



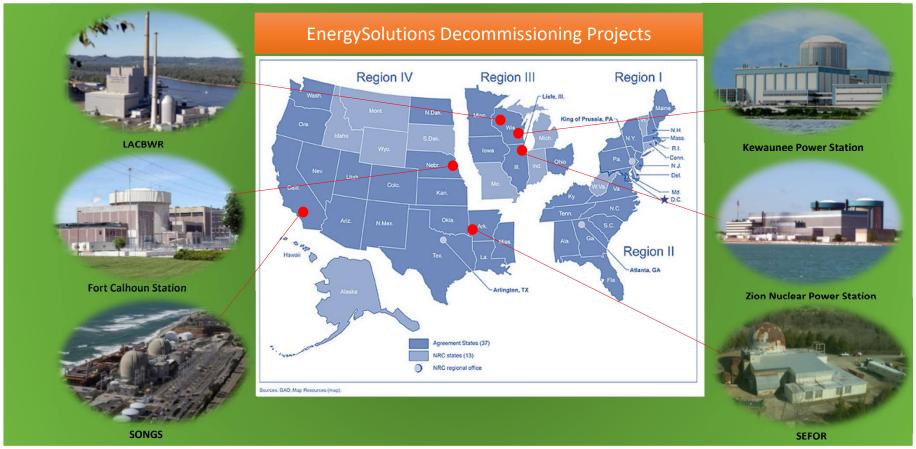
Reference Used For LTP Development



- Regulatory Guide 1.179, "Standard Format and Content of License Termination Plans for Nuclear Power Reactors"
- NUREG-1505, "A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys"
- NUREG-1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions"
- NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)"
- **NUREG-1575**, Supplement 1, "Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME)"
- NUREG-1576, "Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP)"
- NUREG-1700, "Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans"
- **NUREG-1757**, Volume 2, "Consolidated Decommissioning Guidance Characterization, Survey, and Determination of Radiological Criteria, Final Report"

Use of Lessons Learned For LTP Development





Chapter 1: General Information



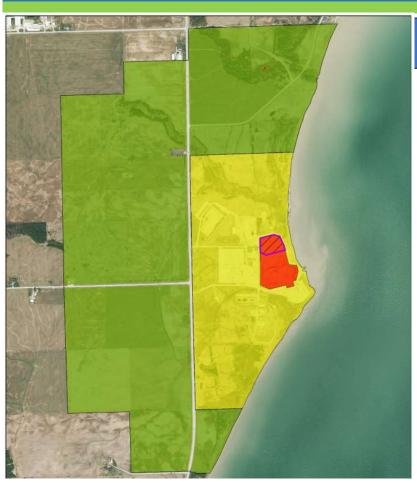
- Decommissioning Objective
- Facility Description
 - Site description
 - Current/future land use
 - Meteorology and Climatology
 - Geology and Seismology
 - Surface and ground water hydrology
 - Environs and natural resources
- Operational Background
- License Termination Plan Summary
- Regulatory Notifications of Changes
 - License conditions that establishes the criteria for determining when changes to the LTP require prior NRC approval. Changes require prior NRC approval when the changes:



- require Commission approval pursuant to 10 CFR 50.59,
- result in significant environmental impacts,
- detract or negate the reasonable assurance that adequate funds will be available
- decrease a survey unit classification (i.e., Class 1 to Class 2 or Class 3, or Class 2 to Class 3)
- increase release criteria (DCGLs)
- increase Investigation Levels
- change the statistical test applied
- increase the Type I Decision Error
- change the approach used to demonstrate compliance with the dose criteria (e.g., change from demonstrating compliance using DCGLs to demonstrating compliance using a dose assessment that is based on final concentration data), or
- change parameter values or pathway dose conversion used to calculate the dose such that the resultant dose is lower than in the approved LTP and if a dose assessment is being used to demonstrate compliance with the dose criteria.

