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ENVIRONMENTAL ASSESSMENT

OPERATION OF THE PINELLAS PLANT CHILD DEVELOPMENT CENTER/PARTNERSHIP SCHOOL

Environmental Health and Safety Programs

July 20, 1990

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*Operated for the
U. S. Department of Energy
Albuquerque Operations Office
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NEED FOR AND PURPOSE OF THE PROPOSED ACTION

The U.S. Department of Energy Albuquerque Operations Office (DOE/AL), through the DOE Pinellas Area Office (PAO) and GE Neutron Devices (GEND), is proposing a joint venture to operate a Partnership School and Child Development Center at the Pinellas Plant. This venture would be based on a partnership with the local county school system. The county school system would provide the teachers, supplies, and classroom furnishings for the operation of the partnership school for kindergarten, first, and second grade students during regular school hours. DOE would provide the facility and its normal operating and maintenance costs.

The benefits of providing child care and elementary education were previously recognized by DOE. The Exemplary Contractor Child Care Initiative [1] outlines the Secretary of Energy's commitment to the development of programs that will contribute to the quality of the Department's workforce. The Secretary stated that such programs are necessary to accomplish the missions of DOE and will contribute substantially to employee welfare and morale, recruitment and retention of highly qualified individuals, increased job satisfaction, and attainment of such statutorily established goals as equal employment opportunity, retaining valued employees, reducing absenteeism and tardiness, and increasing productivity and efficiency.

As the result of the DOE Exemplary Contractor Child Care Initiative, the Child Development Center/Partnership School proposal has been developed. The building has been constructed, teachers and staff selected, and the building made ready for immediate occupancy. The proposed action addressed by this environmental assessment is the operation and utilization of the school as a Partnership School (kindergarten through second grade), a preschool Child Development Center, and a before- and after-hours child care facility.

In compliance with the National Environmental Policy Act of 1970 (NEPA) [2], the potential impacts from the operation of the proposed action are assessed. Additionally, since the proposed school is located next to an industrial facility, impacts on the school population from routine plant operations, as well as abnormal events, are analyzed, and changes in plant operation that may be prudent are considered.

DESCRIPTION OF THE ALTERNATIVES

No Action

The No Action Alternative is not to operate the proposed Partnership School/Child Development Center facility. Child care and elementary education for the children of Pinellas Plant employees would be provided at other public or private institutions, in which DOE would have no involvement.

Alternative Sites for the School

Prior to construction of the building on the plant site, alternative locations were considered, and no reasonable alternative nearby sites for the Partnership School/Child Development Center were identified that would be available in the near term.

Properties off the plant site that are in reasonable proximity to the plant site were not available. Proximity is a main criterion and basic precept of the Exemplary Contractor Child Care Initiative. Based on available information, there were no reasonably proximate off-site properties of suitable size available for purchase at which to locate a new facility. Alternate locations on the plant site, likewise, were not considered reasonable in light of past waste handling, treatment, or disposal.

The use (by lease or purchase) of existing facilities off the plant site also is not reasonable due to lack of a suitable building in the vicinity of the plant site.

Accordingly, only the Proposed Action and the No Action alternatives are examined in this document.

DESCRIPTION OF THE EXISTING ENVIRONMENT

DESCRIPTION OF THE PINELLAS PLANT SITE

The Pinellas Plant is owned by the Department of Energy. It is operated by GEND as a prime contractor for DOE. Construction of the Pinellas Plant commenced in 1956, with production operations beginning in 1957. The plant is engaged in the production of equipment for nuclear weapons application. The facility is part of the nuclear weapons production complex administered by the DOE Albuquerque Operations Office.

The Pinellas Plant is located in Township 30 South, Range 15 East, on an approximately 99-acre site in Pinellas County, Florida (see Figure 1). The county is situated along the west central coastline of Florida on a peninsula that separates Tampa Bay from the Gulf of Mexico. The City of Tampa is located approximately 30 miles east of the plant, while St. Petersburg is about 6 miles to the south. The plant site is centrally located within the county, bordered on the east by Belcher Road (County Road 27), on the South by Bryan Dairy Road (County Road 135), and on the west by CSX Railroad Tracks.

The Pinellas Plant employs approximately 1700 people. An additional 27 people work in the DOE Pinellas Area Office located within the plant. The plant is approximately 700,000 square feet in size. The plant was built in 1956 to manufacture neutron generators, a principal component in nuclear weapons. Production of these devices necessitated the development of several uniquely specialized areas of competence and supporting facilities. The existence of these capabilities has led to the assignment of other weapon application products. In addition to the manufacturing facility, a production development capability is maintained at this plant. The products of the plant include: neutron generators and detectors, vacuum switch tubes, electromagnetic devices, thermal batteries, radioisotopically-powered thermoelectric generators, frequency control devices, quartz digital accelerometers, lightning arrestor connectors, ceramics, and foam support pads.

The hazards presented by operations on this site are typical of those associated with other commercial electronic development and manufacturing facilities. The principal hazards present on this site include: 1) radiation and radioactive materials in some areas, 2) industrial and occupational hazards throughout the site and in various facilities, and 3) packaging and transportation of radioactive and hazardous materials. Solid, liquid, and gaseous wastes (both radioactive and nonradioactive) generated at the site are stringently regulated. This is accomplished by a variety of treatment, control, and monitoring systems.

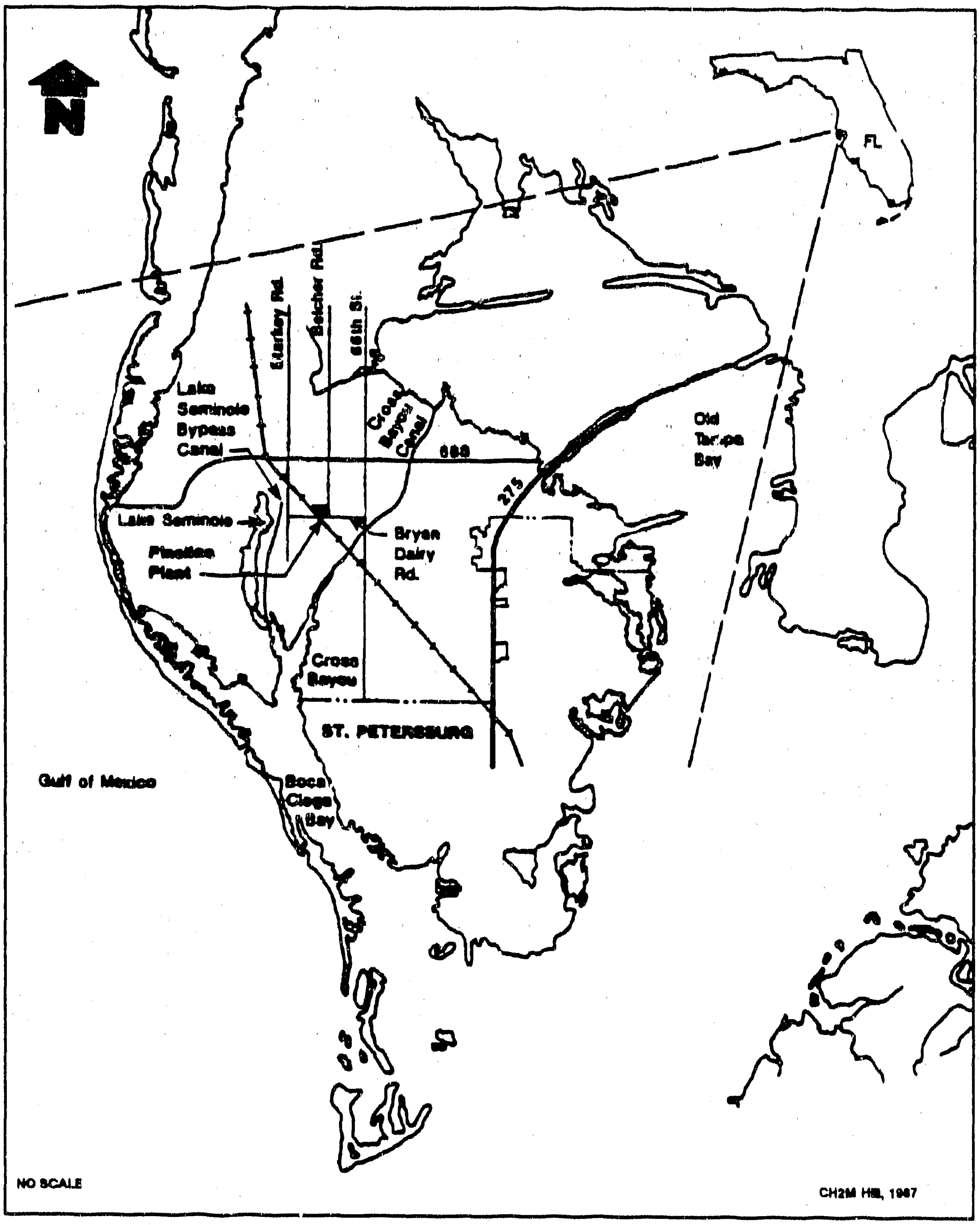


Figure 1. Location of the Pinellas Plant in Pinellas County

CULTURAL SETTING

Pinellas County and the Tampa Bay area in general have experienced dramatic increases in population over the last 30 years. When the plant was originally built in 1956, the central area of Pinellas County was a lightly populated farming area. Today, light industry, office complexes, and warehousing operations are in the area immediately surrounding the site. The closest residential areas are approximately 0.25 miles from the plant site. Based on the 1980 census, Pinellas County is the most densely populated county in the State of Florida; it has 3,064 residents per square mile. Population estimates for the major cities surrounding the site are: St. Petersburg - 243,000; Clearwater - 98,000; Largo - 63,000; and Pinellas Park - 41,000 [3].

CLIMATOLOGY/METEOROLOGY

Climate

The Tampa Bay area has a subtropical marine climate which is characterized by long, humid summers and short, mild winters. Rainfall is abundant, especially during the summer months.

