PermaFix®
environmental services

10100 ROCKET BOULEVARD • ORLANDO, FLORIDA 32824

Via UPS Next Day
1Z3X89112210076350

June 5, 2006

Janine Kraemer
Hazardous Waste Section
Florida Dept. of Environmental Protection
Central District Office
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767

Subject: April 19, 2006 Incident Investigation Report
Perma-Fix of Orlando, Inc., 10100 Rocket Blvd., Orlando;
EPA ID No. FLD 980 559 728

Dear Ms. Kraemer:

As previously requested, enclosed is a copy of the above referenced report prepared by the environmental consultant firm, Schreiber, Yonley, & Associates (SYA). We received the copies last Thursday, June 1, 2006.

The SYA report includes recommendations which they believe would prevent re-occurrence of the incident. Having received the report just last June 1, 2006, we are still reviewing the recommendations. Once we have completed our review, we will send you a separate letter to bring you up to date on how we are addressing the recommendations.

If you have any questions or need additional information, please call me or Victor San Agustin at 407/859-4441.

Sinerely,

Perma-Fix of Orlando, Inc.

Mike Merashoff
General Manager
MM/vsa

APRIL 19, 2006
WASTE MATERIAL STORAGE AND PROCESSING AREA INCIDENT INVESTIGATION

AT
PERMA-FIX OF ORLANDO, INC.
ORLANDO, FLORIDA

MAY 31, 2006

Prepared for:

PERMA-FIX OF ORLANDO, INC.
10100 ROCKET DRIVE
ORLANDO, FLORIDA

Project No. 060093

SCHREIBER & YONLEY ASSOCIATES
ENVIRONMENTAL ENGINEERS

271 Wolfner Drive • Fenton, MO 63026 • (636) 349-8399 • www.perma-fix.com/sya

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF ATTACHMENTS

ABBREVIATIONS AND ACRONYMS

AFA	AFA Protection Systems of Florida
BFAI	Division of the State Fire Marshal, Bureau of Fire and Arson Investigation
FDEP	Florida Department of Environmental Protection
MSDS	Material Safety Data Sheet
PESI	Perma-Fix Environmental Services, Inc.
PFOR	Perma-Fix of Orlando
RCRA	Resource Conservation and Recovery Act
SYA	Schreiber, Yonley & Associates

1.0 INTRODUCTION

Schreiber, Yonley & Associates (SYA), a wholly owned subsidiary of Perma-Fix Environmental Services, Inc. (PESI), was retained by the Industrial Division of PESI to investigate the cause of a waste material fire at the Perma-Fix's Orlando, Florida facility (PFOR). PFOR is a Resource Conservation and Recovery Act (RCRA) permitted industrial waste treatment and storage facility. The plant specializes in the bulk processing of numerous hazardous and non-hazardous wastes for a wide range of industrial clients. Maps showing the site location and layout are included in Attachment A.

In order to complete the requested investigation, Brad Phillips of SYA performed a site visit, damaged equipment analysis, photographic record of the damage, interviews of applicable facility employees, and document review.

Based on the data gathered, site review, and employee interviews completed, SYA has developed this report to summarize the pertinent facts, relevant information, possible scenarios, and supportable conclusions as they relate to the incident. Therefore, this report will provide a detailed description of the incident, analyze the potential root cause of the fire and any contributing factors, and provide recommendations to minimize the risk of this or a similar incident from occurring in the future. This report is limited to reviewing the incident location (i.e., the downstairs material processing and storage area) for direct causes of the incident initiation. Where applicable, administrative procedures, training, and waste analysis procedures were also reviewed to evaluate whether they were contributing factors to the incident. The non-hazardous operation, which is located at the corner of General Avenue and Rocket Drive, was not reviewed as part of this incident investigation and recommendation development.

2.0 INCIDENT DESCRIPTION

The following sections provide a brief overview of the known sequence of events and describe the incident in general terms. These sections also summarize the released materials, cleaned up materials, and material volumes involved.

2.1 Description of Incident

The incident occurred in the second bay of the lower drum storage and processing area. Attachment B includes a map showing the incident location. The materials involved in the incident included calcium hypochlorite, lithium batteries, sawdust, and F006 plating sludge. All the materials are considered wastes except for the sawdust. The calcium hypochlorite and lithium batteries are expired shelf life products. Waste documents and their profile forms are included in Attachment C. In addition, material safety data sheets (MSDSs) for the major components of the waste materials are included in Attachment D.

Starting Monday, April 17, 2006, facility personnel began the task of transferring small containers of the calcium hypochlorite from their ten-gallon pails to bulk super-sack containers. Each calcium hypochlorite pail contained approximately fifty pounds of the material. The handling procedures involved the removal of the inner bag from the outer pail and pouring the material into the bulk super-sacks. The super-sacks are specifically

designed to act as bulk transport containers for solid material and include an inner plastic liner to ensure that the waste materials are not released through the outer bag and contamination from the outside cannot reach the inner portion of the super-sack and the material it contains. Over the course of the first two days of the week, four of these super-sacks (ID Nos. ND0422, ND0423, ND0424, and ND0426) were filled and moved to the upper warehouse for shipment to another off-site waste processing facility. This left four super-sacks partially filled in the lower processing building, along with forty-eight remaining small pails from the original shipment. A drawing showing the layout of the various materials and containers in the area is included in Attachment E.

At the end of the workday on Tuesday, April 18, 2006, the employees completing the calcium hypochlorite consolidation began cleanup of the area at approximately 1530 and completed the cleanup activities at about 1600. The final procedure before leaving the facility was to close the rollup and manway doors to the building. All employees working in the lower warehouse area left the site at approximately 1615. The employees involved in this consolidation operation are listed in Table 1 below. The final two facility employees, who were working on the upper dock area, finished their shift and left the site at 1800 and 1900, respectively. A summary of the applicable personnel involved in the incident area, their titles, work areas, and work hours on April 18, 2006 are included in Table 1.

