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FACSIMILE TRANSMISSION COVER SHEET

Date:	Time	Number Pages (include this sheet)
10/24/93	11:45AM	

To: Janet Bowman, Atty, FDEP General Counsel

From: Ed Spahn

Subject: FTA Fire Protection Comment

Message: Per Your Request

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TRANSMITTAL SHEET

DOCUMENT#: 93014FTR-03

DATE: October 23, 1993

JOB DESCRIPTION: Florida Tire Recycling

TO: Janet Bowman, Atty, FDEP General Counsel

TOPIC: Fire Protection, FTR Facility

TEXT:
Janet;

Please find attached a Fire Protection Plan and position regarding the FTR site.

The intent of this document is to identify the general features and functions required. The detail in this document leave specific design and ability to meet the criteria open.

The intent is to give something to the current owner/operator to work with toward solution of specific problems.

Originals in Overnite...

If questions, please call.

Ed Spahn

FLORIDA TIRE RECYCLING
ST. LUCIE COUNTY, FLORIDA
FIRE CONTROL COMMENT

AIDS TO DESCRIPTION AND DISCUSSION

Figure A; Definition of Quadrant and Side references used in discussion.
Figure B; Identification of the part of the site the St. Lucie FD can access.
Figure C; Separation of Roadbed Containing Processed Tires From Raw Tire Storage.

DESCRIPTION OF SITE

General Operational Features (Relative to Fire Control)

The Florida Tire Recycling facility is located in a remote area of St. Lucie County, Florida. Visual inspection of the complex by air from a helicopter and by land, walking the property permits the following observations.

Processing whole waste tires is the principle activity pursued at this facility. The area of the site is in excess of 30 acres. Visual inspection of the site provides no guaranteed method to determine the exact area dedicated to this process. Because of the proximity of whole, cut, and chipped tires to the public utility high voltage power lines, it is concluded that some of the product must be spilling over onto right-of-way.

Whole tires enter the facility by truck through the front gate. The delivered tires are processed (cut or chipped) in the area identified on the attached map as the "staging area." Processed tire remains are subsequently transported to other areas of the facility by dump type trucks. I observed two type of dump trucks used for this purpose.

There appeared to be a limited use of the traditional 10-wheel dump truck to distribute cuts and chips throughout the facility. A very large, all wheel drive, heavy earth moving category type truck is also available. A representative of the facility related another is on the way to the facility.

Three principal type commodities are evident as the site is surveyed on foot. (Fig-B)

First, whole tires are stored where shown on the enclosed layouts. In some cases these storage areas make attempts to comply with prudent storage of the tires in that they are separated by some distance, one from the other.

Second, cut tires, also called *shredded* tires, (cuts approximately 1/8 tire each) are stored throughout.

Third, tire chips of varying sizes are stored alone or with cut tires in piles.

The site is located in a remote location in St. Lucie County. At the same time, the site is directly adjacent to an occupancy under separate ownership. Little is known about the

exact nature of this occupancy other than that which can be determined by viewing at a distance. This occupancy and complex would be classified as a Hazardous Occupancy Classification under the model Building Codes. The name of the adjacent occupancy is Miami Tank. This facility stores and processes chemicals of varying degrees of hazard and quantities. This adjacent site is located contingent to Quadrant 4. Of particular interest is an accumulation of tank type rail cars on Miami Tank property (Quadrant 4).

The exact topography of FTR property has not been discovered at this point. Nevertheless, visual inspection confirms a downward slope of the grade from the common area (intersection of Quadrants 1-4) toward the distant property lines.

Lay of the Land, Standing Water
On October 15, 1993, areas with large undivided areas of standing water were as follows.

Quadrant 1; Left half

Quadrant 2, Top two-thirds

Quadrant 3; Virtually entire quadrant

Quadrant 4; Area designated swale

As far as the eye could see, the areas adjoining Side 2 and Side 3 had expansive undivided areas of standing water. Standing water is defined to be water which had no appearance of moving horizontally along the surface of the ground from one point to another. It was characterized by algae type growth floating at the surface and a thin sheen of product upon the water surface. The sheen displayed the visible characteristics of a petroleum product spread upon still water.

For all practical purposes, the right half of Quadrant 1 and the left half of Quadrant 4 were free from standing water. In contrast to the rest of the site, water in a swale between the building (Quadrant 1) and the County Road was moving slowly, yet fast enough to allow detection of movement by eye.

Lay of the Land; Surface Characteristics
This comment relates to the current (10/15/93) lay of the ground, or supporting surface of any kind, on which one could walk, or on which one could drive some kind of vehicle.

The nature of the facility's visible surface, the part traversed upon when traveling around the site, on October 15, was as follows:

Quadrant 1; Standing water in left half.
Right half supports vehicles and personnel. Dry sandy ground, right half

FTR Facility Fire Protection Analysis
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Quadrant 2; Standing water essentially throughout. Some sand shows through processed product and tires. Personnel traffic difficult. Support only extra heavy duty off road type motor vehicles.

Quadrant 3; Standing water essentially throughout . Standing water essentially throughout. Some sand shows through processed product and tires. Personnel traffic difficult. Support only extra heavy duty off road type motor vehicles.

Quadrant 4; Dry sandy ground throughout, except for swale area middle and top of Quadrant 4. Left side of Quadrant 4 able to support personnel traffic and truck traffic.

In this context, standing water means large expanses (not puddles) of water with a depth greater than ankle high.

Personnel traffic means a person can walk through the area but is subject to varying degrees of standing water over unstable sandy bottom. It also means an able person can jump from tire to tire, or from shred/chip pile to another when moving from one point to another.

Truck traffic means the vehicle should be no less than a 10-wheel vehicle or an off-road high clearance vehicle.