Chapter 1: General Information





Owner Controlled Area/Licensed Site Boundary (883 acres)

Non-Impacted Areas (634 acres)

Impacted Areas Outside
Protected Area
(234 acres)

Impacted Areas Inside Protected Area (11 acres)

> ISFSI (out of scope) (4 acres)

Chapter 1: General Information











The purpose of site characterization is to ensure that the final status survey (FSS) will be conducted in all areas where contamination existed, remains, or has the potential to exist or remain. The results of the characterization survey, along with the information in the Historical Site Assessment (HSA), demonstrate that it is unlikely that significant quantities of residual radioactivity have gone undetected.

Types of Measurements and Samples Open Land Areas:

- Gamma scans
- Surface and Subsurface soil samples
- Sediment and Surface Water samples

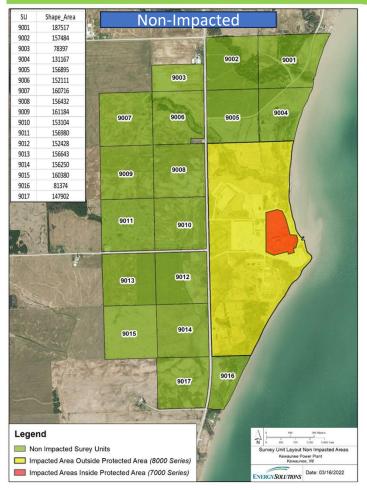
Structures:

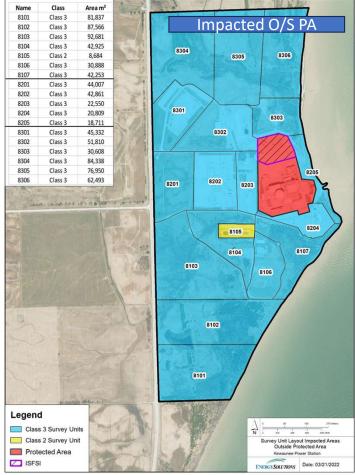
- Beta/gamma scans
- Beta/gamma static measurements
- Volumetric concrete samples
- Smears for loose surface contamination
- · Sediment samples in embedded/buried piping

Class 1	Class 2	Class 3	Non-Imp	Total
	Conc	rete Cores/San	nples	
963	8	159	0	1,130
	Sui	rface Soil Samp	les	
75	10	212	164	461
Subsurface Soil Samples				
84	0	0	0	84
Sediment Samples				
6	0	25	0	31

There are areas known to potentially contain contamination that were inaccessible during the initial characterization which will be surveyed as access is gained. List provided in Ch 5. Results provided in relevant survey unit release records (SURRs).



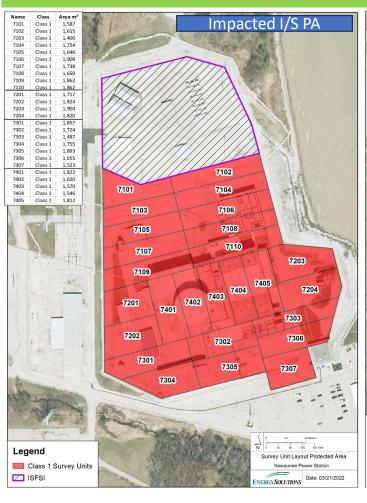


















Chapter 3: Identification of Remaining Dismantlement Activities



Sub-Grade Basements

- Turbine Building (incl. Admin. Bldg.)
 - 3' below grade (603' AMSL)
 - No interior walls except pedestals
 - · Embedded Piping (floor drains)
- Reactor Building
 - 3' below grade
 - No interior walls
 - Concrete removed to liner
 - No embedded piping
- Auxiliary/Fuel Handling Building
 - 3' below grade
 - No interior walls
 - Embedded piping (floor drains)
- Screenhouse
 - 3' below grade
- ATF &TSC (PH1 demo), Training Building, Sewage Treatment Facility
 - 3' below grade
 - No interior walls
- Intake/Discharge Structure to remain B/G

Above-Grade Buildings

- Site Boundary Facility (NI out of scope)
- Maintenance Building
- Switchyard
- Switchyard Control House
- Switchyard South Control House
- Switchyard Spare Parts Building

All other structures will be removed in their entirety with the exception of the sub-grade basements, above-ground buildings and the Switchyard.