Precipitation

The outstanding feature of the local climate is the summer thundershower season. On the average, thundershowers occur 90 days a year, mostly in the late afternoons from June through September. On average, 30 inches of the normal 44 inches of annual rainfall occur during these months. The two driest months of the year are April and November, accumulating an average of 2.10 and 1.79 inches of rain. The driest year on record was 1956, with 28.29 inches of rain. The highest 24-hour rainfall occurred in July 1960 with 12.11 inches. Snowfall in the area is negligible. Traces have occurred in January through March. A maximum snowfall of 0.2 inch occurred January 19, 1977 [4]. Night ground fogs occur frequently during the cool weather season.

Temperature

The waters of the Gulf of Mexico and adjacent bays cause moderate temperatures in the Pinellas County area throughout the year. Average temperatures range from 60.4°F in January to 82.2°F in August. Normal daily fluctuations in the winter months are from the low 50s to the low 70s, while during the summer months they range from the low 70s to low 90s. The highest temperature recorded on several occasions has been 98°F.

Freezes may occur once or twice a season. The winter of 1976-1977 was the coldest on record, with the temperatures dropping below freezing on eight occasions. The coldest recorded temperature, 18°F occurred in December 1962 [5].

Windspeed and Direction

Prevailing winds are from the north and northeast during the winter months and predominantly from east and south for the remainder of the year. A westerly seabreeze commonly occurs during the afternoons in the summer months. These conditions result in a fairly uniform distribution of wind directions. A summary of ten years of hourly observations at the Tampa Weather Station is presented in Table 1. The overall average windspeed is 8.8 mph, while the highest recorded windspeed was 84 mph in September 1935. Table 2 shows the percentage occurrence of various windspeed ranges.

Table 1. Percentage Frequencies of Wind Direction and Speed Over a 10-Year Period

Direction	Frequency (%)	Average Speed (mph)
N	8	8.7
NNE	8	9.2
NE	8	8.4
ENE	9	8.9
E	10	8.2
ESE	6	8.5
SE	5	8.4
SSE	5	9.2
S	6	10.0
SSW	4	10.3
SW	4	8.9
WSW	5	9.6
W	5	9.9
WNW	5	10.6
NW	4	10.0
NNW	4	9.5
Calm	3	0

Table 2. Percentage Occurrence of Windspeeds

Range (mph)	Frequency (%)
0-4	15.6
5-14	74.1
15-24	9.9
25 and above	0.4

Tornadoes

Tornadoes are not uncommon in Florida. By far, the most common and usually the least destructive tornadoes in Florida are the warm season tornadoes. These occur most frequently between May and September, when most large-scale weather disturbances are well to the north of Florida. Warm season tornadoes may form over land or water and move in almost any direction. They owe their existence to convergence caused by the local land-seabreeze effect or by local air mass thunderstorms. Most warm season tornadoes reported in Florida are more analogous to the fair weather waterspouts of the tropics than to the tornadoes of the Midwest, usually being mild and comparable in size to the "dust devils" of the Southwestern United States.

The cool season tornadoes are sometimes very destructive; they account for a disproportionately large share of the tornado damage in Florida. They are most common from October to April. Cool season tornadoes form most frequently in Florida along the Gulf Coast. They are usually associated with large-scale weather disturbances and sometimes occur in groups along fast moving squall lines. The most common direction of movement is from southwest to northeast, with the tornado's vortex occasionally moving across the land at speeds in excess of 60 miles per hour. They may raise and lower several times, and sometimes make their first contact with the ground many miles inland. Tornadoes can form at any hour during the cool season, but they seem to form most frequently between 6 a.m. and 10 a.m. [4]

The tornadoes associated with tropical storms are most frequent in September and October, when the incidence of tropical storms is greatest. Tornadoes usually occur around the perimeter of the leading edge of the storm, and they sometimes occur in outbreaks of several tornadoes.

Florida's extensive coastline offers excellent opportunity for waterspouts to come ashore and be classified as tornadoes. However, waterspouts usually dissipate soon after reaching the shoreline, hence affecting only a small area.

Historical information regarding tornado incidence in Pinellas County for the 31-year period from 1950 through 1980 was obtained from the National Severe Storm Forecast Center. During this period, 50 events occurred. Of these, 37 were classed as tornadoes and 13 as waterspouts moving ashore. They caused 7 deaths and 214 injuries and occurred during every month of the year (see Table 3).

Table 3. Tornado Occurrences by Month, Pinellas County,1950 Through 1980

Month	No.	Month	No.	Month	No.
January	3	May	9	September	4
February	1	June	8	October	2
March	2	July	4	November	2
April	4	August	8	December	3

Classed by intensity, 16 tornados were termed very weak, 22 weak, 6 strong, 2 severe, and 1 devastating. Three were not ranked. The one devastating tornado occurred on April 4, 1966. It was first observed near Clearwater and moved east northeast across the entire state through Hillsborough, Polk, Osceola, and Brevard counties.

Based on the historical data for Pinellas county, the probability of a tornado striking any particular location in the county during a year can be determined. The occurrence rate (50 tornadoes in 31 years) is 1.61 tornadoes per year. If this rate is multiplied by the average path area as determined from the data (47.7 acres) and divided by the area of the county (179,310 acres), the resulting probability is 4.3×10^{-4} per year, or one chance in 2335. With regard to the Pinellas Plant, this probability is most likely an overestimation of the potential. This is because, as mentioned above, waterspouts moving ashore are classed as tornadoes and were included in the calculations. Waterspouts usually dissipate soon after reaching land and have little potential for reaching the plant site.

Hurricanes

Hurricanes are a very real potential in Florida. Jutting out into the ocean between the subtropical Atlantic and the Gulf of Mexico, Florida is the most exposed of all states to these storms. Hurricanes are defined as tropical cyclones with sustained winds equal to or exceeding 75 mph.

A review was made of all reported hurricanes which have passed within 100 nautical miles of Tampa during the past 117 years (1866 through 1982) [4]. Table 4 lists their occurrence by month and shows that, for the Tampa Bay area, the greatest potential exists during the months of September and October. Of the 25 hurricanes which occurred during this period, 14 passed within 50 nautical miles of Tampa. The average occurrence intervals, based on these historical data, are shown in Table 5. Hurricanes Elena and Katie of 1985 were not within 100 nautical miles of Tampa.

Table 4. Occurrence by Month of Hurricanes Within 100 Nautical Miles (1866-1982)

Month	No.
June	2
August	4
September	10
October	8
November	1

Table 5. Occurrence and Intervals of Hurricanes (1866-1982)

Distance from Tampa (Nautical miles)	Number	Average Time Between Occurrences (Years)
100	25	4.7
50	14	8.4

Although hurricane winds can cause considerable damage, by far the greatest hazard to life and property is due to hurricane tidal flooding. The highest tide ever recorded in this area occurred at the northern end of Tampa Bay during a hurricane in 1848. The tide during this storm reached a height of 14.1 feet above mean sea level. The design hurricane postulated by the U.S. Corps of Engineers shows tide heights ranging from about 10 feet near the southern part of Tampa Bay to 14 plus feet at the northern end of the bay. The Pinellas Plant is located about 6.3 miles from the Gulf of Mexico and about 4.4 miles from Tampa Bay and has a minimum floor height of 18.5 feet above mean sea level. No damage, therefore, is expected from hurricane storm surge or tidal flooding [4].

SEISMOLOGY

Although Florida is not usually considered to be subject to earthquakes, minor shocks have occurred. Historically, eight events have occurred in Florida. The most recent shock of record occurred approximately 90 miles northeast of the plant site in 1973. Other smaller events probably have occurred and escaped detection because of the distance to the nearest seismic station and because of the tendency of the residents to identify these with rockets or airplanes.

There is, however, no reasonable expectancy for damaging earthquakes at the Pinellas Plant. The seismic risk map of the United States (Figure 2) shows central and southern Florida to be in Zone 0. This is defined as a "No Damage" zone [4].

DEMOGRAPHY

Pinellas County contains 24 municipalities in which 73% of the population resides [4]. Largo and Pinellas Park are the two closest to the plant site. The locations and populations of the five largest municipalities are shown in Figure 3. With regard to race, 91.5% are white, 7.6% are black, 0.1% are Indian, Eskimo, or Aleut, 0.4% are Asian or Pacific Islander, and 0.3% are other races. Of the county's residents, 1.4% are of Spanish origin.

