ZIONSOLUTIONS LLC
An EnergySolutions Company

10 CFR 50.83(b)

August 27, 2015 ZS-2015-0134

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: Zion Station Request for Partial Site Release

References:

1) Gerard van Noordennen, Zion*Solutions*, Letter to U.S. Nuclear Regulatory Commission, "License Amendment Request for the License Termination Plan," dated December 19, 2014

Zion*Solutions,* the licensee for the Zion Nuclear Power Station (ZNPS), is requesting approval to remove a portion of the site from the Part 50 licenses (License Nos. DPR-39 and DPR-48). Specifically, Zion*Solutions* intends to remove/release the non-impacted survey units from its Part 50 license in accordance with 10 CFR 50.83(b), "Release of part of a power reactor facility or site for unrestricted use."

Attachment 1, "Zion Nuclear Power Station Supporting Information for Request for Partial Site Release," provides the supporting information for a partial release of the site for unrestricted use before receiving approval of the License Termination Plan (LTP) in accordance with the provisions of 10 CFR 50.83(b). The ZNPS LTP was previously submitted as documented in Reference 1 and is currently under review by the NRC. Attachment 1 includes a description of the property and evaluation of the effect of releasing this property. The evaluation concludes that all applicable regulatory requirements will continue to be met and no change to the ZNPS Operating License or the Permanently Defueled Technical Specifications is required.

There are no regulatory commitments made in this submittal. Zion*Solutions* requests NRC approval of this request by February 28, 2016. If you should have any questions regarding this submittal, please contact Robert Yetter at (224) 789-4250.

Respectfully,

Gerard van Noordennen

Gerard van Noordennen
Vice President Regulatory Affairs

A001
NRR

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

Attachments

1) Attachment 1, "Zion Nuclear Power Station Supporting Information for Request for Partial Site Release"

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

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

cc:

Ken Robuck
President Logistics Processing and
Disposal Group
Energy*Solutions*
299 South Main Street, 17th Floor
Salt Lake City, UT 84111

John Sauger
Executive VP & General Manager
Zion*Solutions*, LLC
101 Shiloh Boulevard
Zion, IL 60099

Gerard van Noordennen
VP Regulatory Affairs
Zion*Solutions*, LLC
101 Shiloh Boulevard
Zion, IL 60099

Anthony Orawiec
Decommissioning Plant Manager
Zion*Solutions*, LLC
101 Shiloh Boulevard
Zion, IL 60099

Dan Shrum
Senior VP Regulatory Affairs
Energy*Solutions*
299 South Main Street, 17th Floor
Salt Lake City, UT 84111

Russ Workman
General Counsel
Energy*Solutions*
299 South Main Street, 17th Floor
Salt Lake City, UT 84111

Alwyn C. Settles
Section Head, Nuclear Facility Inspection
Bureau of Nuclear Facility Safety
Illinois Emergency Management Agency
1011 North Street, PO Box 250
Mazon, IL 60444

Kelly F. Grahn
Senior Health Physicist, Unit Supervisor
Illinois Emergency Management Agency
Bureau of Radiation Safety, Environmental
Management
245 W Roosevelt Road, Building 8, Suite 55
West Chicago, IL 60185

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

Zion Nuclear Power Station
Supporting Information for Request for Partial Site Release

PURPOSE

The purpose of this report is to inform the Nuclear Regulatory Commission (NRC) of Zion*Solutions'* intent to remove a portion of the Zion Nuclear Power Station (ZNPS) site from the Part 50 licenses (License No. DPR-39 and DPR-48). Specifically, Zion*Solutions* intends to remove/release eleven (11) non-impacted survey units from its Part 50 License in accordance with 10 CFR 50.83(b), "*Release of Part of a Power Reactor Facility or Site for Unrestricted Use*" and 10 CFR 100, "*Reactor Site Criteria.*" Zion*Solutions* has also reviewed and assessed the subject property to ensure that the subject land area will have no adverse impact on the ability of the site in aggregate to meet 10 CFR Part 20, Subpart E, criteria for unrestricted release. This report contains a summary of the assessment performed, as well as a summary of the characterization surveys performed in these survey units. It is noted that this report does not contain the Final Status Survey (FSS) Report for this area because the survey units within this area are characterized as non-impacted and as such, no statistical tests, scan and static measurements or elevated measurement comparisons are required. Table 1 provides a classification and description list for the subject survey units. Figure 1 provides a depiction of the site's geographical location and Figures 2 and 3 depict an overview of the survey unit boundaries and the site boundary/non-impacted survey unit corner coordinates, respectively.

Table 1 - Classification and Description List of Non-Impacted Open Land Survey Units

Survey Unit ID #	Survey Unit Description	Classification	Approximate Survey Unit Area (m^2)
10200	**Restricted Area Grounds**		
10215	Area Northwest of Switchyard	Non-Impacted	26,008
10216	Area West Northwest of Switchyard	Non-Impacted	31,171
10217	Area Southwest of Switchyard	Non-Impacted	50,880
10300	**Owner Controlled Area Grounds (included in Final Safety Analysis Report)**		
10302	Northwest Corner of FSAR Area	Non-Impacted	64,740
10303	Southwest Corner of FSAR Area	Non-Impacted	68,847
10304	Southern Area of FSAR	Non-Impacted	34,010
10305	Area West of Survey Unit #10217	Non-Impacted	121,535
10306	Area West of Survey Unit #10216	Non-Impacted	85,268
10400	**Owner Controlled Area Grounds (not included in FSAR)**		
10402	MET Tower Area	Non-Impacted	133,565
10403	Area North of West Training	Non-Impacted	139,282
10404	Northwest Corner of Owner Controlled Property	Non-Impacted	118,734

