Commonwealth Edison Company

Chicago, Illinois

Phase I Environmental Site Assessment of the ComEd Powerton Generating Station Manito Road Pekin, Illinois.

ENSR®

ENSR Consulting – Engineering – Remediation

October 1998

Document Number 1801-023-500

Commonwealth Edison Company

Chicago, Illinois

Phase I Environmental Site Assessment of the ComEd Powerton Generating Station Manito Road Pekin, Illinois.

ENSR Consulting – Engineering – Remediation

October 1998

Document Number 1801-023-500

CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

1.1 Objectives and Scope of Work

ENSR was retained by Commonwealth Edison (ComEd) to perform a Phase I environmental site assessment of the Powerton Generating Station facility located on Manito Road in Pekin, Illinois.

The purpose of this Phase I ESA was to assess the environmental status of the subject site with regard to "recognized environmental conditions," which are defined by the ASTM (see E 1527-97) as, "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property." According to the ASTM, "the term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."

The ESA was conducted in accordance with the Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process established by the ASTM (ASTM Designation E.1527-97).

1.2 Study Limitations

This report describes the results of ENSR's initial due diligence investigation to identify the presence of recognized environmental conditions affecting the subject facility and/or property. In the conduct of this due diligence investigation, ENSR has attempted to independently assess the presence of such problems within the limits of the established scope of work, as described in ENSR's July 31, 1998 proposal.

As with any due diligence evaluation, there is a certain degree of dependence upon oral information provided by facility or site representatives which is not readily verifiable through visual inspection or supported by any available written documentation. ENSR shall not be held responsible for conditions or consequences arising from relevant facts that were misconstrued, concealed, withheld, or not fully disclosed by facility or site representatives at the time this investigation was performed.

This report and all field data and notes were gathered and/or prepared by ENSR in accordance with the agreed upon scope of work and generally accepted engineering and scientific practice in effect at the time of ENSR's investigation of the site.

This report, including all supporting field data and notes (collectively referred to hereinafter as "information"), was prepared or collected by ENSR for the benefit of its Client, ComEd. ENSR's Client may release the information to other third parties, whom may use and rely upon the information to the same extent as ENSR's Client. However, any use of or reliance upon the information by a party other than specifically named above shall be solely at the risk of such third party and without legal recourse against ENSR, its parent or its subsidiaries and affiliates, or their respective employees, officers or directors, regardless of whether the action in which recovery of damages is sought is based upon contract, tort (including the sole, concurrent or other negligence and strict liability of ENSR), statute or otherwise. This information shall not be used or relied upon by a party that does not agree to be bound by the above statement.

1.3 Report Organization

ENSR reviewed a substantial volume of information regarding the ComEd facility during the course of this environmental due diligence investigation. This report represents our best efforts to synthesize the most salient information collected and reviewed. The report contains the following sections:

- *Chapter 2: Site Location and Description*, provides an overview of the subject property, including a description of the site history and a discussion of the various activities currently taking place.

- *Chapter 3: Environmental Document Review*, provides a description of ComEd's documents reviewed at each facility and at ComEd's corporate office. The document review included only materials that pertained to site contamination and not documents regarding environmental regulatory compliance.

- *Chapter 4: On-Site Contamination*, evaluates the subject property for the presence of a hazardous material or petroleum hydrocarbon contamination problem due to past or present activities taking place on the site. This analysis also considers land uses in the immediate vicinity that may adversely affect the subject property through off-site migration of contaminants from known releases.

- *Chapter 5: Summary of Findings*, provides our summary of findings regarding recognized environmental conditions.

- *Chapter 6: References*, identifies the various sources of information used in the preparation of this report, including persons interviewed, and documents and files evaluated.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

ComEd's Powerton Station operates as a coal-fired, electric power generating facility located on Manito Road in Pekin, Illinois. The subject property is located on the north side of Manito Road, approximately one mile west of the intersection of Manito Road and Illinois Route 29.

The subject property is bordered to the north by the Illinois River, beyond which is wooded land; to the east is Chicago & Illinois Midland railroad tracks, beyond which is wooded land and Classico Cabinetry; to the south is Manito Road, beyond which is wooded land; and to the west is wooded land. The ComEd switchyard is located to the far west of the main generating building and was not included as a part of this environmental assessment. Figure 2-1 is a site location map.

2.2 Description of Property and Facility Layout

The subject property encompasses approximately 1,710 acres of land and is occupied by the main generating building, several ancillary buildings and structures, and a 1,440-acre cooling lake. Figure 2-2 is a site plan for the facility.

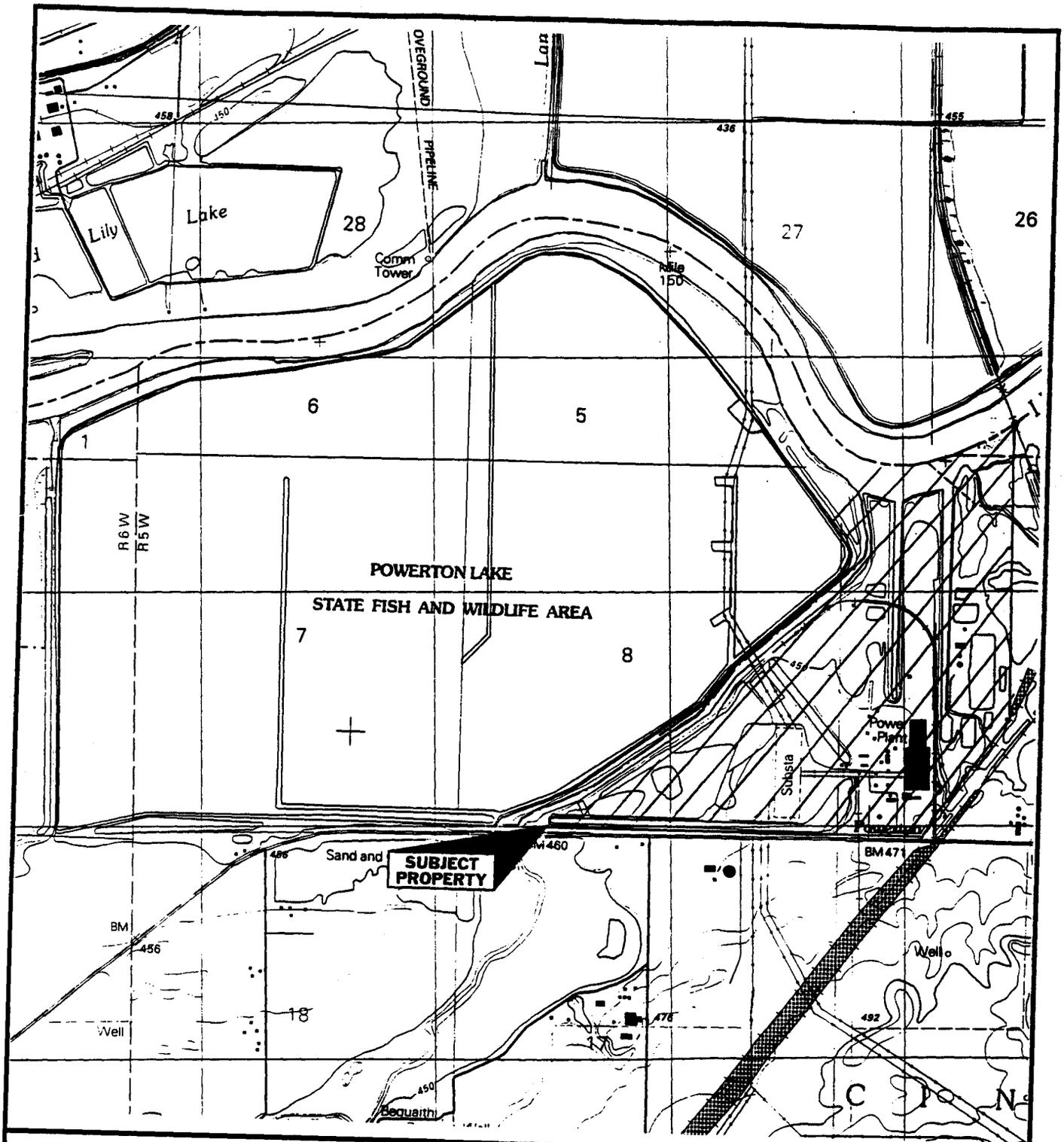
The main generating building, located on the southeastern portion of the subject property, contains the boiler room, turbine room, and administrative offices.

Two units are operational (Units 5 and 6). Four units have been retired (Units 1-4) are located in a separate building situated directly north of the main generating building. Units 1-4 and associated equipment were retired in the early 1970s.

The supplemental demineralizer house is located west of the main generating building. The demineralizer house contains a series of cation and anion storage tanks which demineralize process water prior to it being pumped into the system. A 521,703-gallon demineralized water aboveground storage tank (AST) is located directly north of the building.

The oil storage building is located west of the supplemental demineralizer house. Approximately one hundred fifty, 55-galon drums of various oils and lubricants were observed stored in the area.

A waste oil shed is located southeast of the new oil building. Approximately thirty, 55-gallon drums of used oil were observed stored in the area. A concrete trough inside the shed reportedly leads to an underground storage tank (UST), according to ComEd.



SOURCE: USGS 7½ Minute Topographic Quadrangle, Pekin, Illinois, dated 1996

SCALE

0 1/4 1/2 1 MILE

N

ENSR

ENSR Consulting and Engineering

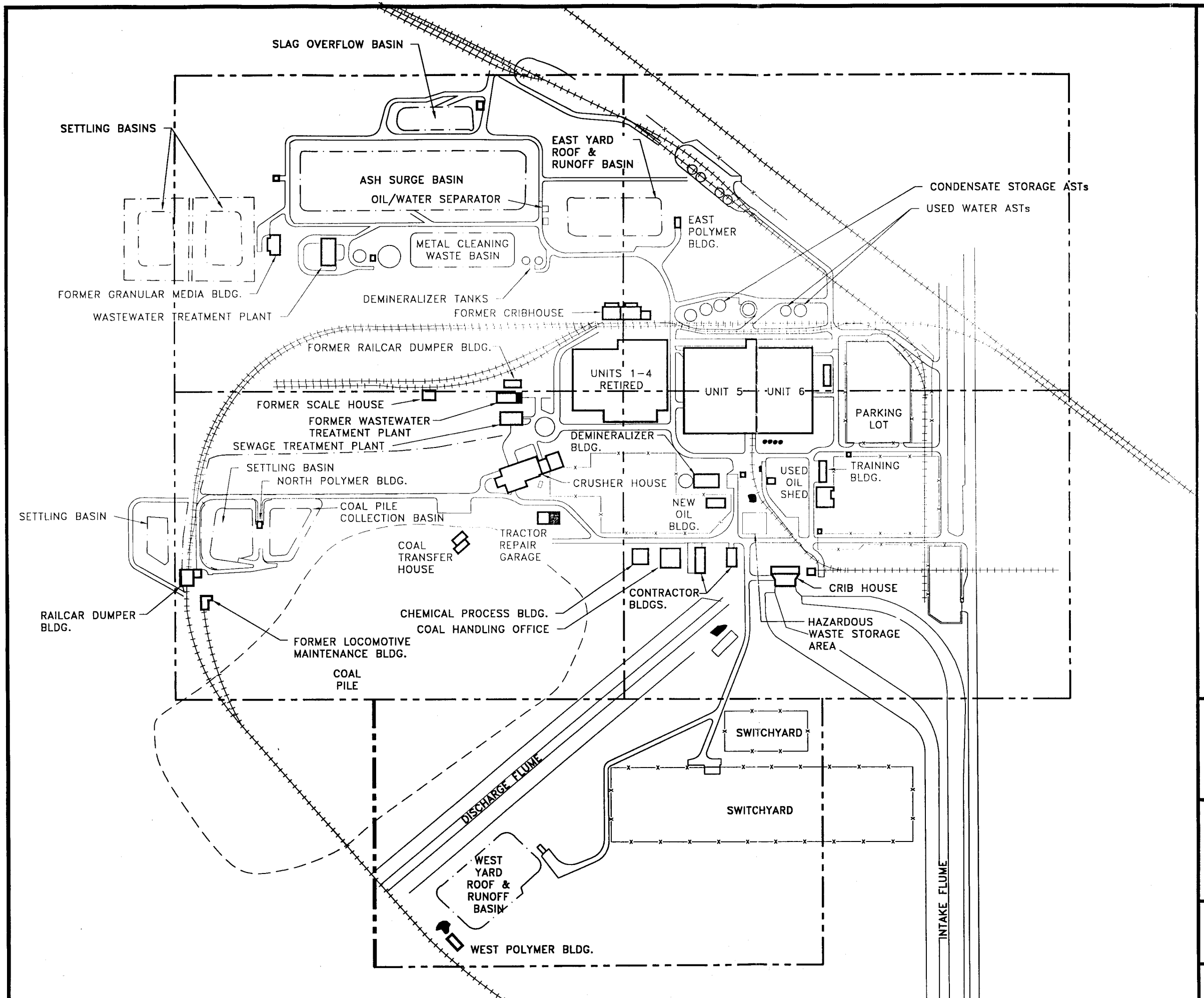
FIGURE 1

SITE LOCATION MAP

ComEd - Powerton Station
Manito Road
Pekin, Illinois

DRAWN: TEB	DATE: September 22, 1998	PROJECT NO.: 1801-023-500	REV: 1
FILE NO.:	CHECKED: TEB		

MWG13-15_8510



LEGEND:

- PROPERTY BOUNDARY
- MW-1 MONITORING WELL
- B-4 SOIL BORING
- S-1 OBSERVATION SUMP
- BASIN BOUNDARY
- FENCE
- RAILROAD TRACK
- AREAS OF STAINING

Note:
- All dimensions and locations are approximate.

Source:
- ENSR field observations.

Dwg No: 023SP1

POWERTON GENERATING STATION
MANITO ROAD
PEKIN, ILLINOIS

COMMONWEALTH EDISON

September 1998 File No: 1801-023-500

SITE PLAN

N

NOT TO SCALE

FIGURE 2

ENSR

MWG13-15_8511

An approximately 200 square foot, fenced-in hazardous waste storage area is located west of the waste oil shed. The area is divided into two storage areas; one for solvents and one for PCB contaminated oils. Two 55-gallon drums of waste solvent were observed stored in this area. No PCB storage was observed during ENSR's site inspection.

Contractor's mobile offices, storage sheds and shipping containers are located south of the waste oil storage shed area.