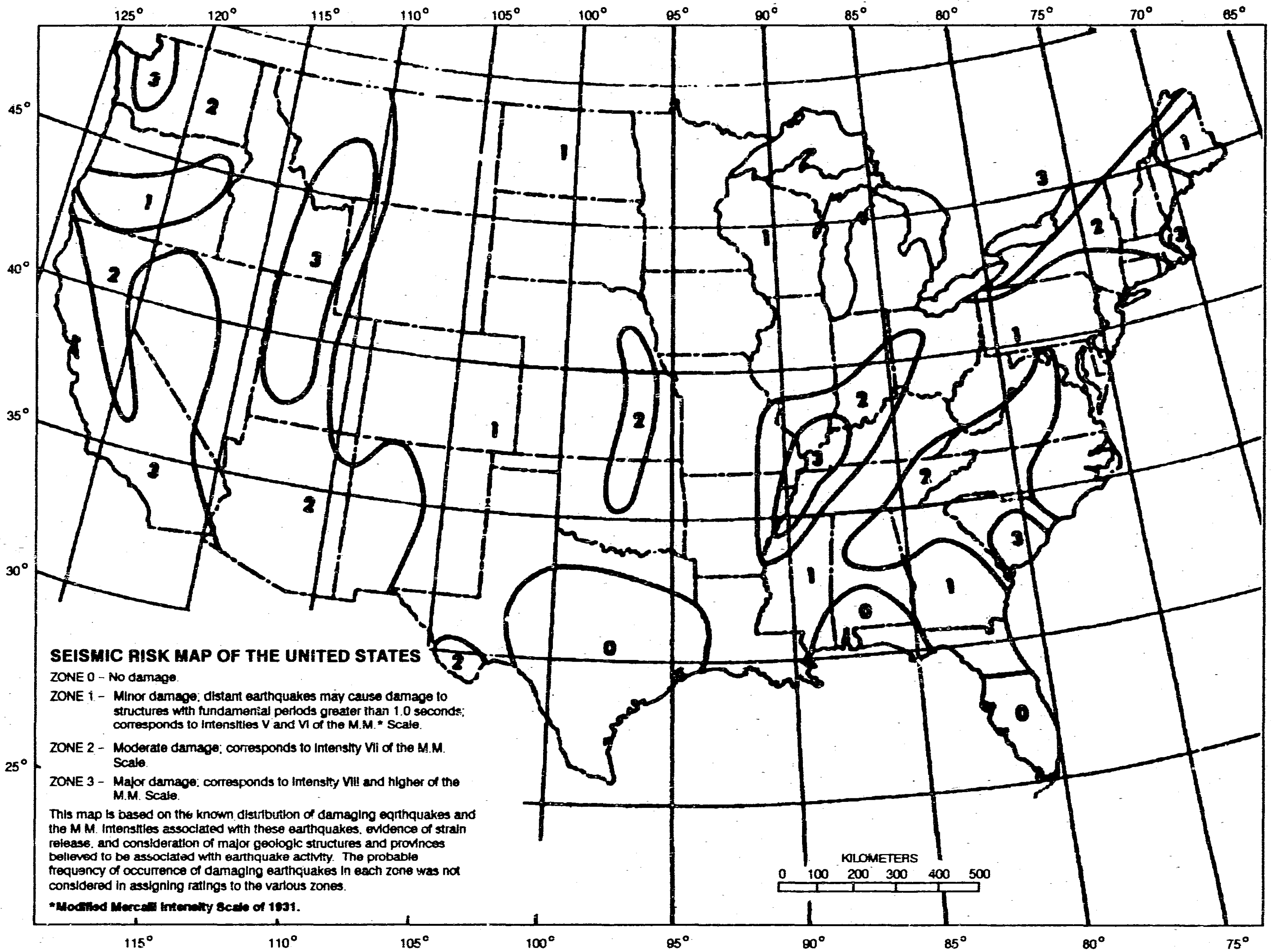
The Tampa Bay area and especially Pinellas County has experienced a dramatic increase in population during the past 20 years. During the 1960s, the county population increased at an average of 12,300 per year. During the 1970s, the increase was 20,600 per year. Pinellas County is the most densely populated county in the the state, with 2850 residents per square mile. The 1980 census showed the county population to be 728,409; the April 1981 population estimate was 755,937, and the July 1, 1988 estimate was 821,000 [3].

A large number of the new residents are retirees. These individuals are a significant factor in the economic base of the county. The Social Security Administration estimates that 228,800 Pinellas County social security recipients are injecting $113.6 million into the local economy each month [6]. The 1980 census showed that social security payments account for 12.7% of the household income in the county.

In addition to the permanent residents, Pinellas County is also a tourist center. The number of tourists visiting Pinellas County during 1989 was 3.7 million. The estimated expenditure of tourists for the same period was $1.8 billion according to estimates from the Clearwater Chamber of Commerce [7].

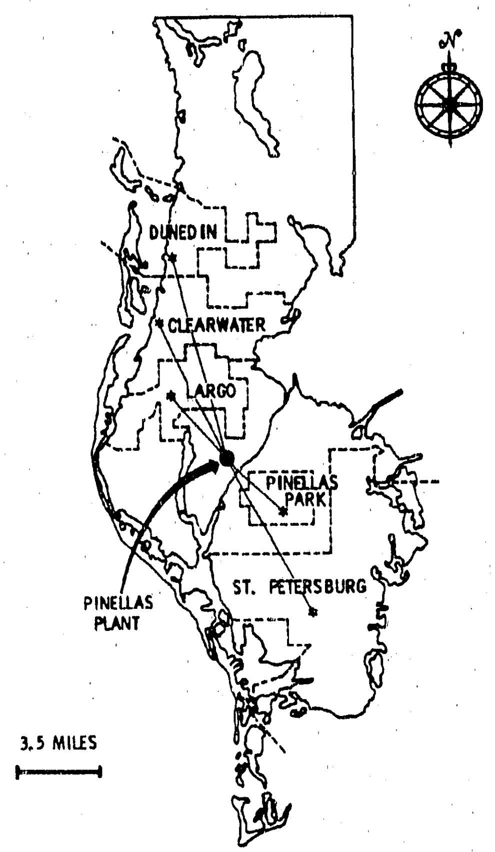
ARCHAEOLOGY AND HISTORICAL LANDMARKS

Pinellas County contains a number of sites of historical and archaeological significance. However, none are in close proximity to the Pinellas Plant [4].



Reprinted from Seismic Risk Studies in the United States, by S.T. Algermissen, Proceedings of the Fourth World Conference on Earthquake Engineering, Vol. 1, pp 14–27, Santiago, Chile, 1969.

Figure 2. Seismic Risk Map of the United States



City	Population	Distance from Plant (miles)
Clearwater	85,450	6.3
Dunedin	30,203	8.8
Largo	58.977	3.5
Pinellas Park	32,811	3.2
St. Petersburg	236,983	7.4

Figure 3. Location and Population of the Five Largest Cities in Pinellas County

ECOLOGY

The Tampa Bay area contains a diversified population of plant and animal life [4]. The Pinellas Plant is located in a pine flatwoods habitat area. The site itself, which was once used as a dairy farm, would fall into the Cultivated Lands category.

THREATENED AND ENDANGERED SPECIES

A listing (dated December 5, 1980) of species classified as threatened and/or endangered was obtained from the U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. The listing was reviewed with the Fish and Wildlife Service, Jacksonville area office [4]. None of the listed species are known to be present on or near the plant site.

GEOLOGY

Pinellas County is located on the western coastal plain of the Floridian Peninsula, a broad, partially submerged shelf in the Gulf of Mexico. The peninsula has been a prominent geomorphic feature of North America since the early Cretaceous Period. The Floridian Peninsula owes its origin to the deposition of thick carbonate sequences ,rom the early

Creteaceous Period to the Oligocene Age. Over this period of time, thousands of feet of limestone were deposited under an environment similar to that found in today's Bahamas Bank region. This sequence is known as the Ocala Limestone, Avon Park Limestone, and the Lake City Limestone which form a total thickness of several thousand feet and extend over 300 feet below the surface [5].

During the late Oligocene Age, another layer of limestone, known as the Suwannee Limestone, was deposited. In the Pinellas County vicinity, the formation is identified by its white to cream colored, hard, generally fossiliferous nature. At the close of the Oligocene Age, the Suwannee Straits, which had separated the Floridan Peninsula from the mainland, closed, allowing clastic material from the mainland to transgress across the carbonate shelf. This event was marked by the deposition of white to light tan, hard, shaley limestone known as the Tampa Formation (see Figure 4). Deposition occurred throughout most of the Miocene Age and resulted in a sequence of 100 to 150 feet in thickness.

The Tampa Formation marked the final carbonate depositional period in the Pinellas County region. During the late Miocene Age and Pliocene Age, deposition of a primarily clastic unit known as the Hawthorn Formation occurred. The Hawthorn Formation is identified by its fairly hard, gray sandstone to sandy, gray clay nature. Irregularly distributed through the formation are small grains of phosphate and angular fragments of chert. Calcarious zones have also been noted on a limited scale. The formation ranges in thickness from 50 to 90 feet.

WATER

Water Demand

The dramatic increase in population in the Tampa Bay area has severely stressed the area's water supply and distribution systems. This has resulted in the necessity to impose periodic water usage restrictions. The region itself, however, has an adequate water supply for both current and predicted needs. Another difficulty has been the management of the total water resources in the Tampa Bay area. To alleviate this situation, the Florida Legislature passed several laws to improve water management and comprehensive planning efforts. One of these acts, the Water Management Districts and Regional Water Supply Authorities Act, which became effective October 1, 1974, provided enabling legislation for the formation of regional water supply authorities. The counties of Hillsborough, Pasco, and Pinellas, along with the cities of St. Petersburg and Tampa, formed the West Coast Regional Water Supply Authority. This group, together with the Southwest Florida Water Management District, is working toward alleviating these problems by developing well fields, expanding supply and distribution systems, and purchasing recharge areas [4]. Water demand for the school will not increase pressure on water demands for the area.

Surface Water

Natural surface waters do not exist on Pinellas Plant property. However, two man-made ponds, the East and West Ponds, have been designated as wetlands by the U.S. Department of the Interior, Fish and Wildlife Service National Wetlands Inventory. In addition to the two man-made ponds, there is one stormwater retention basin, the South Pond, designed to collect runoff from a half-inch rainfall event.