Figure 1, Zion Nuclear Power Station Geographical Location

Figure 2, Boundaries of Non-Impacted Open Land Survey Units

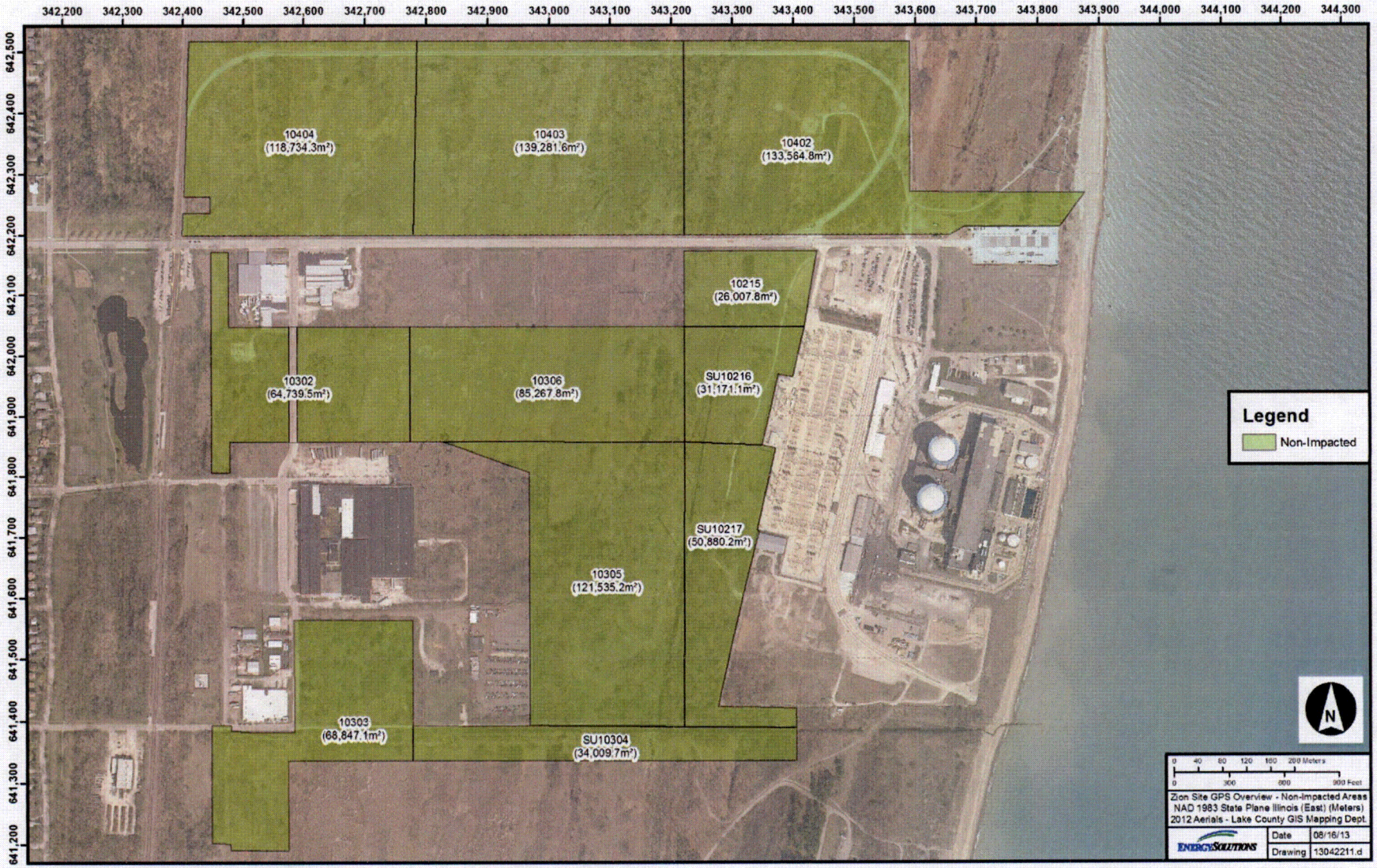

Figure 3, Site Boundary/Non-Impacted Survey Units Corner Coordinates

BACKGROUND

The Zion Nuclear Power Station (ZNPS) consists of two (Units 1 and 2) Pressurized Water Reactors (PWR). The station is located near the city of Zion in northeast Illinois on the west shore of Lake Michigan. The site is approximately 40 miles north of Chicago, Illinois and 42 miles south of Milwaukee, Wisconsin.

The station was comprised of two essentially identical pressurized water reactors with supporting facilities. Each unit's primary coolant system consisted of a pressurized water reactor system designed by the Westinghouse Corporation and was comprised of the reactor vessel and four heat transfer loops. Each loop contained a reactor coolant pump, steam generator, and associated piping and valves. In addition, each unit includes a pressurizer, a pressurizer relief tank, interconnecting piping, and the instrumentation necessary for operational control. All major components of each unit's reactor coolant system were located in their respective containment building. The designed reactor thermal power level was 3250 Megawatts thermal (MWth). The corresponding electrical output was approximately 1,085 Megawatts electric (MWe) for each unit.

The initial construction of the station was authorized on December 26, 1968. Unit 1 and Unit 2 achieved initial criticality on June 19, 1973 and December 24, 1973, respectively. Next, Unit 1 was synchronized to the grid for the first time on June 28, 1973 and Unit 2 on December 26, 1973. Finally, Unit 1 and Unit 2 began commercial operation on December 31, 1973 and September 19, 1974, respectively. Between the two units, ZNPS operated for approximately 248,238,983 effective MWhrs over the course of its operating lifetime.

On January 15, 1998, Commonwealth Edison (ComEd) announced the permanent shutdown of both Zion reactors. The shutdown decision was based on the corporation's economic determination that neither Zion reactor would be able to produce competitively priced electricity in a deregulated marketplace over the facility's remaining useful life. On February 13, 1998, ComEd certified the permanent cessation of operation of ZNPS Units 1 and 2 to the NRC (Reference 1). On March 9, 1998, ComEd certified to the NRC that all fuel assemblies had been permanently removed from both ZNPS reactor vessels and placed in the Spent Fuel Pool (Reference 2). Both units at ZNPS were subsequently placed in a SAFSTOR condition (a period of safe storage of the stabilized and defueled facility) until eventual final decommissioning and dismantlement.

In 2000, the license was transferred from ComEd to Exelon Nuclear Generation, LLC (Exelon). On January 25, 2008, Exelon and Zion*Solutions*, LLC submitted an *Application for License Transfers and Conforming Administrative License Amendments* to the NRC requesting that the NRC consent to the transfer of Exelon's Facility Operating Licenses for ZNPS to Zion*Solutions* (Reference 3). On September 1, 2010, the licenses were transferred from Exelon to Zion*Solutions* (Reference 4). Zion*Solutions* is now the current licensee. The operating licenses that were scheduled to expire in April 2013 for Unit 1 and November 2013 for Unit 2 continue to remain in effect until the NRC notifies Zion*Solutions* that the licenses have been terminated.

EVALUATION OF EFFECT OF PROPOSED RELEASE

Zion*Solutions* has evaluated the effect of releasing the subject property from the Part 50 License in accordance with the criteria specified in 10 CFR 50.83(a)(1-3) in order to ensure that ZNPS will continue to comply with all applicable statutory and regulatory requirements that may be affected by the release of the subject property.