Table 1. Employee Work Information

Name	Title	Work Area	Work Hours
Mike Merashoff	Facility Manager	Office/Plant	0700 – 1600
Raj Singh	Operations Manager	Office/Plant	0700 – 1600
Mike Avery	Transportation Manager	Office/Plant	0700 – 1600
Rob Cannon	Field Chemist	Lower Warehouse	0700 – 1600
Jason Woodroof	Supervisor	Lower Warehouse	0700 – 1600
Einard Duriettz	Technician	Lower Warehouse	0700 – 1600
Jesus Rivas	Technician	Upper Warehouse	0900 – 1800
Harry Ortiz	Technician	Lower Warehouse	0700 – 1700
John Schreiber	Technician	Upper Warehouse	0900 – 1800

At 0255 on April 19, 2006, the alarm monitoring company [AFA Protection Systems of Florida (AFA)] reported an alarm level associated with a drop in the sprinkler system riser pressure. This sensor alarms whenever the water pressure drops, which is associated with the initiation of the sprinkler head(s). AFA called the PFOR emergency coordinator, Mike Avery, at 0300. Mr. Avery authorized AFA to contact the fire department to respond to the incident. The incident log from AFA is included in Attachment F of this report.

During his travel to the facility, Mr. Avery relayed the types of materials located in the bay to the fire department. Since the materials were water-reactive, the fire department was judicious in their use of water in responding to the incident and shut off the sprinkler system as soon as it was felt prudent. Additionally, a small water line serving the bathroom behind the drum storage and processing building was shut down because two

holes had developed in the line. During the course of responding to the incident, the fire department used the 150-lb wheeled dry chemical extinguisher system.

Mr. Avery arrived at the facility at about 0330, and the fire department had already gained access to the site and the building in question. The operations manager, Raj Singh, was also contacted and arrived at the site around 0400. The fire department blocked access to Rocket Avenue shortly after arriving, thus stopping access to the facility by the remaining employees who were also contacted. The remaining employees were allowed to enter the site at approximately 0700.

Once all water sources were discontinued, the fire died away, leaving only a small reaction continuing between the calcium hypochlorite and the accumulated water. The material was allowed to remain in place during the remainder of the day (April 19, 2006). Facility personnel completed incidental cleanup around the facility and prepared strategies to address incident cleanup.

Since the sprinkler system was inactive in the lower processing area, a fire watch system that utilized trained facility personnel was put in place to ensure that the unprotected portion of the plant was monitored and assistance could be summoned should another incident occur.

Brad Phillips of SYA arrived at the facility at 1600 on April 19, 2006 and began investigating the incident location by taking pictures of the area and establishing procedures and data needs for the investigation.

Cleanup of the incident materials was initiated on Thursday, April 20, 2006 by facility personnel at 0700. This involved removal of the remaining calcium hypochclorite material in this processing area, segregation of any remaining sawdust, repackaging of the remaining unreleased F006 plating sludge, and repackaging of certain lithium batteries.

A timeline of all significant events is included in Table 2 below.

Table 2. Incident Timeline

Date	Time	Incident Event
April 18, 2006	1530	Lower Area Cleanup Began
	1615	All Lower Area Employees Leave Facility
	1900	Last Upper Warehouse Employee Leaves Facility
April 19, 2006	0255	AFA Received Fire Alarm
	0257	Fire Department Contacted by AFA
	0300	Mike Avery Contacted by AFA
	0315	Fire Department Arrived at Facility
	0330	Mike Avery Arrived at Facility
	0400	Access to Rocket Avenue Blocked
	0415	Raj Singh Arrived at Facility
	0445	Fire Contained by Fire Department

Date	Time	Incident Event
	0700	Access Allowed by Fire Department
	0715	Fire Watch Initiated
April 20, 2006	0700	Cleanup of Incident Area Began
April 21, 2006		Sprinkler System Restored/Fire Watch Discontinued

2.2 Incident Response Actions

The initiation of the incident response started with a call by AFA to the emergency coordinator and the fire department. The incident was relatively small in size and extent and therefore the majority of the response was handled quickly by the fire department. The response included using water to keep the combustible materials from becoming engulfed in flames due to the heat of the reaction between calcium hypochlorite and water.

According to the MSDS for calcium hypochlorite, water is the best media for fire fighting even though it is incompatible with the chemical. The technique is to keep the combustible and flammable materials from catching fire and to keep incompatible materials such as flammables, ammonia, etc. from coming into contact with the calcium hypochlorite. Water should be used sparingly to extinguish combustible materials, and dry chemical extinguishers are to be avoided since dry chemical agents may react with the calcium hypochlorite, resulting in a more dangerous situation. The techniques used by the facility personnel and fire department during the response action were appropriate for the materials involved.

Once the fire was contained and the facility personnel were allowed back onto the site, cleanup of the areas outside the containment structure was considered the most urgent. Areas outside of containment where waste was released and materials were tracked were addressed as soon as practical. Numerous methods, such as sweeping, excavation, etc., were used to decontaminate the areas of any visible waste materials. This operation took most of Thursday, April 20, 2006. In addition, the accumulated water in the containment area was pumped to an empty tanker in an attempt to minimize the amount of water contact with the calcium hypochlorite. This response action allowed SYA to complete its investigation of the incident area prior to initiating cleanup activities within the containment structure.

The cleanup of the incident area located within the containment structure was initiated Thursday, April 20, 2006 in the afternoon and was concluded on Friday, April 21, 2006. The incident materials were segregated into the various waste streams as follows:

Calcium Hypochlorite

This material was shoveled into open-top plastic drums. The drum lids were purposely left off since the wet material would continue to react slowly and could produce pressure within the drum. Such pressure could result in injury to facility personnel. Samples of the material are to be taken and submitted to alternative disposal locations, in accordance with applicable regulations. A determination as to how to transport the material would be

made with knowledgeable personnel prior to shipment. Photographs 1 through 10 of Attachment G show this material shortly after the incident, the cleanup efforts, and the final incident area after cleaning.