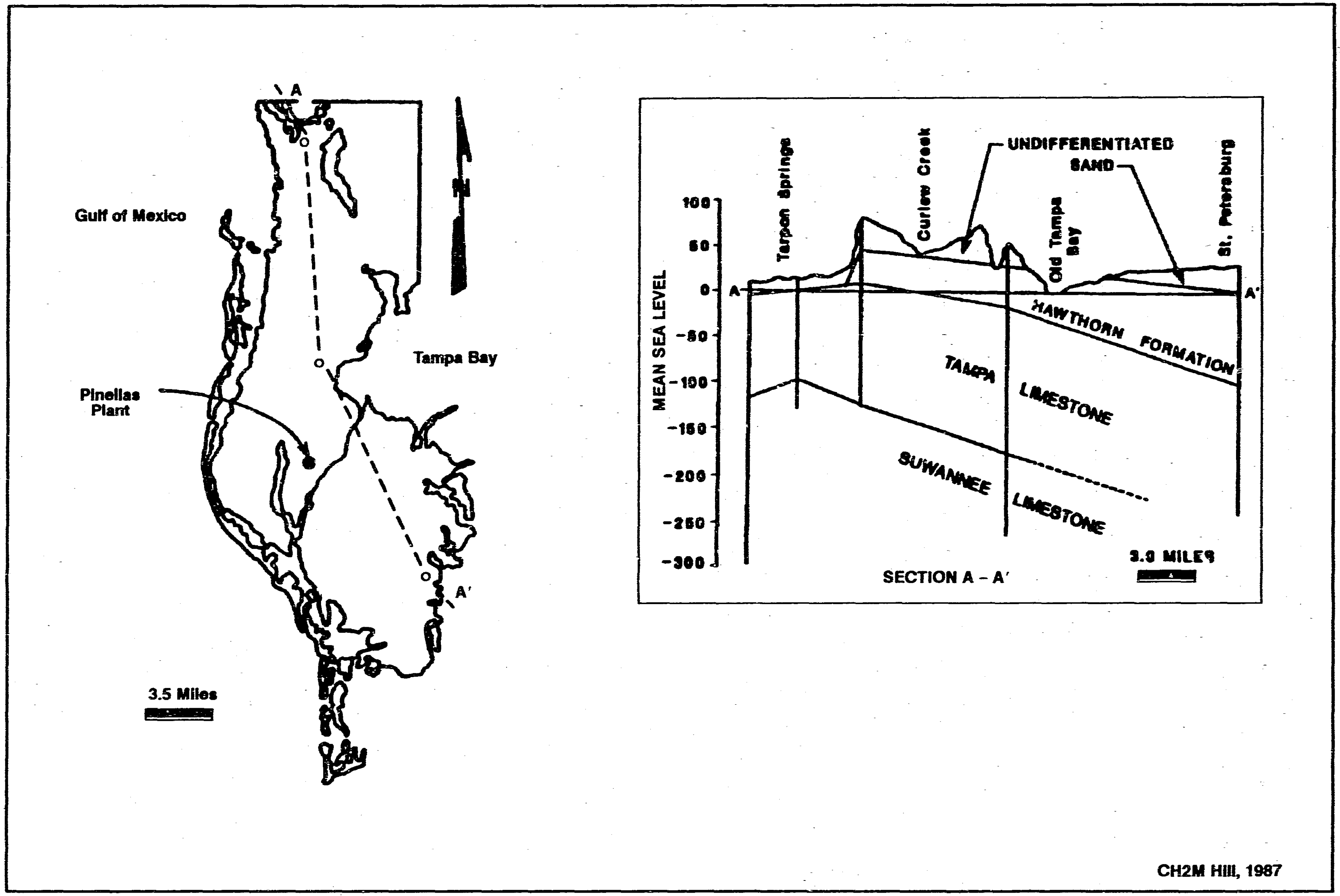


Figure 4. Generalized Geologic Cross Section in the Vicinity of the Pinellas Plant

The Pinellas Plant site is not included in a flood plain area [8]. The primary threat for flooding in Pinellas County stems from hurricanes. The 100-year tidal flood is expected to reach a level of 11 feet above mean sea level, while the land elevation at Pinellas Plant is 17 to 18 feet above sea level; therefore, the area is not expected to be flooded.

Groundwater

The groundwater system underlying the Pinellas Plant is composed of three primary water-bearing units. The upper unit, designated as the surficial aquifer, is associated with the upper 25 to 35 feet of undifferentiated sands of Pleistocene Age. The middle unit corresponds to sediments of the Hawthorn Formation which, because of the formation's relatively low permeability, functions as an aquitard. The lower unit, of primary economic importance, is the Floridan Aquifer.

Based on information gained as a result of past environmental studies conducted at the site, the basic hydrogeologic characteristics of the surficial aquifer are known; however, little information is available concerning site-specific characteristics of the Hawthorn Formation of Floridan aquifer. For this reason, the following discussion on the Floridan aquifer will be on a regional basis [5].

Floridan Aquifer

The Floridan aquifer is an extensive carbonate water-bearing unit that is of primary economic importance as a water resource throughout Florida, Southeastern Georgia, and Southern Alabama. The Floridan aquifer includes all or parts of the Avon Park and Lake City Limestone, Ocala Limestone, Suwannee Limestone, and Tampa Limestone. Throughout west-central Florida, the Floridan aquifer is divided into upper and lower units, which are separated by a tight, intergranular evaporate bed associated with the undifferentiated Avon Park and Lake City Limestone. The lower unit generally contains saltwater, while the upper unit serves as the primary potable and agricultural water supply to the area. In Pinellas and Hillsborough Counties, the thickness of the upper Floridan aquifer is approximately 1200 feet. The water supply for the Pinellas Plant and the school is furnished by the Pinellas County Water System, and the sewage system for the plant and school is provided by the Publically Owned Treatment Works.

DESCRIPTION OF THE CHILD DEVELOPMENT CENTER/PARTNERSHIP SCHOOL

LOCATION AND LAYOUT

The Child Development Center/Partnership School is located approximately 150 feet east of Building 100 in the northern end of the east parking area. Figures 5 and 6 show the location of the facility on the Pinellas Plant site. The Child Development Center/Partnership School is comprised of two separate modular buildings connected by an open, covered walk. The total area of the school is 12,786 square feet. A floor plan of the facility is shown in Figure 7.

A four-foot high chain link fence surrounds the school grounds and playground area. A gate, wide enough to admit emergency vehicles, is attached to the fence. This gate will normally be locked to prevent students from leaving the site. A padlock keyed to the security master key system is used to lock the gate. Both the Security Inspection Force and school personnel have keys to the gate and can unlock the gate for emergency egress from the school.

In a tornado emergency, students would evacuate to the main plant building (Building 100). A designated Security Inspector will unlock the gate in the east inner fence surrounding the plant to allow the students safe egress to the main building. Provisions for unlocking this secure area are included in the GEND Tornado Emergency Plan [9].

A landscaped buffer zone ten feet in width lies along the outside perimeter of the fence and separates the school site from vehicle traffic lanes and parking areas. Traffic lanes exist on all four sides of the school site, with two-way traffic on both the east and west side(s).

The main entrance to the school is on the east side. A curb island and circle driveway in front of the main entrance serves as a pick-up and drop-off zone for students. A concrete sidewalk of standard width runs along the east side and provides access to the main entrance. A painted pedestrian walkway is in place along the south side of the site.

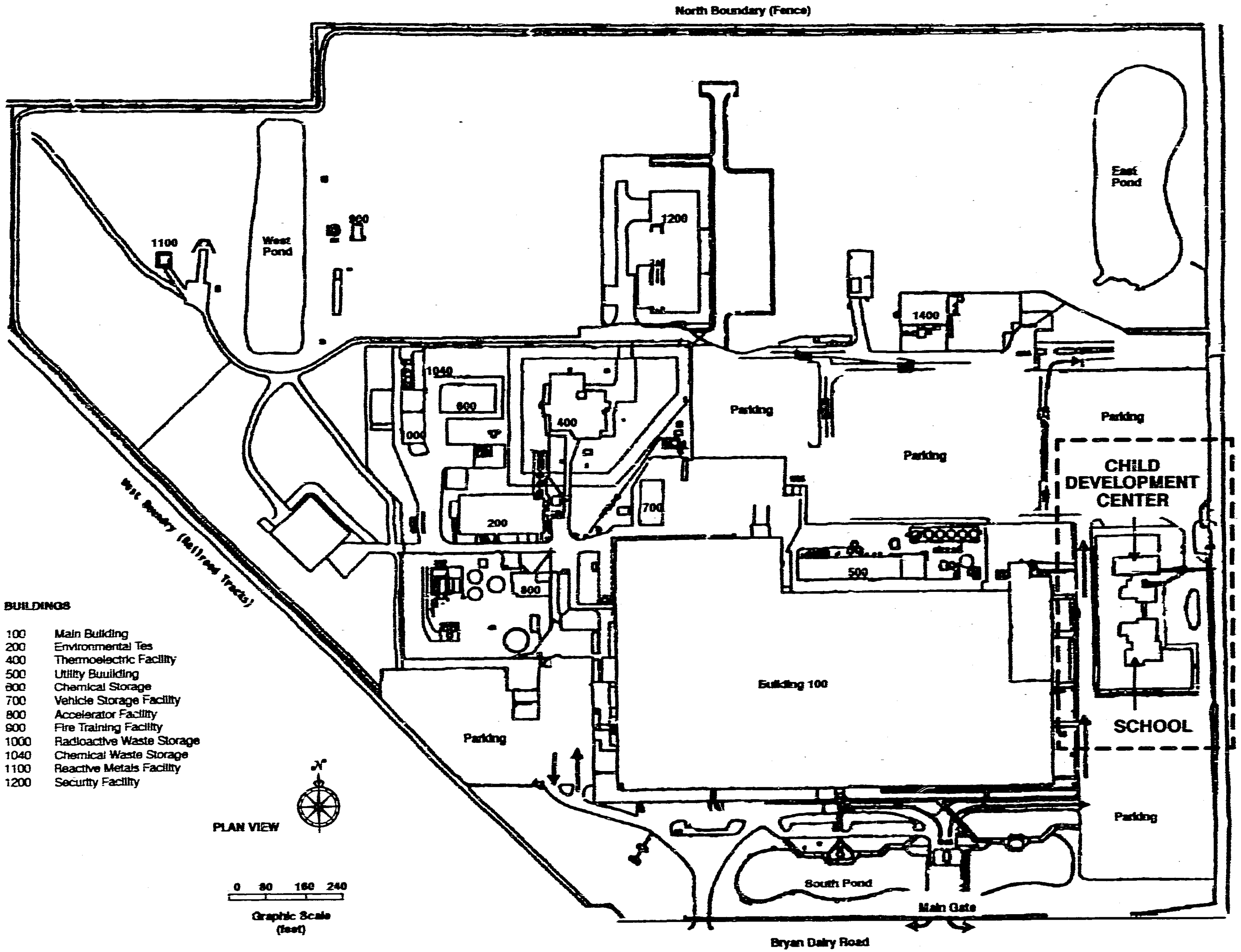


Figure 5. Location of the Child Development Center/Partnership School on the Pinellas Plant Site

