ZIONSOLUTIONS LLC
An EnergySolutions Company

10 CFR 50.4(b)(6)
10 CFR 50.71(e)
10 CFR 50.59(d)(2)

October 1, 2012 ZS-2012-0376

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Zion Nuclear Power Station, Units 1 and 2
Facility Operating License Nos. DPR-39 and DPR-48
NRC Docket Nos. 50-295 and 50-304

Subject: Submittal of Defueled Safety Analysis Report Update, Revision 7 Report of Changes, Tests and Experiments

References: (1) Zion*Solutions*, LLC (ZS) letter, "Submittal of Defueled Safety Analysis Report Update," dated October 1, 2010

(2) Exelon Generation Company, LLC (EGC) letter, "Submittal of Defueled Safety Analysis Report Update," dated October 2, 2008

In accordance with the requirements of 10 CFR 50.71, "Maintenance of records, making of reports," paragraph (e), Zion*Solutions*, LLC (ZS) is submitting Revision 7 of the Defueled Safety Analysis Report (DSAR) for the Zion Nuclear Power Station (ZNPS). In accordance with 10 CFR 50.71(e)(4), the DSAR update is being submitted within 24 months of the previous ZNPS DSAR revision which was submitted in Reference (1).

The changes to the DSAR reflect administrative changes (i.e., editorial and DSAR text changes) and plant design changes. Revision 7 includes changes made from October 2010 through September 2012.

Attachment 1 contains a summary of the DSAR changes. Attachment 2 contains page change instructions. Attachment 3 contains the update to the ZNPS DSAR. As required by 10 CFR 50.71(e), this attachment consists of replacement pages to be inserted into the DSAR. Changes to the DSAR are indicated by revision bars.

In accordance with 10 CFR 50.59, "Changes, tests, and experiments," paragraph (d)(2), a report of changes, tests, and experiments, including a summary of the 10 CFR 50.59 evaluation of each change is also required to be submitted on a biennial basis. In Reference (2), the previous ZNPS 10 CFR 50.59 report was submitted. There were no 10 CFR 50.59 evaluations performed for ZNPS in the reporting period identified in Reference (1) and therefore, a summary of evaluations was not submitted for that reporting period. Attachment 4 contains a summary of 10 CFR 50.59 evaluations performed during the time period from September 2010 through August 2012.

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101 Shiloh Boulevard, Zion • IL 60099
(224) 789-4016 • Fax: (224) 789-4008 • www.zionsolutionscompany.com

As Vice President, Regulatory Affairs, I certify that the information in this submittal accurately presents changes made since the previous submittals necessary to reflect information and analyses submitted to the NRC or prepared in accordance with NRC requirements.

Should you have any questions concerning this letter, please contact Jim Ashley at (847) 379-2978.

Respectfully,

Patrick S. Thurman, Esq.
Vice President Regulatory Affairs
Zion*Solutions*, LLC

Attachments:

1) Summary of Changes
2) Page Change Instructions
3) ZNPS DSAR Revision 7
4) 10 CFR 50 .59 Summary Report

cc: John Hickman, U.S. NRC Senior Project Manager
Service List

Zion Nuclear Power Station, Unit 1 and 2 License Transfer Service List

cc:

Patrick T. Daly
Senior VP and General Manager
Zion*Solutions*, LLC
101 Shiloh Boulevard
Zion, IL 60099

Patrick Thurman, Esq.
VP Regulatory Affairs, Licensing & Document Control
Zion*Solutions*, LLC
101 Shiloh Boulevard
Zion, IL 60099

Gary Bouchard
VP Engineering, Ops & Nuclear Security and Decommissioning Plant Manager
Zion*Solutions*, LLC
101 Shiloh Boulevard
Zion, IL 60099

Alan Parker
President Projects Group
Energy*Solutions*
1009 Commerce Park Drive, Ste. 100
Oak Ridge, TN 37830

John Christian
President of Logistics, Processing and Disposal (LP& D) Group
Energy*Solutions*
1750 Tysons Boulevard, Suite 1500
Mclean, VA 22102

Thomas Magette
Senior VP Nuclear Regulatory Strategy
Energy*Solutions*
6350 Stevens Forest Road, Ste. 2000
Columbia, MD 21046

Russ Workman
General Counsel
EnergySolutions
423 West 300 South, Ste. 200
Salt Lake City, UT 84101

Illinois Department of Nuclear Safety
Office of Nuclear Facility Safety
1035 Outer Park Drive
Springfield, IL 62704

Kent McKenzie
Emergency Management Coordinator
Lake County Emergency Management Agency
1303 N. Milwaukee Avenue
Libertyville, IL 60048-1308

Regional Administrator
U.S. NRC, Region III
2443 Warrenville Road
Lisle, IL 60532-4352

John E. Matthews
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004

ATTACHMENT 1

CHANGES MADE TO THE DSAR BUT NOT PREVIOUSLY SUBMITTED

Pages	Description of Change
Pages 3-52a, 3-61	Delete Spent Fuel Nuclear Island (SFNI) lightning protection discussion.
Table 4-3	Delete Auxiliary Building Radiation Monitor mid and high range channel discussion.
Pages 3-51, 3-52, 4-12, 4-13, Table 4-3	Modify discussion of Containment Purge System.
Page 4-10, Figures 1-1, 1-2, 1-14	Remove Dry Active Waste Storage building discussion.
Page 3-55, Figures, 1-1, 1-2, 1-5, 1-14, 3-45	Delete Main Power Transformer and Unit Auxiliary Transformer references.
Page 3-51	Modify discussion of Containment Purge System.
Pages 2-12, 2-13, 2-14, 2-15	Revise site flood discussion for clarification.
Page 3-29	Add discussion of fuel repair methods in preparation for dry cask storage.
Pages 3-51, 3-52, 4-12, 4-13, Table 4-3, Figure 3-42	Modify discussion of Unit 1 Containment Purge System.
Pages 3-21, 3-22	Modify discussion of Containment Building tendons to address partial removal.
Page 3-21	Add discussion of Containment access opening in support of decommissioning activities.
Pages 1-7, 3-53, 3-55, 3-55a, 3-56, 3-58, 3-59, 3-60, Table 3-15, Figures 1-1, 3-45, 3-46, 3-47	Add discussion of new site auxiliary power supply system.
Pages 3-vi, 3-46, 3-47, 3-48, 3-53, 3-55a, Table 3-14, Figure 3-40	Add discussion of new Service Water Pump installation.
Page 3-29	Correct historical discussion of fuel types used during power operation.
Pages 3-50, 3-51, Figures 3-41, 3-42	Revise Auxiliary Building Ventilation System air flow discussion.

ATTACHMENT 2

PAGE CHANGE INSTRUCTIONS

To perform the October 2012 Zion Defueled Safety Analysis Report (DSAR) update, please remove the existing pages and insert pages dated October 2010 as follows:

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ATTACHMENT 3

ZION NUCLEAR POWER STATION
DEFUELED SAFETY ANALYSIS REPORT REVISION 7

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1.2.4 Fuel Handling System

The fuel handling equipment is designed to handle spent fuel under water from the time it leaves its fuel rack until it is placed in a cask for shipment from the site. Underwater transfer of spent fuel provides an optically transparent radiation shield, as well as a reliable source of coolant for removal of decay heat. This system also provides capability for receiving, handling and storage of new fuel. Both the new fuel storage facility and the spent fuel storage facility are shared by the two units.

1.2.5 Electrical System

The station auxiliary power system consists of auxiliary transformers, 4160-V and 480-V switchgear, 480-V motor control centers, 120-Vac instrument buses and 125-Vdc battery buses.

The station auxiliary power is fed from a single 34 KV commercial electrical distribution system. The 34 KV system supplies power to three 34 KV to 4 KV step down transformers. These transformers provide normal power supply to the station support systems. The 4 KV Power Distribution Centers (PDC) are located outside the turbine building inside self contained enclosures.

In addition, there are two independent 12-kV feeds from the commercial electrical distribution system. They supply two 12-kV to 480-V step down Spent Fuel Nuclear Island (SFNI) transformers. These transformers provide the normal power supplies to the spent fuel pool support systems. The switch gear buses are located in the fuel building.

1.2.6 Site and Environment

The characteristics of the site and its environs have been investigated to establish bases for determining criteria for storm, flood, and earthquake protection and to evaluate the validity of calculational techniques for the control of routine and accidental releases of radioactive liquids and gases to the environment. Field programs to investigate geology and seismology are completed. A Preoperational Meteorological Program to provide onsite observations of wind speed and direction was begun January 1970. A radiological study of the site environs was initiated March 1970 with the objective of establishing background radiation levels.

The site is in Northeast Illinois on the west shore of Lake Michigan about 40 miles north of Chicago, Illinois, and about 42 miles south of Milwaukee, Wisconsin, as shown in Figure 1-17.

The site is covered mainly by sandy soil with patches of peat and muck in the marshy western portions of the site. Test borings, to investigate subsurface conditions reveal that the site is blanketed by granular lake deposits underlain by glacial drift consisting of till, outwash and lake deposits. The site is well ventilated and not subject to severe persistent inversion. While tornadoes occur in the region, none have been reported to affect the lake shore site directly. High winds (on the order of 70-mph) can be expected once in 50 years from storms.

A horizontal ground acceleration, at the site, of 0.17 times gravity (0.17g) combined with a vertical acceleration of 0.11 times gravity (0.11g) has been used for the earthquake design criteria based on site investigations.

2.4.2.1 Rainfall

Lakes Michigan and Huron are considered as a unity from the standpoint of drainage and water level since these two lakes are connected. The drainage basin for these two lakes comprises 115,700 square miles and has an average annual rainfall of about 31 inches. Table 2-15 lists the average and maximum precipitations recorded at various locations on the Illinois shore of southern Lake Michigan.

2.4.2.2 Flood Design Considerations

No special design features are required to accommodate the hydrological characteristics of the site. The station grade level is approximately 2.1 feet above the theoretical maximum water level at the shoreline due to a 6.7 foot wave occurring simultaneously with the maximum high water level. For a maximum seiche height of 8.8 feet concurrent with 2 foot waves occurring at the maximum high water level, the station floor grade level is approximately 2 feet below surge water level for up to 20 minutes. With the plant in a permanently defueled condition, no SSCs are classified as safety related as discussed in DSAR Section 3.2.4. Potential flood damage to SSCs classified as Important to the Defueled Condition (ITDC) is bounded by the site accident analysis presented in DSAR Chapter 5.

2.4.3 Probable Maximum Flood (PMF) on Streams and Rivers

Text for this section is not applicable to the Zion Station.

2.4.4 Potential Dam Failures, Seismically Induced

Text for this section is not applicable to the Zion Station.

2.4.5 Probable Maximum Surge and Seiche Flooding

2.4.5.1 Surge and Seiche Water Levels

A seiche may be caused by intense squall lines that move across the Southern Basin of Lake Michigan in a direction generally toward the southeastern quadrant. The accompanying pressure gradient and wind stress acting on the lake surface can produce an organized mid-lake disturbance which resembles a solitary wave. Upon arrival at the lake shore, this wave can create large changes of water level through the operation of shoaling effects. The highest surge (seiche) on the Chicago shore occurs at Montrose Harbor as the result of squall lines which have moved toward the southeast at about 55 knots. The surge travels with the squall line as it crosses the lake and thus, for the usual west to east motion, occurs on the eastern shore with the squall line, but must be reflected to reach the western shore. This means the west-shore seiche usually will occur at a time of meteorological quiet and thereby can catch people unaware unless they are alerted to the danger. Amplification of this discussion can be found in References 18 through 20. On June 26, 1954, the maximum recorded seiche occurred with a rise of eight feet at Montrose Harbor. The rise in level calculated to exist at Montrose Harbor and Zion under the conditions of June 26, 1954, is 6 feet and 2 feet, respectively. With the number of variables in such a calculation, the predicted value of 6 feet versus the observed value of 8 feet is considered a good correlation. The pertinent fact is the seiche at Zion will be less than any of Montrose Harbor by a factor of approximately one-half. This observation is supported by the "contours of amplitude" curves shown in Reference 19, published in the Monthly Weather Review, Vol. 93, Number 5, May 1965. These curves show the maximum seiche levels at Montrose Harbor and Zion are in a ratio of 8 to 5 under the worst conditions.