The cribhouse is located west of the contractor's office area. The cribhouse sits on the eastern terminal end of the intake flume from Powerton Lake. The building contains strainers which screen intake cooling water from the intake flume prior to being pumped into the plant. A 550-gallon diesel fuel AST is located on the north side of the building and a 550-gallon diesel fuel AST is located on the south side of the building. The tanks are used to store diesel fuel for the emergency fire pumps. A plastic 5,600-gallon polyacrylic acid tank is located on the south side of the cribhouse. The tank holds polyacrylic acid that is fed into the water system. Three 55-gallon drums of motor oil were observed stored in the building.

A former pump house building is located directly south of the cribhouse. An empty, abandoned 15,000-gallon sulfuric acid AST is located on the south side of the pump building. The tank was formerly used to hold sulfuric acid that was fed into the water system.

The west yard lift station is located northwest of the cribhouse. The station collects stormwater runoff from the west half of the property, and process water from floor drains located in the west half of the main generating building. Oil is skimmed off the top of the water and disposed by Safety Kleen on an as-needed basis. The water is then pumped into a concrete canal and channeled to the West Yard and Roof Runoff Basin.

Two long storage buildings are located northeast of the west yard lift station. The buildings are used to store contractor's equipment and materials.

The coal handling office building is located north of the storage buildings.

The west yard and roof runoff basin is located on the far western portion of the main subject property near the railroad track extension for the car dumper. The basin collects stormwater runoff from the west half of the plant and process wastewater from the west half of the plant.

The west polymer building is located south of the West Yard and Roof Runoff Basin. The building is used to store a dry cationic polymer (CP-7) which is added as a flocculent to the water settling basin.

The west yard oil/water separator is located north of the west yard basin. A 2,100-gallon waste oil AST, and an approximate 10,000-gallon water storage AST comprise the separator. Oil from the West Yard and Roof Runoff Basin is skimmed off and stored in the 2,100-gallon AST.

The chemical process building is located north of the coal handling office. The building contains one 7,500-gallon binder AST, one 7,500-gallon suppressant AST, and one 3,000-gallon surfactant AST. The chemicals are stored in the tanks and then transferred to a water wagon and sprayed on the coal pile as a dust suppressant.

The tractor repair garage is located northeast of the chemical process building. The garage is used to repair coal tractors and facility vehicles. A 20,000-gallon diesel AST is located on the west side of the garage. An oil storage room is located off the east side of the building. Approximately thirty, 55-gallon drums of various oils and lubricants were observed stored in this area.

The crusher house is located northeast of the tractor repair garage. Equipment within the crusher house mechanically crushes coal and conveys it to the boiler house. An out-of-service surfactant AST is located on the east side of the crusher house. The tank was formerly used to store dust suppressant for coal dust.

The coal transfer house is located west of the crusher house. The building houses equipment which transfers coal from the coal pile conveyor system to the crusher house conveyor system.

The coal pile is located directly west of the crusher house. The active coal pile has a capacity to store 32,000 tons of coal, and the inactive coal pile has the capacity to store 1,400,000 tons of coal.

An unlined coal pile collection basin is located in the northeastern portion of the coal pile. The basin collects stormwater runoff from the coal pile and channels it to one of two settling basins located north of the coal pile collection basin. The primary (south) basin is lined and the secondary (north) basin is unlined.

The north polymer building is located between the south settling basin and coal pile collection basin. The building is used to store a dry cationic polymer (CP-7) which is added as a flocculent to the water in the settling basin.

A railcar dumper building is located between the north and south settling basins. The building contains a railcar dumper that mechanically rotates railcars 180° to unload their coal into a subsurface hopper. Two empty, obsolete dust suppressant ASTs are located on the north side of the building. Two propane ASTs are located west of the building and an empty calcium chlorite AST is located on the south side of the building.

A former oil/water separator building is located north of the railcar dumper building. The building formerly housed an oil/water separator used in conjunction with coal pile runoff. According to Mr. Mark Kelly, Chemistry Staff Supervisor, the system has been disconnected for several years.

A locomotive repair building is located west of the railcar dumper building. The building was formerly used to repair locomotives and is now primarily used for parts and material storage.

The conveyor drive house is located west of the south settling basin. The building houses the coal conveyor drive system.

A former slag and dumping area is located directly east of the coal pile collection basin. The area is presently overgrown with vegetation.

The former coal pile storage area is located in an area north of the former slag and dumping area. The area is presently overgrown with vegetation.

The sewage treatment plant is located east of the crusher building. The plant treats sanitary sewerage generated from the plant. The effluent from the plant is discharged to a canal that discharges into the Illinois River.

The former wastewater treatment building and former railcar dumper building are located south of the sewage treatment plant. The buildings were utilized in association with Units 1-4 when they were active. The buildings were in a severely dilapidated condition at the time of ENSR's site inspection.

The former water intake channel is situated in a north/south direction and runs from the former cribhouse building, located east of the former generating building, to the Illinois River, located approximately ½-mile to the north. The former cribhouse was in a severely dilapidated condition at the time of ENSR's site inspection.

The former granular media filter building is located east of the former water intake channel on the east side of the property. The building housed several sand filter tanks to filter water prior to it being discharged into the Illinois River. The filtration system is no longer used.

Two settling basins are located north of the former granular media filter building. The lined basin located immediately north of the building is used to hold ash sluice water prior to it being discharged to the Illinois River. The unlined basin located north of the service water basin is no longer used in the wastewater treatment process. According to Mr. Kelly, dredged material from intake flume has been placed in this basin in the past.

The wastewater treatment building is located south of the granular media filter building. This building is used as a mechanical maintenance building and contains controls and pumps associated with wastewater treatment. Two diatomaceous earth silos, which are no longer used, and one lime storage silo are located on the north side of the building.

A lined metal cleaning waste equalization basin is located south of the wastewater treatment plant. An anionic polymer (AP-11) is added to the water clarifier prior to water being channeled to the ash basin. The polymer acts as a flocculent to help settle out metals. Lime is also added for pH adjustment.

The ash basin building is located south of the metal cleaning waste equalization basin. An out-of-service 10,000-gallon sulfuric acid AST is located on the north side of the building and two 20,000-gallon regenerated waste rinse water ASTs are located west of the building. The tanks store regenerated waste rinse water that is discharged into the ash surge basin.

The east yard oil/water separator is located east of the demineralization ASTs. A 2,100-gallon waste oil AST and an approximate 10,000-gallon water storage AST comprise the separator. Oil from the East Yard and Roof Runoff Basin is skimmed off and stored in the 2,100-gallon AST.

The East Yard and Roof Runoff Basin is located south of the east yard oil/water separator. The basin collects stormwater and process water from the east half of the plant and from the demineralization tanks.

The east yard polymer building is located between the east yard basin and the dewatering bins. The building is used to store a dry cationic polymer (CP-7) which is added as a flocculent to the water in the settling basin.

A synthetically lined ash surge basin is located east of the wastewater treatment plant. The basin collects regenerated waste rinse water and other east yard process wastewater. A lined slag overflow basin is located east of the ash basin. The basin was dry at the time of ENSR's site inspection and is used store fly ash and slag.

Three 500,000-gallon condensate ASTs are located east of the main generating building. The tanks store condensate water from the demineraliztion process.

A former scrubber system is located east of the condensate storage tanks. The scrubber system was abandoned in the late 1970s.

Four dewatering bins are located east of the former scrubber system. Bottom ash is placed in the silos and allowed to drain prior to it being transported off site by railcar.

A well water AST and a boiler cleaning waste AST are located near the southeast corner of the main generating building.

2.3 Topography, Hydrology, and Geology

According to the USGS Pekin, Illinois Quadrangle 7.5-Minute Series Topographic map, the topographic elevation of the main building is approximately 580 feet above mean sea level.

According to the USDA SCS Soil Survey for Tazwell County, Illinois, the soils on the subject property consist of mostly built-up areas and deep, nearly level, poorly drained soils that have a silty and clayey subsoil; formed in glacial till. The estimated depth to shallow groundwater is between three and five feet below grade surface. The regional groundwater is expected to flow toward the Illinois River that is located adjacent to the west of the subject property. Bedrock at the site is anticipated to be ranging in depth from 5 to 10 feet below grade.

2.4 Site History

Historical information for the subject site is based on interviews with site personnel, a review of, aerial photographs, tax assessors records, current and historic plat maps, and a topographic quadrangle map. Sanborn Fire Insurance maps and city directories were not available for the subject property area. Building permits were unavailable for review during ENSR's site investigation.

According to Mr. John Henderson, Compliance Specialist, the facility began operation in the late 1920s with Units 1-4. Those units were retired in the early 1970s, and an entirely new generating station (Units 5 and 6), and several outbuildings were constructed in the early 1970s adjacent to the original station. Mr. Henderson indicated that Unit 5 came on-line in 1971 and Unit 6 came on-line in 1973.

Aerial photographs dated 1993, 1988, 1976 showed the subject property occupied by a coal-fired electrical generating plant. Aerial photographs dated 1969, 1957, and 1939 showed the subject property occupied by the original electrical generating plant (Units 1-4). No evidence of landfilling was observed in the photographs reviewed for this assessment.

Assessment records indicated that several buildings were originally constructed on site in 1928 and 1930, which were associated with the original generating plant (Units 1-4). Several buildings were subsequently built in the early 1970s, which are associated with the current generating plant (Units 5-6).

A 1993 plat showed the subject property owned by ComEd. A plat map dated 1873 showed the subject property as farmland owned by C.R. Cummings and J.C. Waldo.

A USGS Topographic map dated 1960, photorevised 1967 and 1979 showed the subject property as it currently exists.

2.5 Adjacent Site History

Historical information for the subject site vicinity is based on a review of aerial photographs, current and historic plat maps, and a topographic quadrangle map.

The subject property is bordered to the north by the Illinois River, beyond which is wooded land. To the east is the Chicago & Illinois Midland Railroad, beyond which is wooded land and Classico Cabinetry; to the south is Manito Road, beyond which is wooded land; and to the west is wooded land.

Aerial photographs dated 1993 and 1988 showed the adjacent properties as they currently exist. Aerial photographs dated 1976, 1969, 1957 1939 showed the adjacent properties as they currently exist, with the exception of the Classico Cabinets building which was not shown in the photographs.

A plat map dated 1993 listed the adjacent properties as they currently exist. An 1873 plat map listed the adjacent properties as farmland.

A USGS Topographic map dated 1960, photorevised 1967 and 1979, showed the adjacent properties as they currently exist.

2.6 Description of Operations

The subject facility is operated as a coal-fired electrical power generating station. Additional operations include wastewater treatment, tractor and other plant maintenance operations. Electrical power is transmitted from the plant to the Chicago metropolitan area through a series of overhead transmission power lines.

The generating station receives coal by railcar. Coal is transferred from the railcar in the railcar dumper building. The coal is fed into a hopper and then conveyed either to the coal pile or to the crusher house. After crushing, the coal is conveyed directly into the plant boilers.

The facility's water sources are obtained from two resources. Well water is used to supply potable water, boiler feed water, and demineralizer water. Lake water is used to supply condenser cooling water, fire protection water, and heat exchanger water.

Condenser cooling water is drawn from and returned to Powerton Lake at a rate of approximately 497 million gallons per day (MGD). Raw boiler make-up water is obtained from on-site deep wells. Demineralized water is stored in on-site ASTs. Water treatment chemicals, including ammonia, hydrazine, and phosphates are added into the boiler make-up water to soften the water and inhibit corrosion and scaling. No chemicals are added to condenser cooling water.

The burning of coal produces waste fly ash, bottom ash, and economizer slag. Fly ash is collected in the precipitators and transported to storage silos. Bottom ash and economizer slag are collected in a slurry and piped to dewatering bins located in the northeast corner of the subject property. After dewatering, bottom ash is transported off site by railcar.

Wastewater from facility operations is treated on-site prior to being discharged into the Illinois River under the conditions of a NPDES permit. The NPDES permit covers discharges from the property including storm water runoff, cooling water, and any other process wastewater.

2.7 Utilities

Currently, the Powerton generating station obtains potable water from five deep wells that are located on the subject property. Sanitary wastewater is treated at an on-site sewage treatment plant prior to being discharged into the Illinois River. Most electrical power is provided by the station itself. A 138 KV feeder from CILCO provides power to coal handling.

3.0 ENVIRONMENTAL DOCUMENT REVIEW

3.1 Introduction

This environmental document review is based upon a review of information provided by ComEd coupled with observations made by Tim Bulthaup and Jeffrey Menter of ENSR during the site visit, which took place on August 27 and 28, 1998. The information provided by ComEd included documents relative to the various regulatory areas described below. Also, certain computerized U.S. Environmental Protection Agency (USEPA) enforcement databases were screened.

3.2 Air Quality

Although no formal emissions inventory was prepared as part of this Phase I environmental site assessment, a preliminary review of the facility indicates air permits are required for the facility. The Illinois Environmental Protection Agency (IEPA) oversees the state's air permitting compliance programs. ENSR's review of air permits for the Powerton generating station indicated the station was currently operating under existing permits. According to Ms. Lorinda Lamb of ComEd, the facility has filed an application under the Title V permit program, and is currently awaiting its approval.

3.3 Water Resources

The facility is permitted to discharge process wastewater under NPDES Permit No. IL0002232 which was issued on January 27, 1995 and expires on January 1, 2000. The permit allows for the discharge of ash treatment system effluent; metal cleaning waste treatment system effluent; cooling pond emergency overflow; coal pile runoff treatment system effluent; west yard runoff treatment system effluent; east yard runoff treatment system effluent; RBC sewage treatment plant effluent; and condensate storage tank overflow.

Stormwater runoff from process areas of the station is treated in the existing wastewater treatment facility. Per the stations NPDES permit, this constitutes Best Available Technology (BAT) for treatment and discharge of storm water runoff, therefore, Will County station is not required to maintain a Storm Water Pollution Prevention Plan (SWPPP).

3.4 Oil and Hazardous Materials Storage and Use

3.4.1 Material Storage and Use

Several types of fuels, oils, and hazardous materials are stored and used on site and include: diesel fuel, gasoline, lubricating oil, sulfuric acid, polyacrylic acid, sodium hypochlorite, sodium hydroxide, liquid nitrogen, hydrogen gas, aqueous hydrazine, ethylene glycol, coal pile binder, coal, slag, and scrap metal. These materials are stored in underground and aboveground tanks, drums, and various other containers located both indoors and outdoors.

The facility has prepared contingency plans, including a Spill Prevention, Control, and Countermeasures Plan (SPCC) to prevent the discharge of oil from the aforementioned containers, and to mitigate any adverse effects from such a spill.