Buried Piping

- Sanitary Sewer
- Storm Sewer
- Service Water
- Recirculating Water
- Potable Water
- Fire Protection
- Sewage Treatment Plant
- Switchyard Oil Collection System
- Waste Disposal
- Culverts
- Miscellaneous Buried Pipe (7)

Once D&D activities are completed, as well as subsequent FSS and IVS, each basement or excavation (if required) will be backfilled to grade with clean (non-impacted) fill from an off-site location.

Chapter 3: Identification of Remaining Dismantlement Activities









Date	Milestone	Date	Milestone
Q3/2023	Demolition of Administrative & Training Facility	Q4/2025	Demolition of Transformer Bays
Q3/2023	Demolition of Maintenance Vehicle Garage	Q4/2025	Demolition of Administration Building
Q3/2023	Demolition of Office-Warehouse Annex	Q1/2027	Reactor Vessel Internals Segmentation
Q3/2023	Demolition of Decontamination & Fabrication Bldg.	Q3/2027	Demolition of Auxiliary Building
Q4/2023	Demolition of Technical Support Center	Q4/2027	Reactor Vessel Segmentation
Q4/2024	Demolition of 9-Stall Garage	Q3/2029	Demolition of Intake/Discharge Structures
Q4/2024	Large Component Removal	2030	Demolition of Shield Building
Q1/2025	Demolition of Gatehouse	2030	Demolition of Waste Handling Facility
Q3/2025	Demolition of Sewage Treatment Plant	2030	Demolition of Containment Waste Structure
Q3/2025	Installation of Containment Waste Structure	2030	Final Status Survey Complete
Q4/2025	Installation of Waste Handling Facility	2031	License Termination (except for ISFSI)
Q4/2025	Demolition of Turbine Building		

Chapter 3: Identification of Remaining Dismantlement Activities



Radiation Exposure Projections for Decommissioning

Activity	Estimated Exposure (person-rem)	Exposure-to-Date 6/30/25
		(person-rem)
Large Component Removal – S/G & PZR	17.74	17.74
Large Component Removal – prep and all other	16.7	16.625
Reactor Vessel/Internals Segmentation	60	1.963
AB Surgical Demo	8	1.463
RCS Removal	10	0
AB RCS/Support Systems	6	0
CTMT Surgical Demo	20	0.310
Waste Operations	60	0.006
Reactor Vessel Head	4	0
Total Project Activities	202.44	38.107
Walk downs/Tours/Security/NRC	1.2	0.391
RP Routines	30	0.781
Misc. D&D Activities	7.5	0.098
FSS Activities	0.2	0
Misc. Operational Activities	2	0.031
Total Operational Activities	40.9	1.301
Project Total	243.34	39.408

Projected/Estimated Waste Quantities

Waste Class	Volume (Cubic Feet)
Α	4,394,944
B or C	780
GTCC	173
Clean	8,251,450
Total	12,647,347



Chapter 4: Remediation Plans



- Remediation Actions
 - Scabbling, Pressure Washing, Grit or Sponge Blasting, Hydrolasing, Needle Guns, Excavation, etc.
- Remediation Activities Impact on the Radiation Protection Program
- ALARA Evaluation
 - Costs to remediate and transport waste (plus risk), worker dose, analysis equation



FCS Auxiliary Building

Conclusion: No benefit to remediation past the DCGL

Chapter 5: Final Status Survey Plan



The purpose of the FSS Plan is to describe the methods to be used in planning, designing, implementing, evaluating and reporting the FSS at KPS. The FSS Plan also provides discussion on Quality Assurance (QA).



The FSS Plan describes the final radiation survey process used to demonstrate that the site complies with the radiological criteria for unrestricted use specified in 10 CFR 20.1402.