Lithium Batteries

The lithium batteries that were stacked on top of the drums to the south side of the calcium hypochlorite super-sacks were repackaged. Upon investigation, only the outside cardboard container surrounding the batteries and the outside of the outermost batteries sustained any fire damage. Therefore, only a few damaged batteries were packaged separately from the bulk of the batteries. Photographs 11 through 14 of Attachment G show this material shortly after the incident and final containers holding the burned lithium batteries.

Other Batteries

Located south of the calcium hypochlorite super-sacks were several different kinds of waste batteries (i.e., lithium, nickel-cadmium, and lead-acid). The outside cardboard containers for these wastes were slightly damaged, but no damage was noted on the waste batteries themselves. These batteries were transferred into new containers. Photographs 15 through 19 of Attachment G show these containers shortly after the incident.

F006 Plating Sludge

The solid material remaining in the drum that was not released during the incident was repackaged into an overpack drum for shipment to another disposal outlet. This drum (before and after overpacking) is shown in photographs 20 through 22 of Attachment G.

No other containers were damaged during the incident and all other containers are to be processed in their original intended fashion as determined prior to the incident.

2.3 Description of Released Materials

Three possible scenarios for releasing materials into the environment could have occurred as a result of the incident: 1) material release outside of containment; 2) tracking of material from the incident site during the response; and, 3) air release.

For the first avenue, the containment structure was adequately sized to contain all of the waste materials and the fire response materials (i.e., water and fire extinguishing chemical). The lower drum storage and process area is curbed with a building covering the entire structure. It was observed after the incident that the containment curb on the east side of the incident area was cracked and allowed a small amount of the contaminated water to release onto the soil surrounding the facility. The release area and containment crack are shown in photographs 23 through 25 of Attachment G. Previous facility inspections did not note this crack. Copies of the previous facility inspections are included in Attachment I. It is estimated that approximately nine (9) gallons of materials were released through this crack in the contaminant curb. The area of the release was

cleaned by excavating the material to a depth of six inches and backfilled with clean material. Photographs 26 through 28 show the remedial action taken. Samples were taken at the bottom of the excavation and the results are included in Attachment H and summarized in Table 3. Additionally, samples of the contained water that constituted the released materials was also sampled and analyzed. These are also included in Attachment H.

During the response, the fire department did remove contaminated pallets and other materials from the drum storage and processing area in order to properly address the incident. These materials were placed on the ground on the east side of the facility in the same location as the released material described above. Once the incident was over, these materials were placed back into the containment structure and the laydown areas were cleaned. Cleaning procedures included scrapping, sweeping, and wiping any visibly contaminated areas. All of the tracked materials were on concrete and none of the materials reached any standing water or soil. Photographs 29 through 31 of Attachment G show the areas before the remedial action and photographs 32 and 33 show the areas after cleanup.

Additionally, the fire department decontaminated their personnel and equipment in the parking lot of the PFOR facility. Samples of this area were taken to ensure that no contamination had occurred at this site. The analysis is included in Attachment H. Also included in Attachment H is a map detailing the location of each sample location.

The final release pathway is via air. The primary air emissions would be combustion products from plastic, paper, and wood, since the burned materials consisted of cardboard, wooden pallets, and plastic liners. Common air emissions from these materials include carbon monoxide, fine cellulose fibers/particles, nitrous oxides, Because the amount of materials involved in the incident was limited to five plastic super-sacks, six wooden pallets and three cardboard boxes, the emissions from these materials are considered to be negligible.

In addition to these materials and their combustion products, the reaction products of calcium hypochlorite and water were also reviewed. Generally, these two materials react in accordance with the following equation.

$$Ca(ClO)_2 + 2H_2O \rightarrow 2HOCl + Ca(OH)_2$$

The reaction of the HOCl molecule with other compounds, such as organics or metals, can produce chlorine and hydrogen chloride as byproducts. Therefore, since the reaction was limited to a small amount of chromium plating sludge and sawdust, it is not believed that an appreciable amount of the chlorine (RQ value of ten (10) pounds per 40 CFR 302.4) was released.

2.4 Description of Collected Response Materials

The response materials consisted of the contaminated water collected from the sprinkler system and fire department. This contaminated water was sampled and analyzed for the

waste constituents released as a result of the incident. These results are included in Attachment H. This water was contained in three 250-gallon totes and in one tanker. Approximately 4,000 gallons of contaminated water was generated as a result of the remedial action and the incident. At the end of the remedial action, the contents of the totes were transferred to the tanker. This material will be sampled, analyzed, and profiled to a disposal outlet in accordance with applicable environmental regulations. Photograph 34 of Attachment G shows the tanker used for storage of the water.

In addition to the contaminated water, approximately 55 gallons, or 0.25 cubic yard, of contaminated soil was also generated as a result of release through the crack in the containment wall. Photograph 35 of Appendix G show the rolloff container that held the contaminated soil and other contaminated debris such as pallets, and damaged super-sacks. Like the water, this material will be sampled, analyzed, and profiled to a disposal outlet in accordance with applicable environmental regulations.

3.0 INVESTIGATIVE PROCEDURE

Brad Phillips of SYA was retained to review the operation and develop a root cause analysis report and recommendations for the incident. The investigative procedure involved the following steps:

1. Perform a visual site review;
2. Complete a photo log of the incident area;
3. Obtain all available and relevant documentation for the materials involved;
4. Interview all facility personnel;
5. Research the specific chemical nature of the materials involved;
6. Review the weather conditions present at the time of the incident; and
7. Investigate potential initiation scenarios based on burn patterns, waste handling operations, and material characteristics.

Each of these steps provided information pertinent to the determination of the cause of the incident and any contributing factors that helped sustain the event.