3.4.2 Principal Waste Streams

Waste oil is placed on the coal pile and burned in the station boilers per the facility's air operating permit. According to ComEd records, the facility has been a small quantity generator for at least the past three years. The facility's generator ID number is ILD 1798010002.

Several parts washing basins are located throughout the facility. The basins use a high flash point (> 140 °) non-hazardous solvent as a degreaser. No staining was observed beneath the basins. This solvent is disposed by Great Northern Processing of East Huntington, IN. General refuse is disposed in a local landfill operated by Waste Management, Inc. of Chicago, IL. Fly ash is disposed in a landfill operated by the Freeman Coal Company, Canton, IL. Bottom ash is sold commercially to Reed Mineral of Kansas City, MO.

4.0 ON-SITE CONTAMINATION POTENTIAL

4.1 Introduction

Based on ENSR's inspection and review of various documents/files, there is a potential for on-site contamination at the Powerton generating station in Pekin, Illinois. Known and suspect problem areas are discussed below.

4.2 Above and Underground Storage Tanks

4.2.1 Inventory of Underground Tanks

One 1,500-gallon gasoline UST is located on the east side of the demineriliser building. According to the facility's Notification for Underground storage Tanks, the tank is current with leak detection and corrosion protection requirements.

One 2,000-gallon waste oil UST is located on the west side of the waste oil storage shed. The tank is scheduled to be removed in November 1998.

Two 1,000-gallon diesel USTs are located on the west side of the main generating building. The Unit 5 UST is scheduled to be removed in November 1998. The Unit 6 UST is scheduled to be abandoned-in-place in November 1998.

4.2.2 Inventory of Aboveground Storage Tanks

The following table provides a list of aboveground storage tanks identified at the Powerton station.

TABLE 4-1
Aboveground Storage Tanks
Powerton Station

TANK TYPE	TANK LOCATION	ESTIMATED CAPACITY (gallons)
Sulfuric Acid	Demineralizer Building	10,000
Sulfuric Acid	East side of main generating plant	15,000
Sodium Hydroxide	East side of main generating plant	12,000
Sodium Hydroxide	Demineralizer building	10,000
Sodium Hypochlorite	Unit 5 and Unit 6 turbine rooms	18,000
Polyacrylic Acid	South side of crib house	5,600

TANK TYPE	TANK LOCATION	ESTIMATED CAPACITY (gallons)
Liquid Nitrogen	South of hazardous waste storage area	3,089
Binder Tank	Chemical process building	7,500
Suppressant Tank	Chemical process building	7,500
Surfactant	Chemical process building	3,000
Carbon Dioxide	Unit 5 and Unit 6 boiler rooms	2 @ 20,000 lbs.
Carbon Dioxide	West yard west of contractor's mobile office area	100,000 lbs.
Aluminum Sulfate	Wastewater treatment plant	10,000
Hydrogen Gas	Near liquid hydrogen tank in west yard	130,000 ft^3
Calcium Hydroxide	North side of wastewater treatment plant	90,000 lbs.
Calcium chlorite	South side of railcar dumper building	11,940
Aluminum Hydroxide	Unit 5 turbine room	6,000
Diesel fuel	West side of tractor repair garage	20,000
Dirty turbine oil tank	Units 5	12,000
Clean turbine oil tank	Units 5	12,000
Turbine oil reservoir	Unit 5	10,000
Turbine oil reservoir	Unit 6	10,000
EHC system oil storage tank	Unit 5	650
EHC system oil storage tank	Unit 6	650
East yard waste oil tank	East yard	7,500
East yard oil separator tank	East yard	2,100
West yard waste oil tank	West yard	7,500
West yard oil separator tank	West yard	2,100
Turbine room waste oil tank	Unit 5 & 6	7,500
Unit 5 diesel generator fuel oil tank	Unit 5	1,000
Unit 6 diesel generator fuel oil tank	Unit 6	1,000
Unit 5 emergency fire pump fuel storage tank	North side of crib house	550
Unit 6 emergency fire pump fuel storage tank	South side of crib house	550
Unit 5 oil storage room tanks	Unit 5 oil storage room	12 @ 62 each
Coal pile waste oil tank		500
Oil separator tank	Unit 5 345 kV switchyard	16,778
Condenser Pit oil separator tank	Unit 5	20,651
Oil separator tank 2	Ash handling area	21,789
Condenser Pit oil separator tank	Unit 6	20,651
Oil separator tank	Unit 6 345 kV switchyard	16,778

TANK TYPE	TANK LOCATION	ESTIMATED CAPACITY (gallons)
Turbine oil reservoir	Unit 1	3,500
Turbine oil reservoir	Unit 2	3,500
Turbine oil reservoir	Unit 3	4,500
Turbine oil reservoir	Unit 4	4,500
Generator reactor	Old generating building	424
Dirty oil tank	Units 1-4	4,000
Altered oil tank	Units 1-4	6,000
New turbine oil tank	Units 1-4	11,000
Demineralized Water	West side of main generating building	521,703
Demineralized Water	Outside northeast corner of main generating building	3 @ 500,000
Well Water	Outside southeast corner of main generating building	500,000
Wastewater tank	Outside southeast corner of main generating building	335,000

4.3 Polychlorinated Biphenyl's (PCBs)

There are numerous liquid-cooled transformers and capacitors on the site. According to Mr. Dave Rubner, ComEd PCB Specialist, the fluid contained within many of the liquid-cooled electrical equipment has been changed with Non-PCB electrolytic fluids. Since the completion of the fluid exchange process, a majority of the equipment was tested for PCB-content, and shown to contain less than 50 ppm PCB. Even though the PCB fluids were removed, small concentrations of PCBs still remained within the transformers. When the non-PCB fluids were introduced into the transformers, the PCBs slowly leached back into the new fluids. The leaching process resulted in PCB contaminated fluid. The following table lists the known PCB-containing equipment. This equipment is scheduled to be retrofilled in the spring 1999 station overhaul.

Table 4-2
PCB Electrical Equipment
Powerton Station

EQUIPMENT	PCB CONCENTRATION (ppm)
Top of 51 precipitator, I.D. # 5114	854
Top of 52 precipitator, I.D. # 5231	775
Top of 61 precipitator, I.D. # 6124	740
Top of 61 precipitator, I.D. # 6125	927
Top of 61 precipitator, I.D. # 6131	9120
Top of 61 precipitator, I.D. # 6145	571
Top of 61 aux precipitator, I.D. # 6124A	839
Top of 61 aux precipitator, I.D. # 6143A	810
Top of 62 precipitator, I.D. # 6214	1011
Top of 62 precipitator, I.D. # 6215	757
Top of 62 precipitator, I.D. # 6224	833
Top of 62 precipitator, I.D. # 6225	820
Top of 62 precipitator, I.D. # 6231	6780
Top of 62 precipitator, I.D. # 6234	815
Top of 62 precipitator, I.D. # 6235	1026
Top of 62 precipitator, I.D. # 6244	7180
Top of 62 precipitator, I.D. # 6245	651

Evidence of minor staining or leaking was observed on or around many of the pad-mounted electrical transformers.

4.4 Asbestos-Containing Materials

ENSR representatives who are State of Illinois Department of Public Health licensed Asbestos Building Inspectors performed a visual suspect asbestos-containing material (ACM) inspection of the main building and outlying structures as part of this investigation, however, bulk sampling was not performed. The types and quantities of suspect materials identified during the meticulous walk-through of each on-site structure at the Powerton Station included pipe and pipe fitting insulation, boiler and equipment insulation, tank insulation, vinyl floor tile, suspended ceiling tile, duct insulation and cement pilings. Although the removal of all ACM in not required at this time, Table 4-3 presents the types and estimated quantities of suspect ACM, as well as estimated removal costs for Unit 5. Unit 6 is reported to be ACM free.

TABLE 4-3
Suspect Asbestos-containing Materials
Powerton Station

TYPE OF MATERIAL	ESTIMATED QUANTITY	REMOVAL COST ESTIMATES
Pipe & Pipe Fitting Insulation	111,700 Linear Feet	$2,270,000
Boiler & Equipment Insulation	100,000 Square Feet	$2,500,000
Tank & Pump Insulation	5,500 Square Feet	$137,500
Vinyl Floor Tile	7,200 Square Feet	$36,000
Suspended Ceiling Tile	5,200 Square Feet	$52,000
Duct Insulation	25 Square Feet	$625
Cement pilings	1,500 Square Feet	$15,000

The total suspect ACM removal cost is estimated at approximately $5,000,000. The cost estimate is based on ACM location and quantity information provided by ComEd, ENSR's visual inspection of accessible areas of the facility, and generally accepted ACM removal unit costs. The cost estimate does not include project consulting or reinsulation fees. The estimated removal cost provided above is subject to change as a result of the potential variability in material quantities and locations, contractor fees, disposal fees, and project scheduling. Based on the aforementioned variables, the estimated removal cost may fluctuate as much as 50%.

According to a demolition consulting company, the whole area of the Units 1-4 building is contaminated with friable asbestos, the majority of which, is concentrated in the boiler room. Floor deposition has been attributed to the building being exposed to the elements via portions of missing roof. Estimates to remove and dispose of this material range from $1.5 to 2.5 million.

4.5 Areas of Staining

The following areas of staining were observed on the subject property during ENSR's site inspection:

- The new oil storage building is located southwest of the demineralizer building. Approximately one hundred fifty, 55-gallon drums of various oils and lubricants were observed stored in the area. Staining was observed on the concrete floor beneath the drums.

- A waste oil shed is located southeast of the new oil building. Approximately thirty, 55-gallon drums of used oil were observed stored in the area. An approximate ten square foot area of staining was observed on the concrete pad beneath the drums.

- The west yard lift station is located northwest of the cribhouse. The station collects stormwater runoff from the west yard, and process water from floor drains located in the west half of the main generating building. Staining was observed within the concrete basin, and an approximate eight square foot area of staining was observed on the unpaved ground surface along the north side of the lift station.

- The west yard oil/water separator is located north of the west polymer building. A 2,100-gallon waste oil AST and an approximate 10,000-gallon water storage AST make up the system. Oil from the west yard and roof runoff basin is skimmed off and stored in the 2,100-gallon AST. Minor staining was observed within the concrete secondary containment basin housing the waste oil storage tank.

- The tractor repair garage is located northeast of the chemical process building. The garage is used to repair coal tractors and facility vehicles. A 20,000-gallon diesel AST is located on the west side of the garage. An oil storage room is located off the east side of the building. Approximately thirty, 55-gallon drums of various oils and lubricants were observed stored in this area. An approximate ten square foot area of staining was observed on the concrete floor beneath the drums.

- A waste oil room is located in the southwest corner of the former wastewater treatment building, which contained three 55-gallon drums of oil. An approximate ten square foot area of staining was observed on the concrete floor beneath the drums.

- The east yard oil/water separator is located east of the demineralization ASTs. A 2,100-gallon waste oil AST and an approximate 10,000-gallon water storage AST make up the system. Oil from the east yard and roof runoff basin is skimmed off and stored in the 2,100-gallon AST. Minor staining was observed within the concrete secondary containment basin housing the waste oil storage tank.

- Minor oil staining was observed on the gravel surface beneath several transformers in the west transformer yard.

4.6 Former Aboveground and Underground Storage Tanks

Based on a review of facility documentation and municipal files, the following former storage tanks were listed as being located at the subject property:

- A 500,000-gallon ignition fuel oil AST was removed from the south side of the subject property in the fall of 1997.

- A 20,000-gallon diesel fuel UST was removed December 15, 1992 from the west side of the former locomotive maintenance building. ComEd records indicate that no incident number was assigned resulting from any release.

- Additionally, four boiler ignition USTs have been retired-in-place; and one 400-gallon gas UST and one 500-gallon solvent UST have been removed. ComEd records indicate that no incident number was assigned resulting from any release.

4.7 Spill History

Based on a review of Com Ed's spills file, the following spills have been reported at the subject property:

- On January 4, 1990, under IEMA No. 90-0038, an estimated 40 gallons of gasoline was reported spilled on to the ground east of the cribhouse. The log entry indicates the area of contamination was excavated and properly disposed.

- On August 16, 1990, under IEMA No. 90-2354, an estimated 50-60 gallons was reported spilled as an accumulation of small spills on to the ground from unloading of the 400,000-gallon main ignition oil AST. Log entries indicate the area of contamination was excavated and properly disposed.

- On June 24, 1991, under IEMA No. 91-17332, an estimated 25-50 gallons of fuel oil was reported entering the station through the canal from the Illinois River to the cooling pond. This spill was from a barge located in the river. The log entry indicates that booms were placed to collect the oil. The station subsequently performed the cleanup.

- On April 14, 1994, under IEMA No, 94-0795, an estimated 18,000 gallons of non-PCB mineral oil was released from a cracked transformer onto a rock area which drained the spill area and permitted recovery at the shut-down lift station. Containment and recovery questions were asked by USEPA on April 14, 1998 via phone and an agency representative said he could "closeout report".

4.8 Environmental Database Report

ENSR reviewed a variety of federal and state governmental databases using Environmental Data Resources (EDR) of Southport, Connecticut. The following federal and state

contamination-related databases were searched for the subject property and the area surrounding the subject property; the various search distances used are also noted:

TABLE 4-4
Databases Searched and Radii

Database Acronym	Description	Search Distance[1] (miles)
Federal Databases		
NPL[2]	Existing and proposed Superfund sites on the National Priorities List	1.0
CERCLIS[2]	Abandoned, uncontrolled or inactive hazardous waste sites reported to the U.S. EPA, which have been or are scheduled to be investigated by the U.S. EPA for potential nomination to the NPL.	0.5
RCRIS-TSD[2]	Reported sites that treat, store and/or dispose of hazardous waste and subject to the federal RCRA regulations.	0.5
RCRIS-LQG/SQG[2]	Reported large-quantity generators and small quantity generators of hazardous waste.	0.25
ERNS[2]	Sites reporting spills to the U.S. EPA and/or the U.S. Coast Guard under various federal regulations	target property
FINDS	Facility Index System indicates the presence of a site on another federal database.	target property
PADS	PCB Activity Database System identifies generators, transporters, commercial storers and/or brokers and disposers of PCBs who are required and have notified the EPA of such activities.	target property
RAATS	RCRA Administrative Tracking System contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA.	target property
TRIS	Toxic Chemical Release Inventory System identified facilities who have reported releases of listed toxic chemicals to the air, water, and land in reportable quantities under SARA Title III Section 313.	target property
TSCA	Toxic Substances Control Act identified manufacturers and importers of chemical substances by plant site in 1986. No updates of the list have been made by EPA.	target property
HMIRS	Hazardous Materials Information Reporting System contains hazardous material spill incidents reported to the Federal DOT.	target property

TABLE 4-4
Databases Searched and Radii

Database Acronym	Description	Search Distance[1] (miles)
NPL Liens	List of liens placed against real property in order for the EPA to recover remedial action expenditures or when the property owner receives notification of potential liability.	target property
CORRACTS	Corrective Action Report identifies hazardous waste handlers with RCRA corrective action activity.	1.0
ROD	Records of Decision mandating a permanent remedy for a Superfund Site	1.0
MLTS	Material Licensing Tracking System, maintained by the Nuclear Regulatory Commission, contains a list of sites that possess or use radioactive materials and are subject to NRC licensing.	target property
Delisted NPL	Sites removed from the NPL	target property
Coal Gas	Former manufactured coal gas sites	1.0
Illinois Databases		
SHWS[2]	State hazardous waste sites	1.0
UST[2]	Sites which have reported underground storage tanks.	0.5
LUST[2]	Sites which have reported leaking underground storage tanks.	0.5
SWF/LF[2]	List of permitted solid waste disposal facilities	0.5

1 The radial search distances used equal or exceed those recommended by ASTM for assessing the environmental condition of commercial real estate.
2 Databases which are required to be searched by ASTM.