Establish Radionuclides of Concern and Mixture Fraction

Initial Suite of Radionuclides

Radionuclide	Half Life	Radionuclide	Half Life
Am-241	4.32E+02	Ni-59	7.50E+04
Am-243	7.38E+03	Ni-63	9.60E+01
C-14	5.73E+03	Np-237	2.14E+06
Cm-244	2.85E+01	Pm-147	2.62E+00
C0-60	5.27E+00	Pu-238	8.77E+01
Cs-134	2.06E+00	Pu-239	2.41E+04
Cs-137	3.00E+01	Pu-240	6.60E+03
Eu-152	1.35E+01	Pu-241	1.44E+01
Eu-154	8.80E+00	Sb-125	2.76E+01
Fe-55	2.70E+00	Sr-90	2.91E+01
H-3	1.24E+01	Tc-99	2.13E+05
Nb-94	2.03E+04		

Half Life
1.24E+01
5.73E+03
2.70E+00
5.27E+00
9.60E+01
2.03E+04
3.00E+01

Final ROC and mixture fractions for each media are established in TSD 25-01 (in development)



Establish Derived Concentration Guideline Levels (DCGLs)

A Derived Concentration Guideline Level (DCGL) is a derived, radionuclide-specific activity concentration within a survey unit corresponding to the release criterion.

DCGLs are derived from activity/dose relationships through various exposure pathway scenarios.

To ensure that the summation of dose from each source term is 25 mR/year or less after all FSS is completed, the **Base Case DCGLs** are reduced based on a projected, or *a priori*, fraction of the 25 mR/year dose limit from each media.

The reduced DCGLs, or **Operational DCGLs**, are then used for survey design and implementation.

Table showing $DCGL_{BC}$ and $DCGL_{OP}$ for each media provided in Chapter 5.

The radiological criteria for unrestricted use specified in 10 CFR 20.1402 are: 1) the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group (AMCG) that does not exceed 25 millirem/year, including that from groundwater sources of drinking water, and 2) the residual radioactivity has been reduced to levels that are as low as is reasonably achievable (ALARA).

a priori Dose Fractions for End State Media

Media	A priori Fraction	DCGL Units of Measure
Basement Floors/Walls	0.15	pCi/m²
Basement Embedded Pipe	0.3	pCi/m²
Soil	0.28	pCi/g
Buried Pipe	0.14	dpm/100 cm ²
Above-ground Building	0.09	dpm/100 cm ²
Basement Fill	0.02	pCi/g
Existing Groundwater	0.02	DCF (mrem/year per pCi/L)
Sum	1	



Verify Classification of Survey Units

KS-FS-PR-302

- <u>Class 1</u> areas are impacted areas that have, or had prior to remediation, a potential for radioactive contamination (based on site operating history) or known contamination (based on previous radiological surveys) above the DCGL_W, and there is insufficient evidence to support reclassification as Class 2 or Class 3.
- <u>Class 2</u> areas are impacted areas that have, or had prior to remediation, a potential for contamination or known contamination, but are <u>not</u> expected to exceed the DCGL_w and little or no potential for small areas of elevated activity.
- <u>Class 3</u> areas are not expected to contain residual radioactivity, or are expected to contain levels of residual radioactivity at a small fraction of the DCGL, based on site operating history and previous radiological survey, and have little or no potential for small areas of elevated activity. Previous remediation would preclude a survey unit from having a Class 3 designation.

Survey Unit Type/Classification	Suggested Surface Area Limit
Class 1:	
Above-ground Structures (floor area)	≤ 100 m ²
Land Areas	≤ 2,000 m ²
Basements (all surfaces combined)	≤ 2,000 m ²
Class 2:	
Above-ground Structures (floor area)	100 to 1,000 m ²
Land Areas	2,000 m ² to 10,000 m ²
Basements (all surfaces combined)	2,000 m ² to 10,000 m ²
Class 3:	
Above-ground Structures (floor area)	no limit
Land Areas	no limit
Basements (all surfaces combined)	no limit

Class 1 or Class 2 basement survey unit sizes can exceed the open land area sizes listed in Table 5-1, but the direct measurement frequency (i.e., samples per area) must be equal to or greater than that derived assuming survey unit sizes of 2,000 m² and 10,000 m², respectively.