SUITABILITY OF THE SITE

In the discussion that follows, three time intervals are considered. Specifically, short term, intermediate term, and long term. Ultimately, a decision is required regarding the suitability of this site for long term operation as a waste tire recycling operation strictly from a "lay of the land" point of view.

No changes can be made to the lay of the land in the near term because the excess quantity of water tire product can not be effectively moved to make way for improvements.

I suggest that the short term and intermediate term use of the complex for this purpose presents extremely dangerous conditions relating to fire control, without regard to pollution considerations. This position is based on the fact that there is virtually no access to any part of the site, excepting the right half of Quadrant 1, and left half of Quadrant 4 by any kind of motorized vehicle available at the present time of mounting any kind of fire control effort.

It is my opinion that given the present topography, the complex is not suitable for any use as a tire recycling facility in areas exceeding the originally declared 10 acres. Assuming the proposition that the 10 acres be seriously considered, that area requires extensive grading and installation of fire protection infrastructure which is not currently present.

Nevertheless, the fact remains that the site presently is a waste tire site. Therefore, the task at hand is to identify how to carry out total stabilization from a fire control point of view and eventually approach partial abatement of the commodity handling and storage on site.

It is safe to say that any plans to utilize the entire site as a tire recycling facility would absolutely include plans to either bring in sufficient fill to raise the nominal lay of the land above its present level, or plans to initiate extensive draining of the current level.

GENERAL FIRE PROTECTION CONSIDERATIONS

Degree of Threat

t is accurate to start with the position that nationally and internationally *Prudent and Reasonable* guidelines exist regarding fire control practices in what is called *NFPA Outdoor Storage of Scrap Tires* principles. Experience gained in actual fire incidents shows the intensity of burning appears to be more severe in loosely stored whole tires compared to tightly packed tire chips. Since there are many forms of scrap tires in the spectrum ranging from whole tires to crumb rubber, it is safe to say the possible rates of burning, i.e. intensity, across the site are different. Yet, none of the burning rates are acceptable. To the degree humanly possible, the only design goal priorities acceptable in this facility are first, prevent fire in the first case; second, suppress any fire incident early on in the event. Early on in this facility means within zero to five minutes after ignition. Note the term "ignition," not "discovery."

Given, the rate of heat release from a fire in this product varies as a function of its form, it is likewise accurate to say that the summation of the heat release is the same, and the releases of pollutants, both air and ground, are about the same. Therefore it is safe to say that without regard to the form of the waste on this site, the ultimate environmental threat is the same. A corollary of this statement is that the rate of heat release from a whole tire fire is proposed to be a higher rate than that of a tightly stacked pile of chips.

Fires in waste tire accumulations historically present the following threats, if not prevented in the first place, or brought under control very early on in the fire event.

1. Generation of large amounts of black, toxic, damaging smoke. The black smoke not only produces severe air pollution, but also, as the products of combustion cloud rises, it eventually reaches a certain altitude where the gas temperature is no longer adequate to cause rise into the atmosphere. At this point the products stratify out and begin to drift with the wind direction at that altitude. The myriad of particulate, gases, and vapors contained in this cloud now undergo precipitation and fallout back to earth. This fallout includes damaging acids, petroleum products which attack either ground or property downwind.

2. Radiant heat threat to nearby buildings, vehicles, and other combustibles

The rate of heat release varies as a function of the product form. Because waste tire product burns with such a high level of BTU/sec/pound, it also decreases the efficiency of water when applied to the burning product.

3. Generation of significant quantities of low grade oils when the product burns. This burning oil transmits fire from one area of a waste tire accumulation to another, spreading the fire quickly deep into the depths of a pile. Extinguished or non-burning oil production is carried off by fire fighting agents resulting in pollution of nearby ground or water areas.

4. Required commitment of vast amounts of public and private resources upon initiation of an advanced fire event. Usually public fire fighting and other public safety agencies bear the brunt of the costs to control and suppress large tire incidents. Few if any private sector organizations typically involved in waste tire operations have financial resources to pay for the required services. Therefore, the cost usually falls to the public sector.

Therefore, effective fire control planning addresses actions directed toward elimination or minimizing the probability of ignition. If ignition occurs, the fire must be addressed within the first three to five minutes or it will rapidly grow beyond the extinguishing resources available on site, and a catastrophe will result.

Public Fire Protection Resources

Responsibility

The public fire protection agency responsible for fire combat and code enforcement at this address is the St. Lucie Fire Control District. This is a political entity governed by a Board of appointed Fire Commissioners.

Response Time and Apparatus Type

The only method available to notify the county fire district of a fire in the facility is 911 telephone. This method of notification is useful so long as there is human presence on the site. At this time, there is no guaranteed presence.

The fire district response to the facility comes from Stations 10, and 6 initially. A fire station called *Central* also would response on special call. Station 10 includes a Hazardous Materials Unit. However, this unit carries no equipment or sufficient consumable commodities such as foam of particular importance regarding an incipient fire on the site. The equipment expected to arrive on the site includes two pumping engines and one rescue as part of the first alarm. Second, or greater alarms, would include more of the same, as well as the Haz Mat unit certainly. Supervision would be in the form of command level officers.

True fire incident response time includes more than the transit time for fire apparatus. A worst case analysis is necessary here because of the extreme potential of a fire to grow to disastrous levels quickly.

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The time required to place any kind of public fire department presence on the site is a function of the following time elements.

1. Fire incident ignition. Time = 0.

2. Discovery of Fire: Human presence on the site is required. Assuming a human notices smoke from an incident approximately 2 minutes after ignition.
Time to complete = 2 minutes.

3. Investigation on site of the nature of the smoke. Without doubt, because of the nature of human response, despite any pre-plan agreement, the discoverer of the smoke will first go to the site of the smoke before alerting anyone of the sighting.
Time to complete = 3 minutes.

