-methyl-, hydrochloride; O-Toluidine hydrochloride
U223	Benzene, 1,3-diisocyanatomethyl-; Toluene diisocyanate
U225	Bromoform; Methane, tribromo-
U234	Benzene, 1,3,5-trinitro-; 1,3,5-Trinitrobenzene
U235	1-Propanol, 2,3-dibromo-, phosphate (3:1); Tris(2,3-dibromopropyl) phosphate
U236	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-dlyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt; Trypan blue
U238	Carbamic acid, ethyl ester; Ethyl carbamate (urethane)
U240	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters; 2,4-D, salts, esters
U243	Hexachloropropene; 1-Propene, 1,1,2,3,3,3-hexachloro-
U244	Thioperoxydicarbonic diamide, tetramethyl-; Thiram
U246	Cyanogen bromide (CN)Br

Waste Code	Description
U247	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-; Methoxychlor
U248	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-; Warfarin, & salts when present at conc. of <= 0.3%
U249	Zinc phosphide Zn_3P_2, when present at conc. <= 10%
U271	Carbamic acid, [1- [(butylamino) carbonyl]- 1H-benzimidazol-2-yl] -, methyl ester
U278	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate
U279	1-Naphthalenol, methylcarbamate
U280	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester
U364	1,3-Benzodioxol-4-ol, 2,2-dimethyl-
U367	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-
U372	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester
U373	Carbamic acid, phenyl-, 1-methylethyl ester
U387	Carbamothioic acid, dipropyl-, s-(phenylmethyl) ester
U389	Carbamothioic acid, bis(1-methylethyl)-, s-(2,3,3-trichloro-2-propenyl) ester
U394	Ethanimidothioic acid, 2-(dimethylamino) -n-hydroxy-2-oxo-, methyl ester
U404	Ethanamine, N,N-diethyl-
U409	Carbamic acid, [1,2-phyenylenebis (iminocarbonothioyl)] bis-, dimethyl ester
U410	Ethanimidothioic acid, N,N'-[thiobis [(methylimino) carbonyloxy]] bis-, di-methyl ester
U411	Phenol, 2-(1-methylethoxy)-, methylcarbamate

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ATTACHMENT 3

NIOSH ILDH VALUES

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ATTACHMENT 4

AIHA ERPG VALUES

APPENDIX A

ALOHA MODELING RESULTS

APPENDIX B

ARCHIE MODELING RESULTS