0



Isolation and Control Measures

KS-FS-PR-303

NOTICE

Final Status Survey CLEAN AREA

THIS AREA IS UNDER THE CONTROL
OF HEALTH PHYSICS

NO DECOMMISSIONING ACTIVITIES
ARE TO BE PERFORMED IN THIS
AREA WITHOUT PRIOR APPROVAL

THE USE, MOVEMENT OR STORAGE OF RADIOACTIVE MATERIAL IS PROHIBITED IN THIS AREA

ENTRY OF PERSONNEL IN THIS AREA IS
PROHIBITED WITHOUT THE
AUTHORIZATION OF HEALTH PHYSICS

CONTACT:	

Isolation & Control measures are implemented IAW KS-FS-PR-003

Describes the protocols used to verify that a survey unit is in suitable physical condition for FSS implementation, that proper I&C measures are in place to limit the potential for cross-contamination from other decommissioning activities and that the final physical and radiological conditions are maintained

Walkdowns performed to verify:

- All decommissioning activities are completed
- All surfaces are prepared for FSS (mark grids/survey locations, mowing, etc.)
- All tools and equipment not needed for FSS are removed
- Measures to prevent cross-contamination are in place
- Hazards have been identified mitigation measures in place or hazard eliminated
- Travel paths through area are removed or re-routed

Periodic surveillances performed and I&C measures remain in force throughout FSS and until there is minimal risk of cross-contamination from D&D or the survey unit released from the license.



Background Reference Areas and Ambient Background



A background study may be necessary to determine Cs-137 levels present in local soil due to fallout from nuclear weapons testing and power plant accidents (Chernobyl)

Using the Data Quality Objective (DQO) process, a sample plan is prepared to obtain measurements/samples at offsite locations (Background Reference Area) having similar geographical features as the licensed site



A Background Reference Area is needed if the Wilcoxon Rank Sum (WRS) is used for the Partial Site Release of Non-Impacted portions of the license property. Normally, the Sign Test is used for FSS and therefore, a Background Reference Area study is not necessary

Depending on the DCGLs, determination and subtraction of ambient background may be required during the FSS of buried piping and above-grade buildings

Media-specific background determinations are typically not needed if using the Sign Test



Additional Chapter 5 Planning Discussions

Surrogate Radionuclides

- Surrogate ratios have been established for several different mixture fractions.
- In cases where the use of surrogate ratios is not feasible, direct analysis of HTD radionuclides will be required.

Adjusted Gross DCGLs

• For the FSS of above-ground buildings, adjusted gross DCGLs are calculated because radionuclide-specific data is not acquired with static measurements.

Sum of Fractions (SOF)

- The SOF or "unity rule" is applied to the data used for the survey planning, data evaluation and statistical tests for the analyses of media since multiple radionuclide-specific measurements will be performed or the concentrations inferred based on known relationships.
- When the unity rule is applied, the DCGL_w (used for the nonparametric statistical test) becomes one.

Area Factors

- Rather than using statistical methods, a simple comparison to an investigation level is used to assess the impact of potential elevated areas.
- The investigation level for this comparison is the DCGL_{EMC}, which is the DCGL_W modified by an AF to account for the small area of the elevated radioactivity.
- Dose from Groundwater
- Dose from Fill Material



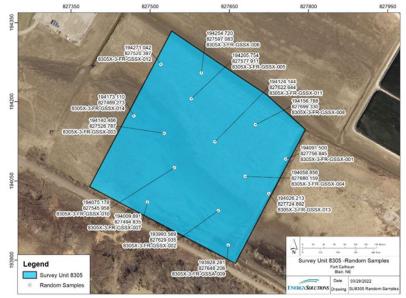
Relevant Procedures

KS-FS-PR-201, "Characterization Sample Plan Development" KS-FS-PR-301, "Final Status Survey Sample Plan Development" KS-FS-PR-306, "Radiological Assessments (RA) and Remedial Action Support Surveys (RASS)"