Therefore, the maximum seiche level that will occur at Zion, based on correlation to the June 26, 1954 Montrose Harbor seiche level, is considered to be five feet.

Using the Platzman Theory (Reference 18), the storm surge that could occur at the site was found to be 8.8 feet due to the passage of a squall line with a pressure jump of 0.21 inches Hg and a wind speed of 65 knots. This surge height is greater than the 5 foot seiche projected to occur based on the Montrose Harbor correlation. Adding this surge to the maximum monthly lake elevation of 583.24 feet above MSL results in a maximum water level of 592.05 feet above MSL. The surge height of 8.8 feet was based on an estimated deep water surge height of 2.92 feet with a shoaling factor of 3.0. The surge, in combination with waves in the height range of 1 to 2 feet, would result in overtopping of the crib house wall which extends to elevation 592.0 feet above MSL and would create water levels of 1 to 2 feet above plant grade (592.0 feet above MSL) for up to 20 minutes.

An analysis of wave runup on the crib house wall showed waves breaking 100 feet offshore will runup to elevation 594.2 feet above MSL, overtopping the wall at elevation 592 feet above MSL by some 2 feet. The analysis was based on the assumption of an equivalent slope from the point of breaking to the top of the wall, as suggested in "Shore Protection Planning and Design," Third Edition, 1966, p. 190. The depth at this point is 11 feet and the breaking wave height 8.6 feet. The runup above design highwater is 11.8 feet. Wave setup is estimated at 0.17 feet. The amount of water overtopping the wall will be less than 1 cubic foot per second per foot of width.

Table 2-16 identifies the location, elevation, and type of use of all exterior above ground accesses below El 600' above MSL.

2.4.5.2 Currents, Tides, Waves and Littoral Drift (References 21 and 22)

2.4.5.2.1 Wind Effects on Surface Currents

Surface currents in Lake Michigan are generated primarily by wind stress on the water surface. The lake's wind-driven currents have speeds averaging 1% to 2% of the wind speeds. Thus, an average wind speed of 15 mph over the lake would generate an average surface current of about 0.15 to 0.3 mph. Such currents may persist for several days after the wind has subsided. On large water surfaces, the wind-driven current is theoretically 45 degrees to the wind vector, due to the rotation of the earth. On the west side of Lake Michigan, the current is largely parallel to the shore and nearly 22 degrees to the right of the prevailing wind. Current velocities were measured three miles off the coast of Waukegan during July 1963 through June 1964 by the Great Lakes Illinois River Basin Study of the Federal Water Pollution Control Administration (see Reference 23). Measurements taken at a depth of 10 meters showed the flow to be from the south 60% of the time with greater than 40% of the current directions within 70 degrees centered on south.

Data on current speeds for the period July through November 1963 are representative of the entire period and are shown in Table 2-17.

Median current speed for the observed period is 9.2 cm/sec (0.3 ft/sec).

2.4.5.2.2 Wave Action Due to High Winds

The second phenomena is wave action due to local squalls and persistent high winds. Deep water wave heights in the general vicinity of the site due to storms, based on Corps of Engineers observations at Chicago and Milwaukee, can be expected to occur with a frequency as shown in Table 2-18.

Based on the deep-water wave heights in Table 2-18, the maximum elevation of wave runup and wind tide is estimated to be 6.7 feet above the normal water level (at an occurrence frequency of once in 500 years.) It is to be noted this 6.7-foot height is the maximum elevation at the shoreline.

Of the two phenomena, the seiche presents the greater hazard to the site. The deep-water wave will be quickly dissipated as it overruns the shore and is therefore of little consequence to structures located at some distance from the shoreline. However, the seiche-generated wave will comprise a much greater quantity of water, and the rise in level will endure for longer periods of time.

Waves are responsible for most of the littoral drift on Lake Michigan. The predominant drift appears to be to the north.

During much of the winter season, portions of the lake are covered with ice, and fetch areas are limited considerably. In addition, for a somewhat greater portion of the winter season, the coast area of the lake is covered with ice. Even though waves are generated in offshore areas, they never reach the shore, being interrupted by the ice around the rim of the lake. No account of this effect of the ice was taken in the compilation of the above data.

2.4.5.3 Protective Structures

Motor Control Centers (MCCs) located at the Auxiliary Building elevation 542' are protected by 4 ft. tall flood walls built around them.

The Crib House is protected by sheet pile wall up to El 592' above MSL at maximum high water El 583.24' above MSL. The maximum water depth at the wall will be 7 feet. The offshore bottom slope at the wall is approximately 1:45. All other Class I structures are protected by the Turbine Building.

LIST OF TABLES

3.8 DESIGN OF CATEGORY I STRUCTURES

3.8.1 Concrete Containment

3.8.1.1 Description of the Containment

The Reactor Containment completely encloses the entire reactor and Reactor Coolant System (RCS). It is a cylindrical concrete structure with a shallow domed roof and a flat foundation slab. The cylindrical portion is prestressed by a posttensioning system consisting of horizontal and vertical tendons (98 of these tendons have been evaluated for de-tensioning and removal to support the installation of the construction opening as part of the de-commissioning effort). The dome has a three-way posttensioning system. The foundation slab is conventionally reinforced with high-strength reinforcing steel. The entire structure is lined with one-quarter inch welded steel plate except for the construction opening area, where it has been removed, in support of decommissioning activities. The structure provides biological shielding for normal situations.

The Containment structure was designed and constructed in accordance with the Design Criteria shown in Section 3.8.1.4.1. These criteria are based upon American Concrete Institute (ACI) 318-63, ACI 301, and the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Sections III, VIII, and IX.

The selection and use of containment materials comply with the applicable codes and standards as stated hereinafter.

3.8.1.2 Loads and Load Combinations

3.8.1.2.1 Dead Loads

Dead load consists of the weight of the concrete wall, dome, base slab, and any internal concrete.

3.8.1.2.2 Live Loads

Live load consists of snow and ice loads on the dome and major components of equipment which are supported on the containment base slab. Equipment loads are assumed for design of internal slabs consistent with their intended use.

3.8.1.2.3 Hydraulic Uplift Forces

Uplift forces are created by the displacement of ground water by the structure.

3.8.1.2.4 Seismic Forces

A dynamic analysis is used to determine equivalent loads for design For seismic design provisions, see Section 3.7.

This analysis provided compression/tension, bending, and shear forces that are accounted for in the seismic design of the structure. Seismic rocking of the structure has been considered. Torsion in symmetrical buildings caused by wave propagation has not been considered.

3.8.1.2.5 Wind Loading and External Missiles

The forces due to wind (excluding tornadic wind) were calculated in accordance with the methods described in the American Society of Civil Engineers (ASCE) paper No. 3269 entitled "Wind Forces on Structures."

The Zion Containment structure was analyzed for tornado loading (not coincident with accident or earthquake) on the following basis:

1. Differential pressure between the inside and the outside of the Containment structure is 3 psi and a torsional moment resulting from the horizontal peripheral tangential velocity.

2. Lateral force caused by a "funnel" of wind having a peripheral tangential velocity of 300 mph and a forward progression of 60 mph. Shape factors from ASCE Paper No. 3269 were used. Gust factors and variation of wind velocity with height do not apply.

3. A tornado-driven missile equivalent to an airborne 8-inch-diameter by 12-foot-long piece of wood traveling on end at 225 mph.

3.8.1.3 Design and Analysis Procedures

3.8.1.3.1 General

A finite element computer program for individual loading cases of dead load, live load, wind, earthquake, temperature, and pressure analyzed the Containment.

The net moment, shear, and axial force on a cross section for any load combination were then obtained by algebraic addition of the effects under individual loading. The ACI-318-63 code design methods and allowable stresses were used for concrete and prestressed and non-prestressed reinforcing steel except as noted herein.

3.8.1.3.2 Computer Analysis Programs

3.8.1.3.2.1 General

The analysis of the Zion Containment vessel was performed utilizing plate and shell programs available from S&L Computer Divisions' program library. More than one validated computer program was used to obtain the design moments and forces and the results obtained showed agreement. The computer analyses provided equilibrium checks of internal forces and the external loads in every case. The checks indicated by ACI Committee 334 (Page 3) and the ACI Code 318-63, Section 2603 (a) have been fully met.

The analysis of the Containment Building performed for the de-tensioning of pre-stressing tendons utilized the plate and shell program PD-STRUDL.

Stresses and ultimate strength were investigated at service conditions and at all load stages that may be critical during the life of the structure from the time prestress is first applied. These stresses are listed in Table 3-4 for all critical load combinations envisaged. Time-dependent deformations due to creep and shrinkage induce compressive strain in the liner. Detailed analysis of creep and shrinkage at elevated temperatures showed that the maximum strain that may occur in the liner plate at the end of the life of the plant will be less than the permissible strain.

Storage racks are provided to hold spent fuel assemblies. Fuel assemblies are placed in vertical cells and contiguously grouped in parallel rows. The spent fuel storage racks are Seismic Class I equipment and will remain functional during and after a DBE. They are not anchored to the Spent Fuel Pool floor or walls, or structurally interconnected. Each rack module is provided with leveling pads which support the rack. The fuel rack structure is a folded metal plate assembly welded to a baseplate and supported on four legs. Center to center spacing of region 1 cells is 10.78" in the East-West direction and 10.54" in the North-South direction. Region 2 storage cells have a 9.144" center to center spacing in both directions. Additionally, the storage racks contain an amount of Boral which is a neutron absorber. This assures the necessary spacing between assemblies to prevent criticality, even if the pool was inadvertently filled with unborated water. Regions 1 and 2 of the spent fuel storage pool are shown in Figure 3-31. Control rod clusters are stored in the fuel assemblies. Fuel assemblies stored in the spent fuel pool must have no more than 57.4 grams U-235 per axial centimeter of fuel assembly length. Most abnormal storage conditions will not result in an increase in k_{eff}. However, it is possible to postulate events, such as the inadvertent misloading of a fuel assembly with a burn-up and enrichment combination outside of the acceptable area or dropping an assembly between the pool wall and the fuel racks, which could lead to an increase in reactivity. However, credit can be taken for the presence of approximately 500 ppm of boron in the pool water as is required when fuel is being moved in the Spent Fuel Pool by the plant Technical Specifications. The reduction in k_{eff} caused by the boron more than offsets the reactivity addition caused by these postulated events. A minimum boron concentration of 160 ppm is adequate to assure that the limiting k_{eff} of 0.95 is not exceeded.