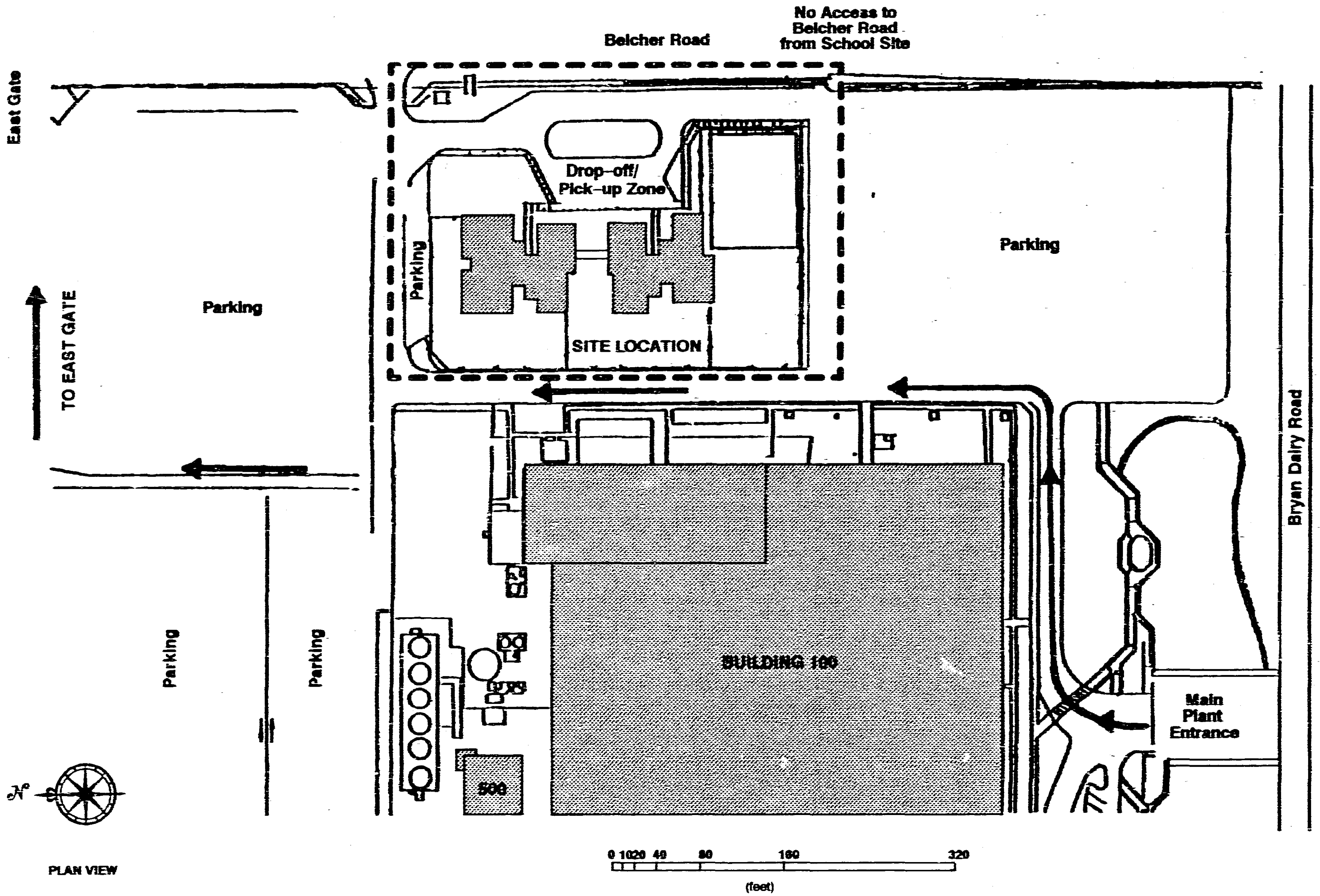


Figure 6. Pinellas Plant Child Development Center/Partnership School Site Location Plan

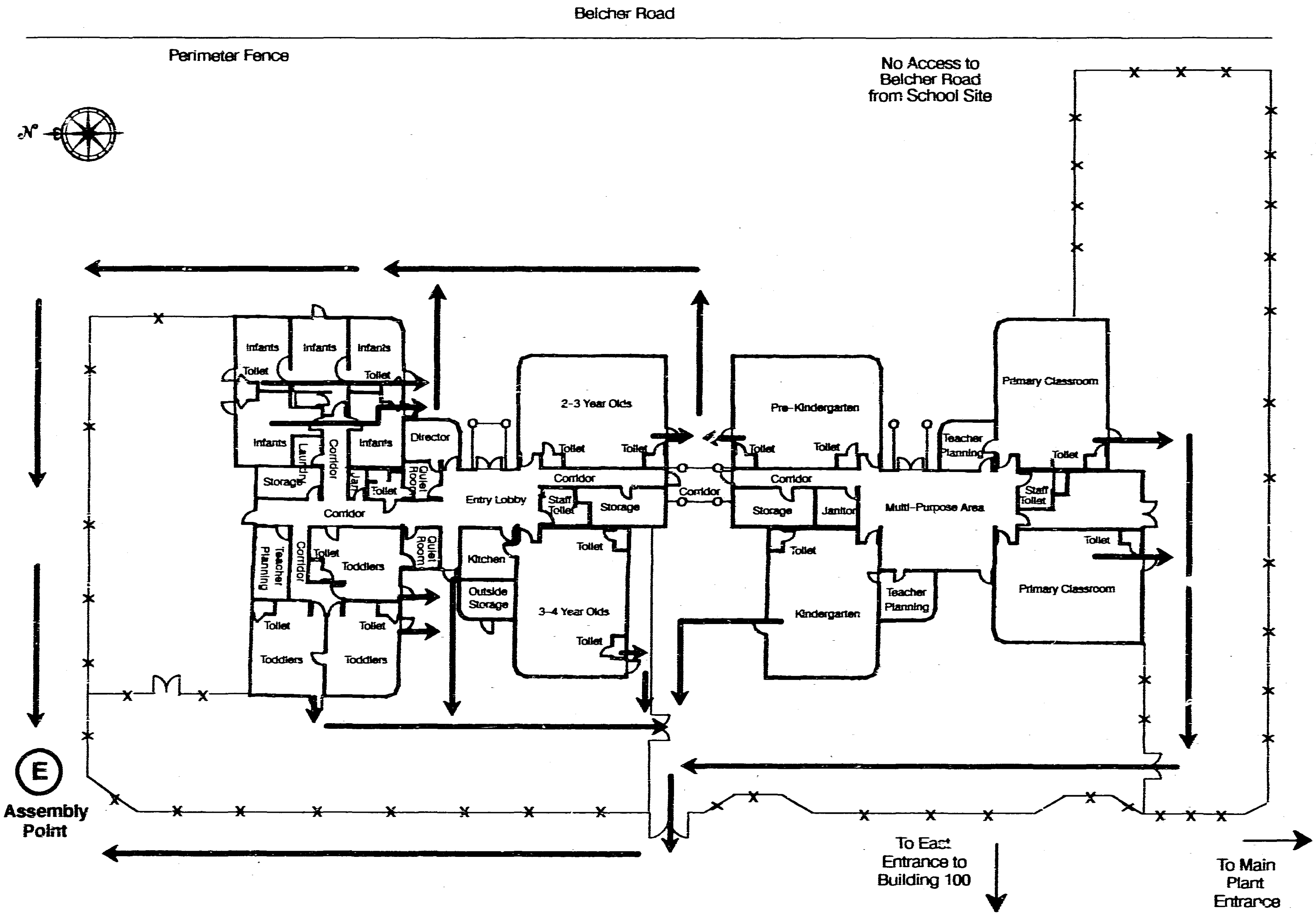


Figure 7. Pinellas Plant Child Development Center/Partnership School Floor Plan and Evacuation Routes

STRUCTURE AND DESIGN

The facility buildings are steel frame, Type IV construction with raised concrete floors. The roof is steel/bar joints and metal decking with rigid insulation and a single-ply membrane roof. Foundations are spread footing/piers with a continuous perimeter foundation wall and footing. The design is based upon the Standard Building Code, National Fire Protection Association (NFPA) 101 [10], Pinellas County Licensing Board requirements for child care centers, and certain requirements of the Pinellas County School Board. Materials include light gauge metal framing exterior walls with plywood sheathing and an exterior insulation and finish system (Dryvit*). Interior partitions are drywall. Floor finish is carpet and vinyl composition tile. The school is built upon a raised foundation. The floor slab is approximately 24 inches above the level of the parking lot. The school is a single-story structure. The ten-foot high walls of the school are constructed of metal studs covered with fire-resistant gypsum board. The roof is metal pan covered with fiberglass insulation board and a single-ply membrane roof. The school is grounded to earth ground, and a standard system of air terminal lightning rods is in place.

The buildings are designed to be fully accessible to handicapped persons. Structural design is based upon the Standard Building Code, including the design parameters of American National Standards Institute (ANSI) A58.1 [11] for the 100-year mean recurrence wind. The maximum head-on wind load capacity of the school is 41.2 pounds per square foot. Wiring is in accordance with the National Electric Code, and lightning protection is in accordance with NFPA 78 [12]. The school building meets all construction standards of the Pinellas County School System for school standards.

Electrical service includes ground fault receptacles on the exterior walls and near water sources, with child proof receptacles where they may be accessed by children. There are intercom speakers in all rooms which are wired back to the school director's office if any emergency announcements are required. All rooms include emergency lighting and required exit signs which comply with NFPA 101.

Fire Protection

Both buildings are equipped with automatic fire sprinklers, heat or smoke detectors, and fire extinguishers. Detectors and sprinkler alarm systems are tied in to the main plant alarm system. The school structure is fully protected by a wet-pipe sprinkler system with dedicated fire riser. This fire system will be added to the GEND fire equipment preventive maintenance schedule. Flow testing of the fire system will be conduced on an annual basis. Two fire hydrants are located within 500 feet of the school site.

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Alarm Systems

Water flow alarms have been included in the wet-pipe sprinkler system. The opening of one or more sprinklor heads sends an alarm directly to the main plant alarm panel. Heat or smoke detectors are in place in each room of the school, are wired into a signal circuit leading to the main plant alarm panel, and sound a local audible alarm. The alarm panels have backup battery supplies.

Heating, Ventilating, and Air Conditioning System

The Heating, Ventilating, and Air Conditioning (HVAC) system includes multiple direct expansion (DX) units with fan coil units in the ceiling. Outside air is brought in from a dampered duct at each fan coil unit. The kitchen has a residential type exhaust hood. Each toilet facility has an exhaust fan automatically activated by the switch.