4.8.1 Subject Property

According to the EDR database report, the subject property is listed on the UST, FINDS, RCRIS-LQG and ERNS databases. The facility likely appeared on the ERNS database as a result of one of their reported spills. However, since additional information regarding final disposition of the spills was not provided to ENSR, the exact determination of why the facility is listed on the ERNS database could not be made. Additional information regarding the facility was not contained within the EDR report.

4.8.2 Surrounding Land Uses

According to the EDR database report, no sites were identified within the specified search radius.

5.0 SUMMARY OF FINDINGS

ENSR performed a Phase I Environmental Assessment in conformance with the scope and limitations of the ASTM Practice E 1527-97 of ComEd's Powerton Generating Station, located on Manito Road in Pekin, Illinois. Any exceptions to, or deletions from this practice are described in this report. This practice has revealed the following evidence of recognized environmental conditions in connection with the property:

- Staining: Several areas of staining were observed throughout the subject property (see Section 4.5 for a detailed listing of stained areas). Staining was primarily observed around drums, ASTs, and transformers.

- Suspect ACM: Suspect asbestos-containing pipe insulation, tank insulation, boiler insulation (Units 1-4), duct insulation, cement pilings, ceiling tile and floor tile were observed throughout the site buildings. Unit 6 is reported to be ACM free.

- PCBs: Seventeen electrical transformers are known to contain PCBs. According to Mr. Rubner, these transformers contain fluid that is greater than 500 ppm PCB. These are scheduled to be retrofilled during the spring 1999 station overhaul.

- Former USTs: A total of eight USTs have been either removed or retired-in-place. According to ComEd records, there were no apparent releases associated with these tanks.

  Current USTs: There are four USTs currently located on the subject property. One of the tanks meets 1998 requirements, two of the tanks are scheduled to be removed in November, 1998, and one tank is scheduled to be abandoned-in-place in November 1998. ComEd records indicate no apparent leaks are associated with these tanks.

- Spill History: Four reported spills have occurred on the subject property (see section 4.7 for a detailed listing of spills).

- Dumping: Two areas of dumping were observed on the subject property. A former slag and dumping area is located directly east of the coal pile collection basin. The area is presently overgrown with vegetation. The former coal pile storage area is located north of the former slag and dumping area. The area is presently overgrown with vegetation. It is unknown whether slag and/or coal management practices in these areas have had an adverse impact on soil and/or groundwater quality.

- Unlined Basins: Two unlined wastewater basins are located on the subject property. A lined coal pile collection basin is located in the far northern portion of the coal pile. The basin collects stormwater runoff from the coal pile and channels it to one of two settling basins located north of the coal pile collection basin. The primary (south) basin is lined and the secondary (north) basin is unlined. Two settling basins are located north of the former granular media filter building. The lined basin located immediately north of the building is used to hold process water prior to it being discharged to the Illinois River. The unlined basin located north of the service water basin is no longer used in the wastewater treatment process. According to Mr. Kelly, dredged material from intake flume has been placed in this basin in the past. It is presently unknown if past disposal operations have impacted the areas surrounding these basins.

- Switchyards: Three switchyards are located on the subject property. The 345kV switchyard has been certified to be PCB free. One 138 kV switchyard contains feed lines from CILCO and the other 138 kV switchyard has been abandoned and the equipment has been removed. Additionally, the two 138 kV switchyards are assumed to have been operational since the plant was constructed in the late 1920s, it is unknown whether or not some equipment has leaked fluid over that time period which may have impacted the subject property.

6.0 REFERENCES

6.1 Persons Interviewed or Contacted

Mr. John Henderson, Compliance Specialist, ComEd Powerton Generating Station, Manito Road, Pekin, Illinois. (309) 477-5289.

Mr. Mark Kelly, Chemistry Lab Supervisor, ComEd Powerton Generating Station, Manito Road, Pekin, Illinois. (309) 477-5289.

Ms. Lorinda Lamb, ComEd Company, One First National Plaza, 10 South Dearborn, 35 FNW, Chicago, Illinois. (312) 394-4438.

Mr. Dave Rubner, ComEd PCB Specialist, One First National Plaza, 10 South Dearborn, 35 FNW, Chicago, Illinois. (312) 394-4461.

6.2 Documents and Reports Reviewed

Aerial Photographs of subject property and surrounding properties dated 199 1988, 11976,1969, 1957, and 1939 reviewed at the Tazwell County Natural Resource Conservation Service, Pekin, Illinois.

EDR Radius Map with Geocheck, Powerton Station, Manito Road, Pekin, Illinois, dated August 18, 1998.

U.S.G.S. 7.5-minute Topographical Quadrangle Map, Pekin, Illinois, dated 196, photorevised 1967 and 1979.

Plat maps for Tazwell County, dated 1993 and 1873, reviewed at the Pekin Public Library, Pekin, Illinois.

Certificate of Survey Map, ComEd Powerton Station, dated 1996, provided by ComEd.

SPCC Plan, ComEd Powerton Station, dated November 11, 1996, provided by ComEd.

Industrial Waste Generation and Disposal Reports for 1998, ComEd Powerton station, provided by ComEd.

Tier II Inventory Forms for 1997, dated February 27, 1998, ComEd Powerton station, provided by ComEd.

NPDES Permit No. IL0002232 ComEd Powerton station, provided by ComEd.

Spill Log Review, 1986-1998, ComEd Powerton station, provided by ComEd.

ComEd document review relating to Hazardous Waste, Acid Rain Permits, Wetlands, Air Operating Permits, NPDES Permits, Tier II Reports, and Storm water, performed at One First National Plaza, 10 South Dearborn, 35 FNW, Chicago, Illinois.

7.0 SIGNATURES AND QUALITY CONTROL REVIEW

BY: Brian P. Dunn /for
Timothy E. Bulthaup, M.S., CHMM

TITLE: Project Specialist

DATE: 10/5/98

QUALITY CONTROL REVIEW

BY: Mark J. Knight /for
Aaron B. Gesin

TITLE: Program Manager

DATE: 10/5/98

ENSR®

AL, Florence
(205) 767-1210

AK, Anchorage
(907) 561-5700

AK, Fairbanks
(907) 452-5700

CA, Alameda
(510) 748-6700

CA, Camarillo
(805) 388-3775

CA, Glendale
(818) 546-2090

CA, Irvine
(714) 752-0403

CA, Sacramento
(916) 362-7100

CO, Denver
(303) 446-8420

CO, Ft. Collins
(970) 493-8878

Ft. Collins Tox Lab
(970) 416-0916

CT, Stamford
(203) 323-6620

FL, Tallahassee
(850) 906-0505

GA, Norcross
(770) 209-7167

IL, Westmont
(630) 887-1700

LA, Lafayette
(318) 234-9130

ME, Portland
(207) 829-0929

MD, Columbia
(410) 884-9280

MA, Acton
(978) 635-9500

MA, Northborough
(508) 393-8558

MA, Buzzards Bay
(508) 888-3900

MA, Woods Hole
(508) 457-7900

MN, Minneapolis
(612) 924-0117

MO, St. Louis
(314) 428-8880

MO, St. Louis
Environmental
Training Center
(314) 428-7020

NJ, Piscataway
(732) 457-0500

NC, Raleigh
(919) 571-0669

OH, Cincinnati
(513) 677-8583

PA, Langhorne
(215) 757-4900

PA, Pittsburgh
(412) 261-2910

PR, Rio Piedras
(787) 753-9509

SC, Columbia
(803) 216-0003

TX, Dallas
(972) 960-6855

TX, Houston
(713) 520-9900

TX, San Antonio
(210) 590-8393

WA, Seattle
(425) 881-7700

ENSR International

Acton, MA
(978) 266-4232

Bolivia

Costa Rica

Czech Republic

Ecuador

France

Germany

Italy

Malaysia

Mexico

Spain

Turkey

United Kingdom

Venezuela

Internet

www.ensr.com

MWG13-15_8536

Commonwealth Edison Company

Chicago, Illinois

Phase I Environmental Site Assessment of Commonwealth Edison Waukegan Generating Station, 10 Greenwood Avenue, Waukegan, Illinois.

ENSR Consulting – Engineering – Remediation

October 1998

Document Number 1801-023-600

CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

1.1 Objectives and Scope of Work

ENSR was retained by Commonwealth Edison (ComEd) to perform a Phase I Environmental Site Assessment of the Waukegan Generating Station facility located at 10 Greenwood Avenue in Waukegan, Illinois.

The purpose of this Phase I ESA was to assess the environmental status of the subject site with regard to "recognized environmental conditions", which are defined by the ASTM (see E 1527-97) as, "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property." According to the ASTM, "the term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies."

The ESA was conducted in accordance with the Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process established by the ASTM (ASTM Designation E-1527-97).

1.2 Study Limitations

This report describes the results of ENSR's initial due diligence investigation to identify the presence of recognized environmental conditions affecting the subject facility and/or property. In the conduct of this due diligence investigation, ENSR has attempted to independently assess the presence of such problems within the limits of the established scope of work, as described in ENSR's July 31, 1998, proposal.

As with any due diligence evaluation, there is a certain degree of dependence upon oral information provided by facility or site representatives which is not readily verifiable through visual inspection or supported by any available written documentation. ENSR shall not be held responsible for conditions or consequences arising from relevant facts that were misconstrued, concealed, withheld, or not fully disclosed by facility or site representatives at the time this investigation was performed.

This report and all field data and notes were gathered and/or prepared by ENSR in accordance with the agreed upon scope of work and generally accepted engineering and scientific practice in effect at the time of ENSR's investigation of the site.

This report, including all supporting field data and notes (collectively referred to hereinafter as "information"), was prepared or collected by ENSR for the benefit of its Client, Commonwealth Edison (ComEd). ENSR's Client may release the information to other third parties, whom may use and rely upon the information to the same extent as ENSR's Client. However, any use of or reliance upon the information by a party other than specifically named above shall be solely at the risk of such third party and without legal recourse against ENSR, its parent or its subsidiaries and affiliates, or their respective employees, officers or directors, regardless of whether the action in which recovery of damages is sought is based upon contract, tort (including the sole, concurrent or other negligence and strict liability of ENSR), statute or otherwise. This information shall not be used or relied upon by a party that does not agree to be bound by the above statement.

1.3 Report Organization

ENSR reviewed a substantial volume of information regarding the ComEd facility during the course of this Phase I assessment. This report represents our best efforts to synthesize the most salient information collected and reviewed. The report contains the following sections:

- *Chapter 2: Site Location and Description*, provides an overview of the subject property, including a description of the site history and a discussion of the various activities currently taking place.

- *Chapter 3: Environmental Document Review*, provides a description of ComEd's documents reviewed at each facility and at ComEd's corporate office. The document review included only materials that pertained to site contamination and not documents regarding environmental regulatory compliance.

- *Chapter 4: On-Site Contamination Potential*, evaluates the subject property for the presence of a hazardous material or petroleum hydrocarbon contamination problem due to past or present activities taking place on the site. This analysis also considers land uses in the immediate vicinity that may adversely affect the subject property through off-site migration of contaminants from known releases.

- *Chapter 5: Summary of Findings*, provides our summary regarding recognized environmental conditions.

- *Chapter 6: References*, identifies the various sources of information used in the preparation of this report, including persons interviewed, and documents and files evaluated.