The fuel assemblies are a canless type, with the basic assembly consisting of a rod cluster control guide thimble mechanically attached to grids and a top and bottom nozzle. Fuel rods are supported at several points along their length by spring-clip grids. There are three types of fuel assemblies that were used by Zion: Low Parasitic (LOPAR), Optimized Fuel Assemblies (OFA), and VANTAGE 5. The lengths of the assemblies are as follows: LOPAR length is 159.710", OFA length is 159.765", VANTAGE 5 length is 159.975". The maximum height of a fuel assembly stored in the spent fuel pool, based on the spent fuel rack design, is at the 589' 11.725" elevation. The fuel rods are cold worked, partially annealed Zircaloy tubes containing slightly enriched uranium pellets. Rod cluster control assemblies (RCCAs), secondary sources, thimble plugs, and burnable absorber rods, if required, were inserted into the guide thimbles of the fuel assemblies. The absorber sections of the control rods were fabricated of a silver-indium-cadmium alloy sealed in stainless steel tubes. The material in the discrete burnable absorber rods is in the form of an aluminum oxide-boron carbide annulus sealed in Zircaloy called a Wet Annular Burnable Absorber (WABA). As of August 12, 1998, there are 2226 spent fuel assemblies stored in the spent fuel pool.

The inventory of spent fuel assemblies at Zion includes 1454 Westinghouse 15x15 assemblies that have been identified as susceptible to inter-granular stress corrosion cracking (IGSCC) in the bulge joint region of the guide tubes just below the top nozzle plate. An instrument tube tie rod (ITTR) was installed into 1451 of these Zion fuel assemblies to resolve the issue of potential top nozzle separation when the IGSCC-affected assembly is lifted or moved in the spent fuel pool. Each ITTR was inserted through a machined hole in the top nozzle into the central instrument tube until the tip extended and engaged below the bottom nozzle plate. Guide tube anchors were used to repair the remaining three assemblies, namely C63P, C64P and C62R. Six sleeved anchors were installed into preselected guide tubes of each assembly and expanded to grip the potentially defective sections just below the top nozzle. After guide tube anchor and ITTR installation, normal fuel handling procedures using conventional tools can engage the fuel assembly top nozzle to lift and move the IGSCC-susceptible fuel assemblies.

A new fuel elevator is located in the pool that was used to transfer new fuel assemblies into the pool for subsequent handling with the spent fuel pool handling crane. The elevator is equipped with alarms to inform the operator of any malfunction of the elevator during movement of new fuel. To prevent the inadvertent lifting of irradiated fuel, the new fuel elevator is key interlocked to prohibit raising when the elevator is loaded with greater than 1400 lbs. Raising of the elevator when loaded with a fuel element activates an audible alarm.

3.10.2 Service Water System

3.10.2.1 Design Basis

The Service Water System supplies the equipment cooling water for the plant with the exception of the Fuel Building. The arrangement of the equipment and the flow path of the water is shown on Figure 3-40. Two pumps feed a common discharge header.

3.10.2.2 System Description

The two service water pumps are rated at 3,400 gpm at 240 feet TBH. The pumps are located in the Crib House and take their suction from the Crib House forebay which receives water from the lake through three, 13-foot steel intake lines. Two of the intake lines have 24-foot diameter bell-shaped inlets and are covered by a flat protective canopy. The third intake line receives water through an annular structure with 55 openings separated by as much as 96 feet. It is extremely improbable that any single barge or ship on Lake Michigan could block all of the circulating water intake structure. Any two of the openings in the annular intake structure which supplies one 13-foot intake line, or a small fraction of one of the two 24-foot diameter bell-shaped inlets, each of which supply one 13-foot intake line, would be adequate to provide full service water flow for both Unit 1 and Unit 2. In the event that all three intake lines are blocked, water can be admitted to the forebay through one discharge line and its recirculation connection to the forebay.

The discharge of the service water pumps passes through two 40,000 gpm strainers with $^{1}/_{8}$-inch openings to a common header. The main supply headers connect to this common discharge header. The main headers pass under the Turbine Building after leaving the Crib House and enter the Auxiliary Building where the cooling water loops are supplied.

Service Water is taken from the discharge of the service water pumps, treated by an electrolytic dissolution of both copper and aluminum and returned to the Service Water system upstream of the Service Water pumps into the intake bays. The copper and aluminum will control the Zebra Mussel population by reducing their ability to attach to substrate and by inhibiting settlement of the Zebra larvae.

The normal water supply to the Fire Protection System is provided by the service water pumps.

Isolation valves are provided in the loops and are provided in each of the feeds to individual coolers.

The system pressure is maintained at approximately 90 to 138 psig in the main supply header and a pump may be aligned to start when pressure drops in the main header.

The maximum service water flow required to meet the cooling needs in the permanently defueled condition is 1,600 gpm. However, for turbine fire sump dilution reasons the minimum service water flow is to be established at 2500 gpm. This is verified by pump discharge pressure. A single service water pump is capable of delivering at least 3,400 gpm. Therefore, one service water pump is capable of supplying sufficient cooling water.

Detection of leakage which might affect system operation is provided by means of installed pressure, temperature, and flow instrumentation and by level in the Auxiliary Building sumps. This instrumentation also aids in identifying flow restrictions.

The Auxiliary Building is provided with water detectors in collecting sumps which will alarm in the event of water accumulation from a piping or valve leak. The operator, upon receiving this alarm, goes to the area of the alarmed sump to determine the nature and location of the leakage and will operate the appropriate valves to isolate the affected area.

3.10.2.3 Design Features Important to the Defueled Condition

- The Service Water System is not associated with the maintenance of stored nuclear fuel in a safe condition. As such, this system is not considered ITDC.

3.10.3.1.4 Design Features Important to the Defueled Condition

The Control Room Ventilation System was designed to handle a loss of coolant accident. Therefore, it is sufficiently designed to accommodate the significantly reduced source term in the permanently defueled condition. The consequences of the accidents in the defueled condition are significantly below the 10CFR100 guidelines. In addition, no credit for control room ventilation isolation is taken in the safety analysis since the dose consequences to control room inhabitants is significantly low without ventilation isolation. In the event of evacuation, cooling of the stored irradiated fuel in the spent fuel pool can be monitored locally.

The Control Room Ventilation System is not considered ITDC.

3.10.3.2 Auxiliary Building Ventilation

3.10.3.2.1 Design Bases

The Auxiliary Building Ventilation system is designed to maintain acceptable ambient air conditions for personnel habitability, and provides a bulk exhaust flow for ease of effluent sampling.

3.10.3.2.2 Normal Operation

The Auxiliary Building Ventilation system supplies filtered, conditioned outside air to the general areas of the Auxiliary Building and Fuel Building and exhausts filtered air back to the outside. The exhaust fans draw filtered air from the common exhaust plenum and discharges air to the Auxiliary Building vent stack past a radiation sampling monitor. The exhaust system can operate to maintain the pressure gradients by vortex control dampers and the operation of one or more exhaust fans. Individual filter units treat the exhaust from miscellaneous areas of the Auxiliary Building prior to discharge via the main exhaust fans. See figures 3-41 and 3-42.

Each supply and exhaust fan may be manually started and stopped from the Control Room. System variables pertaining to normal operation are indicated on the main control room panel. Abnormal conditions, such as high temperature, low temperature, low building differential pressure, and high pressure drop across filters are annunciated either locally or on the main control room panel.

During periods of very cold weather, the Auxiliary Building Ventilation system may be secured to prevent freezing conditions in the Auxiliary Building. With no exhaust airflow through the vent stack, the ODCM requirements and Radiation Protection Procedures for radioactivity sampling will be followed to ensure appropriate quantification of effluent releases.

3.10.3.2.3 Design Features Important to the Defueled Condition

Neither the Fuel Handling Accident in the Fuel Building nor the Radioactive Waste Handling Event credit ventilation or filtration to prevent or mitigate the consequences of the accidents (see Chapter 5). The main function of the Auxiliary Building Ventilation System is to facilitate sampling and analyses of gaseous effluents. The components Important to the Defueled Condition required to ensure these functions are met are:

- Auxiliary Building Ventilation system supply and exhaust fans (as required)
- Auxiliary Building Ventilation system exhaust fan inlet vortex dampers (as required)
- Auxiliary Building Ventilation system exhaust HEPA filter banks
- Auxiliary Building Vent Stack effluent monitor (see Chapter 4)

3.10.3.3 Containment Purge

3.10.3.3.1 Design Bases

The Containment Purge system is designed to maintain acceptable environmental conditions in the Containment Buildings for personnel and to control the release of radioactivity from the Containment in the event of high Containment activity.

3.10.3.3.2 Normal Operation

The Containment Purge System, consists of supply fans, exhaust fans, and associated dampers. The supply fans can supply filtered, conditioned air to the Containment, and the exhaust fans exhaust filtered air back outside via the vent stack.

The supply and exhaust lines for the Containment Purge system each pass through a manually operated butterfly valve that can be closed when the associated fan is not running. A debris screen is installed in the opening of the supply and exhaust line to prohibit foreign material from entering the line and preventing the butterfly valves from closing. The exhaust air passes through a HEPA filter bank. In the event of high airborne radioactivity inside the containment, the associated vent stack Air Monitor will alarm and the Purge fans can be manually stopped.

The vacuum and pressure relief line penetrating the containment is isolated by the normally closed butterfly valves.

See figures 3-43 and 3-44.

3.10.3.3.3 Design Features Important to the Defueled Condition

The Containment Purge system is associated with effluent monitoring in conjunction with the associated vent stack Air Monitor, and with personnel comfort and habitability. The features deemed Important to the Defueled Condition for these functions during operation are:

- Containment Purge supply and exhaust isolation valves 1(2)AOV-RV0002 & RV0004
- Vacuum and Pressure Relief line isolation valve 1(2)AOV-RV0006
- Debris screens
- Purge exhaust HEPA filter bank

3.10.3.4 Auxiliary Ventilation Systems

The auxiliary ventilation systems are those ventilation systems that are operated to facilitate the general maintenance of the facility and whose function is deemed not to be ITDC. These ventilation systems circulate air for personnel comfort in the summer months, and in conjunction with the heating system, provide freeze protection in the winter months. Without the auxiliary ventilation systems in service, these same functions could be performed using portable fans and heaters. The auxiliary ventilation systems are comprised of the following:

- Main Turbine Building Ventilation System,
- Crib House Ventilation System,
- Portions of the Containment Ventilation System (not described as ITDC in section 3.10.3.3),
- Portions of the Auxiliary Building Ventilation System (not described as ITDC in section 3.10.3.2),
- Computer and Miscellaneous Equipment Room Ventilation System, and
- Diesel Generator Building Ventilation Systems.

3.10.4 Fire Protection System

Zion Station utilizes the defense-in-depth concept, placing special emphasis on detection and suppression in order to minimize radiological releases to the environment. This system is, therefore, considered Important to the Defueled Condition. A detailed description of the plant's Fire Protection System is contained in the Fire Protection Report.

3.10.5 Operating Control Stations

3.10.5.1 General Layout

The operating control stations consist of the Main Control Room for centralized control of the facility during defueled operations; and local stations for normal operation of the Radioactive Waste System and miscellaneous noncritical systems.

3.10.5.2 Design Basis

3.10.5.2.1 Control Room Design

The facility is equipped with a Control Room which contains controls and instrumentation for centralized operation of select plant equipment.

The main control panels for the facility are totally enclosed walk-in panels, which are located in the Main Control Room. The front portion of each main panel is a duplex bench board which contains the operating controls. The rear portion consists of instrument racks containing power supplies, amplifiers, relays, etc., for the radiation monitoring and miscellaneous facility control systems. Heating, Ventilating, and Air Conditioning controls are on a vertical panel near the center of the Main Control Room. A separate general services panel, also located near the center of the Main Control Room, contains controls for the Fire Protection System.