Special motorized fail-safe intake air dampers have been installed on the HVAC system. In the event that toxic gas or smoke were released from the main plant, the dampers would prevent entry of contaminated air. The dampers are set to close automatically in the event of power failure or may be closed by a manually activated switch located in the school Director's office. This safety system allows isolation of the Child Development Center/Partnership School from the environment, if necessary.

HVAC cooling is accomplished with DX cooling units using conventional refrigerant gases (Freon*). HVAC heating is accomplished through resistance heating coils (fan coils). There are no boilers or pressure vessels on the school site.

Emergency Exit Lighting

The school building is a single-story structure. To provide maximum protection, each classroom has its own exit door leading directly outside the building. Each room also has a ground-level window. An evacuation assembly point has been established in the northwest corner of the school property (see Figure 7).

Illuminated exit signs are installed on all exterior doors and throughout the structure at key points to direct traffic flow to the exits. All exit signs are electrically powered with battery back-up and will turn on automatically in the event of power failure. Electrically powered emergency lights with battery back-up are mounted throughout the interior of the facility in accordance with fire code requirements.

Traffic Flow

Approximately 220 parking spaces were eliminated by the school facility. Twelve new spaces were created. These are for short-term parking only and are designed to facilitate drop off and pick up. No major change was made to plant traffic flow patterns, and no change was made to

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*Trademark, E. I. du Pont de Nemours & Co., Inc.

the length or width of existing plant roadways. The addition of the school building has not created parking problems since adequate parking exists north, south, east, and west of the main plant building [13].

OPERATIONS

The facility is composed of two distinct operations: the Child Development Center and the Partnership School. The Child Development Center, operated by New Directions in Learning, Inc., is for the care of children from 8 weeks to 4 years of age. Facilities include a director's office, classrooms, laundry, storage, toilets, quiet rooms for children that are not feeling well, and a kitchen for distributing food. Food will be prepared in the main plant cafeteria and catered to the school. The Partnership School will be operated by the Pinellas County school system and will provide care and education for children of Pinellas Plant employees from kindergarten through the second grade. Facilities include classrooms, storage, toilets, and teacher planning and multipurpose rooms.

Maximum occupancy of the school is 270. Children at the facility will range in age from 8 weeks to approximately 8 years old. The Child Development Center will provide care and development for children ranging in age from 8 weeks through 4 years old. The facility has the capacity to house children in each age group as follows:

8 weeks to 1 year old – 30 children
1 to 2 years old – 30 children
2 to 3 years old – 30 children
3 to 4 years old – 30 children
4 to 5 years old – 30 children

Additionally, the Child Development Center will offer before- and after-school care for children that are in kindergarten and first and second grades. This program could have a maximum enrollment of 90:

Kindergarten – 30 children
First Grade – 30 children
Second Grade – 30 children

Assuming full capacity enrollment, the Child Development Center will require a staff of 25 to 30 early childhood development professionals.

The Partnership School will provide education for children in kindergarten, first grade, and second grade. The facility has the capacity to house 30 children in each grade. These same 90 children will be eligible for the before and after school program mentioned above. The Partnership School is a public school and will be staffed with employees of the public school system. There will be one teacher for each grade.

The hours of operation for the entire center will be Monday through Friday, from 6:00 a.m. to 6:00 p.m. The elementary school day will begin at 7:50 a.m. and end at 1:50 p.m. The center will be open on all days that the plant is open for business. The school will not operate on weekends, county and plant holidays, or shutdown days [13].

EMERGENCY PLAN

A full emergency plan has been prepared for the school [14] and has been integrated with other Pinellas Plant emergency-specific control plans [9]. These include:

- Evacuation
- Fire Control Plan
- Hurricane Plan
- Tornado Plan
- Severe Weather Message Plan
- Explosion Plan
- Medical Plan

Emergency plans are reviewed and updated annually. Periodic exercises, utilizing varying emergency scenarios, are conducted to ensure that personnel are fully trained in their assigned positions. Specific aspects of emergency plans which involve the school, such as notifications to the school and parents, sheltering, and evacuation are part of these exercises.

An intercom system connects each room with the director's office. The GEND plant emergency public address alert system is connected to the school director's office. Additionally, a dedicated emergency telephone line links the school director's office directly to the main plant Communications Center.

There is consideration for internal personal conflicts which may arise during a plant emergency among individuals who hold key emergency management positions, whose children may also attend the school. Personnel selected for these positions are the most qualified and highly trained to hold these positions, and hence, are the most committed to performing necessary duties toward mitigation of a plant emergency.

Because the school is located inside the perimeter fence of the Pinellas Plant access will be restricted to authorized personnel only. Security inspectors make regular inspection rounds of the plant site at all hours of the day and will include the school area in these inspections.

Chemical use and storage within the school will be minimal and limited to those associated with the operation of a typical elementary school and day care center, such as duplicating fluid and non-toxic art materials.

IMPACTS OF THE PROPOSED ACTION

IMPACTS ASSOCIATED WITH OPERATION OF THE SCHOOL

There is no history of waste handling, treatment, or disposal at the site of the Child Development Center/Partnership School. The site was chosen primarily because it was one of the areas on the plant site for which there no were concerns identified during an environmental restoration investigation [15]. The interior of the school building is being tested for radon as required by the Pinellas County Licensing Board. There are no known direct impacts from the operation of the school on archaeological and historical sites, threatened and endangered species, water quantity, sewage, wetlands, or quality of surface and groundwaters.

The Pinellas Plant is located on the northwest corner of the intersection of Belcher Road and Bryan Dairy Road. Belcher Road is a six-lane, north-south route, while Bryan Dairy is a four-lane road running east-west. The average daily traffic flow measured in 1987 (adjusted seasonally by the Pinellas County Traffic Engineer's Office) shows Belcher Road to sustain 16,100 vehicles in a 24-hour period, while Bryan Dairy Road supports 21,500 vehicles. Due to recent growth in the area, an increase of 20% is reasonably expected. The closest estimated traffic volume for 1990 is 19,320 vehicles on Belcher Road and 25,800 vehicles on Bryan Dairy Road. Neither road is considered a major commercial thoroughfare at this time.

Delivery trucks enter the Pinellas Plant site at the East Gate (Belcher Road entrance). Dry goods and general stock items are delivered to the Remote Shipping and Receiving Facility (Building 1400). Drums of virgin chemicals are usually delivered directly to the Bonded Stock Area near the Chemical Storage Building (Building 600). Drums of chemical waste are also transported by truck across the site from Buildings 1000 and 1040 out the East Gate.

Several steps have been taken to mitigate traffic/pedestrian collisions. A drop-off/pick-up zone (complete with concrete island) has been constructed on the east side of the school building (the side farthest from the east plant entrance). Traffic lanes have been clearly marked around the school, and the posted speed limit of 14 miles per hour will be strictly enforced.

GEND will provide electrical power, water, communications, alarm systems, routine maintenance, sanitary sewer, and waste removal services. These costs are not excessive, do not place extra demands on existing facilities, and are furnished as part of the agreement with the Pinellas County School Board.

The Child Care Center/Partnership School will enhance the relationship between the Pinellas Plant and the Pinellas County School Board in supporting an initiative to provide additional education facilities. The school represents a savings to Pinellas County of at least the cost of the building and annual operating expense. Plant employees will benefit by having day care and public education facilities in close proximity to the work place. Finally, there will be a minor reduction in fossil fuel usage associated with transportation of employees' children to and from off-site day care and school facilities.

In summary, there are no known adverse impacts upon the environment which will be caused by the operation of the school.

IMPACTS ON THE SCHOOL FROM INTERNAL AND NATURAL ACCIDENTS

Like other child care facilities, the new Pinellas Plant Child Development Center/Partnership School faces several hazards from routine operations. These hazards include fire, electrical shock, severe weather, traffic/pedestrian collisions, and slip/fall accidents. To reduce the likelihood of accidents and to mitigate the consequences in the unlikely occurrence of an accident, the design and construction of the facility meet or exceed all building codes. Additionally, emergency procedures consistent with the Pinellas County Emergency Disaster Plan requirements for public schools will be integrated in the Pinellas Plant Emergency Preparedness Program.

The probability of potential off-site accidents near the plant site was also investigated. Potential accidents included train derailment, tanker/auto fire at a gas station, truck/tanker collision, and a boat manufacturing facility incident. The probability of occurrence for these accidents range from 10^{-1} to 10^{-3} and are conservative estimates. The probabilities of occurrence are representative of most sites within Pinellas County and are judged to be acceptable.

The intrinsic risk scenarios (I-1 through I-6) are summarized in Table 6. The resulting risk matrix is illustrated in Figure 8. These categories correspond to those established by DOE Order 5481.1B [16]. Definition of these categories is presented in Tables 7 and 8.

Table 6. Accident Summary for the Child Development Center/Partnership School

Scenario ID No.	FMEA* ID No.	Accident Description	Frequency	Consequence
Intrinsic Accidents				
I-1	6-1	Major fire in school; fire suppression system fails on demand	B	II
I-2	6-2	Major fire in school; fire detection system fails on demand	B	II
I-3	6-11	Hurricane	A	IV
I-4	6-12	Tornado	B	I
I-5	6-13	Severe thunderstorm	A	IV
I-6	6-14	Earthquake	D	II
Extrinsic Accidents				
E-1	6-5	Fire/explosion in Building 600	B	III
E-2	6-6	Chemical Vapor Deposition (CVD) release from Area 353	B	IV
E-3	6-7	Fire in Lithium Ambient (LAMB) Facility	B	III
E-4	6-8	Fire in Thermal Battery Area	B	III
E-5	6-9	Explosion in Hydrogen Storage Area	C	III
E-6	6-10	Tritium release from processing bed to exhaust stack	B	III

*Failure Modes and Effects Analysis tables included in the Safety Assessment [13].