4. Upon field verification, notification to the office results in 911 call to PSAP in St. Lucie County.
Time to complete = 1 minute.

5. Call received in St. Lucie PSAP. This facility is operated by the county. Fire Department Dispatch is not in the PSAP. Call taker receives call, identifies nature of the call, takes pertinent information and relays call to St. Lucie Fire District Dispatch Office in Central.
Time to complete = 1.5 minutes.

6. St. Lucie Fire District identifies proper stations to respond, equipment available, and dispatches equipment by radio.
Time to complete = 1 minute.

7. St. Lucie Fire District stations receive alarm, understand destination, take dispatch paper from printer in station, and turn apparatus wheel.
Time to complete = 1.5 minute.

8. St. Lucie Fire District stations traverse the distance and arrive on the site.
Time to complete = 35 minutes.

9. St. Lucie Fire District supervisors perform size-up.
Time to complete = 2 minutes.

10. Fire Department personnel layout suppression equipment to the seat of the fire and apply extinguishing agent.
Time to complete = 5 minutes.

Therefore it is concluded that the estimated time for the public fire department to apply agent is 52 calculated minutes after ignition. The estimated time from unattended ignition

to fire department agent application is estimated to be 17 minutes, travel time discounted. On the proposition the estimated time required to perform required tasks between ignition and fire department agent application could be reduced by 25% then the turn out time is about 12.5 minutes, travel time discounted..

Assume that travel time for the fire department is 25% high, the lowest estimated time for travel is 26 minutes.

The shortest reasonably expected time for extraordinary response from ignition is then 38.5 minutes. An estimated public fire department agent application window then extends from 38.5 minutes to 52 minutes.

Code Enforcement

The stated position of this agency regarding enforcement of State and Local Laws is that since the FDEP is in the process of pursuing the enforcement, the Fire District determines to stay clear of the issue of code enforcement so as not to confuse the matter or insert contradiction into the enforcement. The Fire District does not see any empowerment by any form of legislation to enforce NFPA 231 Appendix C or NFPA 231D to this facility.

Requirements for and Identification of On Site Fire Protection Features

The stated position of this agency is to not address design considerations relating to how on site fire protection is to be achieved. The major concern of the Fire District in this regard is liability resulting from inadequate specifying of resources. Adequate expertise to perform this task is not on staff as the District views the matter.

Fire District Management did not appear to be aware of that part of FDEP Rule that requires local fire agencies to assign certain levels of what is referred to as *fire protection features* before FDEP can issue a permit. In this case there is questionable application in view of the fact that the site is not permitted to operate as it is in fact, and also in fact does not possess a permit to operate in the fashion it indeed currently pursues.

Capital Resources of the Fire District

The fire district has no apparatus able to traverse further than the area identified cross hatched and marked *St. Lucie FD* on Figure-B. Reportedly the fire district has no 4-wheel drive vehicles.

The fire district has a hazardous material team. But, waste tires are not so much a complicated fire fighting problem as they are a commodity requiring brute force suppression efforts involving the movement of large quantities of extinguishing agent. Water is the most practical extinguishing agent. The fire district has the ability to move water from one place to another with very modern and adequate fire apparatus. However, the apparatus is designed for urban and suburban service. It is entirely inappropriate for this fire fighting setting. The Fire District does not agree the revenues sources available

to the district should be used to purchase very expensive equipment for use exclusive use in this occupancy.

There is no known cache of water additives available in the fire department supply. A quantity of 1000 gallons of foam product would be considered a start. The supply must be within 20 to 30 minute transit time.

Water Supply Considerations

Municipal or County Certified Central Water Service

There is no municipal or county water systems within a useful distance of this facility.

Other Available Water Sources

A canal is located approximately five to seven miles from the site. Access to the water surface is difficult. Water plants heavily infest the canal. Run off from adjacent agricultural activities contain nutrients that can only make the water plant growth become heavier. Water plants severely impact reliable drafting operations by the motorized pumps available in the St. Lucie Fire District fleet.

Over the years, approximately 25,000 of water has been accumulated in various water tanks on the FTR property. However, 25,000 of water would last no longer than one-half hour. Added to this shortfall, there is no plan to use the tanks in a coordinated fire attack. The tanks are not part of a total system. No calculations are available indicating the peak water flow possible from this tank set.

REMEDIAL FIRE PROTECTION PROPOSAL

The access principles proposed here are based typically on the principles established for a structure. The potential for a disastrous outcome of a fire in this complex is far greater than that probable in a typical structural fire, without regard for the typical contents of the occupancy.

Access

Motor vehicle access to within 100 feet of the most remote location of any given pile is necessary. This feature is needed to allow trained crews on the site to bring extinguishing agent and basic fire fighting equipment in a motor vehicle to a point no further than 100 feet from a fire incident in the complex and then use appropriate hose lines to apply the agent efficiently to the burning waste.

Roadways must be constructed to reliably support the axle weights and undercarriage characteristics of the vehicles transporting the extinguishing agent.

Typical axle weights found in existing St. Lucie Fire District equipment would be 38,000 pounds to 45,000 pounds. These axle weights would be transferred to the roadbed by four truck tires mounted on the rear of the vehicle. Front axle weights, would be delivered to the roadbed by two truck tires.

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Clearance between the vehicle drive train and the access road surface is very important. The difference between the wheels in a depression and the crown of an access road cannot practically exceed eight inches in the case of existing Fire District fire apparatus. Existing access roads do not approximate these requirements.

Any access road design will necessarily need to address the allowable angle of approach and angle of departure of the vehicle projected to traverse the roadway. Existing Fire District apparatus is not tolerant of radical approach or departure angles exceeding those set down in typical residential roadway design.

Turning radius design of the access road is a function of the vehicle design. This remains to be determined.