3.10.5.2.2 Annunciator and Audible Alarm System

A visual annunciator system with audible signals is provided to alert the operator to off-normal conditions requiring corrective action. Audible alarms will be sounded in appropriate areas throughout the facility if high radiation conditions are present.

3.10.5.2.3 Radwaste System Control Panels

The liquid and solid radwaste control panels are located in the Auxiliary Building. These panels contain all the controls and instruments to control and monitor the Radioactive Liquid and Solid Waste Disposal Systems.

3.11 Electrical Systems

3.11.1 Design Basis

The Electrical Power System to the station is designed to distribute electrical power to structures, systems, and components (SSCs) important to the defueled condition (ITDC) and other SSCs that support other activities that may be conducted at Zion Station.

3.11.2 System Description

3.11.2.1 Offsite Power System

The station auxiliary power is fed from a single 34 KV commercial electrical distribution system. The 34 KV system supplies power to three 34 KV to 4 KV step down transformers. These transformers provide normal power supply to the station support systems. The 4 KV Power Distribution Centers (PDC) are located outside the turbine building inside self contained enclosures.

In addition, there are two independent 12-kV feeds from the commercial electrical distribution system. They supply two 12-kV to 480V step down Spent Fuel Nuclear Island (SFNI) transformers. These transformers provide the normal power supplies to the spent fuel pool support systems. The switchgear buses are located in the fuel building. Each independent line can supply power to the SFNI transformers.

3.11.2.2 Onsite Power System

3.11.2.2.1 AC Power Systems

The Auxiliary Power System provides a reliable source of power to structures, systems, and components (SSCs) important to the defueled condition (ITDC) and other SSCs that support other activities that may be conducted at Zion Station.

The basic arrangement of the plant electrical system is shown on the Single Line Diagram, Figure 3-46 for Unit 1 and Figure 3-47 for Unit 2.

Auxiliary power at 4160 V is provided by the auxiliary transformers (0, 1 and 2). The auxiliary power transformers are rated at 6.25MVA (force air rating).

3.11.2.2.1.1 4160-V System

Power from the auxiliary transformers is distributed at three main 4160-V switch-groups (PDC 1, 1 and 2). PDC 0, 1 and 2 in turn feed the 480-V unit substations.

Plant auxiliaries which have large power requirements, such as the Electric Water Heating system will be fed directly from 4160-V PDC bus.

3.11.2.2.1.2 480-V System

The smaller plant auxiliaries are supplied from the 480-V unit substations which in turn derive their power from the main 4160-V PDC buses.

The 480-V unit substation transformers are rated 1500 kVA, 4160 V, delta 480/277 V, wye, 3-phase. The 480-V switchgear is the draw-out type.

Motor control centers are fed from the 480-V unit substation load breakers and are strategically located throughout the Station. There are no motor control centers located within the Reactor Containment Building. The 480-V motor control centers are equipped with thermal magnetic circuit breakers for nonmotor loads and magnetic breakers and starters with thermal overload protection for the motor loads.

480-V power is supplied to the spent fuel pool support systems from the two 480-V SFNI switchgear buses located in the fuel building. The 12-kV/480-V transformers are each rated at 500-kVA, 480-V, wye, 3 phase.

The 480-V switchgear and motor control centers are metal-enclosed. They are provided with grounding and have the mechanical safeguards necessary to assure personnel protection and prevent or limit equipment damage during system fault or overload conditions.

3.11.2.2.1.3 120-Vac Instrument and Control Power System

The general instrumentation and control power at 120 Vac can be obtained from instrument inverters or 480- to 120-Vac, dry-type transformers and associated circuit breaker distribution panels which are an integral part of the 480-V system motor control centers. Motor starter control power is obtained from individual control power transformers associated with each motor control center motor starter.

3.11.2.2.1.4 Cable Derating

The allowable current carrying capacities (ampacities) for the various power cables and control cables (where applicable) were computed using Reference 11 such that the specific ampacity for each size cable was determined by applying the appropriate derating factor (0.6 for 25-42 conductors) from Table VIII, in accordance with note 3 (page V), to the ampacity of the identical cable in isolated conduit in air (as shown on pages 264 and 313), thus obtaining the ampacity for cables in solid metal trays without maintaining spacing.

3.11.2.2.1.6 Reliability of Power Supplies

Power to all ITDC related 4160 Vac and 480 Vac equipment is from the following sources:

1. a) A normal source from the auxiliary transformer via PDCs 0, 1 and 2

   b) 480-V SFNI switchgear buses 1 and 2 for spent fuel pool support systems.

2. a) A bus crosstie is provided between SFNI switchgear bus 1 and 2 to allow either bus to supply the spent fuel pool support systems.

3. a) An emergency hookup connection to allow for a temporary power supply to feed the SFNI buses.

No electrical or mechanical interlocks are available for the SFNI and PDCs feed breakers. These breakers are controlled by operating procedures.

3.11.2.2.2 DC Power Systems

3.11.2.2.2.1 125-Vdc Power System

Each unit is provided with two sources of 125-Vdc power (each with its own battery, battery charger and distribution bus), plus a fifth physically separate and electrically isolated source of 125-Vdc power. Figure 3-48 shows (in one-line form) that this fifth 125-Vdc source (Battery 011) supplies dc power to two 125-Vdc distribution buses (011-1 for division 17 Unit 1 loads and 011-2 for division 27 Unit 2 loads).

The five batteries are each housed in separately ventilated rooms within the Auxiliary Building and are provided with reinforced battery racks. Separate ventilating (exhaust) ducts are provided for each Battery Room (111, 112, 211, and 212). Each duct rises more than 10 feet vertically (and independently) above the battery room ceiling (a path distance of at least 20 feet between the Battery Rooms) where they join a common duct to the suction plenum for two full-capacity redundant exhaust fans. Thus adequate ventilation is provided for each Battery Room at all times. The ventilation of Battery Room 011 is accomplished via independent ducts and exhaust fans. The battery room ventilation is supplied from the Computer and Miscellaneous Equipment Room Ventilation (OV) system. This ventilation feature is not considered important to the defueled condition since portable fans and heaters can perform the heating and cooling functions and can also keep the hydrogen gas produced by the batteries below explosive limits.

The DC System is seismically qualified for the Design Basis Earthquake (DBE). The qualification reports for the battery cells, racks, chargers, and the dc distribution panels and cabinets are contained in References 4 through 10, respectively.

The DC System at Zion is designed to allow the cross-tying of dc buses between units. The tie between buses 111 and 211, buses 112 and 212 (dc buses for Unit 1 and Unit 2), and buses 111 to 011-2, battery 011, 011-1 to 211, are each provided with two normally open, manually operated air circuit breakers mechanically interlocked with a key lock.

During normal operation, the batteries are kept fully charged by the battery chargers.

The five batteries and associated distribution panels supply the 125-Vdc control power to the switchgear as shown in Table 3-15.

125-Vdc power for the SFNI breaker control functions is provided from a rectifier that is part of the SFNI electrical system.

125-Vdc power for the PDCs breaker control functions is provided from a rectifier that is part of the 34 KV/4 KV system. There are batteries associated with the PDCs which provide backup 125-Vdc for the breaker control functions.

3.11.2.3 Design Features Important to the Defueled Condition

Electrical equipment necessary to perform the following functions is regarded as Important to the Defueled Condition:

1. Adequate offsite power from the 34 KV system to supply the Auxiliary Transformers (Transformer 0, 1 and 2) and one SFNI transformer. Adequate 4160-V, 480-V, and 120 Vac distribution bus equipment for the following reasons:

   a. Provide power to the Fuel Handling system as discussed in section 3.9.3
   b. Provide power to the Spent Fuel Pool Cooling system as discussed in section 3.9.4
   c. Provide power to the Spent Fuel Pool Secondary Loop Cooling system as discussed in section 3.10.1.
   d. Provide power to the Auxiliary Building Ventilation system as discussed in section 3.10.3.2
   e. Provide power to the Containment Purge system equipment as discussed in section 3.10.3.3
   f. Provide power to the Liquid Radwaste system equipment as discussed in section 4.5.2
   g. Provide power to the Solid Radwaste system equipment as discussed in section 4.5.3
   h. Provide power to the Process Radiation Monitoring equipment as discussed in section 4.6.2
   i. Provide power to the Area Radiation Monitoring equipment as discussed in section 4.6.3

   Note: 480 V to 120 V inverters, to supply instrument power as discussed in section 3.11.2.2.1.3, are not considered ITDC.

3.11.3 Fire Protection for Cable Systems

The Zion Station Fire Protection Report provides fire protection information and the effect of postulated fires on plant cable systems.

3.12 References, Section 3.0

1. Spent Fuel Pool Modification for Increased Storage Capacity, Revision 0, dated November 15, 1991

2. Zion Station Calculation No. 22S-0-110S-0060, "Evaluation of the Zion Spent Fuel Pool for an Accident Temperature of 212 Degrees F."

3. November 18, 1996 ComEd Response to NRC Final Report on Spent Fuel Storage Pool Safety Issues.

4. Gould Co. Calculation SO 7-0432124-EQ dated 1-8-71

5. Power Conversion Inc. letter dated 5-25-71 and Gaynes Testing Lab report on Job #7115, dated 3-11-71.

6. General Electric Co. letter dated 2-26-71.

7. General Electric Co. Report #70ICS101, dated 2-18-71.

8. Gould Co. Calculation SO 7-043123-EQS, dated 1-8-71.

9. Gould Co. letter dated June 14, 1971 summarizing results of test performed by TII Testing Lab, Inc., College Point, NY.

10. Gaynes Testing Lab Report #71448A dated November 9, 1971.

11. AIEE/IPCEA Power Cable Ampacities, Volume I – Copper Conductors, (AIEE Publication No. S-135-1, IPCEA Publication No. P-46-426) – 1962.

TABLE 3-14

DELETED

TABLE 3-15

AC AND DC POWER DATA

Unit	Battery Number	Distribution Panel No.	4160 V Swgr Buses	480 V Swgr Buses	Division Number
1	111	111		138	18
1	112	112		139	19
1	011	011-1		137	17
2	011	011-2		237	27
2	211	211		238	28
2	212	212		239	29
			PDC 0		
			PDC 1		
			PDC 2		

Each PDC has its own 125 VDC power supply.

4.5.3.2.4 Processing of Dry Active Waste

All DAW is segregated for waste type.

Compressible wastes may be compacted to reduce volume. A hydraulic drum compactor is located adjacent to the decontamination pad at the north end of the Auxiliary Building, El 592'. The compactor is operated locally and exhaust air is vented through HEPA filters, or containers are shipped offsite for further volume reduction and then burial. Some containers may be sent directly to burial.

Non-compressible wastes are packaged in shipping containers. Containers are visually inspected for structural integrity prior to packaging for shipment. Because of the low activity, DAW can be stored until enough is accumulated to permit: 1) economical transportation to an offsite burial ground for final disposal, or 2) transportation to an offsite facility for further volume reduction.

4.5.3.2.5 Waste Storage

Storage of all containers of waste in final form is either in the Drumming or Shipping Rooms, El 592'. Liners and packaged radwaste material may be stored in the Interim Radwaste Storage Facility (IRSF) which is considered ITDC. Additional storage for DAW is provided outside.

4.6 Radiation Monitoring Systems

4.6.1 Design Bases

The Radiation Monitoring System is designed to detect, compute, indicate, annunciate and record the radiation levels at selected locations in the plant. The system is divided into the following subsystems:

1. The process radiation monitoring system, which includes the effluent monitors, is designed to provide early warning of increasing radiation activity due to a malfunction of plant equipment, and to monitor radioactive discharges to the environment to ensure concentrations do not exceed specified limits.