4.0 CAUSE AND CONTRIBUTING FACTOR ANALYSIS

The following sections describe various potential scenarios and issues that could have caused and/or contributed to the incident at the facility. Each scenario is described in detail with a conclusion based on the data and information collected at the site. As a summary, the following scenarios were reviewed:

1. Rainfall Through Open Doorways that Provided Water for a Calcium Hypochlorite Reaction
2. Spontaneous Combustion of Sawdust
3. Bathroom Water Supply Line Leak Providing Water for a Calcium Hypochlorite Reaction
4. Sprinkler System Malfunction/Leak Providing Water for a Calcium Hypochlorite Reaction

5. Lithium or Other Battery Reaction and Ignition
6. Safety Shower/Eye Wash Station Leak Providing Water for a Calcium Hypochlorite Reaction
7. Waste Material Self Reaction or Fire Initiation
8. Overhead Rollup Door Creeping Open Over Time
9. Sabotage or Other Personal Interaction to Cause Incident

Each of these scenarios are discussed in detail in the following sections, along with references to the data supporting the conclusions.

4.1 Rainfall Providing Water for a Calcium Hypochlorite Reaction

This scenario is considered to be the likely cause of the incident. As a result of the transferring of the calcium hypochlorite powder from the small pails to the super-sacks, residual amounts of the material were spilled onto the super-sack pallets and floor. This fact was revealed during the employee interviews and is evidenced on the four sacks that were filled and transferred to the upper warehouse the day prior to the incident. Pictures of the spilled material on these super-sacks are included in photographs 36 through 38 of Attachment G.

In order to facilitate cleanup of the calcium hypochlorite, an absorbent material was routinely spread in the transfer area. The material of choice is generally a synthetic absorbent. Due to its cost, the supervisor chose to use sawdust from the non-hazardous solidification process as the absorbent rather than the synthetic absorbent. As stated in the MSDS, calcium hypochlorite is an oxidizer that reacts with water to produce enough heat to start combustion of flammable or combustible materials. Based on observations and interview records, the sawdust and calcium mixture was not thoroughly cleaned up at the end of the work day, leaving a potential reactive mixture on the floor in the incident area.

At the end of each workday prior to the employees leaving the site, the manway and overhead rollup doors are to be closed, per PFOR's procedures. This step is part of the supervisor's standard operating procedure. As revealed in all of the employee interviews, the manway doors are damaged and most cannot be closed completely. In addition, interviews with numerous employees confirmed that all of the doors on the west side were closed in accordance with the procedures with the exception of the manway door, which was slightly ajar due to damage. However, none of the employees could confirm that the east side rollup or manway doors were closed at the end of the work day. Based on the burn pattern on the rollup door next to the incident areas (Photograph No. 39 in Attachment G), the door was open to a distance of approximately 22 inches. Based on interviews of employees, one inclement weather event occurred at approximately 0130 on April 19, 2006, and that storm approached the facility from the east. This side of the building does not have an overhanging roofline; therefore, no diversion is available for rainfall events that move from that direction. Interviews with employees also noted that, when closed, the doorway seals are in good working order and no leaks around the seals have been observed. This rain event, coupled with open manway and rollup doors, could have supplied enough water to begin the reaction that ultimately lead to the incident.

4.2 Spontaneous Combustion of Sawdust

The fire department investigation concluded that the sawdust supply, which was in a super-sack next to the eastern rollup door, could have spontaneously combusted through the generation of heat from a composting-type process. This spontaneous combustion would have then lead to the incident by initiating the sprinkler system overhead. The sawdust residual was checked for signs of a composting-type fire and was found to have burn marks on the outside of the piled material. The material within the pile showed no such burn signs. Generally, compost fires begin within the material core due to heat generated from organic degradation that cannot be dissipated. Since the burn pattern as shown in photographs 40 through 42 in Attachment G is not consistent with a compost fire, this pathway is not believed to have initiated the incident.

4.3 Bathroom Water Supply Line Leak

It was also theorized that a 3/4-inch water line that runs along the east wall of the building burst and supplied the water to initiate the reaction and thus the incident. This water line leads to the bathroom located just outside of the east-side rollup door next to the incident area (Photograph No 43 in Attachment G). Two holes in the line were observed after the incident, and these are shown in Photographs 44 through 46 of Attachment G. However, the holes are consistent with heat damage from a fire already in progress. Therefore, the water line is not believed to have been the initial cause of the incident; however, it probably contributed to the continuation of the incident by supplying additional water for calcium hypochlorite reaction. This water line will not be placed back into service until an alternative route is devised that removes it from the processing area of the building.

4.4 Sprinkler System Malfunction/Leak Providing Water for a Calcium Hypochlorite Reaction

As another alterative means of providing water for the calcium hypochlorite reaction, the sprinkler system could have failed or leaked. Wayne Automatic Fire Sprinklers, Inc. (Wayne) found that eight (8) of sprinkler heads were triggered and required replacement. (See report in Attachment K.) However, the sprinkler system was previously inspected by Wayne on March 16, 2006 and found to be operational and free of defects. After the incident, representatives of Wayne relayed that the triggered sprinkler heads were consistent with a heat initiation and that no malfunction appears to have occurred. The sprinkler system was placed back into service on April 21, 2006. Both the previous inspection and the recertification inspection paperwork are included in Appendix I. Based on this information, failure of the sprinkler system is not believed to have occurred and is not considered a cause of the incident.

Because the discharge of the water sprinkler system could be considered a contributing factor to the continued reaction of the calcium hypochlorite, a literature search was conducted to determine the proper fire extinguishing method for the calcium hypochlorite material. From the cursory review it appears that the material present in many dry

chemical extinguishers is more reactive with the calcium hypochlorite than water. Of the numerous fire suppression systems available, it appears that the judicious use of water to minimize the combustion of flammables and combustible materials while minimizing the available water for the calcium hypochlorite reaction is the preferred method of fire fighting such an incident. Literature searches involving this concept have been included in Attachment L.

4.5 Lithium or Other Battery Reaction and Ignition

One member of the fire department's emergency response team stated that certain lithium batteries have been known to initiate similar fire incidents. A literature search revealed no such incidents; however, this avenue was investigated for all battery types stored at the facility. All of the lithium batteries located both west and south of the incident, as shown in photographs 11 through 13 of Attachment G, were slightly burned on the outside covering only. No evidence of an internal spark or fire was discovered. Photographs 15 through 19 in Attachment G show this lack of internal fire event from the other battery types that were located south of the incident area. For these other batteries (Ni-Cd and Lead-Acid), only the outer cardboard storage box was damaged. Therefore, this pathway is not considered to be the cause or a contributor to the incident.