Specifically, Zion*Solutions'* evaluation confirmed the following with respect to each of the regulatory areas identified in 10 CFR 50.83(a)(1)(i)-(vi), (a)(2) and (a)(3):

(a)(1) ***Evaluate the effects of releasing the property to ensure that:***

i. ***The dose to individual members of the public does not exceed the limits and standards of 10 CFR Part 20, Subpart D.***

Zion*Solutions* strictly controls effluents to ensure radioactivity released to the environment is maintained ALARA and does not exceed federal release limit criteria. Effluent controls include the operation of radiation monitoring systems within the plant as well as an offsite environmental analysis program. The release of the subject property does not change any controls used to comply with dose limits for individual members of the public and the conservatively estimated yearly dose to a member of the public is well below the 10 CFR Part 20, Subpart D limits and standards.

A review of the latest quarterly REMP and boundary TLD readings (see Figure 4) shows that the highest possible dose to a member of the public is 3.73 mR/year at TLD location no. 125 just south of the ISFSI fence line. Table 4 provides the yearly dose to a member of the public at the seven locations closest to site source term. Note, this is the first quarter results of 2015 with all 61 Vertical Concrete Casks (VCCs) containing spent fuel and 4 VCCs containing GTCC on the ISFSI pad. Also, note that up to half of the yearly dose is estimated to be attributed to waste source term on site which will lessen as decommissioning completes.

Table 2, REMP and Boundary TLD Readings for 1st Quarter of 2015

TLD #	Highest TLD (gross)	AVG BKG (mR)	Neutron Factor	Occupancy Estimates		mR/Qtr	mR/year
				Hours	Factor		
101	20 mR	22.5 mR	0.12	2920	0.33	0.00	0.00
110	34 mR	22.5 mR	0.12	160	0.02	0.24	0.94
111	29 mR	22.5 mR	0.12	160	0.02	0.13	0.53
124	21 mR	22.5 mR	0.12	2920	0.33	0.00	0.00
125	25 mR	22.5 mR	0.12	2920	0.33	0.93	3.73
129	20 mR	22.5 mR	0.12	160	0.02	0.00	0.00
131	56 mR	22.5 mR	0.12	160	0.02	0.69	2.74

ii. ***There is no reduction in the effectiveness of emergency planning or physical security.***

No credit is taken for this land in either the Emergency Plan or Security Plan. Therefore, the release of the subject property has no adverse effect on either plan.

iii. ***Effluent releases remain within license conditions.***

The ZNPS programs to monitor and maintain effluent releases within license conditions remain in effect and the early release of the subject property does not impact those programs. Therefore, the effluent releases from ZNPS will remain within license conditions.

iv. ***The environmental monitoring program and offsite dose calculation manual (ODCM) are revised to account for the changes.***

The owner controlled boundary will remain the same and therefore, the Environmental Monitoring Program, ODCM and supporting documents are still valid and no changes are needed.

v. ***The siting criteria of 10 CFR Part 100 continue to be met.***

The release of the subject property has been reviewed with respect to the siting criteria in 10 CFR 100 and it has been determined that the requirements of 10 CFR 100 are either not impacted (e.g., 10 CFR 100.11, low population zone or population center distance or 10 CFR 100 Appendix A, Seismic and Geologic Siting Criteria) or are not applicable (e.g., 10 CFR 100, Subpart B, Evaluation Factors for Stationary Power Reactor Site Application on or after January 10, 1997). Zion*Solutions* will continue to control the exclusion area and maintain the ability to remove members of the public from the exclusion area in the case of a radiological emergency. Both reactor vessels have been permanently defueled and both reactor internals have been removed from site. The Unit 2 reactor vessel has been removed from site. The Unit 1 reactor vessel is in the process of being removed from the site.

vi. ***All other applicable statutory and regulatory requirements continue to be met.***

There are no changes to the ZNPS policies and procedures to ensure that statutory and regulatory requirements continue to be met as a result of this early release of the subject property.

In summary, the proposed release of the subject property from the Part 50 License will not have any impact on the ZNPS facility's continued compliance with applicable NRC regulatory standards.

(a)(2) ***Perform a historical site assessment of the part of the facility or site to be released.***

In accordance with the guidance provided in NUREG-1575, "*Multi Agency Radiation Survey and Site Investigation Manual* (MARSSIM)" (Reference 5), section 3.0, a Historical Site Assessment (HSA) was performed and documented in September 2006 (Reference 6). Historical information, including any 10 CFR 50.75(g) files, employee interviews, radiological incident reports, pre-operational survey data, spill reports, special surveys (e.g., site aerial surveys, marine fauna and sediment surveys), operational survey records, and Annual Radiological Operating Reports (including sampling of air, groundwater, estuary water, milk, invertebrates, fish and surface vegetation) were reviewed and compiled for this investigation.

The HSA was a detailed investigation to collect existing information (from the start of Zion Station's activities related to radioactive materials or other contaminants) for the site and its surroundings. The HSA focused on historical events and routine operational processes that resulted in the contamination of the plant systems, onsite buildings, surface and subsurface soils within the Radiologically Controlled Area (RCA) as well as support structures, open land areas and subsurface soils outside of the RCA, but within the owner controlled area. The information compiled by the HSA was used to establish initial area survey units and classifications and eventually, input into the development of potential site-specific Derived Concentration Guideline Levels (DCGL), development of remediation plans and the design of the Final Radiation Survey (FRS). The scope of the HSA included potential contamination from radioactive materials, hazardous materials, and state-regulated materials.

The HSA investigation was designed to obtain sufficient information to provide initial classification of the site land areas and structures as impacted or non-impacted. Impacted areas have a potential for contamination (based on historical data) or contain known contamination (based on past or preliminary radiological surveillance). MARSSIM defines non-impacted areas as those areas where there is no reasonable possibility of residual contamination.

Based on a review of the operating history of the facility, historical incidents, and operational radiological surveys as documented in the HSA, as well as subsequent characterization surveys discussed in the next section, the subject open land areas were deemed not impacted by licensed activities or materials and therefore, it was determined that the "non-impacted" classification is appropriate.

(a)(3) ***Perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402 for impacted areas.***

MARSSIM Section 2.5.2 states, "Non-impacted areas represent areas where all of the information necessary to demonstrate compliance is available from existing sources. For these areas, no statistical tests are considered necessary." Additionally, Table 2.2 of MARSSIM, "Recommended Conditions for Demonstrating Compliance Based on Survey Unit Classification for a Final Status Survey," requires no elevated measurement comparison, no sampling and/or direct measurements and no scanning to be performed in non-impacted areas. Despite this available waiver, a comprehensive characterization survey was performed.