2. The area radiation monitoring system is designed to alert personnel of increasing radiation activity in the fuel building that might result in a radiation health hazard or indicate a degradation of fuel rod integrity.

4.6.2.1.1 DELETED

4.6.2.1.1.1 Containment Purge System Effluent Monitoring

Unit 1 Containment Purge Exhaust is monitored for radiation by the Unit 1 Auxiliary Building vent stack particulate Air Monitor.

Unit 2 Containment Purge Exhaust is monitored for radiation by the Unit 2 Auxiliary Building vent stack SPING Air Monitor.

4.6.2.1.1.2 Auxiliary Building Vent Stack SPING Air Monitor

The Unit 1 AB Vent Stack has been permanently isolated from the AB Ventilation System. When the Unit 1 Containment Purge system is in operation, effluent is continuously monitored for beta particulate by the Unit 1 Vent Stack air monitor. The monitor outputs alarm conditions and abnormal instrument status to the Guard-It system.

The Unit 2 AB Vent Stack SPING continuously monitors the Unit 2 vent stack effluent for beta particulate and noble gas. The monitor outputs data and alarms to the SPING central control console.

This monitor also outputs low flow and flow irregularity alarms to the control console.

This Air Monitors have no self-contained pump to induce a sample flow through the monitors. The sample is fed to the monitors by the Isokinetic Sampling System at a flow rate of up to approximately 2 cfm. The purpose of this system is to regulate the sample flow to accurately duplicate stack gas velocity and pressure to the vent stack Air Monitors. This allows a valid indication of the particulate content of the vent stack effluent.

4.6.2.1.1.3 Fuel Building Exhaust Air Monitor

The Fuel Building Ventilation exhaust is monitored via the Auxiliary Building ventilation stack effluent monitors.

4.6.2.1.2 Liquid Radiation Monitors

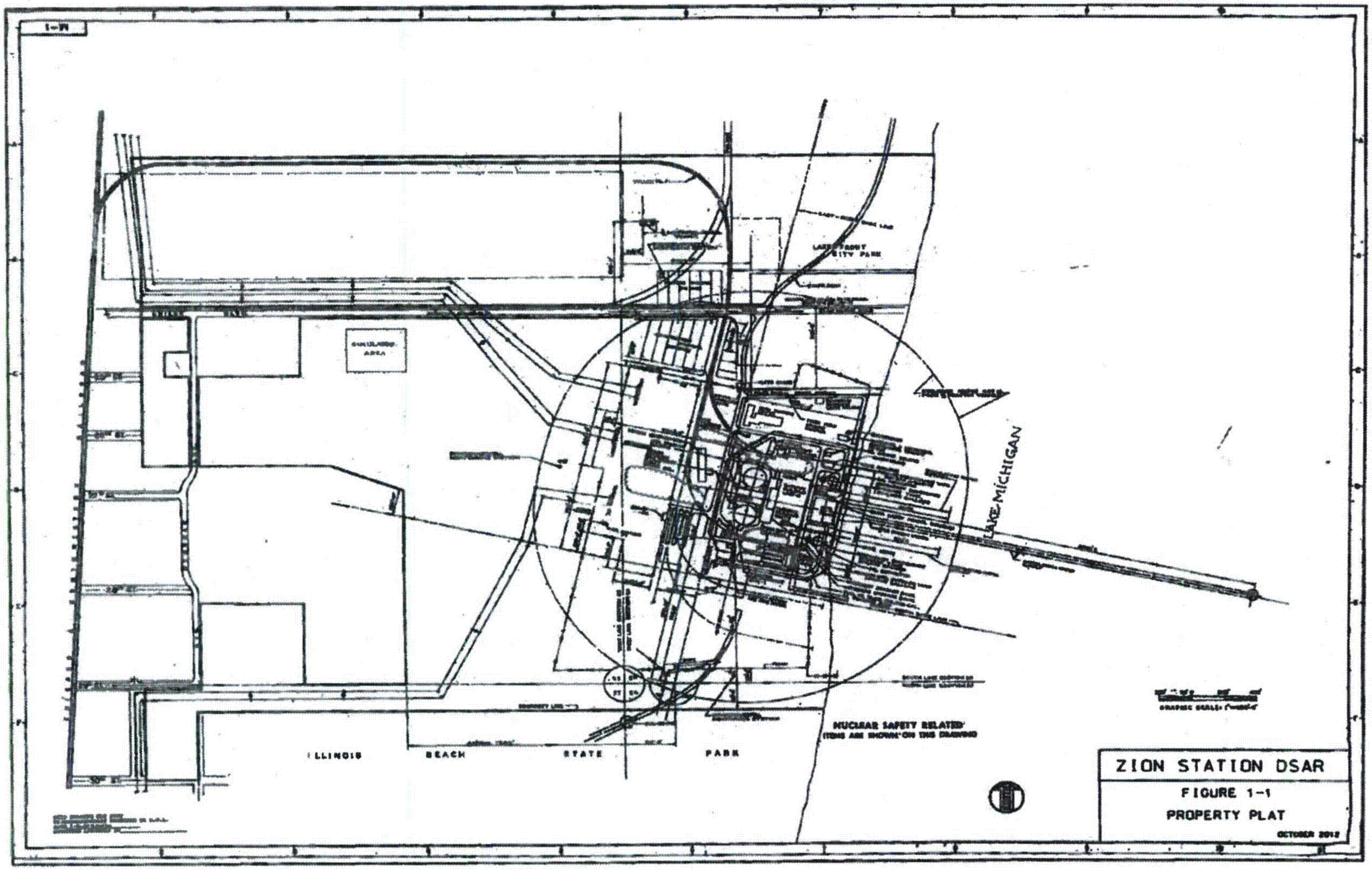
The liquid radiation monitors are a set of self-contained monitors used to measure radioactivity levels in liquid process and effluent streams. Table 4-3 provides a list of these monitors and identifies their tag numbers and sensitivities.

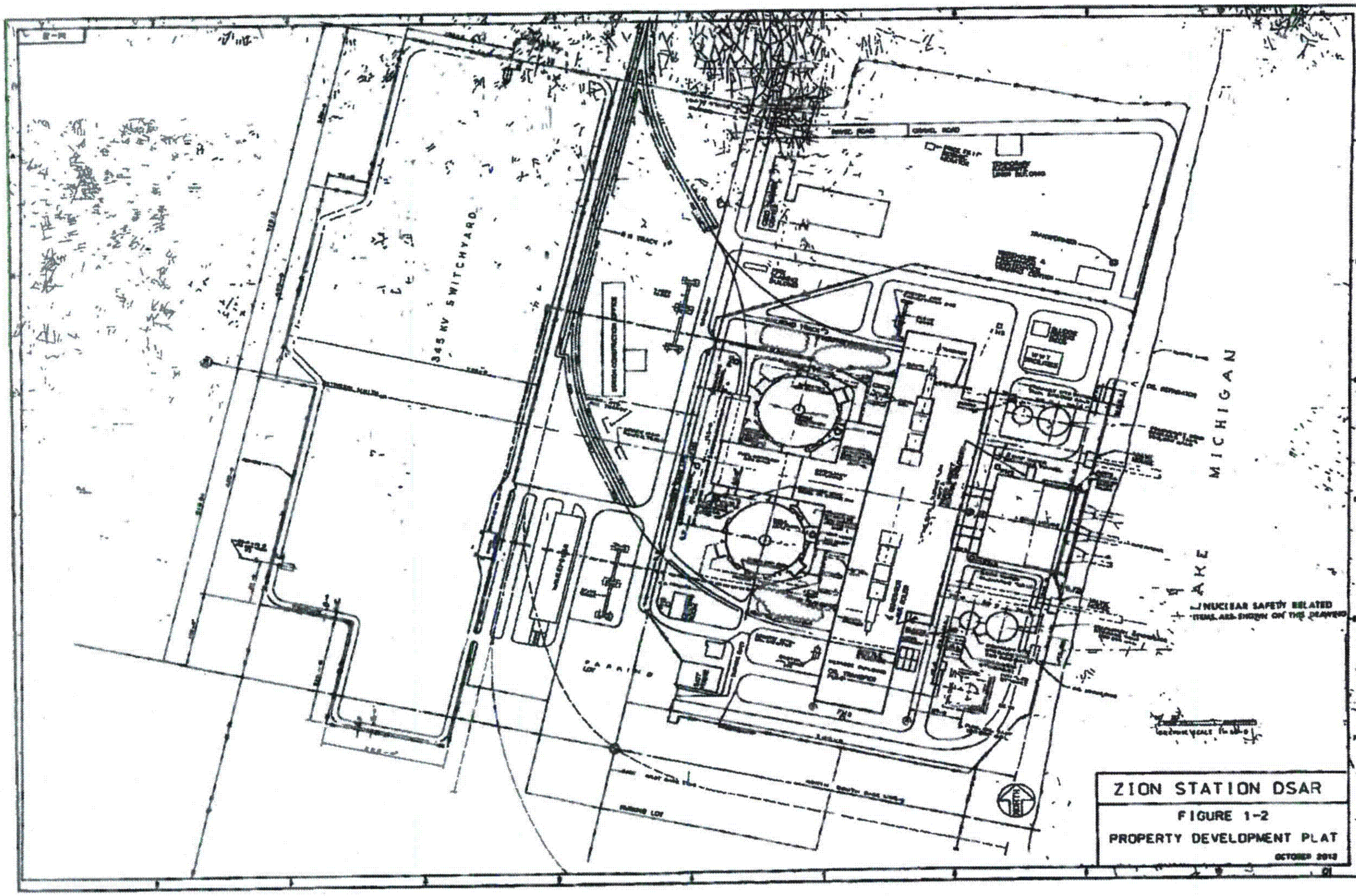
Detector outputs are transmitted to the Radiation Monitoring System cabinets in the Control Room. The radioactivity levels are indicated by the module meters and recorded on paper. High radioactivity-alarm indications are displayed on the Radiation Monitoring System cabinets.