- *Chapter 7: Signatures and Quality Control Review*, identifies the report author and individual responsible for conducting senior review.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

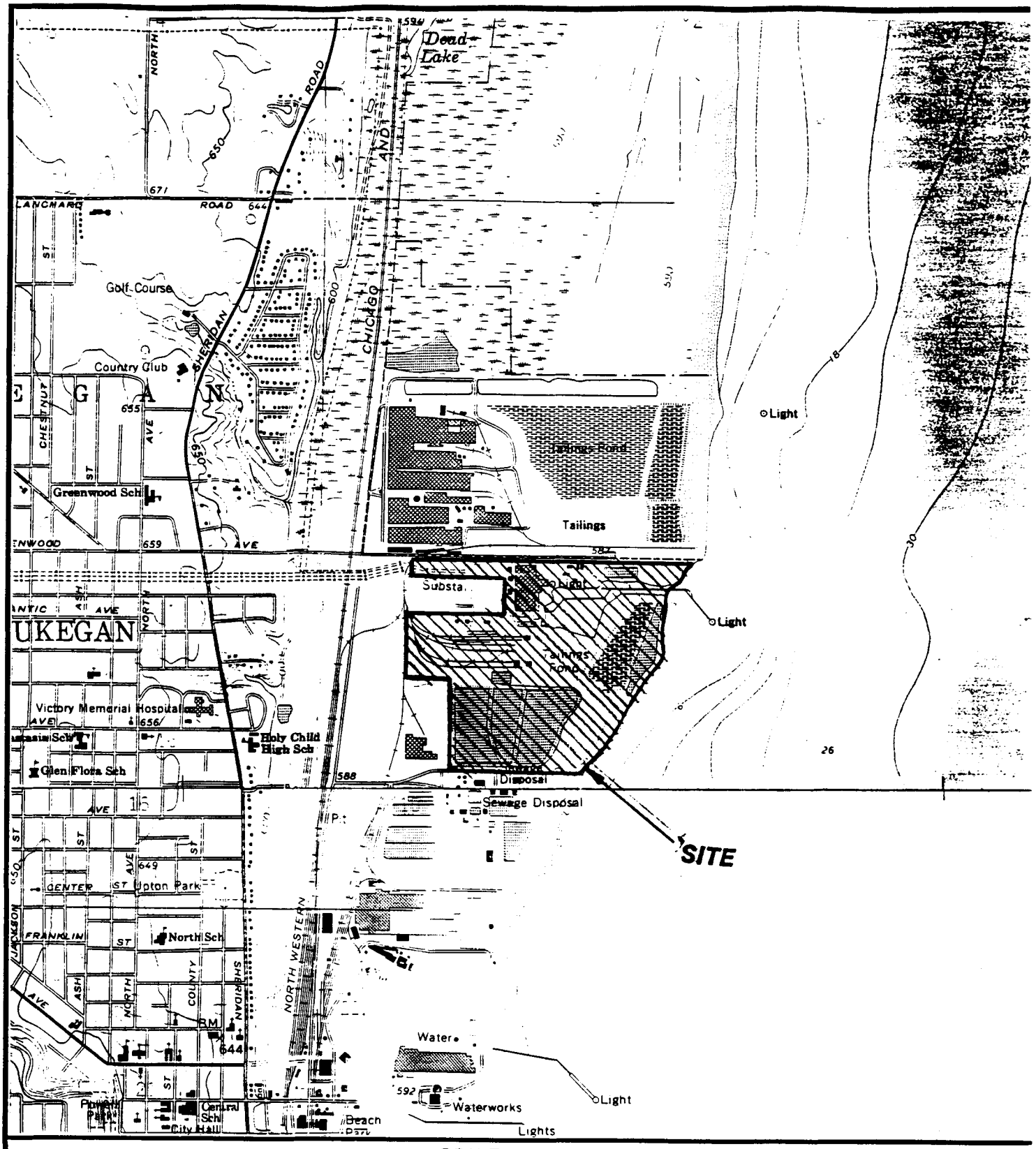
ComEd operates a coal fueled electric power generating facility known as Waukegan Station, located at 10 Greenwood Avenue in Waukegan, Illinois. The subject property is located in the northeast side of the city of Waukegan, at Greenwood Avenue and Lake Michigan.

The subject property is bordered to the north by Greenwood Avenue, beyond which is the Johns Manville Corporation. To the east is Lake Michigan and to the west are the station's main electrical switching yards, a wood chip staging/recycling area, and a construction material excavation area owned by ComEd. To the south is the North Shore Sanitary District (a wastewater treatment facility). Access to the subject property is from Greenwood Avenue to the north. Figure 2-1 is a site location map.

2.2 Description of Property and Facility Layout

The subject property encompasses approximately 194 acres and is occupied by the main generating building near the north central portion of the property, and several other ancillary buildings, settling basins, and conveyors. Rail lines pass through the site from northwest to southeast on the west and south sides of the main building. Low sulfur coal is mined in the Powder River Basin area of northeast Wyoming and delivered to the Waukegan Station via the Chicago & Northwestern Railroad. The delivered coal is staged in an uncovered coal storage area with a capacity of over 750,000 tons, located to the southeast of the main building. Storm water runoff from the coal pile is contained in the coal pile runoff basin located west of the coal pile and southwest of the main building. Cooling water is drawn from Lake Michigan and returned to the lake through a canal system. The canals are periodically dredged and the sediments (i.e. beach sand) are stored in piles along the eastern boundary of the subject property. Bottom ash and slag settles out in two synthetically-lined basins located south of the main building. Site runoff is collected and directed to either of two wastewater treatment settling basins located northeast and southwest of the main building. The wastewater basins are lined with packed clay. Sanitary waste produced at the station is piped off-site to the North Shore Sanitary District for treatment and disposal. Figure 2-2 is a site plan for the facility.

The main structure on the subject property was originally constructed in 1923 with several building additions occurring from 1925 to 1962. The main building is 16-stories at the tallest point and is a steel framed, brick and metal sided building that houses three active electric generating units (i.e.



SCALE 1:24,000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

Contour interval 5 feet

Dwg No: WAUKEGANSL1

N

U.S.G.S.
ZION, IL, &
WAUKEGAN, IL.

SITE LOCATION MAP

WAUKEGAN GENERATING STATION
10 GREENWOOD AVENUE
WAUKEGAN, ILLINOIS

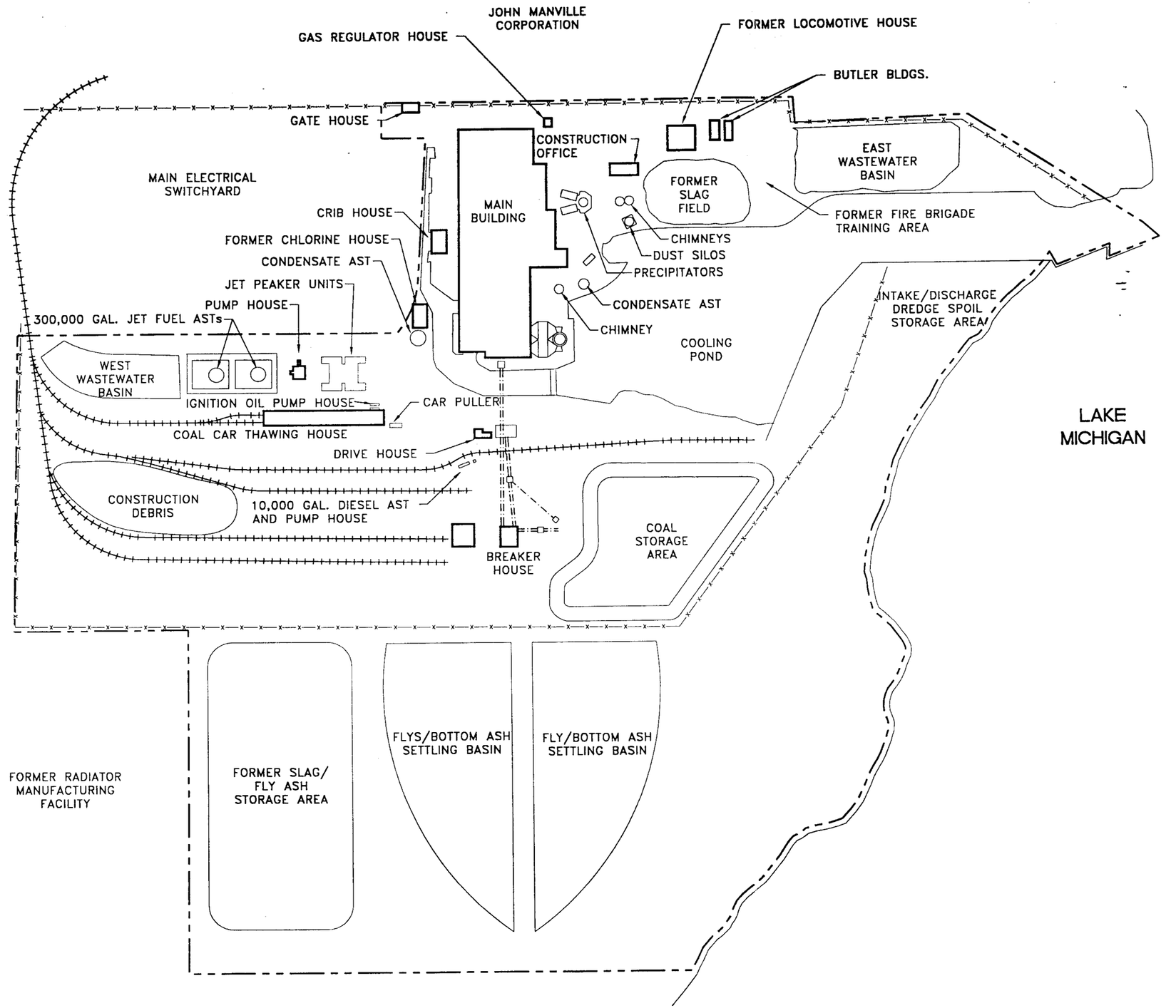
COMMONWEALTH EDISON COMPANY

September 1998 File No: 1801-023-600

FIGURE 1

ENSR

MWG13-15_12011



LEGEND:

- PROPERTY BOUNDARY
- RAILROAD LINE
- FENCE
- CONVEYOR LINE

Note:
- All dimensions and locations are approximate.

Source:
- ENSR field observations.

Dwg No: WAUKEGAN

WAUKEGAN GENERATING STATION NO. 16
10 GREENLAND AVENUE
WAUKEGAN, ILLINOIS

COMMONWEALTH EDISON COMPANY

September 1998 File No: 1801-023-600

SITE PLAN

N

NOT TO SCALE

FIGURE 2

ENSR

MWG13-15_12012

Units #6 through #8). The main building also contains Units #1 through #5 that were in service from the early 1920s through the late 1970s, at which time were all retired and decommissioned. Units #1 through #4 were deemed inaccessible by ComEd personnel, and therefore not inspected by ENSR during the site visit. The turbines associated with Units #1 through #4 have been removed from the facility, but Unit #5 remains substantially intact. Units #1 and #2 were each equipped with a single generator unit and three boilers. Unit #3 was equipped with a single generator unit and four boilers. Units #4 and #5 were each equipped with a single generator unit and three boilers.

Unit #6 was brought on line in 1952 and is equipped with a single generator unit and one boiler. Unit #7 and Unit #8 were brought on line in 1958 and 1962, respectively, and are each equipped with a single generator and a 16-story boiler. The main building also contains offices and employee locker rooms. The main stack for Units #6 through #8 extends from the roof of the main building to a height of 450 feet above surrounding grade. Air emission control equipment (i.e. electrostatic precipitators) is mounted in a structure on the roof of the main building. Main and auxiliary transformers are located outside the east and west sides of the main building.

The subject property consists of numerous outlying structures and facilities, which are described as follows starting with the coal storage area in the southeast and moving clockwise around the main building. The main coal storage area is located southeast of the main building. Coal storage area related structures include two bottom ash settling basins, a coal pile-runoff ditch and settling basin, a tractor repair building, machine shed, coal pile chemical building, coal handling equipment storage building, breaker house, conveyors, 10,000-gallon diesel AST (tractor fueling station), train car "drive house", train car "dump house". The main wastewater house, wastewater collection and make-up aboveground storage tanks (ASTs), wastewater pump house, and wastewater treatment/storage system including clarifiers are located north/northwest of the coal pile handling structures. West of wastewater structures is the ignition fuel pump house, coal car "thawing house", carbon dioxide AST, jet-fuel fired "peaker" units, peaker pump house/mechanics shed, two 300,000-gallon jet-fuel ASTs, west wastewater collection basin, 5,000-gallon west basin waste oil separator, and 7,500-gallon west basin waste oil AST. The main electrical switching yard, containing numerous large capacitors, is located just north of the jet-fuel peaker area. It should be noted: for the purpose of this report that the switchyard is not considered part of the subject property. South and west of the main building is the intake channel, lawn equipment storage shed (old chlorine house), nitrogen AST, wastewater AST, and crib house. Various transformers and capacitors are located west of the main building and expand westward into the switchyard. Northwest of the main building is the main gate house with a paved parking lot and Greenwood Avenue to the north. Northwest of the main building is the east gate house, paved parking lots, 500-gallon diesel AST, 500-gallon gasoline AST, old locomotive house, two butler buildings, fire brigade area, east wastewater building, east wastewater collection basin, 8,000-gallon east wastewater oil water separator, and 7,500-gallon east wastewater waste oil AST. East

of the main building is a group of structures consisting of the ash silos, welding shop, cooling water discharge channel, intake channel and lake intake dredge storage piles.

2.3 Topography, Hydrology, and Geology

According to the USGS Zion, Illinois Quadrangle 7.5 Minute Series Topographic map, the topographic elevation of the main building and lakefront area is approximately 590 feet above mean sea level. The developed portion of the subject property slopes easterly toward Lake Michigan.

According to the USDA SCS Soil Survey for Lake County, Illinois, the soils on the subject property consist of mostly sand and silty loams, and the estimated depth to shallow groundwater is between five and ten feet below grade surface (bgs). The groundwater in the region is expected to flow toward Lake Michigan, which is located adjacent to the east of the subject property. In addition, subsurface investigations previously conducted identified glacial till and stratified outwash deposits on-site. Areas of fill were also identified and consist of silty sand, clayey sand, slag and fly ash. Bedrock at the site was identified as limestone ranging in depth from 50 to 100 feet below grade.

2.4 Site History

Historical information for the subject site is based on a review of building department records, tax assessors records, aerial photographs, Sanborn Fire Insurance maps, a topographic quadrangle map, city directories, ComEd files, and interviews from site personnel and local government officials.

A 1939 aerial photograph shows the subject property to be occupied by a coal-fired power plant. The facility appears to be approximately one-half the size of the current facility. A coal pile is depicted on the southeastern portion of the subject property with fly-ash and slag piles located on the south and west portions of the subject property, respectively. The west wastewater treatment settling basin and the fly-ash/bottom ash settling basins were not depicted on this photograph.

A 1959 aerial photograph shows expansion of the coal-fired power plant. The main building has been expanded in a southerly direction. The outlying structures appeared the same as the 1939 aerial photograph.

Aerial photographs dated 1964, 1975, 1985, 1990, and 1995 show the subject property virtually as it currently exists with the main building occupying the majority of the subject property. Fly-ash/bottom ash, east and west wastewater settling basins, and intake canal dredge spoil piles are depicted in their current locations.

According to building department records, several permits were issued between 1979 and 1995 for the following activities:

- Building Permit #9880 issued in 1979 was for the construction of a 12' X 12' metal meter house.

- Building Permit #0240 issued in 1982 was for the installation of a new roof on an unspecified ComEd structure. In addition, the permit covered the installation of wastewater treatment facilities consisting of chemical control buildings, pump and filter building, two clarifiers, three oil water separators, five collection basins, chemical feed equipment, related piping, and appurtenances.

- Building Permit #3397 issued in 1984 was for the construction of a 3,850 square foot storage building.

- Building Permit #5484 issued in 1985 was to erect a heavy equipment storage shed.

- Building Permit #9071 issued in 1987 was for the installation of two sloped loading docks with automatic door openers and weather protection devices.

- Building Permit #003 issued in 1995 to demolish an unspecified ComEd building.

Assessment records indicate the subject property was occupied by the Public Service Company of Northern Illinois from approximately 1923 until 1953. In 1953, ComEd acquired the property through a merger with the former power company.