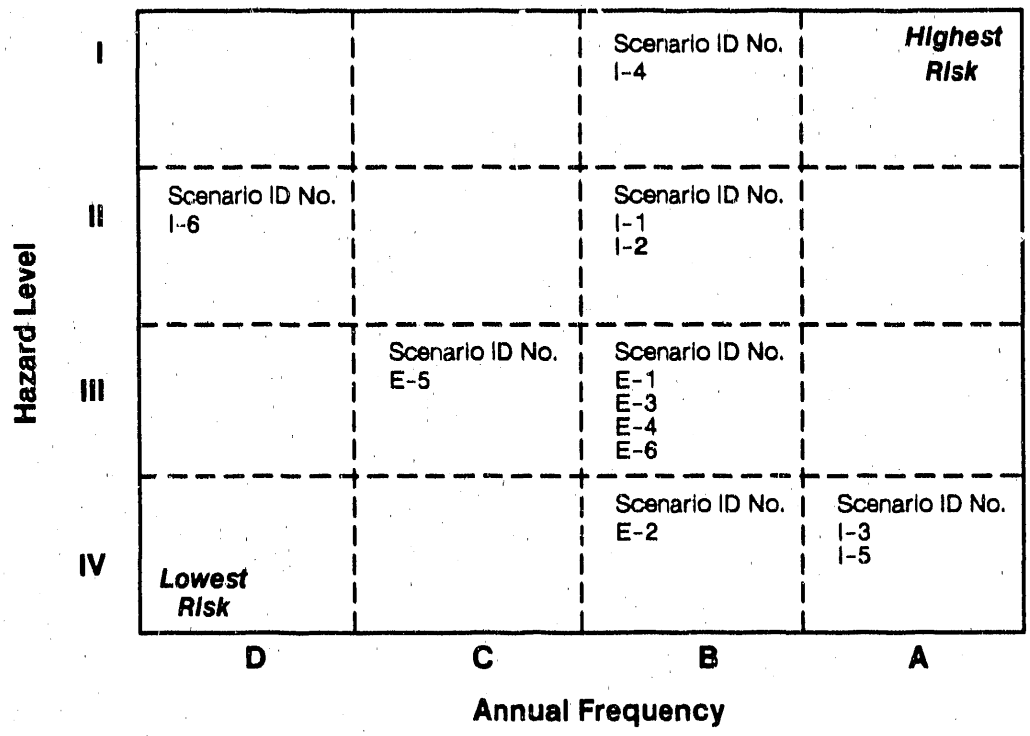

Figure 8. Risk Matrix for the Child Development Center/Partnership School

Table 7. Qualitative Accident Frequency Index

Category	Symbol	Nominal Range (Events per year)
Likely	A	$> 10^{-2}$
Unlikely	B	10^{-2} to 10^{-4}
Extremely Unlikely	C	10^{-4} to 10^{-6}
Incredible	D	$< 10^{-6}$

Table 8. Qualitative Accident Hazard Severity Index

Hazard Category	Symbol	Consequences to the Public, Workers, or the Environment
Catastrophic	I	May cause deaths, or loss of the facility/operation, or severe impact on the environment.
Critical	II	May cause severe injury or severe occupational illness, major damage to a facility/operation, or major impact on the environment.
Marginal	III	May cause minor injury, or minor occupational illness, or minor impact on the environment.
Negligible	IV	Will not result in a significant injury, or occupational illness, or provide a significant impact on the environment.

IMPACTS ASSOCIATED WITH ROUTINE RELEASES FROM PLANT OPERATIONS

Risks associated with routine operations at the Pinellas Plant are similar to those encountered by many large-scale electronics assembly factories; except that small amounts of nuclear materials are used in three processes. Field measurements, calculations, and computer modeling were used to estimate the levels of exposure at the school site which resulted from plant operations. Radiological emissions from plant processes calculated at the school site were well within U.S. Environmental Protection Agency (EPA) standards for the general public (see Table 9). Concentrations of hazardous chemicals at the school site are well below the Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels (PEL) for workers. There are only limited criteria for assessing chemical exposures to children; therefore, a conservative approach has been taken in assessing these exposures. Details of the assessment are given below.

Table 9. Air Emissions Exposures From Pinellas Plant Operations

Substance	Location	Distance to School	Exposure at School	Exposure Criteria
Radiological				**EPA-General Public**
H-3	Building 100	525 ft	0.003 mrem/yr	10 mrem/yr
Kr-85	Building 100	525 ft	<0.0004 mrem/yr*	10 mrem/yr
Pu-238	Building 400	1399 ft	Background	10 mrem/yr
Other Emissions				**OSHA PEL**
Total Volatile Organic Compounds**	Building 100	525 ft	<2 ppm	50 ppm
				NAAQS
Lead	Building 1200	1300 ft	0.86 $\mu g/m^3$ (Max.) 0.005-0.009 (Ave.)	1.5 $\mu g/m^3$

* East boundary (fence line) dose of of Krypton-85 as calculated by AIRDOS dispersion modeling analysis. The school is located 75 feet from the east fence.

** Methylene chloride and trichloroethylene comprise over 50% of volatile organics released at the plant. Estimated mass balance of volatile organics released is 343 lbs/day.

Radiological Releases

As can be seen in Table 9, nearly all of the radiological exposure to the public comes from tritium emissions. Calculations based on calendar year 1989 tritium releases indicate that the dose to children and adults at the school site is essentially equivalent to the fence line dose of 0.003 mrem/yr. This dose is typical of past and anticipated future releases from the plant. This exposure estimate assumes 24-hour/day occupancy for 365 days per year, whereas the children would be present for less than 12 hours per day for about 260 days per year. This dose is well below the 10 mrem EPA standard for exposure of the general public. Environmental sampling data confirms compliance with the EPA standard.

Of lesser concern are plutonium oxide (Pu-238) and krypton. Plutonium oxide is received triply encapsulated in hardened metal alloy and no release of Pu-238 is possible during routine operations or from an 1800°F fire of 1-hour duration. Krypton gas is used for leak check for completed components and subassemblies. Estimated doses to the school children from routine discharge of krypton is estimated to be less than 0.0004 mrem/yr.

The principal health effect of exposure to low levels of ionizing radiation is cancer. Estimates of the risk from such exposure are given in reports such as the Committee on Biological Effects of Ionizing Radiation (BEIR), BEIR V report [17], the EPA [18], and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) [19]. DOE has considered the information in these reports and believes that about 8×10^{-4} Latent Cancer Fatalities (LCF) per person-rem is a reasonable factor to use for estimating health effects on children. Assuming that the school would operate for 30 years and be continuously occupied by 240 children, the total exposure to radiation would be 0.04 person-rem (240 children x 30 years x 6×10^{-6} rem/yr). The result, 3×10^{-5} LCF, indicates that no fatalities would be expected to occur as a result of radiation exposure to occupants of the school from effluents from the Pinellas Plant.

Chemical Releases

The main emissions detected at the school site from routine plant operations are Volatile Organic Compounds (VOCs) emitted from laboratory and process stack and airborne lead from the Indoor Firing Range (IFR). By volume, VOCs comprise the largest group of chemical emissions and include trichloroethylene, methylene chloride, Freon 113, trichloroethane, acetone, and assorted alcohols. Mass balance calculations showed VOC emissions from all fugitive and plant sources to be approximately 343 lbs/day in 1988.

These VOCs emanate from more than 300 exhaust stacks evenly distributed over the 600,000-sq ft roof of the main building, Building 100. Two-thirds of these stacks serve laboratory fume hoods which are operated intermittently, according to laboratory usage patterns. The chemical discharges are diluted with large volumes of exhaust air before release through the stacks. The remaining exhaust points are directly connected to process machinery and release continuous or nearly continuous emissions. Low levels of VOCs may also be released from the chemical storage building, Building 600.

Prevailing winds mix and disperse the rooftop emissions which originate approximately 30 feet above ground level. Prevailing winds at the site are from the north in winter and from the east and south for the remainder of the year. A westerly seabreeze is common during the afternoon in summer months. These conditions result in a fairly uniform distribution of wind direction. Maximum ground level concentrations of chemical emissions are expected to occur when wind conditions are calm.

Ground level concentrations of chemicals emitted from stack exhausts can be estimated by use of the Gaussian dispersion equation [20]. A feature of this dispersion modeling is the fact that doubling the wind speed halves the ground level concentration. Since the average overall windspeed at the school site is 8.8 mph, significant mixing and dispersion of stack emissions occurs.

The maximum modeled concentration of VOCs at the school is about 1 part per million (ppm), while the total measured concentration at the school site ranged from "none detected" to less than 2 ppm. The measured values include background levels (which are unknown quantities) of VOC from off-site sources.

GEND is actively involved in a solvent reduction program as a part of its waste minimization program. Engineering committees are examining solvent use in each area to eliminate as much usage as possible. Usage amounts are being lowered in most areas. In 1989, a large in-line solvent degreaser was removed and replaced with a water based cleaning system, eliminating all solvent emissions from this source. As the solvent reduction program eliminates sources of VOCs from production operations, the exposure levels due to plant emissions will be reduced to even lower levels.

Based upon measured and calculated values, it is believed that there will be no adverse effect upon school occupants from routine plant releases of VOCs. The solvent reduction program should further reduce the measured levels of VOCs below the current low values. Additionally, an ambient air VOC sampling station will be installed at the school site. The station will monitor routine VOC levels at the school and will provide better measured results upon which future operational changes, if needed, can be based.

The calculated maximum air concentration of lead at the school site when the IFR is in use ranged from 0.051 to 0.900 $\mu g/m^3$ for average meteorological conditions to 0.86 $\mu g/m^3$ for worst case meteorological conditions. The current National Ambient Air Quality Standard (NAAQS) [21] for lead is 1.5 $\mu g/m^3$ (maximum arithmetic mean over calendar quarter). Although standards for lead are based primarily on health effects information associated with organic compounds of lead (not the primary forms in this case) and EPA has considered it inappropriate to establish human health effects guidance levels for inorganic lead, nonetheless, this comparison is presented as the most relevant available information. Since the IFR is used infrequently during the week and intermittently during any given 24-hour period, it is not expected that the NAAQS would be exceeded and, therefore, no health effects are expected.