TABLE 4-3
PROCESS RADIATION MONITORS

SERVICE	MONITOR NO.	INSTRUMENT CHANNEL	DETECTOR TYPE	SENSITIVITY	ISOTOPE (1)
Unit 1 Vent Stack	1RIA-PR49	Particulate	Beta Proportional	3.99 E 5 cpm/µCi	Sr-90
Unit 2 Auxiliary Building Vent Stack	2RIA-PR49	Particulate	Beta Scintillation	1.09 E 5 cpm/µCi	Sr-90/Y-90
		Low Range Noble Gas	Beta Scintillation	5.0 E-7 to 1.0 E-2 µCi/cc	Kr-85
Fire Sump Discharge	0RT-PR25		Scintillation	9.0 E-7 to 8.0 E-2 µCi/ml	Cs-137
Waste Disposal System Lake Discharge Effluent	0RT-PR05		Scintillation	1.0 E-7 to 5.0 E-3 µCi/ml	Cs-137

(1) Sensitivity Ranges are based on these isotope


LAKE MICHIGAN
NUCLEAR SAFETY RELATED
ILLINOIS BEACH STATE PARK
ZION STATION DSAR
FIGURE 1-1
PROPERTY PLAT
OCTOBER 2012

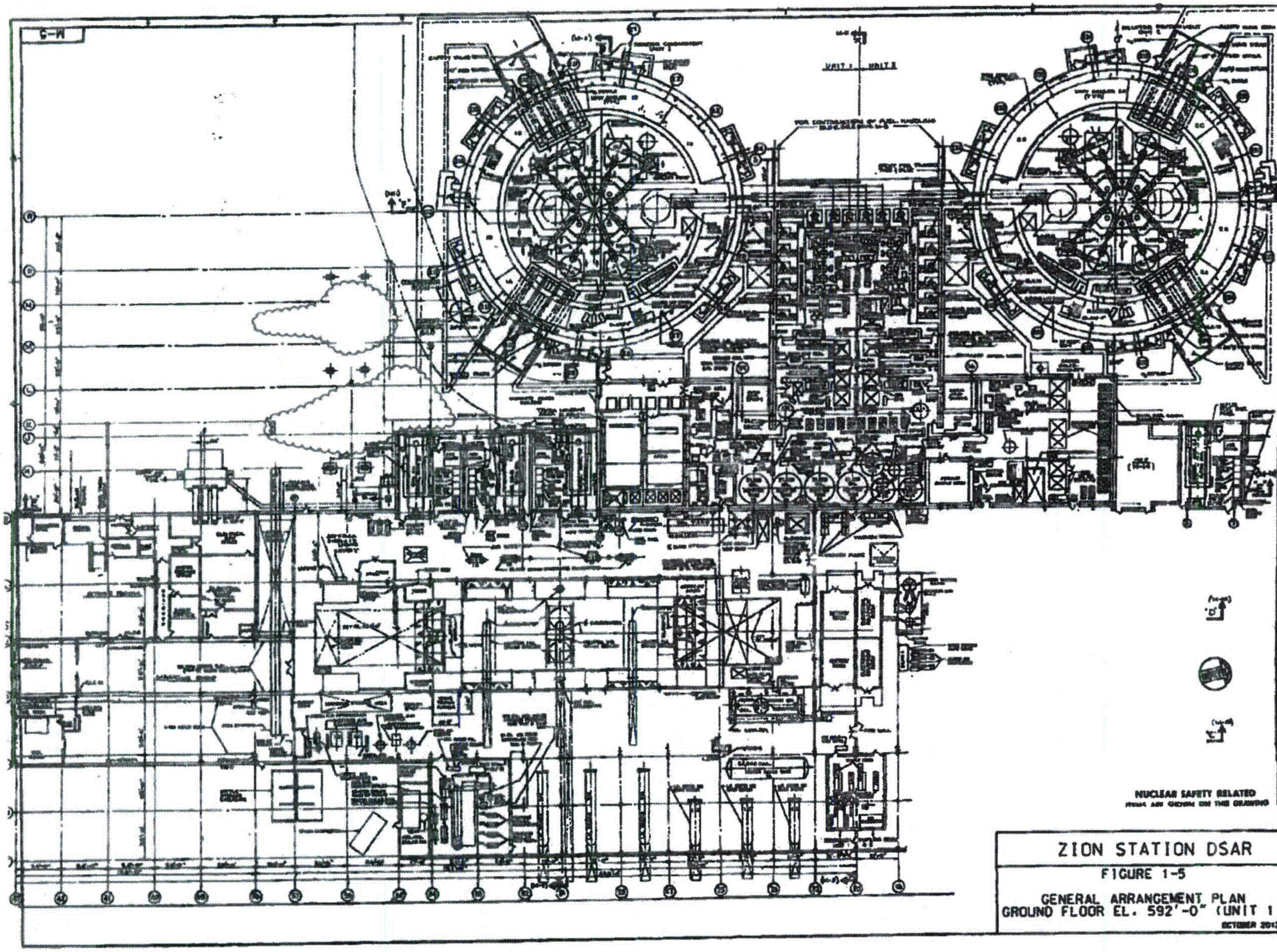


ZION STATION DSAR

FIGURE 1-2

PROPERTY DEVELOPMENT PLAT

OCTOBER 2012

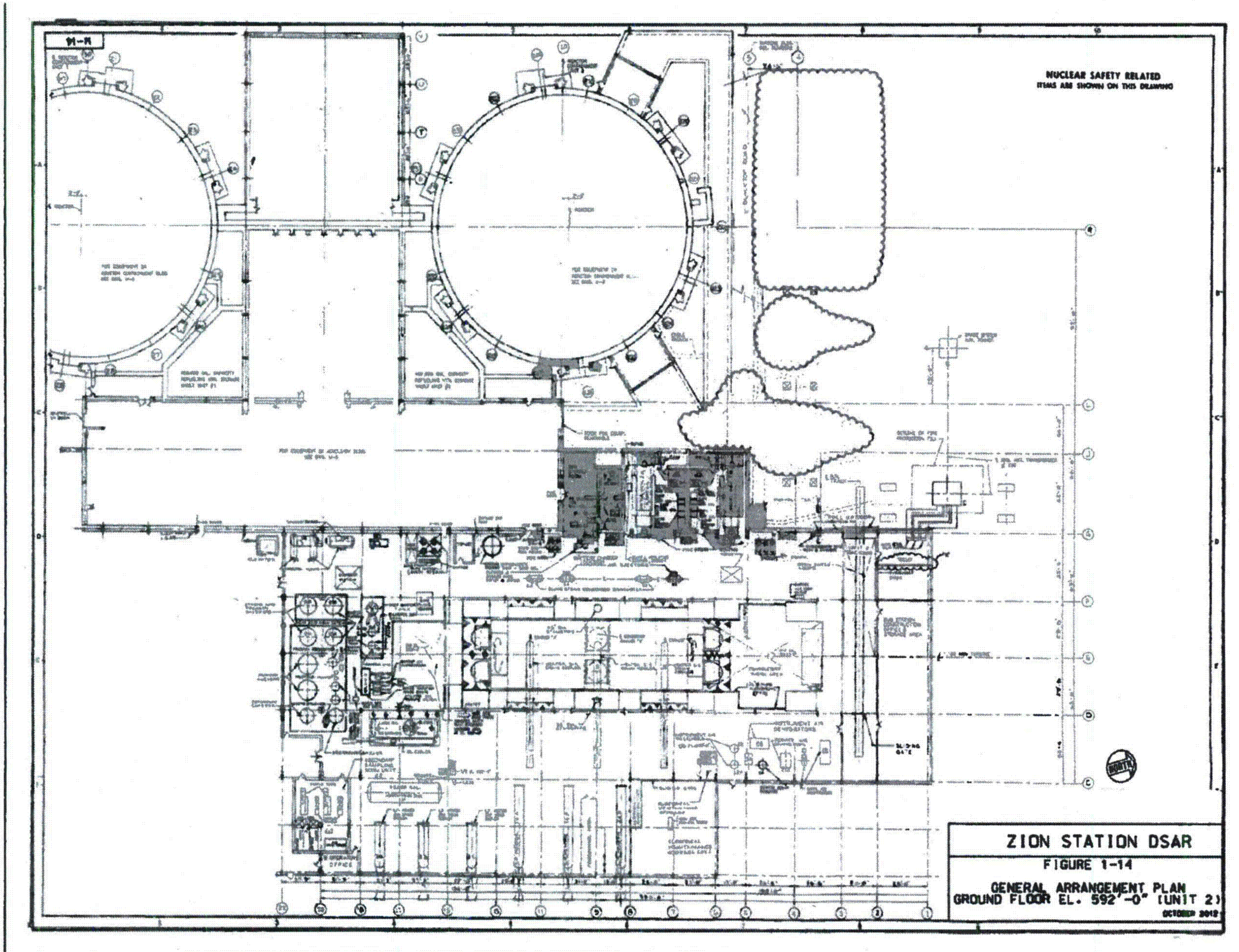


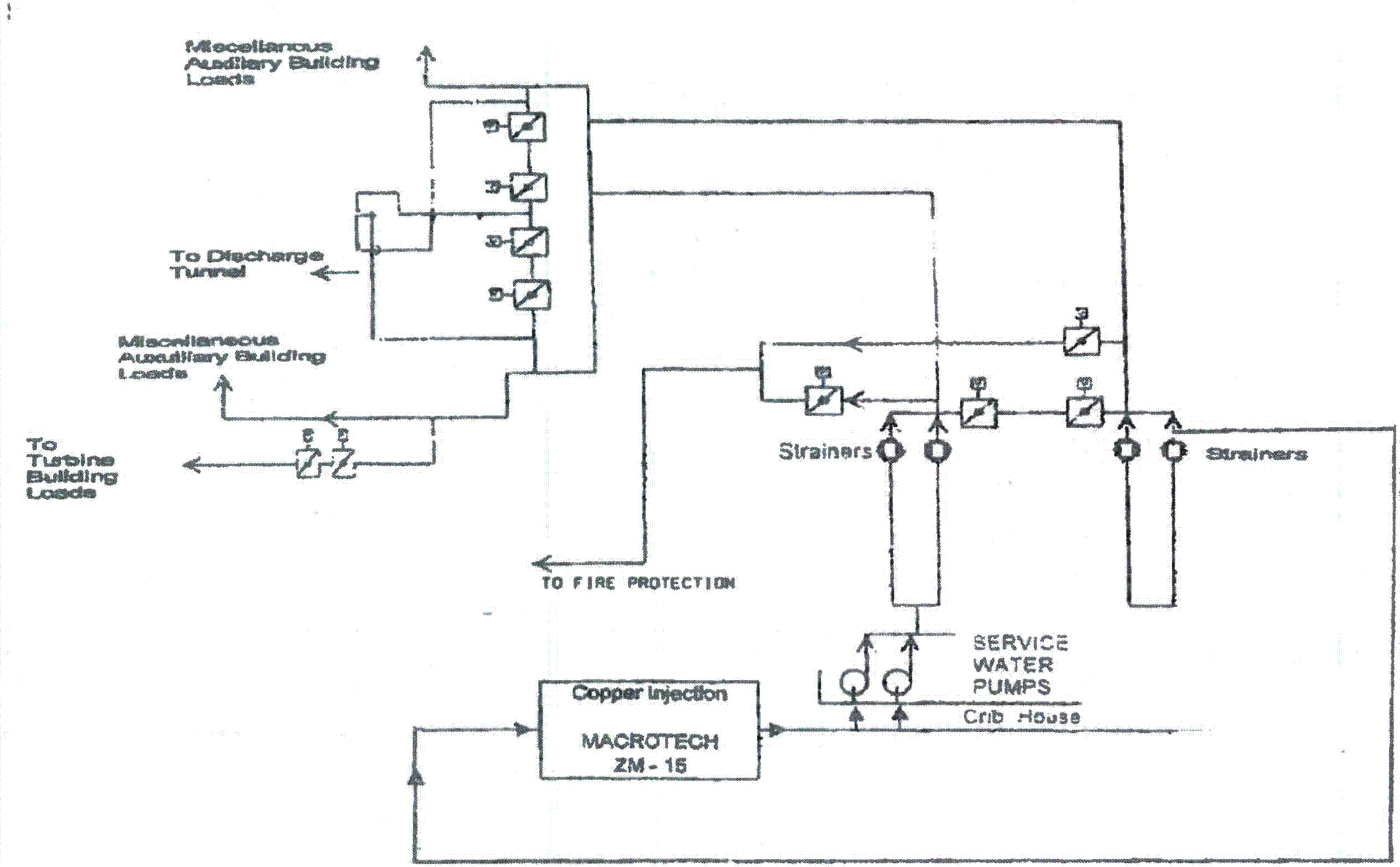
ZION STATION DSAR

FIGURE 1-5

GENERAL ARRANGEMENT PLAN
GROUND FLOOR EL. 592'-0" (UNIT 1)