For FSS and RASS, the survey design is specific for each survey unit

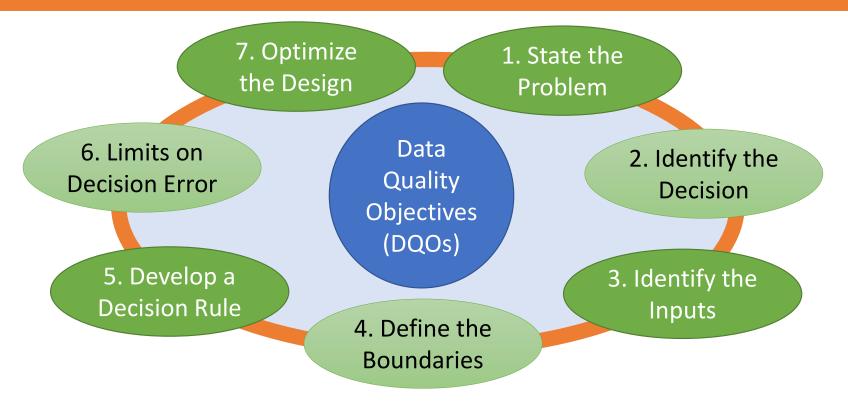
For Characterization surveys and RAs (which is a form of continuing characterization), individual survey units may be grouped together

Likewise, non-impacted survey units may be grouped together when performing characterization surveys to support Partial Site Release





The DQO process includes a series of planning steps found to be effective in establishing criteria for data quality and developing survey plans. DQOs allow for systematic planning and are specifically designed to address problems that require a decision to be made, and alternate actions defined.





A reference grid will be used for reference purposes and to locate the sampling and measurement locations. The reference grid will be physically marked during the survey to aid in the collection of samples and measurements

Software tools such as Visual Sample Plan (VSP) will be used to establish grid spacing, including random start points. Mapping tools such as GIS will be used to determine coordinates for GPS

Systematic

Random

Judgmental

Systematic sampling and measurement locations for Class 1 and Class 2 survey units will be located in a systematic pattern or grid. The grid spacing (L), will be determined using a triangular or square grid. Random start grid location.

For Class 3 survey units, each sampling and measurement location will be randomly selected using a random number generator

Judgmental (biased) sampling and measurement locations are performed at locations selected using professional judgment based on unusual appearance or at locations of known or suspected contamination



The general approach prescribed by MARSSIM for FSS requires that at least a minimum number of measurements or samples be taken within a survey unit, so that the nonparametric statistical tests used for data assessment can be applied with adequate confidence.

Sample Size Determination

Section 5.5 of MARSSIM and Appendix A of NUREG-1757 describe the process for determining the number of sampling and measurement locations (sample size) necessary to ensure that the data set is sufficient for statistical analysis such that there is reasonable assurance that the survey unit will pass the requirements for release.

- Decision Errors
 - The α value will always be set at 0.05 (5 percent) unless prior NRC approval is granted for using a less restrictive value.
 - The β value will also be initially set at 0.05 (5 percent), but may be modified, as necessary, after weighing the resulting change in the number of required sampling and measurement locations against the risk of unnecessarily investigating and/or remediating survey units that are truly below the release criterion.
- Unity Rule or SOF will be used for survey design/data analysis since multiple radionuclide-specific measurements will be performed.
- Gray Region
- Upper Bound of the Gray Region
- Lower Bound of the Gray Region
- Relative Shift
 26

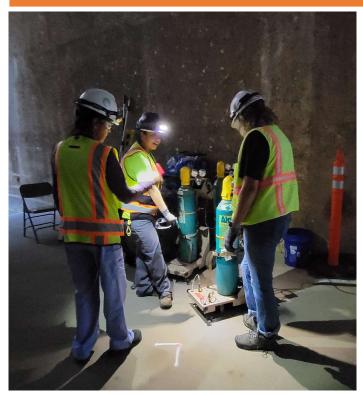


The product of the FSS survey design process is a sample plan. Sample plans are prepared for each survey unit independently and address various elements of the survey, including, but not limited to:

- survey unit preparation requirements including isolation & control measures
- maps showing the survey unit boundaries, measurement/sample locations, and locations of elevated readings
- applicable DCGLs
- instrumentation to be used and methodologies for use
- types and quantities of measurements or samples to be made or collected
- measurement and sample nomenclature
- chain of custody requirements
- investigation criteria
- QA/QC requirements (e.g., replicate measurements or split samples)
- applicable health and safety precautions and mitigation measures



Trained and qualified personnel will perform survey measurements and collect samples. The types of measurements performed for FSS include surface scans, static measurements, gamma spectroscopy of volumetric materials, and in-situ gamma spectroscopy.