The site-release criteria for the ZNPS site correspond to the 10 CFR 20.1402 criteria for unrestricted use. The residual radioactivity, including that from ground water sources, that is distinguishable from background, must not cause the total effective dose equivalent (TEDE) to

an average member of the critical group to exceed 25 mrem/yr. The residual radioactivity must also be reduced to levels that are ALARA.

The characterization survey was designed and executed using the guidance provided in MARSSIM and NUREG-1757, Volume 2, Revision 1, *"Consolidated Decommissioning Guidance-Characterization, Survey, and Determination of Radiological Criteria, Final Report."* (Reference 7). In addition, surveys were designed and executed in accordance with the Zion*Solutions* ZS-LT-02, "*Characterization Survey Plan,*" (Reference 8) and ZS-LT-01, "*Quality Assurance Project Plan (for Characterization and FSS)*" (Reference 9) which describes policy, organization, functional activities, the Data Quality Objective (DQO) process, and measures necessary to achieve quality data. In addition to the above, the survey design for the characterization of the subject property was implemented in accordance with ZS-LT-03, "*Survey Plan, Non-Impacted Open Land Survey Units*" (Reference 10).

Areas classified as non-impacted received surveys developed to include a combination of systematic and biased survey measurement locations and scan areas. Biased survey designs used known information to select locations for static measurements and/or samples. Systematic survey design selected static measurement and/or sample locations at random or by using a systematic sampling design with a random start. The decision of whether to use primarily a biased survey design or a systematic approach was addressed by the DQO process for each survey unit.

From June to September 2013, sufficient survey coverage and an adequate number of samples were obtained in the subject survey units to serve as the basis for the "Non-Impacted" classification. Within each of the survey units specified, the survey focused primarily on surface (0 to 15 cm) soils. Subsurface (15 to 100 cm) soil samples were included in the survey design only if the analysis of surface soil samples indicated the presence of detectable plant-derived radioactivity. The sample and static measurement locations were based on a random design to ensure an unbiased survey.

The characterization survey of each survey unit consisted of both qualitative evaluations and quantitative analysis results. The qualitative evaluation consisted of static measurements using the Canberra *In Situ* Object Counting System (ISOCS). Investigative and verification gamma scans using a Ludlum Model 2350-1 and a Model 44-10 NaI detector were also performed. Minimum Detectable Concentrations (MDC) and gamma scanning sensitivities were estimated based on the assumed geometry and the potential plant-derived gamma-emitting radionuclides that may be present. Quantitative analysis results were obtained from radionuclide specific analysis of surface soil media using a calibrated counting geometry. Analysis times were set to achieve the required MDCs that were based on the expected Cs-137 background due to global fallout.

The minimum number of random-based direct measurements was adjusted to approximate one (1) measurement location for every 2,000 m^2 of land area. Surface scanning using a NaI detector was performed in the vicinity of each static measurement location and for investigations of elevated results. Surface soil samples were taken at 25% of the measurement locations. Specific ISOCS measurement locations were determined by generating random pairs of coordinates that corresponded to specific locations within each survey unit. If a randomly selected location was found to be either inaccessible or unsuitable (e.g., a portion of the surface

area in the instruments "Field-of-View" (FOV) was covered in standing water), then the location was adjusted to the closest adjacent suitable location.

The "Non-Impacted" subject open land areas at ZNPS totaled 864,563 square meters of surface area. The non-impacted surface area was broken into 11 survey units in accordance with the area descriptions, sizes and boundaries presented in the HSA. Of the 864,563 square meters, 182,127 square meters was deemed as "inaccessible". In this context, "inaccessible" is defined as an area where personnel or vehicle transit was inhibited by the presence of standing water, marsh or wet-lands, thick underbrush, trees or natural grasses where clearing would be prohibitive. The total surface area deemed "accessible" was 682,436 square meters.

Of the 682,436 square meters of surface area, 9,378 square meters were scanned by a Model 2350 paired with a Model 44-10 NaI detector. Alarm set-points for the instrument were set at the observed background plus the Minimum Detectable Count Rate (MDCR) of the instrument. With an average background of 4,337 cpm, the average observed scan result was 4,677 cpm. Twenty-four (24) instrument alarms were logged with a maximum observed scan reading of 9,550 cpm. All alarms were investigated and soil samples were taken at locations where the elevated reading was verified. In all instances, the elevated readings were attributed to Naturally Occurring Radioactive Material (NORM). Two hundred and thirty-six (236) static measurements were taken with the ISOCS. This equated to a coverage area of 6,608 square meters using a 28 square meter FOV. Of the total measurements taken, 75 measurement results indicated the presence of Cs-137 in concentrations greater that the MDC of the instrument but not in excess of the established background levels.

One hundred and sixty-six (166) surface soil samples were taken to verify ISOCS results, or as investigations. Of the total number of surface soil samples taken and analyzed, Cs-137 was identified at concentrations greater than the MDC of the instrument in 106 surface soil samples but not in excess of the established background levels. Additional detail on the survey and sampling methodology and results of the radiological analysis of each measurement and soil sample obtained during the characterization of non-impacted open land survey units are presented in Zion*Solutions* TSD 14-028, "*Radiological Characterization Report*" (Reference 11) and Chapter 2 of the Zion Station Restoration Project License Termination Plan (LTP), (Reference 12). Based upon the results of the characterization surveys performed of the non-impacted open land areas, it can be concluded that a non-impacted classification for these areas is appropriate. Cs-137 was the only radionuclide positively identified that could potentially be classified as plant-derived. However, the concentrations observed are well within the range of activity defined as background due to global fallout. The locations of ISOCS measurements and surface soil samples are illustrated on Figure 4. A summary of the findings of the survey for each individual survey unit are presented in Table 3.

Non-impacted areas are defined in MARSSIM as areas that have no reasonable potential for residual contamination, no radiological impact from site operations and are typically identified during the HSA. Zion*Solutions* has found no evidence of using, storing, or burying radioactive material in the subject property. None of the event records in the HSA indicated the uncontrolled release of radioactive material to the subject property. Therefore, it can be concluded that the release of the subject property will have no adverse impact on the ability of the ZNPS site in aggregate to meet the Part 20, Subpart E requirements for unrestricted release.