OCTOBER 2012

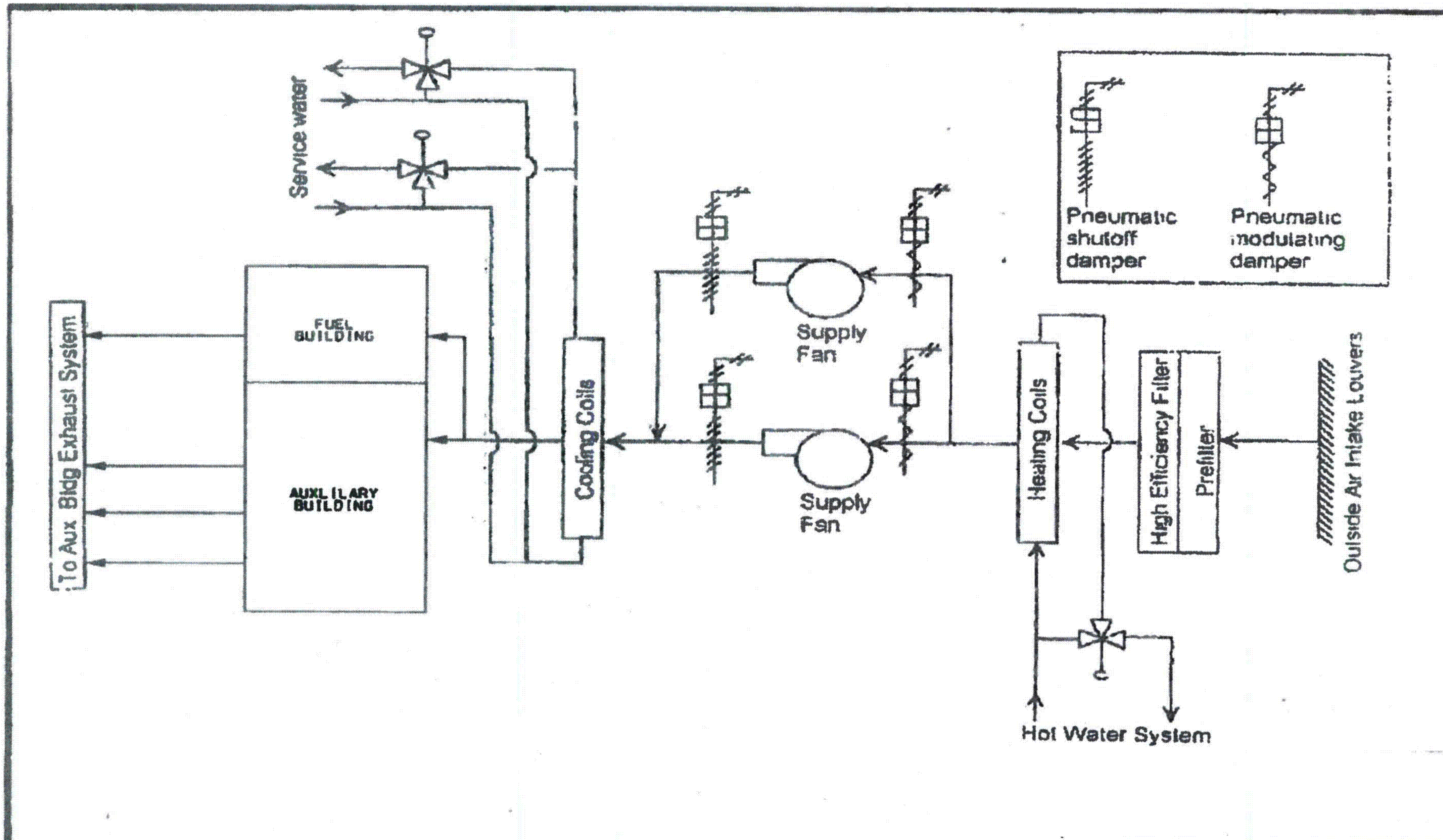

NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
ZION STATION DSAR
FIGURE 1-14
GENERAL ARRANGEMENT PLAN
GROUND FLOOR EL. 592'-0" (UNIT 2)
OCTOBER 2012



ZION STATION DSAR

FIGURE 3-40

SERVICE WATER SYSTEM (SIMPLIFIED)

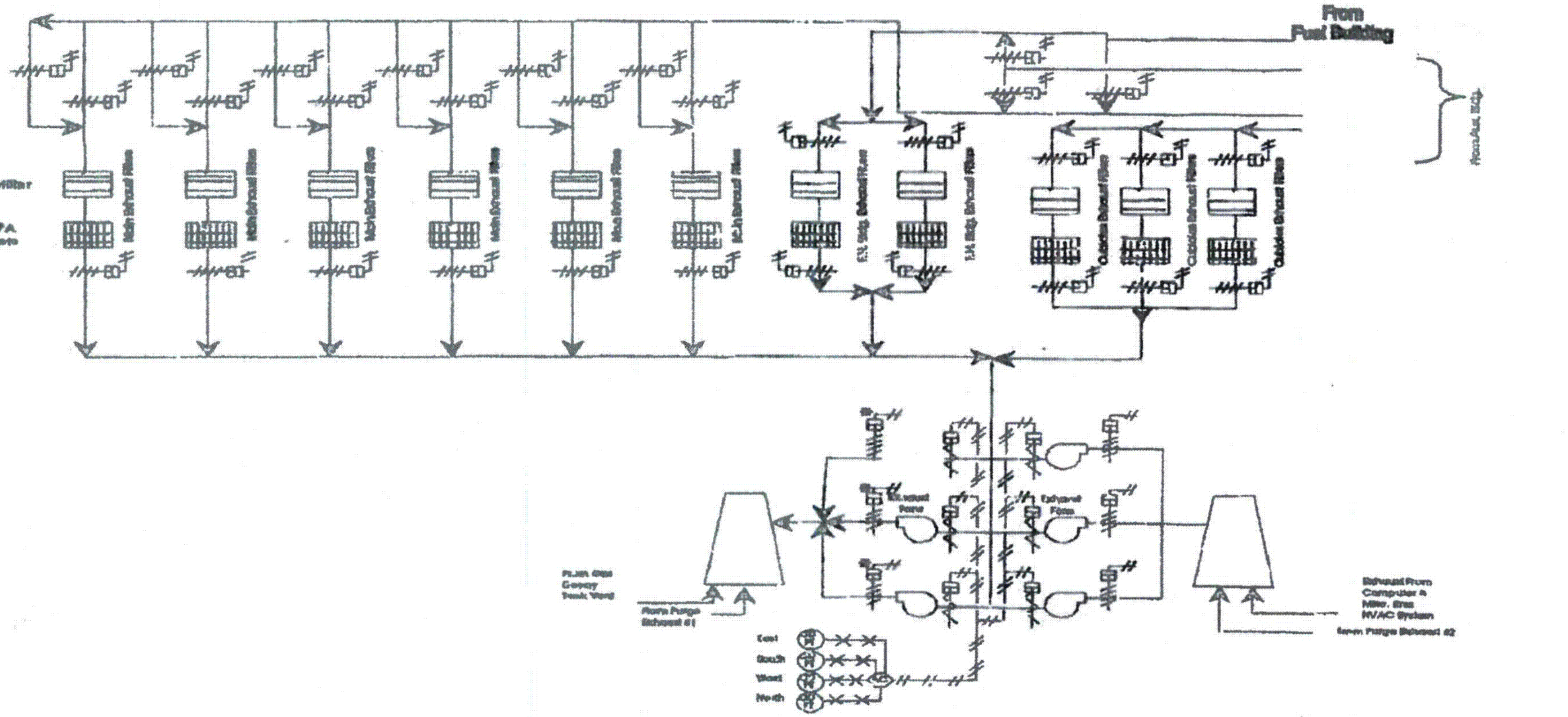


ZION STATION DSAR

FIGURE 3-41

AUXILIARY BUILDING VENTILATION SUPPLY SYSTEM

OCTOBER 2012



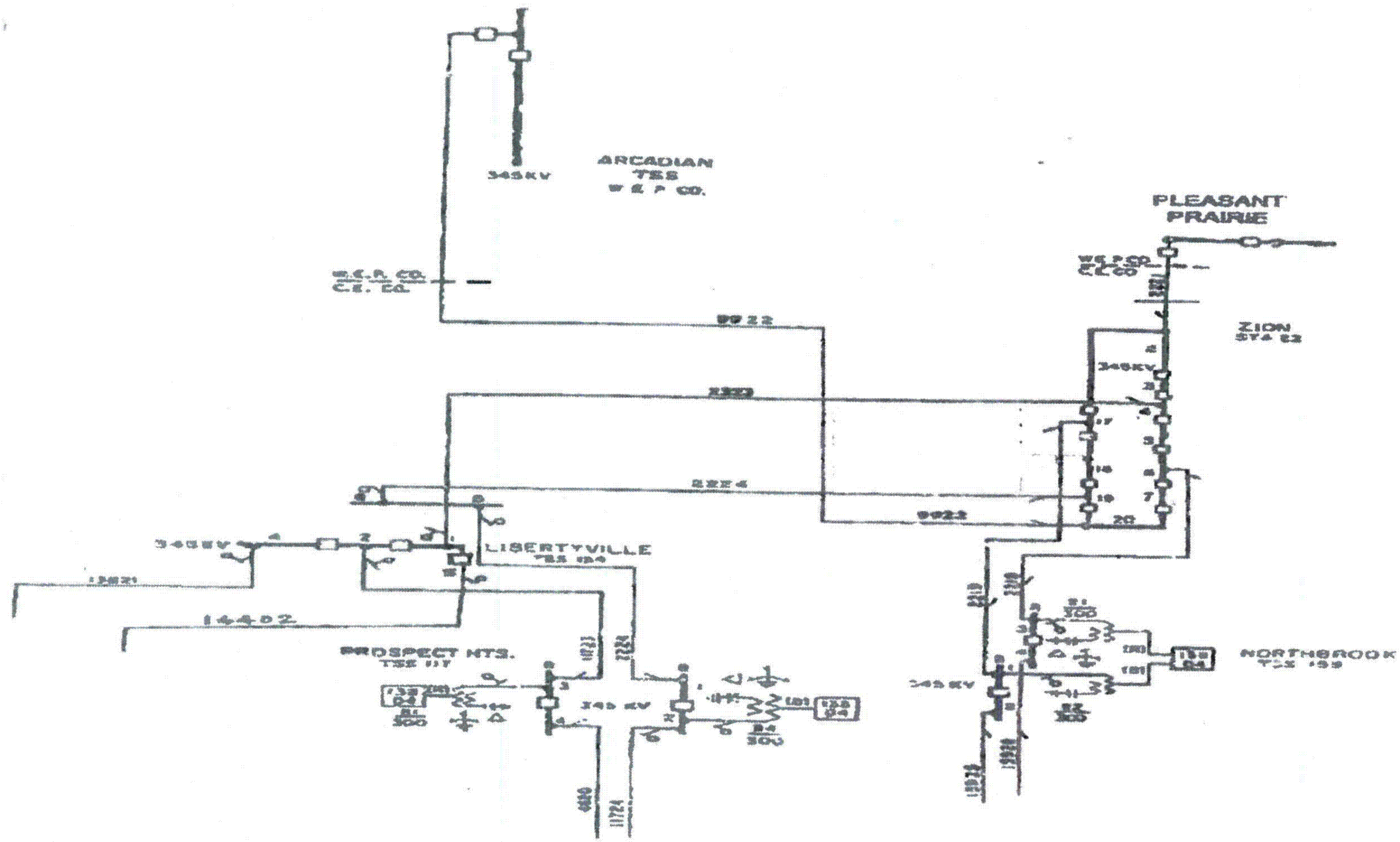
* UNIT 1 EXHAUST FAN DAMPERS MECHANICALLY BLOCKED CLOSED

ZION STATION DSAR

FIGURE 3-42

AUXILIARY BUILDING VENTILATION EXHAUST SYSTEM (SIMPLIFIED)