The roadways must be constructed so they have the same probability of being above water and stable as the county road servicing the facility.

From visual inspection, it is not apparent that waste tire products alone can be reliably used as road base and road surface. A tour of the site and walking upon the various compositions indicates that chips and cuts in any combination do not form any kind of bond, one with the other. This causes the surface and underlayment to be very unstable in all directions. Therefore, the attempt to build access roads using this product alone does not appear to have merit. I would suggest some combination of sand, dirt, and chip might function as a road base. However, while I can provide performance specifications, I am not able to design a road. What exists, is not adequate for any motorized vehicle excepting heavy duty tracked or very large tired mining and construction equipment. The only function cuts and chips serve in the case of the off road equipment is to keep the equipment from sinking into saturated ground.

In any event, if use of cut and chipped tire product is allowed in the construction of access roads, certain restrictions must be understood. There must be at least 2-feet of clean dirt between any roadway base containing tire chips and the base of tire piles. This separation is necessary in all directions from a base containing tire product. See Figure C. This separation prevents travel of fire conditions in one pile to another pile via the combustible tire products in the roadbed.

The foregoing paragraph leaves open the type of motor vehicle that might be used for transporting the fire control equipment to the site of a fire. This vehicle could be a standard fire pumping engine operating on an access road system designed to carry the axle weights and turning radius of the vehicle. On the other hand, the access road system could be something less in road surface design in that it would adequately support large tire, high clearance off-road earth moving equipment, outfitted to bring fire control equipment to the site of a fire. Somewhere within this spectrum of options lies the most economical financial approach.

INITIAL FIRE ATTACK

taking water from ground water would be subject to uncertainties of replenish rates in the area of the well head inlets. Replenishment at the rate of 1000 gpm is difficult.

At the same time, deep wells present some unknown level of risk to aquifer pollution if the well is located in the same area where polluted runoff water from a fire situation might find its way into the well casing penetration. The level of this risk must be determined by others.

WATER DISTRIBUTION

Presence of water in a pond, tank, or other containment is of no value unless the agent can be distributed quickly throughout the complex. Recall it is necessary to deliver agent at an initial rate of 1000 gpm to points throughout the complex no further than 300 feet from a possible fire incident.

This performance specification implies that a water distribution system of hard pipe or soft hose must be designed and set in place.

FIRE PUMPS

The water can not be moved from the storage containment to the far extents of the complex without the assistance of a fire pump. Some level of risk must be assigned to the energy source of the pump prime mover. Electric motors provide high reliability and low maintenance. Diesel engine prime movers are a bit less reliable, require more maintenance and testing. Obviously the electric service to the facility must be in operation for the electric motor to perform.

A system of pumps must be able to deliver 1000 gpm for the first 30 minutes. After that period of time, the capacity must step up to 2000 gpm.

There are several design approaches to this performance requirement. Both criteria imply the presence of an on-site fire pump sized to deliver at least 1000 gpm. Involvement of the fire department in phase 2 volumes is a viable consideration. In this design, fire department pumpers would attach themselves to the water containment and increase the volume into the water distribution system. Fixtures would be required to compliment fire department pumping engines.

DISTRIBUTION OVER THE SITE

Two specific methods to meet the required performance would be to provide a hard piped distribution system to certain strategic locations within the facility. Properly selected and designed motor vehicles could then stretch large diameter soft hose lines from these distribution points to positions within 100 feet of a fire event. The variable here is principally the design of the motor vehicle. The motor vehicle design is based on the quality of the access road system.

EXTINGUISHING AGENT ENHANCEMENT

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Water application to waste tire fires intends to cool unburned product and remove heat through conversion of heat to steam. But, untreated water is not the ultimate form of extinguishing agent for this product. The petroleum nature of tires causes water application to "bead" on the surface of the tires. The additives cited would reduce water surface tension and increase efficiency of water use.

PRODUCT STORAGE PRACTICES

As it now stands, the processed and unprocessed product is stored improperly in two ways. First the product is stored in accumulations exhibiting unmanageable dimensions. Second, the product is stored in piles located too close one to the other, Finally, the vertical faces of one pile as it faces another are of excessive height.

The large accumulations produce situations where the allowable product that can be conceded in a fire situation produces an excessive demand on fire fighting resources and produces an unacceptable pollution problem.

Storage of piles too close one to the other produces a setting wherein radiant energy can easily cause pyrolization of product in adjacent. This action can result in ignition.

Finally, the distance required between piles in nationally accepted standards is predicated on a storage height of about 12 feet. As the height of the pile face increases, and as the length of the pile face increases, the separation dimension increases.

The existing separations are without a doubt significant below the meaningful separation. In several cases, such as the high pile of chips and cuts in Quadrant 3, the recent attempts at separation have increased the hazard risk because of an increase in exposed surface that could easily be involved in open burning.

OUTSIDE EXPOSURES

One exposure is the adjoining Miami Tank facility. A rail spur running on Miami Tank property, may be noted in the top quarter of Quadrant 4. On this spur may be found rail cars containing hydrochloric acid, chlorine, and anhydrous ammonia. There may be other commodities present from time to time. However, there is no certainty to that proposition.

In any case, the proximity of the high piled chips and cuts in Quadrant 3 represent a distinct heat radiation threat to any product stored in rail cars on the Miami Tank rail spur.

Any credible fire plan must include some method of moving the cars to a safe location on the rail spur upon discovery of a fire progressing through the high piled cuts and chips in Quadrant 3.

The St. Lucie Fire District at this time takes the position that it would find protection of these tank cars with available water a priority action. At the same time, the Fire District

does not feel comfortable being responsible for actual moving of the tank care. This matter needs resolution and assignment of responsibility.

Regarding other outdoor storage and structures on the Miami Tank property, the hazard from radiation is not excessive. This is not to say there is no danger. The point is the degree of danger does not exceed the need to immediately spend resources on limiting the spread or spread rate of a fire in the tire site.