The survey implementation requirements and objectives have been outlined in the LTP and incorporated into procedures.





Measurements and/or samples collected to describe the as-left radiological conditions of above-grade structures, basements (including penetrations and embedded piping), surface soil, sub-surface soil, buried piping that are earmarked to remain on site at time of license termination

Scanning is performed in order to locate small, elevated areas of residual activity above the investigation level





Typical FSS Survey Instrumentation

Measurement Type	Detector Type	Effective Detector Area & Window Density	Instrument Model	Detector Model
Beta Static/Scan Measurement	Scintillation	1.2 mg/cm ² 0.01" Plastic Scintillation 125 cm ²	Ludlum 3001/3	Ludlum 44-116
Gamma Scan Measurement	Scintillation	2" diameter x 2" length Nal	Ludlum 3001/3	Ludlum 44-10
Gamma Scan Measurement	Scintillation	3" diameter x 3" length Nal	Ludlum 3001/3	Ludlum 44-20
Gamma Static/Scan Measurement	High-purity Germanium	N/A	AEGIS (Mirion) In Situ Object Counting System (ISOCS)	
Gamma Pipe Static Measurement	CsI NaI NaI	0.75" x 0.75" 2" x 2" 3" x 3"	Ludlum 3001/3	Ludlum 44-159 Ludlum 44-157 Ludlum 44-162
Surface and Volumetric Material (soil, etc.)	High-purity Germanium/CZT	N/A	Canberra Lab In Situ Detector or Kromek	N/A







FSS of Buried Piping, Embedded Piping, and Penetrations









Ludlum 3001

0.75" x 0.75" Csl 2" x 2" Nal Or 3" x 3" Nal

- Detectors are configured in a fixed geometry relative to surveyed surface.
- Detectors are deployed in the pipe and static measurements are acquired at intervals commensurate with the contamination potential.



FSS of Basements and Excavations Using In Situ Object Counting System (ISOCS)

- Performed on Basement Surfaces, Excavations
- ISOCS Instrumentation used for Basements
 - Determines total inventory with depth in concrete
 - Allows remote access; minimizes hands on scan/static surveys or sampling (coring)
 - Nominal FOV of (10-30 m²)
- FSS Survey Units
 - BFM not sensitive to elevated activity levels and size of elevated areas
 - No MARSSIM survey unit size restrictions
 - Averages contamination over entire field of view (FOV)

AEGIS system being used at KPS, which does not require the bulky cooling components

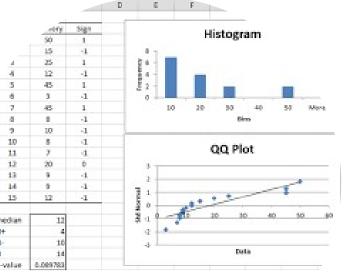


Chapter 5: Final Status Survey Plan: Data Assessment









The Data Quality Assessment (DQA) approach is an evaluation method used during the assessment phase of FSS to ensure the validity of FSS results and demonstrate achievement of the survey plan objectives.

The DQA process will include a review of the DQOs and survey plan design, will include a review of preliminary data, will use appropriate statistical testing, will verify the assumptions of the statistical tests, and will draw conclusions from the data.

Chapter 5: Final Status Survey Plan: Data Assessment



The DQA approach being implemented at KPS is an evaluation method used during the assessment phase of FSS to ensure the validity of FSS results and demonstrate achievement of the survey plan objectives.

- verification that the measurements were obtained using approved methods,
- verification that the quality requirements were met,
- verification that the appropriate corrections were made to any gross measurements, and that the data is expressed in the correct reporting units,
- verification that the Minimum Detectable Concentration (MDC) requirements have been met,
- verification that the measurements required by the survey design, and any measurements required to support investigation(s) have been included,
- verification that the classification and associated survey unit design remain appropriate based on a preliminary review of the data,
- subjecting the measurement results to the appropriate statistical tests, and
- determining if the residual radioactivity levels in the survey unit meet the applicable release criterion, and if any areas of elevated radioactivity exist.