Figure 4, Non-Impacted Open Land Survey Units Measurement and Sample Locations

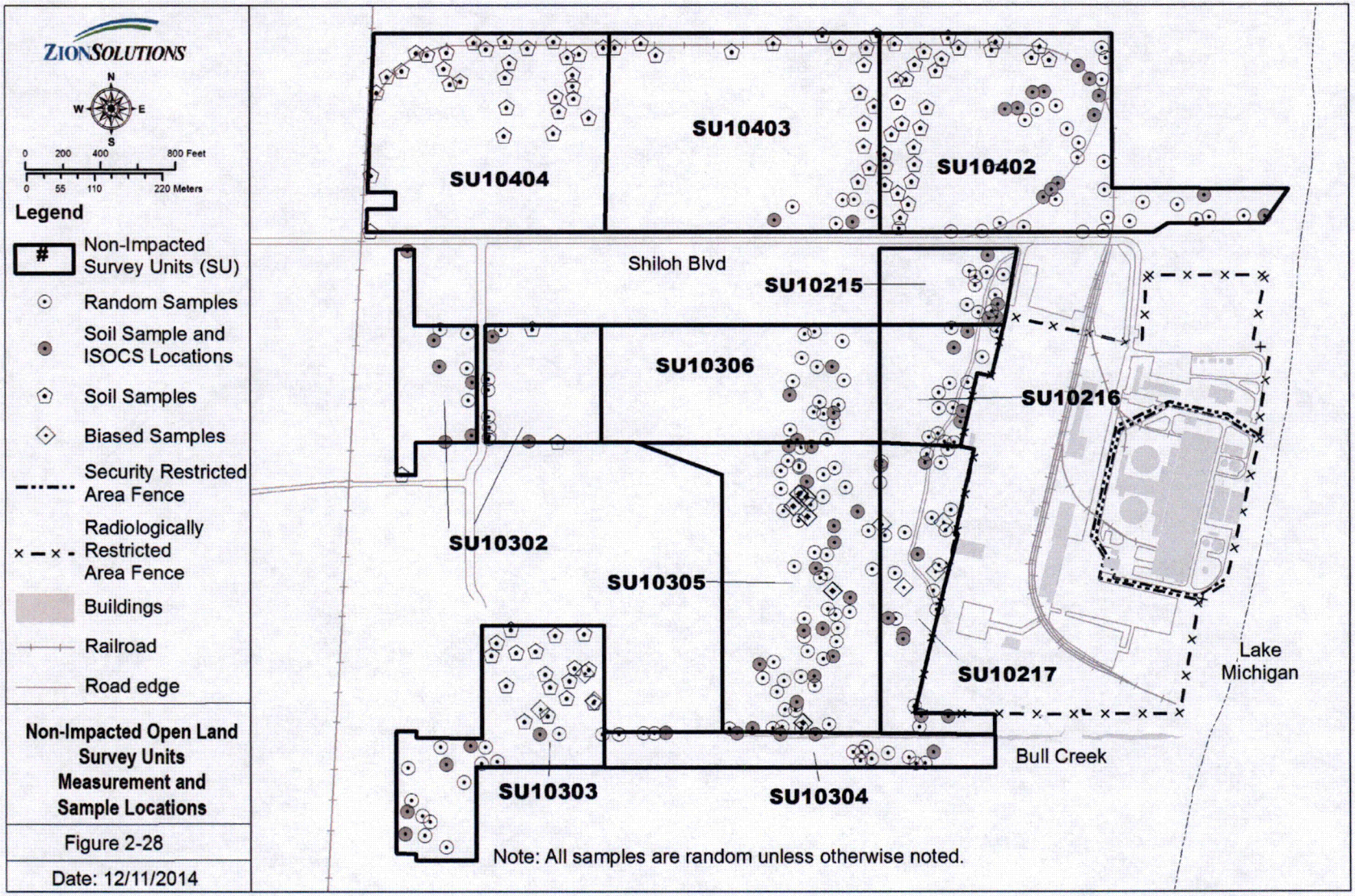

Table 3, Non-Impacted Open Land Survey Units – Characterization Survey Summary

Survey Unit	10215		10216		10217	
Surface Area	26,007.80 m^2		31,171.10 m^2		50,880.20 m^2	
Description	Area Northwest of Switchyard		Area West of Switchyard		Area Southwest of Switchyard	
Surface Soil Samples	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**
# of Samples	4	4	4	4	7	7
# >MDC	0	0	0	3	0	7
Mean	<0.06 pCi/g	<0.09 pCi/g	<0.04 pCi/g	0.23 pCi/g	<0.05 pCi/g	0.41 pCi/g
Median	<0.05 pCi/g	<0.09 pCi/g	<0.04 pCi/g	0.23 pCi/g	<0.05 pCi/g	0.43 pCi/g
Max	<0.09 pCi/g	<0.10 pCi/g	<0.05 pCi/g	0.26 pCi/g	<0.06 pCi/g	0.52 pCi/g
Min	<0.04 pCi/g	<0.08 pCi/g	<0.01 pCi/g	0.20 pCi/g	<0.05 pCi/g	0.26 pCi/g
Standard Deviation	N/A	N/A	N/A	0.03	N/A	0.09
ISOCS	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**
# of Measurements	14	14	16	16	27	27
# >MDC	0	1	0	8	0	10
Mean	<0.04 pCi/g	0.05 pCi/g	<0.04 pCi/g	0.19 pCi/g	<0.04 pCi/g	0.20 pCi/g
Median	<0.04 pCi/g	0.05 pCi/g	<0.04 pCi/g	0.27 pCi/g	<0.04 pCi/g	0.21 pCi/g
Max	<0.05 pCi/g	0.05 pCi/g	<0.05 pCi/g	0.27 pCi/g	<0.06 pCi/g	0.30 pCi/g
Min	<0.02 pCi/g	0.05 pCi/g	<0.03 pCi/g	0.07 pCi/g	<0.04 pCi/g	0.04 pCi/g
Standard Deviation	N/A	N/A	N/A	0.07	N/A	0.08
Surface Scans						
% Scanned	1%		1%		1%	
# of Alarms	0		0		0	
Mean Scan	3,995 cpm		4,828 cpm		4,563 cpm	
Max Scan	4,725 cpm		5,389 cpm		5,070 cpm	
Notes						
	1) 9 of 14 samples in west section of survey unit were relocated as area was deemed as inaccessible. 2) Additional ISOCS measurement (#14) was taken on discovered debris pile.		1) 9 of 16 samples in west section of survey unit were relocated as area was deemed as inaccessible.		1) 3 additional judgmental ISOCS measurement locations were added to account for additional area. 2) 1 additional ISOCS measurement added for discovered abandoned drain pipe.	