The USGS Zion, Illinois Quadrangle Topographic map dated 1960, photorevised in 1972 and 1980, shows the subject property to be occupied by a power plant facility equipped with tailings ponds, rail spurs, and electrical substations. Mr. Dave Raudio, ComEd Construction Specialist, confirmed that ComEd took over operations at the subject property in 1953.

City directories dated 1948 through 1968 list the subject property as occupied by the Public Service Company of Northern Illinois. City directories dated 1973 through 1993 list ComEd at the subject property address.

The 1924 and 1929 Sanborn Fire Insurance maps show the subject property as occupied by the Public Service Company of Northern Illinois (Power Plant #6). The main building and the majority of the outlying structures are located in the northeast portion of the property. The only outlying structures depicted south of the intake pond are rail spurs and conveyor systems.

The 1949 Sanborn Fire Insurance map shows the addition of three boilers in the main building and several storage and coal handling structures located east and south of the main building.

The 1969 Sanborn Fire Insurance map shows the addition of Units #6 through #8 and associated facilities in the main building. Several train car buildings, storage, and coal handling structures were also added to the east, west, and south portions of the subject property.

Based on a review of the Station's oil and hazardous material incident files, there have been several petroleum hydrocarbon spills on site. The majority of the spills did not impact soil and/or groundwater quality. Rather, they directly affected the cooling water intake and/or discharge canals.

2.5 Adjacent Site History

Historical information for the subject site vicinity is based on a review of aerial photographs, a topographic quadrangle map, city directories, Sanborn Fire Insurance maps, and interviews from site personnel and local government officials.

Currently, the subject property is bordered to the north by Greenwood Avenue, beyond which is the Johns Manville Company. The 1924, 1929, 1949, and 1969 Sanborn Fire Insurance maps also show the abutting property to the north as the Johns Manville Company. The 1939, 1959, 1964, 1975, 1985, 1990 and 1995 aerial photographs show the abutting properties to the north as the Johns Manville facility. A USGS topographic map dated 1960, photorevised in 1972 and 1980 shows the north abutting properties in their current configuration with the Manville plant, tailings ponds, and tailings storage piles. According to Mr. Raudio, the abutting properties to the north were developed during the early 1920s. City directories dated 1948 through 1954 did not contain a listing for the north abutting property. City directories dated 1959 through 1993 list the Johns Manville Product Corporation at the north abutting property address.

Currently, the subject property is bordered to the west by the station's main electrical switching yard, a wood chip staging/recycling area, and a construction material storage area owned by ComEd, beyond which is Pershing Road and Amstutz Expressway. The 1924, 1929, 1949, and 1969 Sanborn Fire Insurance maps show the abutting property to the west as the main station electrical switching yard, Greiss Pleger Tannery, and the U.S. Radiator Corporation of New Jersey. The 1939, 1959, 1964, 1975, 1985, 1990 and 1995 aerial photographs show the abutting properties to the west as developed with industrial type facilities. A USGS topographic map dated 1960, photorevised in 1972 and 1980 shows the west abutting properties to be developed with industrial type facilities, rail spurs, and electrical substations. According to Mr. Raudio, the abutting properties to the west were occupied by the main station electrical switching yard, a tannery, and radiator manufacturing facility since the 1920s. City directories dated 1948 through 1993 did not contain a listing for the west abutting properties.

Currently, the subject property is bordered to the south by the North Shore Sanitary District. The 1924, 1929, 1949, and 1969 Sanborn Fire Insurance maps show the abutting property to the south as the city of Waukegan Water Works. The 1939, 1959, 1964, 1975, 1985, 1990 and 1995 aerial photographs show the abutting properties to the south as developed with the North Shore Sanitary District facility. A USGS topographic map dated 1960, photorevised in 1972 and 1980 shows the south abutting properties to be developed with the aforementioned sewage treatment and disposal facility. According to Mr. Raudio, the abutting properties to the south have been occupied by city of Waukegan Water Works Department/North Shore Sanitation District since the 1920s. City directories dated 1948 through 1993 did not contain a listing for the south abutting properties.

2.6 Description of Operations

The subject property is a coal-fired electric power generating station. Additional operations include machinery and mechanical maintenance, wastewater treatment, and other plant maintenance operations. Electrical power is transmitted from the site to the area grid through overhead transmission power lines.

The generating station receives coal by rail south of the main building. Coal is transferred by a conveyor system from the coal dumper to the large coal storage area to the southeast. Coal is fed into active boilers associated with Units #6, #7 & #8 via conveyors through the breaker house on the south side of the main building.

Condenser cooling water is drawn from and returned to Lake Michigan at a rate of approximately 691 million gallons per day (MGD). Boiler make-up water is obtained from on-site ASTs storing demineralized Lake Michigan water. Water treatment chemicals, including ammonia, hydrazine, and sodium phosphate are added to the boiler make-up water lines to soften the water and inhibit corrosion and scaling. Sulfuric acid and sodium hydroxide are used to regenerate the demineralizer resins. Sodium hypochlorite is used to treat service water for biofouling control. No chemicals are added to condenser cooling water.

The burning of coal produces waste fly ash, bottom ash, and slag. Fly ash is collected in hoppers located east of the main building and is sold as construction material by Material Solutions, Inc. Bottom ash and slag are piped as slurry to the settling basins located south of the main building.

The cooling water intake and discharge canals are periodically dredged and the spoils (i.e. beach sand) are stock piled in a bermed area along the eastern boundary of the subject property. ComEd has dredging permits that stipulate the dredged sand be used by the State of Illinois as beach nourishment.

Site-generated sanitary wastewater is piped off-site to the North Shore Sanitary District. Process wastewater from facility operations is treated on-site and stored in wastewater treatment basins. Wastewater basin effluent is discharged to Lake Michigan under the conditions of a NPDES permit. The NPDES permit covers discharges from the property including storm water runoff, cooling water, and any other process water.

The facility stores large quantities of the following materials: turbine oil, sulfuric acid, sodium hydroxide, lubricating oil, liquid nitrogen, ion exchange resin, diesel fuel, jet fuel, hydrazine, gasoline, fuel oil, fly ash, ethylene glycol, elemental sulfur, coal pile binder, coal pile surfactant, and carbon dioxide. Jet fuel is stored on-site in two 300,000-gallon ASTs. This fuel is used in eight jet engine peaker units and to ignite the three generating units. The fast start "peaker" system was installed in 1968 to meet heavy electrical demands during peak demand periods (i.e. summer).

2.7 Utilities

Currently, the Waukegan generating station obtains potable water from the city of Waukegan.

As previously indicated, the Waukegan generating station pipes sanitary wastewater off-site to the North Shore Sanitary District. Wastewater from facility operations is treated on-site and stored in wastewater treatment basins. Treated wastewater basin effluent is discharged to Lake Michigan under the conditions of a NPDES permit. The NPDES permit covers discharges from the property including storm water runoff, cooling water, and any other process water. The Northern Illinois Gas Company provides natural gas to the subject property. The Waukegan Station provides its own electrical power.

3.0 ENVIRONMENTAL DOCUMENT REVIEW

3.1 Introduction

This environmental document review is based upon an analysis of information provided by ComEd coupled with observations made by Jeffrey Menter and Aaron Gesin of ENSR during the site visit, which took place on August 31, 1998 and September 1, 1998. The information provided by ComEd included documents relative to the various regulatory areas described below.

3.2 Air Quality

Although no formal emissions inventory was prepared as part of this Phase I investigation, a preliminary review of the facility indicates air permits are required for the facility. The Illinois Environmental Protection Agency (IEPA) oversees the state's air permitting compliance programs. The facility currently has four operating permits from the IEPA. The air permits cover the operation of three boilers with electrostatic precipitators, turbine oil tanks, coal ash silos, fuel handling (coal) with a radial boom stacker and conveyor belt, ash handling, a fuel dispensing facility, and jet-fuel "peaker" units. This station has submitted a Title V permit application and is awaiting its approval.

3.3 Water Resources

The facility is permitted to discharge all treated wastewater, condenser cooling water, demineralizer regenerant wastes, boiler blowdown water, and storm water runoff to Lake Michigan under the provisions set forth in the NPDES permit issued August 9, 1995 expiring August 1, 2000. Storm water runoff from the main building area is directed towards numerous drains, catch basins, and/or sumps and discharged to the east and/or west wastewater basins. Storm water from the coal pile is directed toward and collected in the coal pile runoff basin. Storm water runoff from process areas of the station is treated in the existing wastewater treatment facility. Per the stations NPDES permit, this constitutes BAT for the treatment and discharge of storm water runoff, therefore the Waukegan Station is not required to maintain a Storm Water Pollution Prevention Plan (SWPP). The remaining storm water runoff from undeveloped areas of the subject property naturally percolates into the soil or runs off-site.

3.4 Oil and Hazardous Material Storage and Use

3.4.1 Material Storage and Use

Several types of oils and hazardous materials are used on site. Several aboveground tanks, drums, and various types of containers located outdoors are used to store fuel oil, jet fuel, kerosene, hydraulic fluid, lubricating oil, antifreeze, and motor oil. Many of these containers were not equipped with secondary containment structures. However, surface run-off from these areas is directed toward the east and/or west wastewater basins, which is discharged under the provisions of the NPDES permit.

The facility has prepared contingency plans, including a Spill Prevention Countermeasure and Control Plan (SPCC) dated November 17, 1994, to prevent the discharge of oil from the aforementioned containers, and to mitigate any adverse effects from such a spill. An updated SPCC plan has been prepared and is under professional engineering review.

Based on interviews with facility personnel, and review of available information, no underground storage tanks are currently in use at the plant, however three USTs were retired in place and/or removed from the plant between 1986 and 1990 (see Section 4.2.1).

3.4.2 Principal Waste Streams

The facility generates several waste streams from its operation and maintenance activities, some of which are considered hazardous waste. The hazardous wastes may be generated on an intermittent or one-time basis. Regulatory database information identifies the ComEd Waukegan Station as a large quantity hazardous waste generator (ILD000803635). According to the ComEd Compliance Specialist, Ms. Jenni Cawein, the Waukegan Station generated hazardous waste in various forms, including used parts washer solvent prior to 1994. The Waukegan Station has used a non-hazardous parts cleaner supplied and disposed by Solvent Systems of Hampshire, Illinois from 1994 to present. Since 1994 when the station switched from a hazardous to non-hazardous parts cleaner, only minor amounts of hazardous waste are generated. Occasionally, ComEd generates medical waste, as result of personal injury accidents. When necessary, the medical wastes are disposed/treated off site by BFI of Waukegan, Illinois.

Non-hazardous wastes typically generated on site include general refuse, used hydraulic oil, used oil, used oil filters, oil soaked absorbents, slag, fly ash, antifreeze, boiler chemical cleaning waste, and boiler bottom ash. These wastes are stored in various types of containers, including dumpsters, drums, bins, silos, and basins. With exception of the waste oil, antifreeze, and boiler chemical cleaning waste; which the plant has a permit to burn in its boilers, the non-hazardous

wastes are disposed/reused off site using one of ComEd's approved vendors. A historic list of approved vendors and disposal sites are provided below.

Waste Transportation Vendors	Disposal Sites
SET Environmental - Wheeling, Illinois	Great Northern – Huntington, Indiana
BFI - Waukegan, Illinois	Great Northern – Huntington, Indiana
Solvent Systems – Hampshire, Illinois	Madison Prairie Landfill – Wisconsin
Solar Environmental – Gary, Indiana	Spring Grove Resource – Cincinnati, Ohio
ENSR Fleet Trucking – Columbus, Ohio	Forest Lawn Landfill - Three Oaks, MI
South Chicago Disposal – Chicago, Illinois	Treatment One – Houston, Texas
Waste Management, Cicero, Illinois	Madison Prairie Landfill - Wisconsin
Sun Ohio - Canton, Ohio	
Clean Harbors – Blue Island, Illinois	
United Scrap - Cicero, Illinois	

4.0 ON-SITE CONTAMINATION POTENTIAL

4.1 Introduction

Based on ENSR's review of the facility there is a potential for on-site contamination at the ComEd Waukegan Station located in Waukegan, Illinois.

4.2 Above and Underground Storage Tanks

4.2.1 Inventory of Underground Tanks

According to Ms. Cawein, there are currently no active underground storage tanks (USTs) located on the subject property, however three USTs have either been removed and/or retired in place. Two 12,000-gallon ignition fuel USTs were installed in 1931 and retired in place in 1986. A 500-gallon gasoline UST was installed in 1931 and removed in 1990. An internal memorandum in ComEd's files indicates that soil samples were collected from the walls of the tank pit following the removal of the 500-gallon gasoline UST. The samples were analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX). None of those compounds was detected in the soil samples. A 5,000-gallon oil/water separator was also apparently located at the subject property, but the date of installation was not available from ComEd, the Waukegan Fire Department, or the OSFM. No visual evidence of the UST (i.e., fill pipes) was observed during ENSR's site visit.

4.2.2 Inventory of Aboveground Storage Tanks

Table 4-1 provides a list of aboveground storage tanks identified at the Waukegan Station.