IMPACTS ON SCHOOL OPERATIONS RESULTING FROM ACCIDENTS INVOLVING PLANT OPERATIONS

A summary of the potential accidents developed in the safety assessment is presented in Table 6. Both elements of the risk couplet, frequency, and consequence were categorized for each of the accident scenarios. The resulting risk matrix (Figure 8) indicates that the operation of the school at the Pinellas Plant site poses risks no greater than those routinely accepted for similar facilities in other parts of Pinellas County. Hazards associated with routine releases and hypothetical accidents associated with the operation of the Pinellas Plant pose risks similar to those posed by hurricanes and severe thunderstorms. It is important to note, in fact, that these plant-related hazards pose less risk than those posed by either tornadoes or fires originating within the school itself.

The release of plutonium from operations at the Pinellas Plant is not a credible event. Plutonium oxide is received at the plant in pellet form. These heat sources arrive at the plant triply encapsulated in welded, hardened metal alloy containers. No release of plutonium is possible during any of the manufacturing processes or during the worst credible fire.

Small releases of krypton and tritium occasionally occur. Emissions from these releases, however, are well within the EPA guideline of 10 mrem/year. Both on-site and off-site monitoring stations continuously monitor for plutonium and tritium releases. The results are published annually in the Pinellas Plant Site Environmental Report.

The potential risks from hypothetical accidents at the Pinellas Plant were evaluated in the safety assessment. The probability and the consequence of these scenarios were the result of a systematic evaluation of the processes, the material storage areas, and the safety features at the Pinellas Plant and their associated response to various upset conditions.

Process upset conditions which were analyzed included spills, leaks, fires, and severe weather events. These extrinsic risk scenarios are summarized in Table 6 (E-1 through E-6) and depicted in Figure 8. No significant risks from accidental releases are indicated. Discussion of the event with the highest consequence category is provided below.

Severe Accident

A conservative scenario considers a fire of 60-minute duration occurring in Area 316. The fire is postulated to cause 2000 D-sized Lithium Ambient (LAMB) cells to release their contents through venting. This is a conservative scenario. In addition to the engineering and administrative safeguards defined below, routine storage practices make involvement of 2000 cells a remote possibility. For example, most of the cell inventory is stored in metal freezer cabinets. Storage geometry and cabinet placement make involvement of multiple storage sites unlikely. There are no radioactive materials in the LAMB area.

LAMB cells are designed to vent their contents when internal pressures rise. This is an important safety feature. Venting relieves internal pressure, such as that caused by excessive external heating. Under venting conditions, each battery has the potential to release about 22 grams of sulfur dioxide (SO_2). An uncontrolled fire in this area could result in cell venting with release of sulfur dioxide and acetonitrile. This irritant gas and smoke would be vented through a rooftop emergency ventilation system and be released to the outside environment.

Sulfur dioxide is a nonflammable, nonexplosive, colorless gas. Most people can taste the gas at concentrations from 0.3 to 1 ppm. At concentration levels above 3 ppm, the gas has a pungent, irritating odor. The major health effect of environmental exposure to sulfur dioxide is irritation of the respiratory tract. Sulfur dioxide is a by-product of coal-burning power plants and is a common air pollutant in industrialized areas. The EPA has established both primary and secondary NAAQSs for sulfur dioxide. The maximum allowable 24-hour concentration of SO_2 is 0.14 ppm. An EPA level of 0.5 ppm has been established as the maximum 3-hour concentration of SO_2 for exposure to the general public. The PEL and Threshold Limit Value (TLV) [22] for SO_2 are both 2 ppm. A Short-term Excursion Limit (STEL) of 5 ppm has been set by the American Conference of Governmental Industrial Hygienists (ACGIH). The STEL is the concentration to which workers can be exposed continuously for a short period of time without suffering from irritation, chronic or irreversible tissue damage, or narcosis [23].

Computer modeling was used to calculate a worst-case concentration of sulfur dioxide at the school site 150 feet away [20], since this concentration is postulated to occur if the entire quantity of sulfur dioxide available in 2000 batteries was to be released at once. A 60-minute fire was postulated as the design-basis accident. Since the fire would gradually increase over time, it is not likely that the entire number of batteries would vent simultaneously. Release of sulfur dioxide would be gradual, with actual concentrations being lower than postulated in the worst case. Additionally, engineered safety processes, such as vents and dampers, would limit the exposure to much less than the 60-minutes of the postulated fire.

The estimated concentration of sulfur dioxide at the school following a 60-minute fire involving 2000 LAMB cells was 3.4 ppm. This value exceeds the TLV and PEL limits for 8-hour exposures to adult workers (2 ppm). This level is also higher than the EPA maximum 3-hour exposure limit for the general public (0.5 ppm). However, this concentration is below the STEL limit for 15-minute exposures (5 ppm). (Exposure limits are listed for comparison only. There are no exposure standards for the general public that can be applied to a catastrophic fire incident.) This level of sulfur dioxide would be expected to cause minor eye and respiratory irritation. The magnitude of the response is related to the air concentration of SO_2. No long-term or irreversible health effects are expected from short-term, acute exposure to SO_2 at these levels.

The same computer modeling was used to calculate acetonitrile concentrations at the school site. The design-basis accident resulted in an estimated level of 3 ppm of acetonitrile at the school. This is only 9% of the OSHA PEL, but exceeds the EPA Subchronic Reference Dose (RfD-s) of 0.3 ppm [24].

The EPA definition of a subchronic reference dose is an estimate of a daily exposure level for a duration of 2 weeks to 7 years for the human population, including sensitive subpopulations (children), that is likely to be without an appreciable risk of deleterious effects. Because of the uncertainties of the data, EPA has used a reduction factor of 300 in the generation of this number for conservatism. The RfD-s essentially represents a "no effect" level.

The ACGIH occupational exposure limit of 40 ppm considers the effects of decomposition of acetonitrile to fumes of cyanide and nitrogen oxides, and the standards are considered to be protective even under these conditions [23]. Acetonitrile is moderately toxic by inhalation, but at doses greater than the postulated worst-case level of 3 ppm [25]. No effect is expected from a short duration exposure at the postulated level.

A number of safeguards are in place to prevent such an accident from occurring and to mitigate the effects of a fire or battery venting in the area. The probability of occurrence of the worst-credible accident is reduced by the presence of these safety systems. Mitigating factors include the following:

- Redundant (primary and secondary) safety controls on all cell and battery test equipment.
- An automatic fire sprinkler system covering the entire LAMB area and all surrounding plant areas.
- A fire detection system with ionization and infrared detectors. These systems are very sensitive and give alarm of a fire even before smoke is formed.
- Sulfur dioxide detection and alarm systems. Continuous ambient air monitoring for SO_2 is performed in the LAMB areas.
- Alarm systems on storage freezers alarm to indicate a loss of cooling temperature.

- The presence of an emergency ceiling-panel ventilation system. This system is activated by the area SO_2 detector. If high levels of SO_2 are detected, rooftop panels open, and fans are activated to ventilate the space.
- Redundant over-temperature controls on all environmental test chambers.
- Low combustible loading in all LAMB work areas. With little material in the room to support combustion, the chances for propagation of a fire are reduced.
- The presence on-site of a fully trained and well-equipped plant fire brigade able to rapidly respond to a fire.

Sulfur dioxide detection and alarm systems are in place. If the concentration of SO_2 inside a room exceeds the pre-set level (0.1 ppm), an alarm is sent immediately. The SO_2 detectors are checked daily, and the results are logged. Audible and visual alarms are activated both in the work area and in the adjoining hallway. Additionally, the alarm signal is transmitted to the Security Communications Center, where the alarm panel is continuously monitored 24 hours a day. These alarms ensure that an emergency situation is immediately detected and notification given to plant and school personnel, and a response by the plant's fire brigade can be expected within 5 minutes of alarm.

It is expected that, as fire develops, sulfur dioxide will be released gradually in stages. As fire approaches areas where LAMB cells are stored, the temperature inside each cell will rise. When sufficient heat has been absorbed, the cell will vent its contents to the room. Due to storage geometry and the spacing of cells in various parts of the LAMB area, it is unlikely that all cells will vent at the same time. Most of the cells are stored in fire- resistant metal cabinets or freezers and will not be immediately affected by the heat of a fire. It is most likely that individual cells and small groups of cells will vent as the heat increases in their immediate location. The entire available amount of SO_2 will not be released unless an uncontrolled fire has essentially swept through the entire work area. The presence of automatic fire sprinklers and a rapid response by the plant's fire brigade greatly reduce the probability of an uncontrolled fire occurring.

In summary, a series of unlikely events must happen before the exposure postulated by this scenario will occur. First, a fire must initiate in a structure constructed and operated to prevent the occurrence of fires. Second, all safety features (i.e., automatic sprinkler system) must fail to suppress or contain the fire's progression. Third, the on-site fire brigade must fail to rapidly secure the fire scene. Fourth, the meteorological conditions must be sufficient to transport the plume to the site of the school. Finally, isolation from outside air by intake dampers must fail to occur.

DESCRIPTION AND IMPACTS OF THE NO ACTION ALTERNATIVE

The No Action alternative would not preclude day care and elementary school opportunities for the children of Pinellas Plant employees. These children would be provided education and child care at other public and private facilities located off-site.

The No Action alternative is not to operate the proposed Partnership School/Child Development Center facility for its intended purpose. Since the school is to be operated as a satellite of the Southern Oak Elementary School, the children would be reassigned to their local school. Thus, additional pressure would then be placed on the Pinellas County school system, which anticipates the need for a dozen more elementary schools over the next five years. The additional pressure would not, in itself, overly tax the existing school system because of the low numbers of children, but could cause some impact to the plans of the Pinellas County School Board to establish other public school at private company sites. The planning staff of five currently employed by New Directions in Learning, Inc., could become unemployed.

LISTING OF AGENCIES AND PERSONS CONSULTED

Chamber of Commerce, Clearwater, FL

Pinellas County Building Department

Pinellas County Department of Planning and Zoning

Pinellas County Health Department

Pinellas County Licensing Board for Childrens' Centers and Family Day Care Homes

Pinellas County School Board

U.S. Census Bureau

U.S. Social Security Administration

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