Table 3, Non-Impacted Open Land Survey Units – Characterization Survey Summary (continued)

Survey Unit	10302		10303		10304	
Surface Area	64,739.50 m^2		68,847.10 m^2		34,009.70 m^2	
Description	Northwest Corner of FSAR Area		Southwest Corner of FSAR Area		Southern Area of FSAR	
Surface Soil Samples	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**
# of Samples	11	11	25	25	5	5
# >MDC	0	9	0	13	0	3
Mean	<0.05 pCi/g	0.30 pCi/g	<0.06 pCi/g	0.17 pCi/g	<0.05 pCi/g	0.26 pCi/g
Median	<0.06 pCi/g	0.27 pCi/g	<0.06 pCi/g	0.15 pCi/g	<0.06 pCi/g	0.23 pCi/g
Max	<0.08 pCi/g	0.46 pCi/g	<0.10 pCi/g	0.39 pCi/g	<0.07 pCi/g	0.35 pCi/g
Min	<0.02 pCi/g	0.12 pCi/g	<0.02 pCi/g	0.06 pCi/g	<0.02 pCi/g	0.21 pCi/g
Standard Deviation	N/A	0.11	N/A	0.10	N/A	0.08
ISOCS	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**
# of Measurements	19	19	18	18	17	17
# >MDC	0	7	0	9	0	8
Mean	<0.05 pCi/g	0.25 pCi/g	<0.05 pCi/g	0.21 pCi/g	<0.04 pCi/g	0.17 pCi/g
Median	<0.05 pCi/g	0.22 pCi/g	<0.05 pCi/g	0.23 pCi/g	<0.04 pCi/g	0.16 pCi/g
Max	<0.06 pCi/g	0.34 pCi/g	<0.06 pCi/g	0.30 pCi/g	<0.05 pCi/g	0.27 pCi/g
Min	<0.04 pCi/g	0.20 pCi/g	<0.03 pCi/g	0.09 pCi/g	<0.02 pCi/g	0.09 pCi/g
Standard Deviation	N/A	0.06	N/A	0.07	N/A	0.06
Surface Scans						
% Scanned	1%		1%		1%	
# of Alarms	0		7		4	
Mean Scan	4,951 cpm		5,858 cpm		4,456 cpm	
Max Scan	7,474 cpm		9,550 cpm		5,704 cpm	
Notes						
	1) 33 designed locations reduced to 22 due to accessibility. 2) 3 of 22 locations scanned with NaI & soil sample only. 3) 6 of 18 ISOCS taken at height of 1 meter due to obstructions – FOV = 3 m^2.		1) 35 designed locations reduced to 18 due to accessibility. 2) 5 of 18 locations scanned with NaI & soil sample only. 3) 17 additional random and 3 additional judgmental soil samples taken.		1) 16 of 17 random locations relocated due to accessibility.	

Table 3, Non-Impacted Open Land Survey Units – Characterization Survey Summary (continued)

Survey Unit	**10305**		**10306**		**10402**	
Surface Area	121,535.20 m^2		85,267.80 m^2		133,565.00 m^2	
Description	**Area West of Survey Unit #10217**		**Area West of Survey Unit #10216**		**MET Tower Area**	
Surface Soil Samples	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**
# of Samples	17	17	4	4	41	41
# >MDC	0	4	0	4	0	31
Mean	<0.05 pCi/g	0.19 pCi/g	<0.05 pCi/g	0.26 pCi/g	<0.04 pCi/g	0.20 pCi/g
Median	<0.05 pCi/g	0.18 pCi/g	<0.04 pCi/g	0.23 pCi/g	<0.04 pCi/g	0.18 pCi/g
Max	<0.08 pCi/g	0.33 pCi/g	<0.08 pCi/g	0.40 pCi/g	<0.07 pCi/g	0.42 pCi/g
Min	<0.01 pCi/g	0.07 pCi/g	<0.02 pCi/g	0.20 pCi/g	<0.01 pCi/g	0.04 pCi/g
Standard Deviation	N/A	0.14	N/A	0.09	N/A	0.10
ISOCS	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**
# of Measurements	61	61	18	18	39	39
# >MDC	0	10	0	14	0	5
Mean	<0.04 pCi/g	0.19 pCi/g	<0.04 pCi/g	0.17 pCi/g	<0.05 pCi/g	0.10 pCi/g
Median	<0.04 pCi/g	0.20 pCi/g	<0.04 pCi/g	0.17 pCi/g	<0.05 pCi/g	0.11 pCi/g
Max	<0.06 pCi/g	0.30 pCi/g	<0.06 pCi/g	0.27 pCi/g	<0.08 pCi/g	0.12 pCi/g
Min	<0.03 pCi/g	0.08 pCi/g	<0.01 pCi/g	0.08 pCi/g	<0.03 pCi/g	0.07 pCi/g
Standard Deviation	N/A	0.06	N/A	0.05	N/A	0.02
Surface Scans						
% Scanned	1%		1%		1%	
# of Alarms	9		0		0	
Mean Scan	5,473 cpm		4,407 cpm		4,835 cpm	
Max Scan	7,343 cpm		5,337 cpm		5,543 cpm	
Notes			1) 43 designed ISOCS measurement locations reduced to 18 due to accessibility. 2) 4 of 18 locations scanned with NaI & soil sample only.		1) 67 designed ISOCS measurement locations reduced to 39 due to accessibility. 2) 30 additional random locations designated for NaI scanning and surface soil samples.	

Table 3, Non-Impacted Open Land Survey Units – Characterization Survey Summary (continued)

Survey Unit	**10403**		**10404**	
Surface Area	139,282.00 m^2		118,735.00 m^2	
Description	**Area North of West Training**		**NW Corner of Owner Controlled Property**	
Surface Soil Samples	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**
# of Samples	18	18	30	30
# >MDC	0	12	0	20
Mean	<0.04 pCi/g	0.18 pCi/g	<0.04 pCi/g	0.20 pCi/g
Median	<0.04 pCi/g	0.17 pCi/g	<0.04 pCi/g	0.20 pCi/g
Max	<0.07 pCi/g	0.39 pCi/g	<0.06 pCi/g	0.57 pCi/g
Min	<0.01 pCi/g	0.05 pCi/g	<0.01 pCi/g	0.02 pCi/g
Standard Deviation	N/A	0.09	N/A	0.14
ISOCS	**Co-60**	**Cs-137**	**Co-60**	**Cs-137**
# of Measurements	7	7	0	0
# >MDC	0	3	0	0
Mean	<0.04 pCi/g	0.19 pCi/g	N/A pCi/g	N/A pCi/g
Median	<0.04 pCi/g	0.19 pCi/g	N/A pCi/g	N/A pCi/g
Max	<0.05 pCi/g	0.23 pCi/g	N/A pCi/g	N/A pCi/g
Min	<0.03 pCi/g	0.14 pCi/g	N/A pCi/g	N/A pCi/g
Standard Deviation	N/A	0.04	N/A	N/A
Surface Scans				
% Scanned	<1%		1%	
# of Alarms	4		0	
Mean Scan	3,959 cpm		3,391 cpm	
Max Scan	5,310 cpm		6,964 cpm	
Notes				
	1) Approximately 90% of area was inaccessible to the ISOCS. 2) 70 ISOCS measurements reduced to 7. 3) 4.8% of accessible 13,928 m^2 of land area scanned. 4) 16 additional random locations designated for NaI scanning and surface soil samples.		1) 60 ISOCS locations were designed. Entire area was inaccessible to the ISOCS. To compensate, additional scan and soil sample locations were evenly distributed in areas that were accessible. The total area scanned equates to 1,200 m^2, or approximately 1%.	