A second set of exposures are the high voltage power lines adjacent to the chip and cut tire pile. I suggest heavy smoke given off by a tire fire is high in carbon particle content. This carbon deposits itself on the insulators of nearby high voltage lines. When the carbon deposit becomes sufficient, a damaging explosion occurs on the insulators. The insulators can be damaged. Interruption of power results on the power grid. Since this power line is a major feeder, it is suggested the impact of an outage could affect thousands of power customers.

CONCLUSION

1. The site as it now stands is not suitable for waste tire processing and storage. The product is currently stored too close together. The product is stored too high.

2. Fire prevention is top on the list of priorities. The following steps must be taken to move in the direction of minimizing probability of ignition.

a. The tire and waste tire storage area must become a no smoking area.
b. All flammable and combustible liquids must be segregated and stored in appropriate containers and configurations.
c. Spark arrestors must be placed on all internal combustion prime movers. Particular attention must be given to large diesel equipment.
d. Cutting, welding, heating devices, open fires must be prohibited in the tire and waste tire storage area.

3. Site security is an absolute necessity. Site security exhibits the following distinguishing characteristics;

a. At least two security personnel must be on duty at all times, i.e. 24 hour per day. The mission of these personnel is to continuously survey the site for fire, intrusion, or unsafe practices.

b. The entire site shall be surrounded with an eight foot fence, with barbed wire or equivalent intrusion deterrent on top. Entry points through the fence should be kept to a minimum. However, points should be established to facilitate efficient and safe fire fighting.

c. Security equipment must be installed to detect unauthorized intrusion. This is contemplated to be in the form of either seismic type intrusion detection, fence intrusion, and or camera surveillance.

d. The site must possess sufficient electrical lighting to effectively observe unauthorized movements of intruders or incidents of fire within the confines of the site. This most probably will require lighting within interior areas as well as perimeter areas because of the large geographical area over which product is stored.

e. A guard shack, trailer must be brought onto site to provide a suitable area from which the guard staff may operate. Depending on the space available and the nature of operations in the existing building, the office area might be considered as a work place for guard service.

4. Site fire protection systems must be installed. This implies the following;

a. Water containment must be established to provide 1000 gpm for the first 60 minutes. 2000 gpm capability for the next 3 hours. This water supply can be in the form of a single properly design containment area or a combination of containment and pumps. If design analysis can prove reliability and duration is attainable with deep well pumps, this design alternative is acceptable. In any case, all design proposals must be proven designs developed by licensed engineers with operating within their declared area of expertise. Combinations of engineers collaborating on the design are desirable.

b. A method to integrate fire department motorized fire pumps into the water delivery system must be designed and developed.

c. A water distribution system must be designed and developed to insure the ability to deliver 1000 gpm to any location in the site during the first 60 minutes. After 60 minutes, the gpm delivery shall be a demonstrated 2000 gpm to distribution points a minimum of 300 feet from any point, and a maximum of 600 feet from any point on the site. More than one distribution point is allowed to meet this requirement.

5. Some kind of motor vehicle, designed to meet the level of access road development must be proposed and obtained to deliver the first attack at a fire event. This vehicle must carry at least 700 gallons of water, deliver extinguishing agent at a maximum rate of 300 gpm. A method of treating the extinguishing agent with an additive, like AFFF, shall be provided. At least 60 gallons of foam product must be carried on board the vehicle. The vehicle must have at least two 1 1/2 inch hose lines, each 150 feet long. A hose reel with 250 feet of 1 inch line must be provided. A self contained fire pump shall be provided. It shall be gasoline driven, and include all piping and apparatus required to safely control water flow to the hand lines. The vehicle shall carry adequate equipment and fittings to supply two 2 1/2 inch hand lines.

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Once a fire extends beyond twenty or so tires, the quantity of water required to complete extinguishment and overhaul extends beyond that quantity that can be carried to a location on motor vehicles.

Therefore, since it is a given that within ten to fifteen minutes it is practical to expect a fire to extend beyond twenty tires, it becomes very important to transport and apply extinguishing agent to the fire site within five minutes or so. This implies some kind of vehicle is needed on site, operated by trained personnel, capable of transporting approximately 600 gallons to 750 gallons of water to the fire event. A fire pump, tank, hose lines and nozzles, must be transported within 100 travel distance feet from the fire event. Additives such as *Wet Water* or *Aqueous Film Forming Foams* should be injected into the attack water supply to give penetration and sealing capability to the applied water as well as reduce the surface tension of the water. This reduction of surface tension allows more efficient use of a quantity of water in the process of covering exposed surfaces with a film of water to reduce temperature rise.

WATER SUPPLY

Water is not the only possible extinguishing agent that can be used to suppress a fire in this kind of commodity. At the same time, it is decided that water is the only agent which can be readily, reliably, and economically stored and maintained in a ready state for a fire in this particular setting. This view is based on the remote nature of the site and the unusual quantity of potential burning product on the site.

Water supplies in properly designed facilities must be capable of supporting an aggressive 1000 gpm minimum fire attack. The water supply in a facility such as FTR needs no less than 1000 gpm for the time period 10 minutes to 30 minutes after initiation of a fire in a pile. (The first few minutes of water application comes from tanks on board motorized vehicles and pumps aboard these vehicles.) The ultimate deliverable volume should be at least 2000 gpm. The total duration of this supply in this case should be at least 4-hours. In ideal conditions, the duration of the water supply would be without end. However, the logistics of this site does not allow consideration of that performance specification.