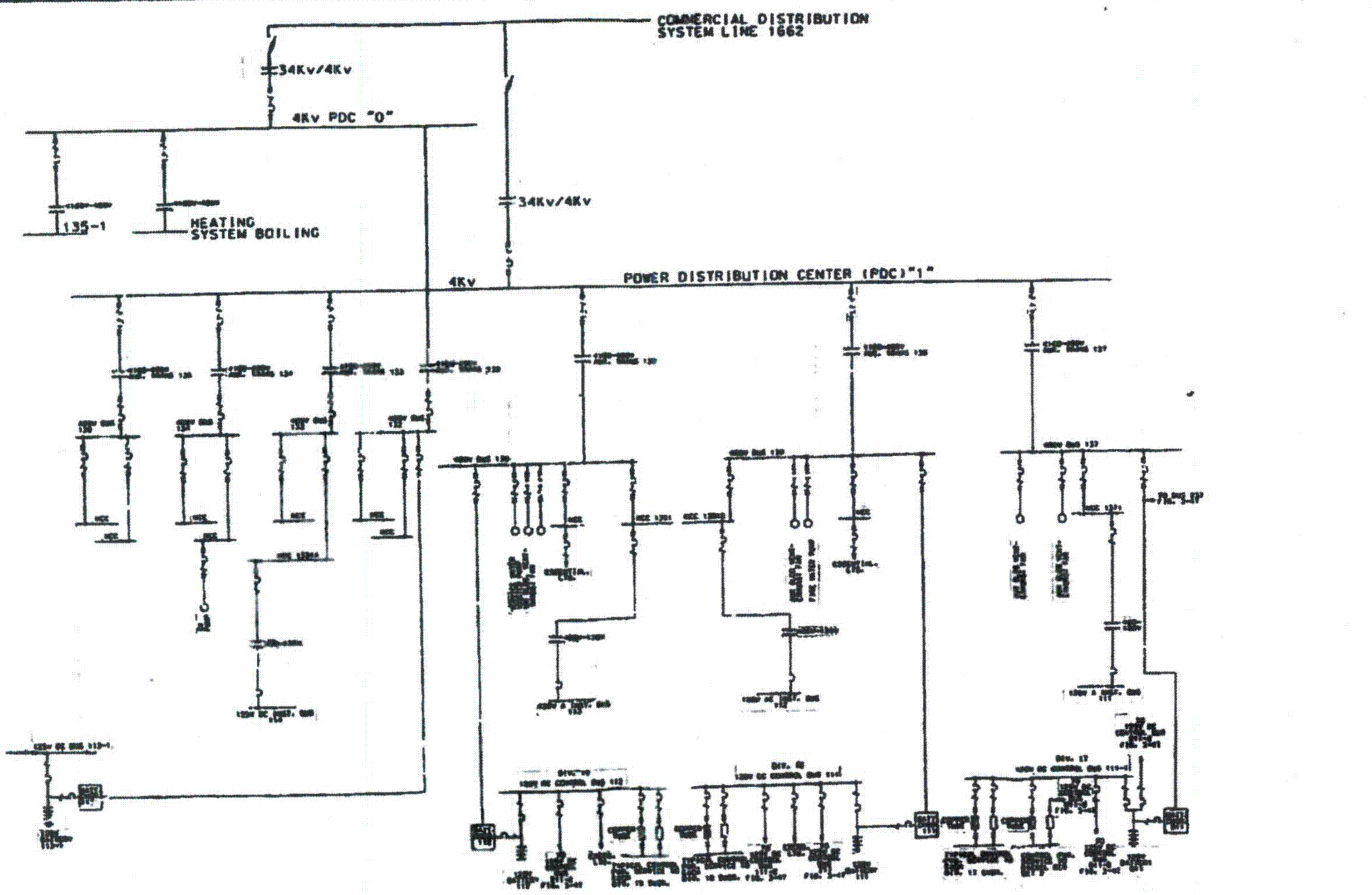
OCTOBER 2012



ZION STATION DSAR

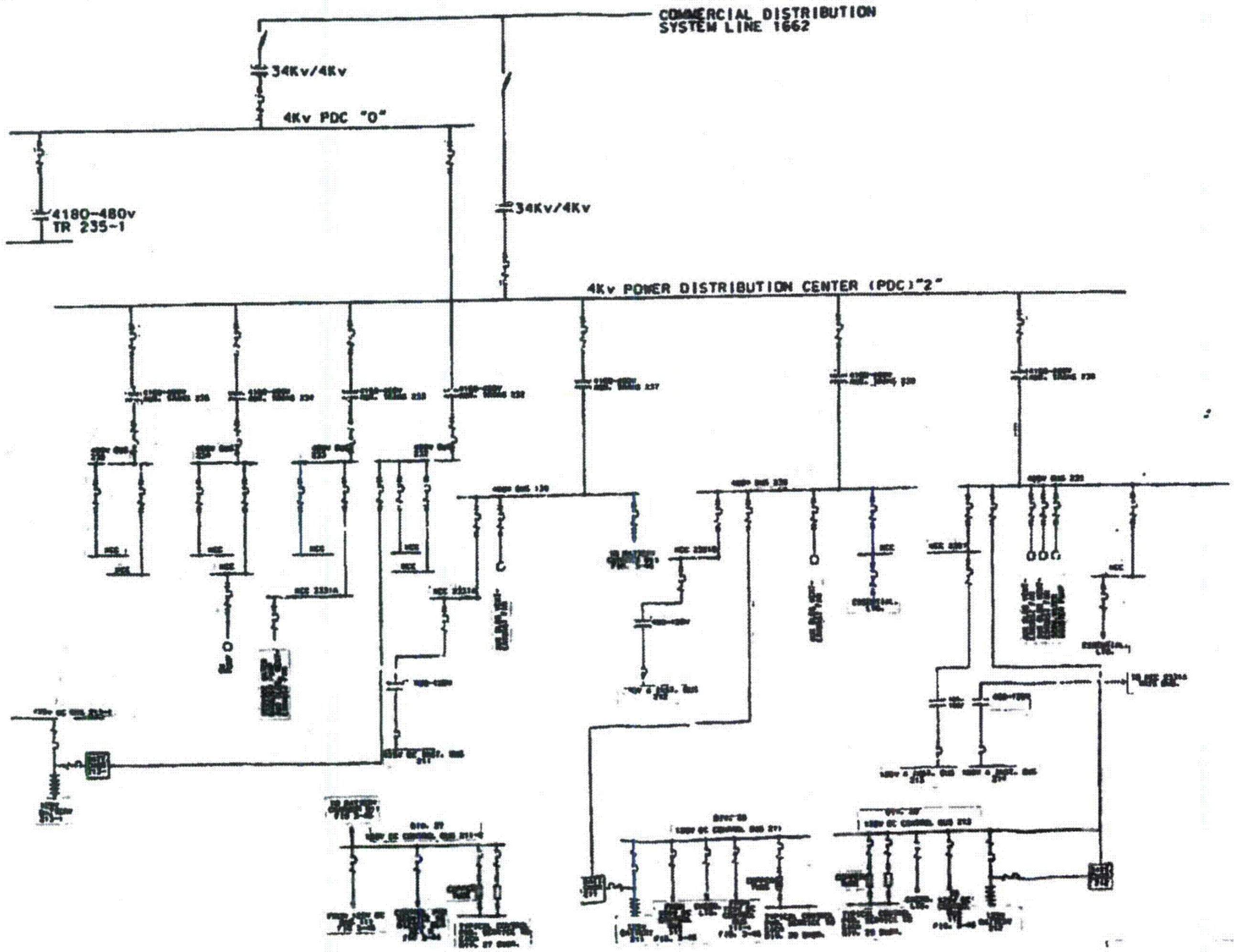
FIGURE 3-45

345Kv INTERCONNECTION WITH TRANSMISSION SYSTEM



PDC - POWER DISTRIBUTION CENTER

ZION STATION DSAR
FIGURE 3-46
SINGLE LINE DIAGRAM UNIT 1
OCTOBER 2012



PDC - POWER DISTRIBUTION CENTER

ZION STATION DSAR

FIGURE 3-47

SINGLE LINE DIAGRAM
UNIT 2

OCTOBER 2012

ATTACHMENT 4

ZION NUCLEAR POWER STATION
10 CFR 50.59 SUMMARY REPORT

Change Number and Title: 2011-54; Install Design Change 384391, Liner Plate Removal in Support of Unit 2 Containment Construction Opening

Description: This modification removes the Unit 2 Containment liner plate in an area where tendons and concrete have already been removed. Consequently, the liner plate removal will establish an opening where equipment can be removed from containment in support of decommissioning activities. A construction door has been installed to secure the opening when not in use.

Summary: The containment design functions credited in the DSAR that are impacted by this design change are structural integrity and ventilation barrier capability. A structural integrity calculation was performed for the Unit 2 containment structure in this revised configuration. It was concluded that the integrity of the containment is not compromised as a result of the opening. The construction door will provide protection from adverse weather and aid in the control of airborne radioactivity. Radiological monitoring of the containment atmosphere will be established prior to the removal of the liner in accordance with revised ODCM requirements. The evaluation concluded that the design change could be installed without obtaining a license amendment.

Change Number and Title: 2011-97; Install Design Change 385723, Unit 1 Containment Building Decommissioning Opening

Description: This modification removes the Unit 1 Containment liner plate in an area where tendons and concrete have already been removed. Consequently, the liner plate removal will establish an opening where equipment can be removed from containment in support of decommissioning activities. A construction door has been installed to secure the opening when not in use.

Summary: The containment design functions credited in the DSAR that are impacted by this design change are structural integrity and ventilation barrier capability. A structural integrity calculation was performed for the Unit 1 containment structure in this revised configuration. It was concluded that the integrity of the containment is not compromised as a result of the opening. The construction door will provide protection from adverse weather and aid in the control of airborne radioactivity. Radiological monitoring of the containment atmosphere will be established prior to the removal of the liner in accordance with revised ODCM requirements. The evaluation concluded that the design change could be installed without obtaining a license amendment.

Change Number and Title: 2012-001; Unit 2 Reactor Vessel Internals Segmentation Project

Description: This activity involves the sectioning and disposal of activated waste generated during the segmentation of the Unit 2 Reactor Vessel Upper and Lower Internals. The majority of the waste is expected to be Class A waste. Portions of the waste are projected to be categorized as Class B/C waste. Select waste from the activity is projected to be Greater Than Class C (GTCC) waste. The 50.59 evaluation will be limited to the safe handling and processing of the GTCC waste to ensure the health and safety of the public and plant personnel is maintained. This evaluation will bound any activities associated with the lower level waste generated.

Summary: Calculation TSD-11-005 concluded that with a complete loss of water in the reactor cavity and evaluating the limited shielding capability of the construction opening in the Containment building, the resultant dose to a member of the public would be well within the bounding DSAR analyses of Section 5.3, Radioactive Waste Handling Accident, during vessel internal segmentation activities. In addition, abnormal Operating procedure AOP 5.1 is in place to close the Containment construction doors during high radiation conditions and administrative controls have been implemented to maintain water in the reactor cavity within set bounds in order to provide shielding. The evaluation concluded that the design change could be installed without obtaining a license amendment.