DESCRIPTION OF THE PROPERTY

For non-impacted areas, 10 CFR 50.83 (b)(2) requires a description of the part of the facility or site to be released. The owner-controlled site is approximately 331 acres in size. For ZNPS, the non-impacted open land areas include most of the surrounding Exelon owned land outside of the footprint of the 87 acre, fence-enclosed "Radiologically-Restricted Area." The property that is subject to this release request is an approximately 214 acre parcel of uninhabited, essentially undeveloped land that has not been negatively impacted by ZNPS operations or subsequent decommissioning activities.

The ZNS property is located in the extreme eastern portion of the City of Zion in Lake County, Illinois on the west shore of Lake Michigan. Although the Site encompasses approximately 331 acres, it is relatively isolated as the property is bordered to the north and south by Illinois Beach State Park, a small industrial area followed by railroad tracks to the west and Lake Michigan to the east. The center of the community of Zion is approximately 1.6 miles from the plant location on the Site. There are no schools or hospitals within one mile and there are no residences within 2,000 feet of station structures.

Based upon the information compiled in the HSA, thirteen (13) large outlying open land survey units received an initial classification as "non-impacted," but were subsequently reduced to eleven (11) survey units when two of these areas were deemed "impacted" as a result of the characterization or review of past use. These include the site parking lot and the area along Shiloh Boulevard designated as the West Training area. The parking lot was designated as impacted because it represents the major path for material egress on and off of the site. The West Training area was the location of a former Westinghouse training reactor that was decommissioned in 1988 (NRC License # R-119, Docket # 50-87). Therefore, the 214 acre parcel of land that is subject to this request has been sub-divided into eleven (11) survey units.

Non-impacted areas have no reasonable potential for residual contamination because historical information indicates there was no known impact from site operations. These include the outlying open land areas of the site, as well as contiguous areas that have no impact from site operations based upon the location(s) of licensed operations, site use, topography, site discharge locations, and other site physical characteristics. These areas are not required to be surveyed for demonstrating compliance beyond any characterization surveys performed to provide a basis for the classification.

Portions of the 214 acre parcel have limited access for personnel or vehicle transit due to the presence of standing water, marsh or wetlands, thick underbrush, trees or natural grasses. Survey unit 10402 contains an area for public parking and a travel path to Hosah Park. A meteorological tower, previously located in survey unit 10402, has been removed. A portion of the site rail system traverses survey units 10402, 10403 and 10404 and rail cars loaded with low level radioactive waste are sometimes staged in the area while awaiting transfer to a disposal facility. Note, the exterior of the rail cars are always checked for loose surface contamination prior to them leaving the "Radiologically-Restricted Area." A ComEd substation is located in survey unit 10302. A roadway (gated) to the ISFSI traverses survey units 10215, 10216 and 10217. Survey unit 10304, located in the southern most area of the site, is frequently traversed by members of the public as this area adjoins a nearby campground to the south of the site.

SCHEDULE FOR SUBJECT PROPERTY RELEASE

For non-impacted areas, 10 CFR 50.83 (b)(3) requires the schedule for release of the property. Zion*Solutions* intends to begin undertaking activities associated with the release of the subject property from the ZNPS Part 50 License on or before March 21, 2016. Therefore, Zion*Solutions* requests that the NRC approve the acceptability of the release of the subject property from the Part 50 License by February 28, 2016.

RESULTS OF 10CFR 50.59 EVALUATION

10 CFR 50.83(b)(4) requires for non-impacted areas that the licensee submit the results of the evaluation performed in accordance with 10 CFR 50.59. The assessment of the release of the subject property is as follows:

The partial site release involves approximately 214 acres of non-impacted land out of the approximate 331 acres the site owns. The release does not involve property that is actively used by the plant for routine or decommissioning operations or that is needed for the site's emergency plan.

The 10 CFR 50.59 review assessed the impact of the change in the site boundary on offsite dose calculations and effluent releases and concluded that the change:

- does not adversely affect any design function as described in the Defueled Safety Analysis Report (DSAR)(Reference 13)
- does not adversely affect how a design function as described in the DSAR is performed or controlled
- does not revise or replace an evaluation method used to establish design basis or safety analysis, and
- does not involve a test or experiment not described in the DSAR.

ENVIRONMENTAL IMPACTS

Under 10 CFR 50.83(b)(5), a request for NRC approval of a release of non-impacted areas must include the reasons for concluding that the environmental impacts associated with the proposed release of property will be bounded by appropriate previously issued Environmental Impact Statements. The original Final Environmental Statement (FES) for the ZNPS was issued in December 1972 (Reference 14).

More recently, in connection with the development of the License Termination Plan, Chapter 8, "Supplement to the Environmental Report," was prepared (and submitted to the NRC in December 2014) to describe any new information or significant environmental changes associated with the site-specific decommissioning and site closure activities performed at ZNPS. The supplement includes a detailed description of the remaining decommissioning and site closure activities, the interaction between those activities and the environment, and the likely environmental impact of those activities. The supplement discusses whether the activities and

their impacts are bounded by the impacts predicted in the original FES. Chapter 8 of the License Termination Plan concludes the non-radiological environmental impacts from decommissioning are temporary and not significant.

Zion*Solutions* has evaluated the environmental impacts associated with the proposed release of the subject property and considered those impacts in light of the original FES and Chapter 8 of the License Termination Plan. The evaluation did not identify any significant new environmental impacts or any significant changes from the environmental impacts previously assessed, or currently being assessed, by the NRC. In particular, the evaluation found as follows:

- The land transfer will have no more than a negligible increase in offsite dose consequences and no change in effluent releases.

- The ZNPS radiological monitoring program will account for the revised site area boundary, and no increases in effects are anticipated.

Accordingly, Zion*Solutions* concludes that the environmental impacts associated with the proposed release of the subject property are bounded by the NRC's previous or current reviews, of the ZNPS facility.