Table 4-1
Aboveground Storage Tanks
Waukegan Station

TANK TYPE	TANK LOCATION	ESTIMATED CAPACITY
Jet Fuel - Oil Tank	West of Jet Peaker Building	300,000 – gallons
Jet Fuel - Oil Tank	West of Jet Peaker Building	300,000 – gallons
Jet Fuel – Oil Additive	West of Jet Peaker Building	1,000 – gallons
Unit #5 – Turbine Oil	Basement of Unit #5	6,400 – gallons
Unit #6 – Turbine Oil	Basement of Unit #6	6,600 – gallons
#2 Diesel – Oil Tank	West of Coal Pile	10,000 – gallons

TANK TYPE	TANK LOCATION	ESTIMATED CAPACITY
#2 Diesel – Oil Tank	Tractor Repair Building	275 – gallons
#2 Diesel – Oil Tank	Machinery Shed	275 – gallons
#2 Diesel – Oil Tank	West of Locomotive House	500 – gallons
Oil Separator Tank	East Wastewater Basin	8,000 – gallons
Waste Oil Tank	East Wastewater Basin	7,500 – gallons
Oil Separator Tank	West Wastewater Basin	5,000 – gallons
Waste Oil Tank	West Wastewater Basin	7,500 – gallons
Waste Oil Tank	East of Main Building	10,000 – gallons
Gasoline Tank	West of Locomotive House	500 – gallons
Antifreeze Tank	Machinery Shed	275 – gallons
Antifreeze Tank	Machinery Shed	275 – gallons
Oil Tank	Machinery Shed	275 – gallons
Oil Tank	Machinery Shed	275 – gallons
Oil Tank	Machinery Shed	275 – gallons
Oil Tank	Machinery Shed	275 – gallons
Oil Tank	Machinery Shed	275 – gallons
Oil Tank	Machinery Shed	275 – gallons
Oil Tank	Machinery Shed	275 – gallons
Kerosene Tank	Southeast Corner of Main Building	500 – gallons
Gasoline Tank	Fire Brigade	250 – gallons
Surfactant Tank	Coal Pile Chemical Building	1,000 – gallons
Binder Tank	Coal Pile Chemical Building	7,500 – gallons
Suppressant Tank	Coal Pile Chemical Building	7,500 – gallons
Water Tank	Coal Pile Chemical Building	5,000 – gallons
Liquid Nitrogen	East of Main Building	1,500 – gallons
Sodium Hydroxide	Main Building	10,000 – gallons
Sulfuric Acid	Main Building	10,000 – gallons
Carbon Dioxide	Peaker Building	2,500 – gallons
Carbon Dioxide	Main Building	2,500 – gallons

Many of the ASTs and chemical storage areas were not equipped with secondary containment structures, and petroleum stains were observed on the concrete floors within the main building and several of the outlying structures. Petroleum stains were also observed on exterior paved, gravel, and soil covered surfaces adjacent to the main building and outlying structures. However, surface run-off from these areas is directed toward the east and/or west wastewater basins, which is discharged under the provisions of the NPDES permit. A listing of these stained areas is provided in Section 4.5.

4.3 Polychlorinated Biphenyls (PCBs)

There are numerous liquid-cooled transformers on the site. According to Mr. Dave Rubner, ComEd PCB Specialist, a fluid exchange process to remove PCB containing dielectric fluid from transformers at all of the ComEd stations was conducted during the 1980s. Since the completion of the fluid exchange process, all transformers at the Waukegan Station are currently PCB free (i.e. below 50 ppm) and are considered to have extremely low potential for leachback to levels in excess of 50 ppm. Based on these statistics, ComEd does not intend to perform any additional testing of the transformers at the Waukegan Station.

However, ENSR observed evidence of mislabeling (i.e. multiple labels on a single transformer listing different PCB concentrations) and oil staining around many of the pad-mounted electrical transformers located along the east and west sides of the main building. Although no permitting requirements currently apply to the use of equipment containing or potentially containing PCB coolants, equipment containing more than 50 ppm PCBs must be marked with the appropriate warning labels (40 CFR 761.45, PCB).

4.4 Asbestos-Containing Materials

ENSR representatives who are State of Illinois Department of Public Health licensed Asbestos Building Inspectors performed a visual suspect asbestos-containing material (ACM) inspection of the main building and outlying structures as part of this investigation, however, bulk sampling was not performed. The types and quantities of suspect materials identified during the meticulous walk-through of each on-site structure at the Waukegan Station included pipe and pipe fitting insulation, boiler and equipment insulation, tank insulation, pump insulation, vinyl floor tile, suspended ceiling tile, and spray-on insulation. Although the removal of all ACM is not required at this time, Table 4-3 presents the types and estimated quantities of suspect ACM, as well as estimated removal costs.

Table 4-3
Asbestos-Containing Materials
Waukegan Station

TYPE OF MATERIAL	ESTIMATED QUANTITY	REMOVAL COST ESTIMATES
Pipe & Pipe Fitting Insulation	1,205,000 Linear Feet	$2,410,000
Boiler & Equipment Insulation	212,000 Square Feet	$5,300,000
Tank & Pump Insulation	6,500 Square Feet	$162, 500
Vinyl Floor Tile	2,000 Square Feet	$10,000
Suspended Ceiling Tile	3,000 Square Feet	$30,000

TYPE OF MATERIAL	ESTIMATED QUANTITY	REMOVAL COST ESTIMATES
Spray-on Insulation	50,000 Square Feet	$1,250,000

The total suspect ACM removal cost is estimated at $9.2 million. The cost estimate is based on ACM location and quantity information provided by ComEd, ENSR's visual inspection of accessible areas of the facility, and generally accepted ACM removal unit costs. The cost estimate does not include project consulting or reinsulation fees. The estimated removal cost provided above is subject to change as a result of the potential variability in material quantities and locations, contractor fees, disposal fees, and project scheduling. Based on the aforementioned variables, the removal costs may fluctuate as much as 50%.

An additional asbestos issue was also identified at the Waukegan Station during ENSR's investigation. Asbestos in the form of transite brake shoes was observed in the dredge spoils and along the lakefront of the subject property. According to ComEd personnel, the Waukegan Station has not manufactured asbestos products and the presence of the transite brake shoes is likely from an off-site source. Estimated quantities and removal costs associated with the cleanup of the transite could not be provided at this time.

4.5 Areas of Surface Staining

The ENSR site inspection was conducted between August 31, 1998 and September 1, 1998. In general, housekeeping conditions at the subject facility were good, with individual areas requiring more attention than others. The following areas of surface staining were identified during the environmental investigation of the subject property:

- Petroleum stains were observed on the concrete floor in the indoor oil storage area. The oil storage room serves as secondary containment with a raised berm protecting the doorway.

- Petroleum stains were observed on the concrete floor within the machinery storage shed and also on the ground surface adjacent to the exterior of the shed.

- Petroleum stains were noted on the ground surface adjacent to the east and west basin oil/water separators and oil storage tanks.

- Petroleum stains were noted on the gravel parking lot surface adjacent to the waste oil AST and wastewater pump system located east of the main building.

- Petroleum surface staining and areas of distressed vegetation were observed east of the Butlers buildings in the old fire brigade training area of the subject property.

- Petroleum surface staining was observed on the ground surface adjacent to several of the pad-mounted transformers located to the east and west of the main building.

- Petroleum surface staining was observed on the ground surface adjacent to the ignition fuel pump house.

- Petroleum surface staining was observed on the ground surface beneath the 10,000-gallon diesel AST located south of the main building.

4.6 On-Site Wastewater System

Building and assessment records indicate the subject property has been occupied by a coal fired power plant facility from approximately 1923 until the present. In July 1977, ComEd was issued IEPA Permit #1977-EB-3699 for the construction of miscellaneous wastewater treatment facilities including clay-lined wastewater treatment settling basins, a synthetically lined coal pile drainage basin, and a synthetically-lined fly/bottom ash settling basin system. Prior to this time, unlined slag basins were in use at the station. It is unknown if the historic use of unlined basins has had an impact on the subsurface at the subject property.

4.7 Railroad

A railroad has abutted and been located on the subject property since at least 1923 according to aerial photographs, Sanborn Fire Insurance maps, and interviews with site personnel. It is unknown if the presence of the railroad and rail spur has had an impact on the subject property from fuels, oils, and/or solvents. ENSR observed areas of pervasive staining along the railroad tracks near the train car "thaw" house, "drive house", and "dump" house.

4.8 Spill History

As previously indicated, there have been several petroleum hydrocarbon spills on site, based on a review of the Station's oil and hazardous material incident files and Spill Prevention Control and Countermeasures Plan. The majority of the spills did not impact soil and/or groundwater quality. Rather, they discharged directly to the cooling water intake and/or discharge canals. A summary of the spill/release incidents at Waukegan Station is provided below.

Waukegan Station's NPDES permit file contained several incident reports relating to spills that occurred on site between 1978 and 1997, and that resulted in a condition that was either in violation of their NPDES (cooling water discharge) permit or that required notification to emergency response agencies (e.g., the Coast Guard). In all cases, the incidents involved

petroleum hydrocarbons that leaked from the Station's equipment directly or indirectly (e.g., through a discharge pipe) to the cooling water canals. Based on the descriptions of the cleanup actions taken by ComEd in response to the incidents, it does not appear as though soil and/or groundwater quality was impacted by these spills/releases. We note that several of the spills were caused by leaks from the plant's oil coolers, including a large spill (600 gallons) that occurred in 1993.

The only record of a spill/release that impacted soil quality on site was the release of jet fuel that occurred during the early 1990s. According to Ms. Jenni Cawein, the release was caused from a leak in an underground pipe associated with the large aboveground storage tank. Ms. Cawein also indicated that the release was not required to be reported to the Illinois Emergency Management Agency (IEMA) and groundwater was not sampled to determine whether that media had been impacted. However, approximately 500 to 1,000 cubic yards of contaminated soil were excavated from the impacted area and treated on-site. The area served as a bioremediation project site during the spring and summer of 1994. Both *in situ* and *ex situ* treatments were conducted over an approximately 6-8-month time period. Sample results indicated a 50-90 percent reduction in total petroleum hydrocarbons (TPH) concentrations in the areas impacted by the leak.

4.9 Adjacent Property

According to Sanborn Fire Insurance maps, aerial photographs, and interviews with site personnel, the north adjacent property has been occupied by an asbestos manufacturing company since the 1920s. The west adjacent properties have been occupied since the 1920s by the Waukegan Station's main electrical switch yard, as well as a tannery and radiator manufacturing facility. According to ComEd documentation, there has been PCB-containing fluid releases from transformers and capacitors, as well as, releases from underground storage tanks containing petroleum products. Furthermore, the tannery and radiator facilities are no longer in operation, but also have left behind soil and groundwater contamination. An arsenic, lead, mercury, and chromium contaminated groundwater plume has been identified on the former tannery site, which extends easterly onto the subject property. The former radiator manufacturing facility has also left behind petroleum-contaminated soil and groundwater from leaking underground storage tanks, which may also be affecting the subject property.

4.10 Environmental Database Review

ENSR reviewed a variety of federal and state governmental databases using Environmental Data Resources (EDR) of Southport, Connecticut. The following federal and state contamination-related databases were searched for the subject property and surrounding area; the various search distances used are also noted:

TABLE 4-4
Databases Searched and Radii

Database Acronym	Description	Search Distance[1] (miles)
Federal Databases		
NPL[2]	Existing and proposed Superfund sites on the National Priorities List	1.0
CERCLIS[2]	Abandoned, uncontrolled or inactive hazardous waste sites reported to the U.S. EPA, which have been or are scheduled to be investigated by the U.S. EPA for potential nomination to the NPL.	0.5
RCRIS-TSD[2]	Reported sites that treat, store and/or dispose of hazardous waste and subject to the federal RCRA regulations.	0.5
RCRIS-LQG/SQG[2]	Reported large-quantity generators and small quantity generators of hazardous waste.	0.25
ERNS[2]	Sites reporting spills to the U.S. EPA and/or the U.S. Coast Guard under various federal regulations	Target property
FINDS	Facility Index System indicates the presence of a site on another federal database.	Target property
PADS	PCB Activity Database System identifies generators, transporters, commercial storers and/or brokers and disposers of PCBs who are required and have notified the EPA of such activities.	Target property
RAATS	RCRA Administrative Tracking System contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA.	Target property
TRIS	Toxic Chemical Release Inventory System identified facilities who have reported releases of listed toxic chemicals to the air, water, and land in reportable quantities under SARA Title III Section 313.	Target property

TABLE 4-4
Databases Searched and Radii

Database Acronym	Description	Search Distance[1] (miles)
TSCA	Toxic Substances Control Act identified manufacturers and importers of chemical substances by plant site in 1986. No updates of the list have been made by EPA.	Target property
HMIRS	Hazardous Materials Information Reporting System contains hazardous material spill incidents reported to the Federal DOT.	Target property
NPL Liens	List of liens placed against real property in order for the EPA to recover remedial action expenditures or when the property owner receives notification of potential liability.	Target property
CORRACTS	Corrective Action Report identifies hazardous waste handlers with RCRA corrective action activity.	1.0
ROD	Records of Decision mandating a permanent remedy for a Superfund Site	1.0
MLTS	Material Licensing Tracking System, maintained by the Nuclear Regulatory Commission, contains a list of sites that possess or use radioactive materials and are subject to NRC licensing.	Target property
Delisted NPL	Sites removed from the NPL	Target property
Coal Gas	Former manufactured coal gas sites	1.0
Illinois Databases		
SWHS[2]	State hazardous waste sites	1.0
UST[2]	Sites which have reported underground storage tanks.	0.5
LUST[2]	Sites which have reported leaking underground storage tanks.	0.5
SWF/LF[2]	List of permitted solid waste disposal facilities	0.5

1. The radial search distances used equal or exceed those recommended by ASTM for assessing the environmental condition of commercial real estate.
2. Databases which are required to be searched by ASTM.

4.10.1 Subject Property

The subject property was listed on the following databases: FINDS, ERNS, RCRIS-LQG, and LUST. The federal FINDS database only indicates the facility's presence on other databases and

the ERNS indicate that the facility had a release of oil and/or hazardous substances on the subject property.

The RCRIS-LQG database indicates the facility is a large quantity generator of hazardous waste and is identified with IEPA #ILD000803635. However, ENSR reviewed an internal letter of comments attached to the 1993 Hazardous Waste Generation Report submitted to the IEPA dated February 25, 1994. This letter stated a new program was initiated to replace hazardous waste generating solvent in parts washing units with a non-hazardous type. As a result of successful waste minimization efforts, the IEPA was notified updating the Waukegan Station's generator status from hazardous to non-hazardous. Contact with the ComEd Compliance Specialist, Ms. Cawein, also indicated the Waukegan Station generated hazardous waste in the form of used parts washer solvent prior to 1994. Since 1994, the Waukegan Station only uses non-hazardous parts cleaner supplied and disposed of by Solvent Systems of Hampshire, Illinois.

The LUST database indicates the facility reported a petroleum release from an underground storage tank (IEPA LUST Incident #901211). According to Mr. Steve Jones, Environmental Protection Specialist with the IEPA Leaking Underground Storage Tank Division, the incident was identified on May 4, 1990 and remains an open case. However, ENSR reviewed a letter to the IEPA from ComEd dated May 22, 1990, which stated that a release from an underground storage tank was not the case, rather, it was an oil release from piping connected to a turbine oil reservoir. The reservoir, which is located entirely within the main building, ruptured an oil line releasing oil into a basement floor drain. The floor drain is routed to a sump that empties into the discharge flume. The release of oil resulted in an NPDES non-compliance violation.

4.10.2 Surrounding Land Uses

According to the EDR database report, several sites were identified within the specified search radius and are summarized in Table 4-2.