4.6 Safety Shower/Eye Wash Station Leak Providing Water for a Calcium Hypochlorite Reaction

Another potential avenue for the initiation of the incident is the failure, leak, or use of the safety shower and/or eyewash station that would have supplied water for a calcium hypochlorite reaction. This station is just inside the east side rollup doorway, next to the incident location (see Photograph No. 47 in Attachment G). Interviews with the employees revealed that the unit was not used prior to the end of the day's work. An inspection of the safety shower unit after the incident revealed that it had not been discharged, since all of the valves were closed and operational. In addition, the station was found to be undamaged as a result of the incident and did not leak when the water supply was again applied to it. Therefore, the safety shower/eyewash station is not considered a cause or contributing factor to the incident.

4.7 Waste Material Self-Reaction or Fire Initiation

Another possible cause of the incident is the self-reaction of the waste materials. An examination of the area reveals that only the calcium hypochlorite material could have self-reacted, since all other materials present have been eliminated from this possibility. The calcium hypochlorite was a pure component material that was considered past its useful shelf life by the generator. No contaminants were added to the material by the generator, since the waste was shipped in the original manufacturer's packaging as supplied to the generator. Based on the MSDS information, the calcium hypochlorite is very stable and does not decompose or degrade without the presence of adverse conditions, such as chemical contamination, outside catalysts, heat, etc. Based on the burn pattern on the ceiling (see Photographs 48 through 50 of Attachment G), the incident began on the east side of the storage area, which was predominately calcium

hypochlorite. Therefore, with no other material in the area of the incident initiation, all other materials eliminated as potential initiators, and the stated stability of the material in question, this scenario is not considered to be the cause or a contributing factor to the incident.

4.8 Overhead Rollup Door Creeping Open Over Time

It was suggested by facility personnel that if the east side rollup door next to the incident area were slammed hard enough, the door would rebound up and slowly creep open. This theory was testing by slamming the rollup door several times during the investigation to see if the scenario could be recreated. Based on the trials conducted, the event could not be recreated; therefore, this theory was discounted as a contributing factor to the incident.

4.9 Sabotage or Other Personal Interaction to Cause Incident

This final pathway involves the intentional or accidental initiation by persons who entered the facility with or without authorization. At the time of the incident, no employees were authorized to be at the facility. All employees, including site workers, office personnel, management, and over-the-road truck drivers, were accounted for, and their absence from the facility was confirmed. The fire department stated that the doors to the storage area were open at the time of their arrival; however, the gates that provide security to the site were locked. The statement that all the doors were open could not be confirmed with the fire department prior to the completion of this report. A thorough investigation by the Division of State Fire Marshal's Office, Bureau of Fire and Arson Investigation (BFAI) was completed since sabotage was initially envisioned as a possible cause. In addition, SYA completed a similar investigation for sabotage. The conclusion by both SYA and the BFAI was that no sabotage had occurred. A copy of the search and remove evidence consent is included in Attachment M, and the BFAI report was delivered verbally since no written report was available.

5.0 RECOMMENDATIONS

Based on the information and data collected, the following are SYA's recommendations to minimize the potential for a similar incident to reoccur.

5.1 Development of Better Material Compatibility Reference Materials

The facility should provide better compatibility reference materials and MSDSs for the site employees and their supervisors. Review of incompatibilities should be performed by knowledgeable facility management. These findings should be passed to facility employees prior to working with the various wastes.

5.2 Material Compatibility Training of All Personnel

In addition to the expanded reference materials, organized training sessions should be developed to alert employees to the potential incompatibilities that may exist for each

received waste stream. These incompatibilities extend to fire suppression equipment and chemicals used in the areas that are not wastes for processing, as well as the other waste materials. The sessions should be part of a comprehensive written training program, and documentation of these sessions should be maintained at the facility.

5.3 Material Compatibility Inspections

Thorough inspections and reviews for incompatible materials within the same containment structure should be completed by knowledgeable management personnel on a routine basis. The results of these inspections should be used to redirect training efforts in areas of any noted deficiencies. These inspections should be added to the formalized inspection program already completed by the facility

5.4 Door Latches On All Rollup Doors

Even though the theory that the east side rollup door could creep open when slammed shut was not proven, actions are recommended to ensure that the scenario cannot occur. It is recommended that latches be installed on all rollup doors in order to ensure that if the doors are properly closed, they will remain closed.

5.5 Repair of the Manway Doors

All manway doors should be inspected and repaired so that they can be closed and latched at the end of the day. This will minimize the potential for unauthorized entry by animals or precipitation from inclement weather events reaching any stored materials.

5.6 Rollup Door Repairs

The northwest rollup door was found to be damaged such that a forklift is needed to open and close it. During the response to the incident, the fire department found it difficult to open this door in order to address the fire. Therefore, it is recommended that this door be repaired.

5.7 Containment Structure Inspections

A release occurred from the containment structure through a small crack in the containment wall. Inspection records show that the crack was not noticed by facility personnel. Therefore, additional training on the inspections procedures is needed to minimize the chance that such issues will not be missed in the future.

5.8 Have the Crack in the Containment Structure Repaired by a Professional Pressure Grouting Contractor

To address the containment wall crack, a professional pressure grouting company should be utilized to properly repair the crack based on the types of materials stored in this area. A written repair record should be obtained from the contractor and maintained in the facility record.

5.9 Move the Bathroom Water Line Outside the Containment Structure

The plastic water line that supplies the outside bathroom east of the lower storage and processing building should be re-routed so that it does not come through the building. This should be accomplished prior to re-supplying water to this bathroom facility.

5.10 Emergency Contacts with AFA

It was apparent in the incident log from AFA (Attachment F) that the group attempted to contact the two emergency coordinators identified in the Contingency Plan prior to the January 2006 revision (Attachment N). Another revised contact list should be supplied to AFA to ensure that the proper personnel are contacted during an event in the future.