ADDITIONAL AREAS TO BE ADDRESSED TO SUPPORT RELEASE OF THE SUBJECT PROPERTY

Statement of Dismantling Activities

No dismantlement activities are required in the subject survey units.

Potential for Cross-Contamination from Subsequent Activities

The potential for cross-contamination of the subject non-impacted areas due to subsequent decommissioning activities is diminutive. The subject areas are bounded on the north by Illinois State Department of Conservation (ISDC) property, the west by general industrial zoned areas and Zion Park District property, the south by ISDC property (camp ground) and the east by Hosah Park, the north contractor parking lot and VCC Pad area (both MARSSIM Class 3 survey units), the Switchyard and the ISFSI. It is highly unlikely that radioactive materials could be introduced into the subject survey units via these borders. Characterization surveys performed in the Class 3 land areas show that residual contamination levels are below those established for unrestricted use. Since decommissioning activities are being conducted onsite in parallel with final status survey and release decisions, measures have been taken to protect these adjacent survey areas from contamination during and subsequent to the FSS. The LTP Section 5.6.3 describes isolation and control measures during and following the FSS. Isolation and control measures in owner-controlled areas adjacent to the subject property have been implemented through approved procedures and will remain in force throughout site final survey activities and until there is no undue risk of recontamination from decommissioning. In the event that isolation and control measures established for these survey areas are compromised, evaluations will be performed and documented to confirm that no radioactive material was introduced into the area

that would affect the results of the FSS. Given the isolation and controls established for the FSS areas adjacent to the subject property it is highly unlikely that radioactive materials could be introduced into the subject property borders. Radioactive material generated during the decommissioning process will be handled and controlled in a manner to prevent contamination of the subject non-impacted areas. These controls include contamination containment, dust control measures, storm water runoff control measures, and proper radiological protection program implementation (including periodic surveillances). Additionally, open-air demolition controls of primary side structures are implemented to limit the spread of contamination during demolition (limits on residual contamination levels that allow for the open-air demolition of primary side structures without adverse effects on the environment have been established. Prior to structure demolition, a Contamination Verification Survey is performed to verify the residual contamination levels are below the established limits).

Impact of Releasing the Subject Property on Part 50 License Basis

The license basis for the ZNPS includes the maintenance of certain programs to fulfill regulatory requirements and functional responsibilities. Throughout decommissioning, these programs are modified as necessary and terminated when the applicable concern is no longer relevant. These program changes are implemented using the change processes specified for each type of program. The methodology for releasing land requires a review and assessment of the impact on license program for the site lands remaining within the domain of the Part 50 License.

- The Technical Specifications are not impacted by the early release of the subject property.
- The Defueled Safety Analysis Report (DSAR) will require minor changes to describe the reduced site licensed area boundaries resulting from the release of the subject property from the Part 50 License.
- The Radiological Groundwater Protection Program will not be affected by early release of the subject property.
- The Fire Protection Program will not be affected by early release of the subject property.
- The Training Program will not be affected by the early release of the subject property.
- The License Termination Plan (LTP), currently being reviewed by the NRC, will be revised to describe the reduced site area resulting from the release of the subject property.

CONCLUSION

The release of the subject property is part of Zion*Solutions*' overall efforts to terminate the ZNPS Part 50 License and to achieve unrestricted release of the entire site (with the exception of the ISFSI area) in accordance with the criteria in subpart E of 10 CFR 20.

In addition, 10 CFR 50.82(a)(11) establishes the criteria to be used by the NRC for terminating license of a power reactor facility. These criteria include (1) dismantlement has been performed in accordance with the approved license termination plan and, (2) the final radiation survey and associated documentation demonstrate that the facility and site have met the criteria for decommissioning in 10 CFR 20, Subpart E. This early release of the subject property area also

supports the process of license termination by demonstrating that this portion of the site lands can be released from ZNPS license. This report along with future reports provides documentation that demolition activities have been performed in accordance with the LTP and the characterization survey confirms the residual radioactivity in each survey unit meets the criteria established in the LTP. Thus this action of the early release of the subject land supports the overall license termination process in accordance with NRC regulations.

In summary, based on the considerations discussed above, this release of the subject property from the ZNPS Part 50 License has no impact on Zion*Solutions*' continued compliance with applicable NRC regulatory standards. Zion*Solutions* has determined that we have adequately evaluated the effect of releasing the subject property, and that the release area has been properly classified as "non-impacted." Accordingly, Zion*Solutions* is requesting the NRC to approve the requested release.

REFERENCES

1) Letter from O. Kingsley Jr. (Commonwealth Edison) to NRC, "Certification of Permanent Cessation of Operations" – February 13, 1998

2) Letter from O. Kingsley Jr. (Commonwealth Edison) to NRC, "Certification of Permanent Fuel Removal" March 9, 1998

3) Letter from T.S. O'Neill (Exelon Generation Company) and J. Christian (Zion*Solutions*) to NRC, "Application for License Transfers and Conforming Administrative License Amendments" – January 25, 2008

4) Letter from J.B. Hickman (U.S. Nuclear Regulatory Commission) to J. Christian (Zion*Solutions*), "Issuance of Conforming Amendments Relating to Transfer of Licenses for Zion Nuclear Power Station, Units 1 and 2" – September 1, 2010

5) U.S. Nuclear Regulatory Commission NUREG-1575, Revision 1, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)" – August 2000

6) "Zion Station Historical Site Assessment" (HSA) – September 2006

7) U.S. Nuclear Regulatory Commission NUREG-1757, Volume 2, Revision 1, "Consolidated Decommissioning Guidance – Characterization, Survey, and Determination of Radiological Criteria, Final Report" – September 2003

8) Zion*Solutions* ZS-LT-02, "Characterization Survey Plan," Revision 3, July 6, 2015

9) Zion*Solutions* ZS-LT-01, "Quality Assurance Project Plan (for Characterization and FSS)" (QAPP), Revision 2, February 10, 2014

10) Zion*Solutions* ZS-LT-03, "Survey Plan, Non-Impacted Open Land Survey Units," Revision 1, June 11, 2013

11) Zion*Solutions* Technical Support Document 14-028, "Radiological Characterization Report," Revision 0, December 15, 2014

12) "Zion Station Restoration Project License Termination Plan, " Revision 0, December 19, 2014

13) Zion Station "Defueled Safety Analysis Report (DSAR)," March 2015

14) U.S. Atomic Energy Commission, Directorate of Licensing, "Final Environmental Statement related to the Operation of Zion Nuclear Power Station Units 1 and 2", Docket Nos. 50-295 and 50-304 – December 1972