For a general idea of the amount of stored water required to meet this performance criteria, consider a container 80 feet by 80 feet by 10 feet deep. This volume holds about 480,000 gallons of water. There are other approaches to providing this resource, but this is the brute force method. Variations on a container this size would be a continuous replenishment of the container by a less reliable, lower volume pump. This pump would continuously pump from a deep well water source at a rate that would reduce the actual size of the water container. For instance with a 500 gpm pump continuously replenishing the container, the size of the container could be reduced to 70 feet by 70 feet by 10 feet deep.

The water source for contemplated wells is of importance. Certainly only wells taking water from a water aquifer would be the only reliable and predictable configuration. Wells

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The platform on which this fire control assembly is built must be quickly and reliably transported to the scene of a fire on site.

Either as part of this vehicle, or a part of another vehicle, adequate soft hose line must be provided in order to supply the main attack assembly at the scene of a fire on site. This hose is intended to attach to an on site water distribution system installed in accordance with Section 4 above.

6. A training program shall be developed to insure the personnel on site are capable of transporting the fire attack equipment to the site of a fire event on the site. This training shall include driver training for the motor vehicle, and operation of the fire pump, hose lines, and other equipment. This program is necessary because of the extended response time of the public fire department to the tire site.

7. A resource list of at least five front end loaders, five 10-wheel dump trucks, and five bulldozers must be assembled. The list should include equipment deliverable to the scene within one hour after call. It is especially important that night time hours, weekends, and holidays be adequately covered.

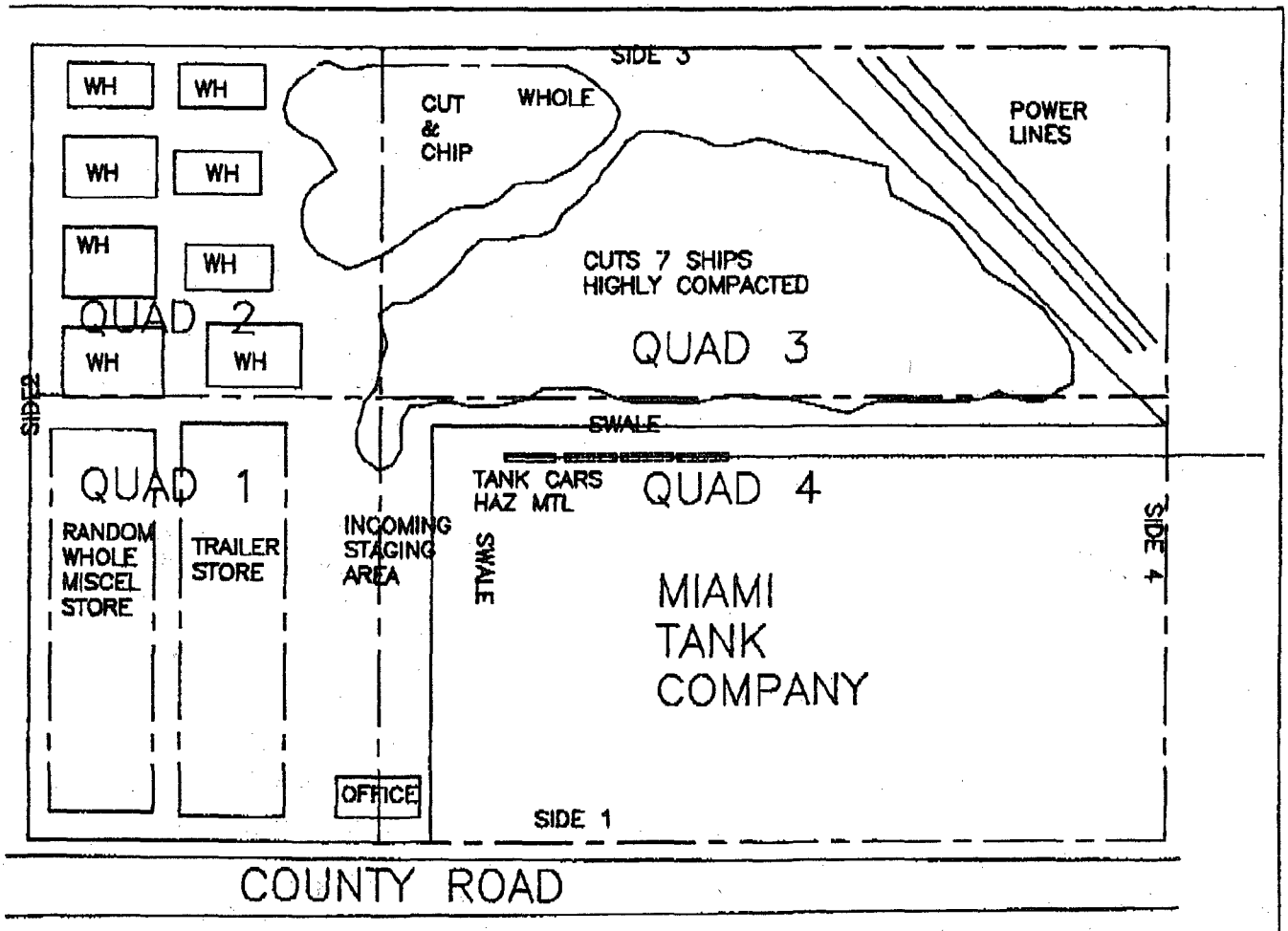
8. Since this site is currently out of compliance, the first performance and product storage configuration goal should be in conformance with NFPA 231D, *Storage of Rubber Tires*, Appendix C. The storage area of principal concern is the high piled cut and chip product facing onto the Miami Tank Corp property. The height of the pile is abnormal and unsafe. Fire would bury into the pile and become an unmanageable fire for all practical purposes. This product must be transported off site since there is inadequate room to rearrange the product on site. Product height should be in accordance with the above document.

A plan must be developed which provides for shipment of product off site at a rate greater than the incoming product rate. At the present time this does not seem to be the case.

Please review and accept this report and analysis.