TABLE 4-2
EDR Database Summary

Site	Database	Distance	Direction	Location Relative to Inferred Hydraulic Gradient at Site
ComEd (Former Greiss Pfleger Tannery 1251 Sand Street Waukegan, Illinois	CERCLIS, FINDS, RCRIS-LQG	Adjacent	West	Upgradient

TABLE 4-2
EDR Database Summary

Site	Database	Distance	Direction	Location Relative to Inferred Hydraulic Gradient at Site
Manville Sales Corporation Greenwood Avenue & Sand Street Waukegan, Illinois	CERCLIS, RCRIS-SQG, FINDS, NPL, TRIS, SHWS	Adjacent	North	Cross-gradient
Thermal Ceramics, Inc. 120 E. Greenwood Avenue Waukegan, Illinois	FINDS, RCRIS-SQG	1/8-1/4 mile	Northwest	Upgradient
Waukegan Tar Pits JCT of Pershing & Dehringer Road Waukegan, Illinois	CERCLIS, FINDS, SHWS, RCRIS-LQG	1/2-1 mile	Southwest	Cross-gradient
Outboard Marine Corporation 200 Seahorse Drive Waukegan, Illinois	CERCLIS, FINDS, NPL, RCRIS-LQG, TRIS, RCRIS-TSD, CORRACTS, CONSENT, ROD, LUST	1/2–1 mile	South	Cross-gradient
North Shore Gas Company Sand & Dehringer Road Waukegan, Illinois	Coal Gas	1/2–1 mile	Southwest	Cross-gradient

The inferred groundwater flow direction in the subject property vicinity is toward Lake Michigan, which is located adjacent to the east of the subject property. Based on distance, inferred hydraulic gradient, and/or regulatory status, the last four above listed sites are unlikely to impact the subject property. However, as indicated in Section 4.9, the first two listed sites, Manville Sales Corporation and the former Pfleger Tannery have impacted the subject property, and are further discussed below.

- ComEd (Former Greiss Pfleger Tannery), located at 1251 Sand Street in Waukegan, Illinois is listed on the CERCLIS, FINDS, and RCRIS-LQG databases. The site is located adjacent west of the subject property. According to the EDR database report, the site is not listed on the NPL. However, interviews with ComEd personnel revealed that soil and groundwater contamination is prevalent at this location, which extends onto the subject property.

- Manville Sales Corporation, located at Greenwood Avenue and Sand Street in Waukegan, Illinois is listed on the CERCLIS, RCRIS-SQG, FINDS, NPL, TRIS, and SHWS databases. The site is located approximately less than 1/8 mile north of the subject property. According to

the EDR database report, the site has been issued compliance violations, is listed on the final NPL, and is identified as an asbestos disposal facility. According to ComEd personnel, the Waukegan Station has not manufactured asbestos products, however the presence of the transite has been identified in the dredge spoils and believes these materials are from an off-site source. No closure date is reported on the EDR report. Based on the above information, this site is likely to have impacted the subject property.

5.0 SUMMARY OF FINDINGS

ENSR performed a Phase I Environmental Assessment in conformance with the scope and limitations of the ASTM practice E-1527-97 at the Commonwealth Edison Waukegan Station located at 10 Greenwood Avenue, Waukegan, Illinois. Any exceptions to or deletions from this practice are described in this report. This practice has revealed evidence of the following recognized environmental conditions associated with the subject property:

- Underground Storage Tanks: According to Mr. Dave Raudio, Construction Specialist, and available information, the facility has removed and/or abandoned-in-place three USTs used to store ignition oil and gasoline. According to Ms. Cawein, there are currently no active USTs located on the subject property. Two 12,000-gallon ignition fuel USTs were installed in 1931 and retired in place in 1986. A 500-gallon gasoline UST was installed in 1931 and removed in 1990. An internal memorandum in ComEd's files indicates that soil samples were collected from the walls of the tank pit following the removal of the 500-gallon gasoline UST. The samples were analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX). None of those compounds was detected in the soil samples. A 5,000-gallon oil/water separator is also located at the subject property, but the dates of installation was unable to be provided by ComEd personnel, Waukegan Fire Department, or the OSFM. Although, no visual evidence (i.e., fill pipes) were observed during the ENSR site visit, no analytical results or clean closure documents were available for review. It is unknown if subsurface petroleum contamination exists.

- Aboveground Storage Tanks: Many of the ASTs and chemical storage areas were not equipped with secondary containment structures and petroleum staining was observed on the concrete floors within the main building and several of the outlying structures. Areas of petroleum staining were also observed on exterior paved, gravel, and soil covered surfaces adjacent to the main building and outlying structures. However, surface run-off from these areas is directed toward the east and/or west wastewater basins, which is discharged under the provisions of the NPDES permit.

- Polychorinated Biphenyls (PCBs): There are numerous liquid-cooled transformers on the site. According to Mr. Dave Rubner, ComEd PCB Specialist, a fluid exchange process to remove PCB containing dielectric fluid from transformers at all of the ComEd stations was conducted during the 1980s. Since the completion of the fluid exchange process, all transformers at the Waukegan Station are currently PCB free (i.e. below 50 ppm) and are considered to have extremely low potential for leachback to levels in excess of 50 ppm. Based on these statistics, ComEd does not intend to perform any additional

testing of the transformers at the Waukegan Station. However, ENSR observed evidence of mislabeling (i.e. multiple labels on a single transformer listing different PCB concentrations) and oil staining around many of the pad-mounted electrical transformers located along the east and west sides of the main building. Although no permitting requirements currently apply to the use of equipment containing or potentially containing PCB coolants, equipment containing more than 50 ppm PCBs must be marked with the appropriate warning labels (40 CFR 761.45, PCB).

- Asbestos: According to Mr. Raudio, the spray-on material located on and within the train car "thaw" house has been tested and found to contain asbestos. This material, as well as, pipe insulation, boiler insulation, floor tile, ceiling tile, and any other materials not identified as asbestos free, should be treated as ACM. An additional asbestos issue was also identified at the Waukegan Station during ENSR's investigation. Asbestos in the form of transite brake shoes was observed in the dredge spoils and along the lakefront of the subject property. According to ComEd personnel, the Waukegan Station has not manufactured asbestos products and the presence of the transite brake shoes is likely from an off-site source. Estimated quantities and removal costs associated with the cleanup of the transite could not be provided at this time.

- Areas of Petroleum Surface Staining: Several areas of surface staining were observed on interior concrete and on exterior paved, gravel, and soil covered areas. Many of the aboveground storage tanks, transformers, and chemical storage areas were not equipped with secondary containment structures and petroleum staining was observed adjacent to these areas. However, surface run-off from these areas is directed toward the east and/or west wastewater basins, which is discharged under the provisions of the NPDES permit.

- On-Site Wastewater and Fly/Bottom Ash Disposal Systems: Building and assessment records indicate the subject property has been occupied by a coal fired power plant facility from approximately 1923 until the present. In July 1977, ComEd was issued IEPA Permit #1977-EB-3699 for the construction of miscellaneous wastewater treatment facilities including clay-lined wastewater treatment settling basins, a synthetically lined coal pile drainage basin, and a synthetically-lined fly/bottom ash settling basin system. Prior to this time, unlined slag basins were in use at the station. It is unknown if the use of the unlined basins may have impacted the subsurface at the subject property.

- Railroad: A railroad has abutted and been located on the subject property since at least 1923. The presence of the railroad and rail spur may have had an impact on the subject property from fuels, oils, and/or solvents. ENSR observed areas of pervasive staining

along the railroad tracks near the train car "thaw" house, "drive house", and "dump" house.

- On-Site Spills/Releases: Based on a review of Waukegan Station's incident files, there have been several spills/releases on site. However, only one appears to have adversely affected on-site soil quality. According to Ms. Jenni Cawein, the release was caused from a leak in an underground pipe associated with the large aboveground storage tank. Ms. Cawein also indicated that the release was not required to be reported to the Illinois Emergency Management Agency (IEMA) and groundwater was not sampled to determine whether that media had been impacted. However, approximately 500 to 1,000 cubic yards of contaminated soil were excavated from the impacted area and treated on-site. The area served as a bioremediation project site during the spring and summer of 1994. Both *in situ* and *ex situ* treatments were conducted over an approximately 6-8-month time period. Sample results indicated a 50-90 percent reduction in total petroleum hydrocarbons (TPH) concentrations in the areas impacted by the leak.

- Adjacent Properties: The north adjacent property has been occupied by an asbestos manufacturing company since the 1920s. The west adjacent properties have been occupied since the 1920s by the Waukegan Station's main electrical switch yard, as well as a tannery and radiator manufacturing facility. According to ComEd documentation, there has been PCB-containing fluid releases from transformers and capacitors, as well as, releases from underground storage tanks containing petroleum products. Furthermore, the tannery and radiator facilities are no longer in operation, but also have left behind soil and groundwater contamination. An arsenic, lead, mercury, and chromium contaminated groundwater plume has been identified on the former tannery site, which extends easterly onto the subject property. The former radiator manufacturing facility has also left behind petroleum-contaminated soil and groundwater from leaking underground storage tanks, which may also be affecting the subject property.

6.0 REFERENCES

6.1 Persons Interviewed or Contacted

Mr. Dave Raudio, Construction Specialist, Commonwealth Edison, 10 Greenwood Avenue, Waukegan, Illinois; (847) 662-6201.

Ms. Jenni Cawein, Compliance Specialist, Commonwealth Edison, 10 Greenwood Avenue, Waukegan, Illinois; (847) 662-6201.

Mr. Christopher Lux, Site Construction Specialist, Commonwealth Edison, 10 Greenwood Avenue, Waukegan, Illinois; (847) 662-6201.

Mr. Dave Rubner, PCB Specialist, Commonwealth Edison, 10 South Dearborn Street, Chicago, Illinois; (312) 394-4461.

Mr. Steve Jones, Environmental Protection Specialist, Illinois Environmental Protection Agency Leaking Underground Storage Tank Division, Springfield, Illinois; (217) 782-6762.

6.2 Documents and Reports Reviewed

City of Waukegan Building Department Records, 18 North County Street, Waukegan, Illinois.

City of Waukegan Assessment Department Records, 18 North County Street, Waukegan, Illinois.

Aerial Photographs of subject property and surrounding properties dated 1939, 1959, 1964, 1975, 1985, 1990, and 1995 reviewed the City of Waukegan Graphics Department, 18 North County Street, Waukegan, Illinois.

Polk's 1948 through 1993 City Directories reviewed at the City of Waukegan Public Library, 128 North County Street, Waukegan, Illinois.

Ecology and Environment, Inc. of Chicago, Illinois, Screening Site Inspection Report , prepared for Pfleger Greiss, Waukegan, Illinois, dated March 13, 1990.

NPDES Permit #IL0002259, issued August 9, 1995, expiration August 1, 2000.

Illinois Generator Non-Hazardous Special Waste Report dated January 1, 1996.

Illinois Generator Non-Hazardous Special Waste Report dated January 1, 1997.

Illinois Generator Non-Hazardous Special Waste Report dated January 1, 1998.

Spill Prevention and Countermeasures Plan (SPCC) for Waukegan Generating Station, dated November 11, 1994.

Metcalf & Eddy of Chicago, Illinois, Report of Outstanding Environmental Liabilities at The Winston Property, 184 Dahringer Road, Waukegan, Illinois, dated May 18, 1998.

LUST Correspondence Letter between Comed and IEPA, dated May 22, 1990, regarding the misrepresentation of an oil spill as a LUST incident.

EDR Radius Map with Geocheck®, Comed Waukegan Station, 10 Greenwood Avenue, Waukegan, Illinois, dated August 18, 1998.

EDR Sanborn™ Map Report, ComEd Waukegan Station, 10 Greenwood Avenue, Waukegan, Illinois, dated August 18, 1998.

U.S.G.S. 7.5-minute Topographical Quadrangle Map, Zion, Illinois, dated 1960, photorevised 1972 and 1980.

Letter from Commonwealth Edison to the Waukegan Fire Marshal, dated February 26, 1998, regarding 1997 Tier II Emergency and Hazardous Chemical Inventory Form for Commonwealth Edison Waukegan Station, 10 Greenwood Avenue, Waukegan, Illinois.

7.0 SIGNATURES AND QUALITY CONTROL REVIEW

BY: _____
Jeffrey D. Menter

TITLE: Senior Staff Specialist

DATE: 10/5/98

QUALITY CONTROL REVIEW

BY: _____
Aaron Gesin FOR

TITLE: Program Manager

DATE: 10/5/98

7.0 SIGNATURES AND QUALITY CONTROL REVIEW

BY: _____
Jeffrey D. Menter

TITLE: Senior Staff Specialist

DATE: 10/2/98

QUALITY CONTROL REVIEW

BY: _____
Aaron Gesin

TITLE: Program Manager

DATE: 10/2/98

ENSR®

AL, Florence
(205) 767-1210

AK, Anchorage
(907) 561-5700

AK, Fairbanks
(907) 452-5700

CA, Alameda
(510) 748-6700

CA, Camarillo
(805) 388-3775

CA, Glendale
(818) 546-2090

CA, Irvine
(714) 752-0403

CA, Sacramento
(916) 362-7100

CO, Denver
(303) 446-8420

CO, Ft. Collins
(970) 493-8878

Ft. Collins Tox Lab
(970) 416-0916

CT, Stamford
(203) 323-6620

FL, Tallahassee
(850) 906-0505

GA, Norcross
(770) 209-7167

IL, Westmont
(630) 887-1700

LA, Lafayette
(318) 234-9130

ME, Portland
(207) 829-0929

MD, Columbia
(410) 884-9280

MA, Acton
(978) 635-9500

MA, Northborough
(508) 393-8558

MA, Buzzards Bay
(508) 888-3900

MA, Woods Hole
(508) 457-7900

MN, Minneapolis
(612) 924-0117

MO, St. Louis
(314) 428-8880

MO, St. Louis
Environmental
Training Center
(314) 428-7020

NJ, Piscataway
(732) 457-0500

NC, Raleigh
(919) 571-0669

OH, Cincinnati
(513) 677-8583

PA, Langhorne
(215) 757-4900

PA, Pittsburgh
(412) 261-2910

PR, Rio Piedras
(787) 753-9509

SC, Columbia
(803) 216-0003

TX, Dallas
(972) 960-6855

TX, Houston
(713) 520-9900

TX, San Antonio
(210) 590-8393

WA, Seattle
(425) 881-7700

ENSR International

Acton, MA
(978) 266-4232

Bolivia

Costa Rica

Czech Republic

Ecuador

France

Germany

Italy

Malaysia

Mexico

Spain

Turkey

United Kingdom

Venezuela

Internet

www.ensr.com

MWG13-15_12040