6.0 AGENCY NOTIFICATIONS

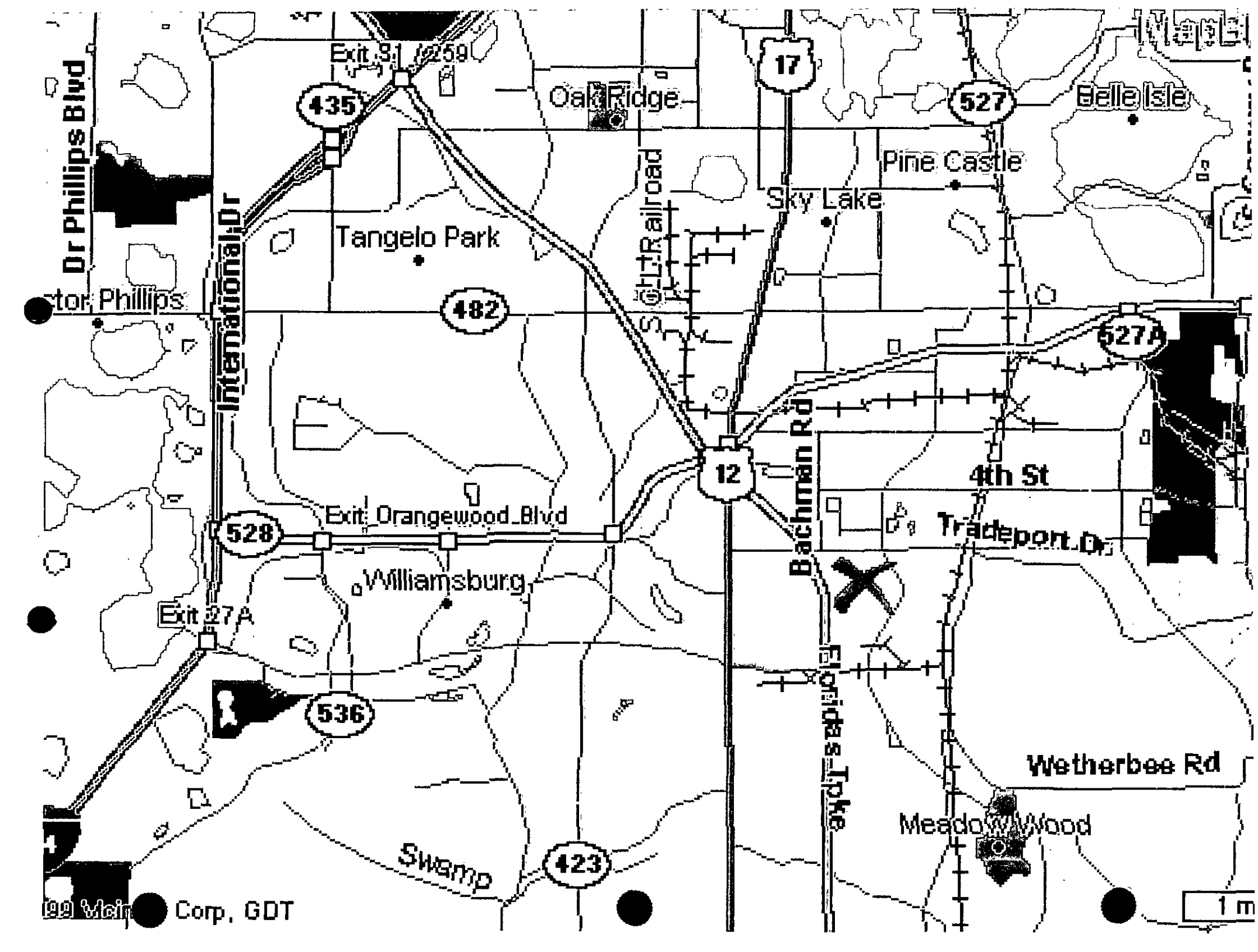
Attachment N includes the 15-day notification to the Florida Department of Environmental Protection (FDEP), as required by the RCRA permit for triggering use of the Contingency Plan.

7.0 CONTRACTOR QUALIFICATION

Attachment O includes information about the author, Brad Phillips, and the company, Schreiber, Yonley & Associates, that completed this report.

ATTACHMENT A

FACILITY MAPS


Exit 31
259
435
Oak Ridge
17
527
Belle Isle
Dr Phillips Blvd
International Dr
Tangelo Park
Pine Castle
Sky Lake
S Fl R Railroad
tor Phillips
482
527A
12
Bachman Rd
4th St
Exit Orangewood Blvd
528
Tradeport Dr
Williamsburg
Exit 27A
536
Florida Tpke
Wetherbee Rd
Meadow Wood
Swamp
423
Corp, GDT
1 m