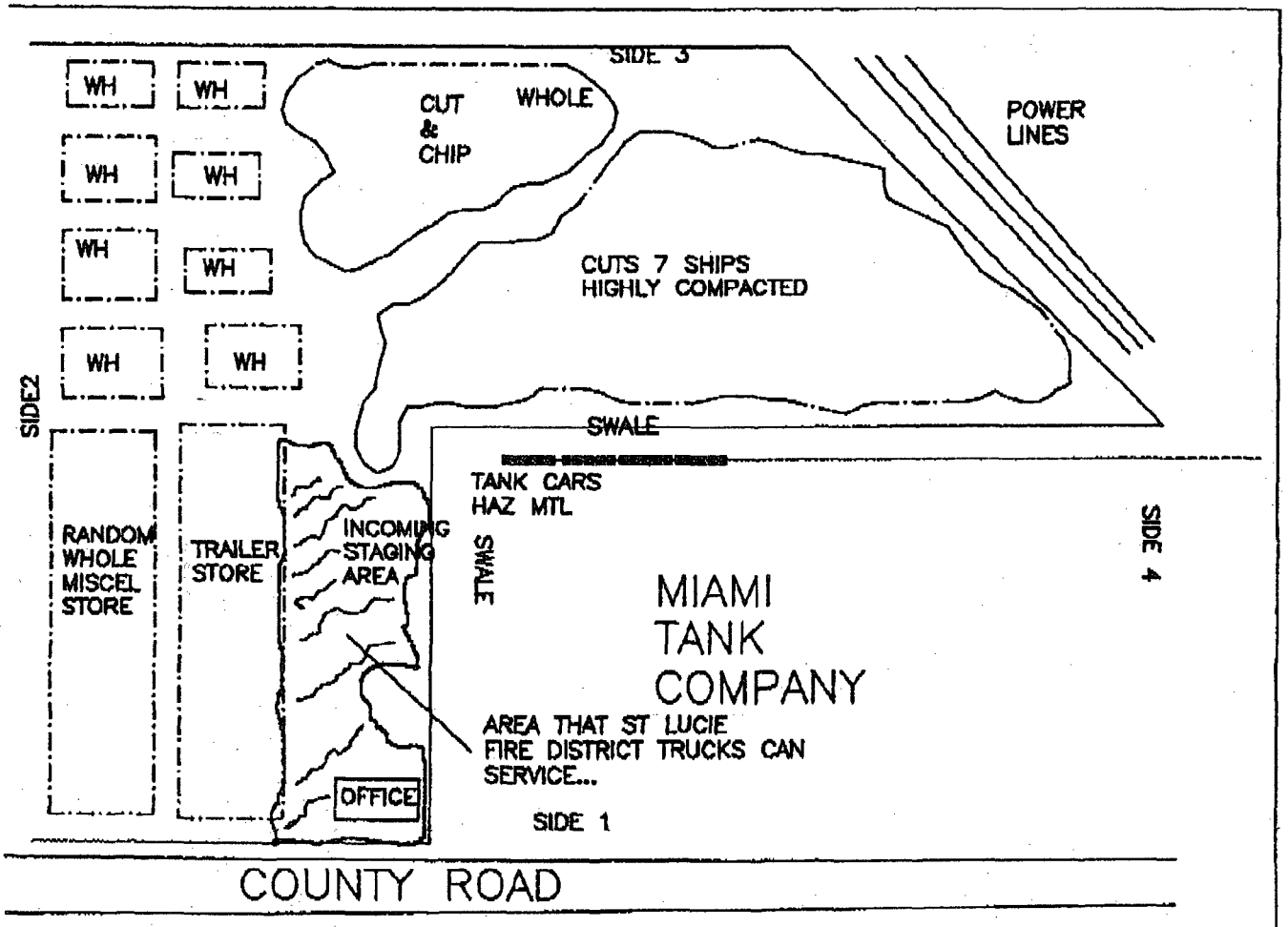
Respectfully submitted,

Ed Spahn, PE
Fire Protection



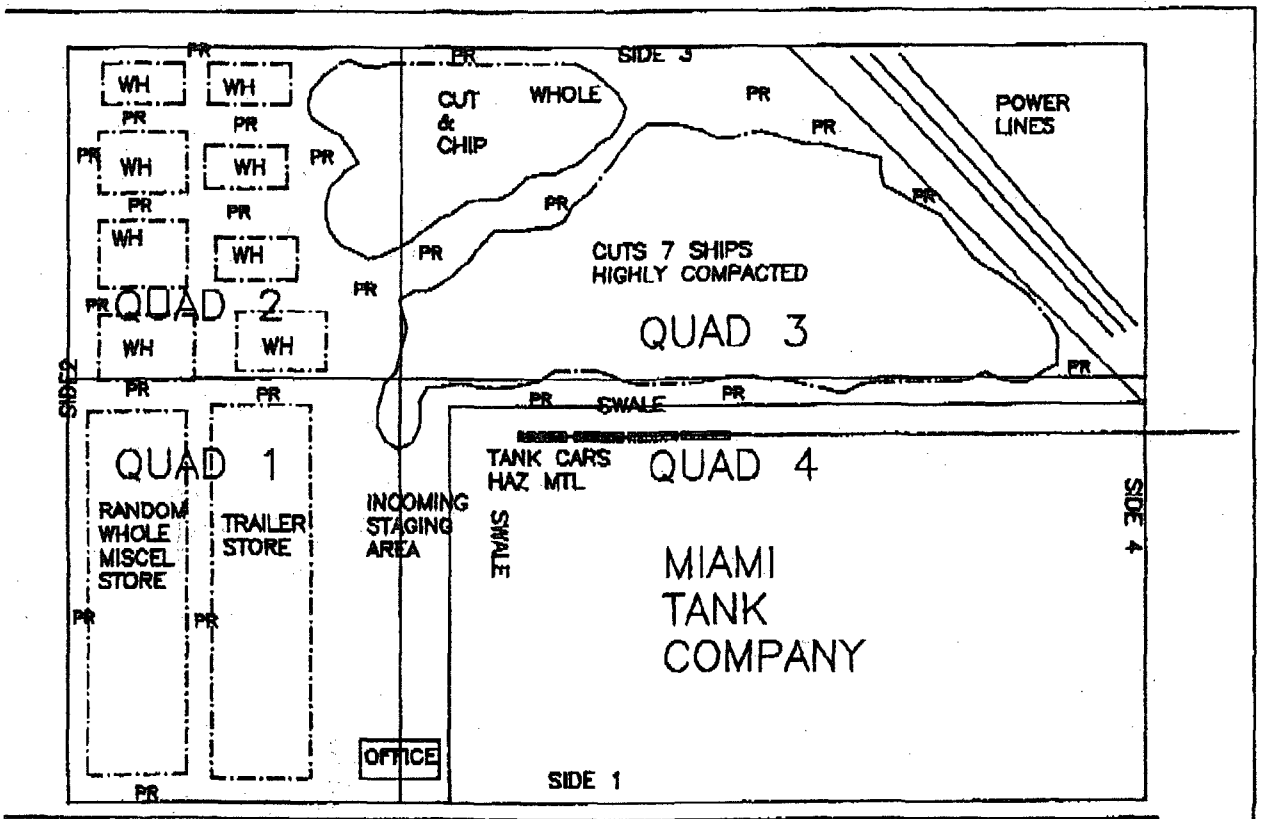
FTR FACILITY
St. Lucie Cnty

Location Identifiication
Quadrants & Sidee
Figure A ejs

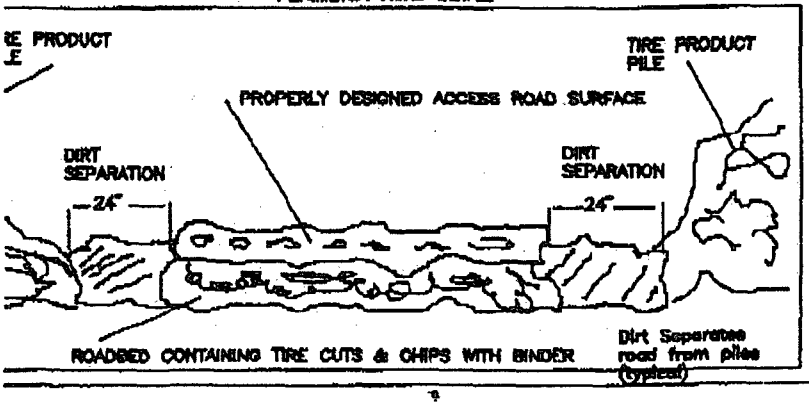


FTR FACILITY
St. Lucie Cnty

St. Lucie Fire District
Area FD Apparatus Can Traverse
Figure – B ejs



PERIMETER ROAD DETAIL



NOTE:
PR identifies typical perimeter road.
Access to all piles from all sides.

FTR FACILITY
St. Lucie Cnty

Roadbed Construction Details
Separation of Road from Piles
Figure – C ejs

FTR Facility Fire Protection Analysis
Spahn to FDEP, 10/23/93

Once a fire extends beyond twenty or so tires, the quantity of water required to complete extinguishment and overhaul extends beyond that quantity that can be carried to a location on motor vehicles.

Therefore, since it is a given that within ten to fifteen minutes it is practical to expect a fire to extend beyond twenty tires, it becomes very important to transport and apply extinguishing agent to the fire site within five minutes or so. This implies some kind of vehicle is needed on site, operated by trained personnel, capable of transporting approximately 600 gallons to 750 gallons of water to the fire event. A fire pump, tank, hose lines and nozzles, must be transported within 100 travel distance feet from the fire event. Additives such as *Wet Water* or *Aqueous Film Forming Foams* should be injected into the attack water supply to give penetration and sealing capability to the applied water as well as reduce the surface tension of the water. This reduction of surface tension allows more efficient use of a quantity of water in the process of covering exposed surfaces with a film of water to reduce temperature rise.

WATER SUPPLY