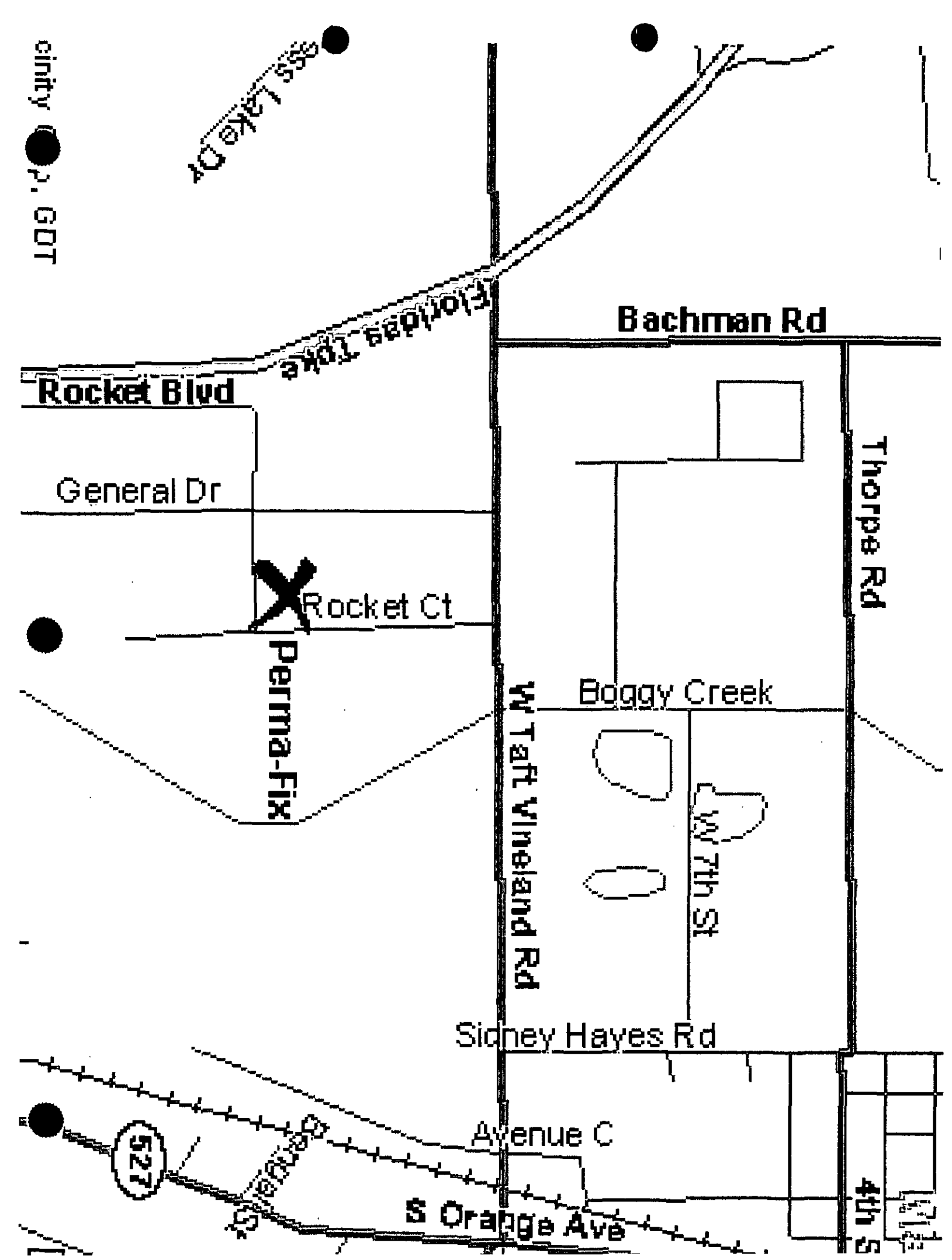
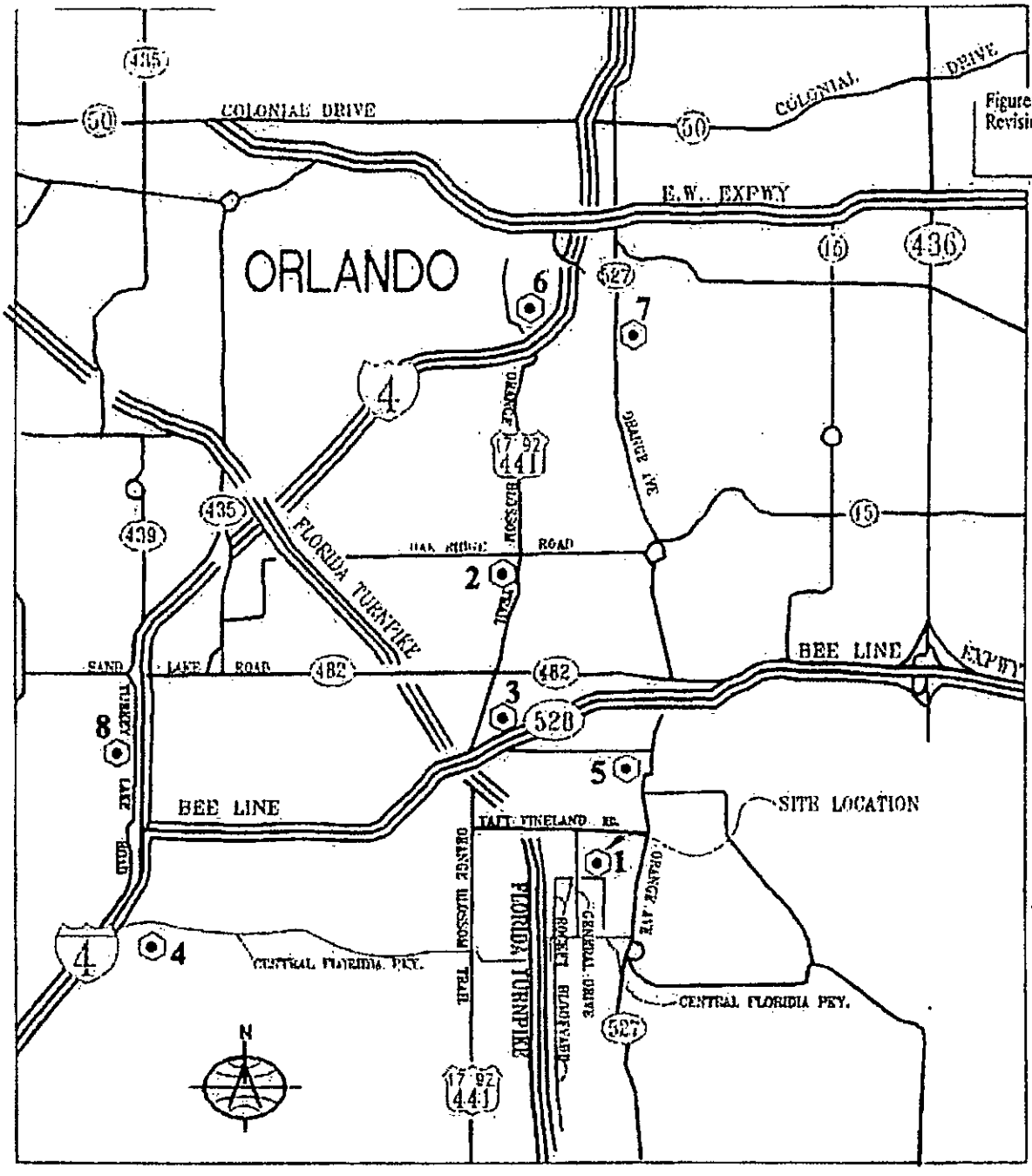