Water is not the only possible extinguishing agent that can be used to suppress a fire in this kind of commodity. At the same time, it is decided that water is the only agent which can be readily, reliably, and economically stored and maintained in a ready state for a fire in this particular setting. This view is based on the remote nature of the site and the unusual quantity of potential burning product on the site.

Water supplies in properly designed facilities must be capable of supporting an aggressive 1000 gpm minimum fire attack. The water supply in a facility such as FTR needs no less than 1000 gpm for the time period 10 minutes to 30 minutes after initiation of a fire in a pile. (The first few minutes of water application comes from tanks on board motorized vehicles and pumps aboard these vehicles.) The ultimate deliverable volume should be at least 2000 gpm. The total duration of this supply in this case should be at least 4-hours. In ideal conditions, the duration of the water supply would be without end. However, the logistics of this site does not allow consideration of that performance specification.

For a general idea of the amount of stored water required to meet this performance criteria, consider a container 80 feet by 80 feet by 10 feet deep. This volume holds about 480,000 gallons of water. There are other approaches to providing this resource, but this is the brute force method. Variations on a container this size would be a continuous replenishment of the container by a less reliable, lower volume pump. This pump would continuously pump from a deep well water source at a rate that would reduce the actual size of the water container. For instance with a 500 gpm pump continuously replenishing the container, the size of the container could be reduced to 70 feet by 70 feet by 10 feet deep.

The water source for contemplated wells is of importance. Certainly only wells taking water from a water aquifer would be the only reliable and predictable configuration. Wells