Bachman Rd
Rocket Blvd
General Dr
Rocket Ct
Perma-Fix
Thorpe Rd
W Taft Vineland Rd
Boggy Creek
W 7th St
Sidney Hayes Rd
Avenue C
S Orange Ave
4th S
527

Figure: II.A.4.b-2
Revision: 0



EMERGENCY SERVICE ORGANIZATIONS

LEGEND:

1- PERMA-FIX OF ORLANDO
2- FIRE STATION # 51
3- FIRE STATION # 53
4- FIRE STATION # 54
5- FIRE STATION # 73
6- HAZARDOUS MATERIAL RESPONDS TEAM #50
7- ORLANDO REGIONAL MEDICAL CENTER - ORANGE
8- ORLANDO REGIONAL MEDICAL CENTER - SAND LAKE

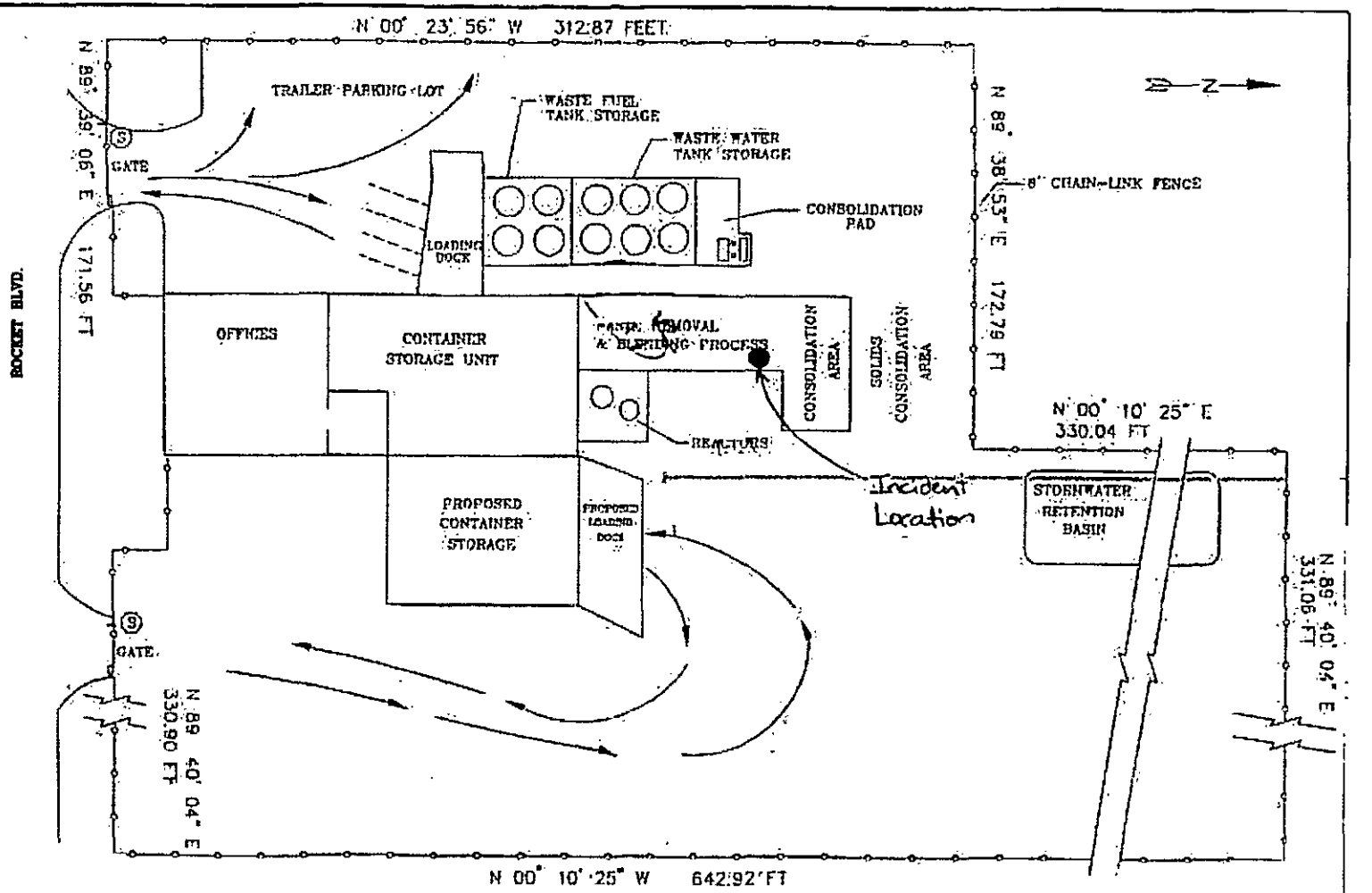
PERMA-FIX OF ORLANDO

10100 ROCKET BOULEVARD ORLANDO, FLORIDA

SCALE: N.T.S.	APPROVED BY	DRAWN BY
DATE: 4/20/95		DRAWING SERVICE
		DRAWING NUMBER

ATTACHMENT B

INCIDENT LOCATION



DAILY TRAFFIC VOLUME

TYPE	AVG.	MAX
VAN TRAFFIC	4	7
TANKER TRUCK	1	2

LEGEND

(S) STOP SIGNS AT EXITS

PERMA-FIX OF ORLANDO, INC.

FACILITY TRAFFIC PATTERNS

FIGURE II.A.1.C.-1

SCALE: NOT TO SCALE

CHECKED BY:	DRAWN BY: WJS	DATE DRAWN 02-06-03	DRAWING # II.A.1.C.-1	REVISION 2

SCHREIBER & YONLEY ASSOCIATES
ENVIRONMENTAL ENGINEERS