Chapter 5: Final Status Survey Plan: Data Assessment



- Non-parametric Statistical Test
 - For KPS, the Sign test is the most appropriate test for FSS. Characterization surveys indicate that Cs-137 found in background due to global fallout constitutes a small fraction of the DCGL. Consequently, the Sign test will be applied to open land, basement surfaces (to include penetrations and steel liner), above-ground buildings, embedded pipe and buried piping when demonstrating compliance with the unrestricted release criteria.
- Data Investigations
 - If all measurements are below the DCGL $_{OP}$, then the survey unit passes FSS a Sign Test is not required.
 - If an individual measurement exceeds the DCGL_{OP}, then the Sign Test is performed.
 - If an individual measurement exceeds the DCGL_{BC}, then an Elevated Measurement Comparison is performed, or the location is remediated.
 - If the Sign test fails, or if the mean of the total SOFs in a survey unit exceeds one (using Operational DCGLs), then the survey unit will fail FSS.
 - If the survey unit fails FSS, then an investigation will be implemented. Depending on the results of the investigation, the survey unit will be remediated, reclassified (if necessary) and re-surveyed.

Chapter 5: Final Status Survey Plan: Data Reporting



A Survey Unit Release Record will be prepared to provide a complete record of the as-left radiological status of an individual survey unit, relative to the specified release criteria. Survey Unit Release Records will be made available to the NRC for review as appendices to the appropriate FSS Final Report.

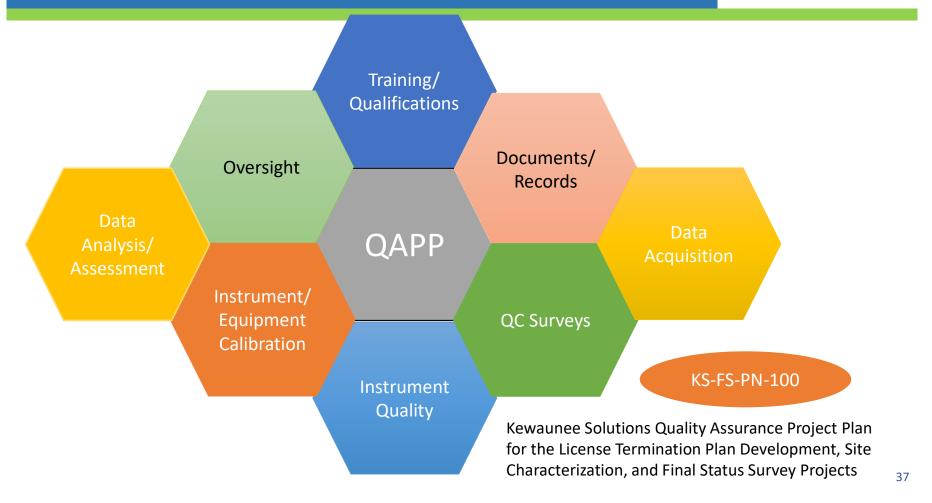
An FSS Final Report, which is a written report that is provided to the NRC for its review, will be prepared to provide a summary of the survey results and the overall conclusions which demonstrate that the site, or portions of the site, meets the radiological criteria for unrestricted use, including ALARA.

The FSS Final Report will be provided to the NRC in phases The phased approach for submittal is intended to provide NRC with detailed insight regarding the remediation and FSS early in the process, to provide opportunities for improvement based on feedback, and to support a logical and efficient approach for technical review and independent verification.



Chapter 5: Final Status Survey Plan: Quality Assurance





Chapter 5: Final Status Survey Plan: Radiological Assessments



Sampling and/or measurements performed in survey units to assess the radiological conditions where radiological conditions may have changed since initial site characterization or were unknown due to inaccessibility (another form of site characterization)

Gamma scans and soil sampling – gamma spec. analysis expedited

- Primarily scheduled after secondary-side building demolition/slab removal
 - Successor to building demolition/slab removal
 - Predecessor to backfill of building footprint
- Performed in trenches/excavations when installing/removing piping
 - Scan topside land where excavation footprint and where excavated soil will be staged
 - Periodic scans/samples obtained as excavation progresses, and final scans/samples obtained when excavation complete
- Performed in any areas to verify survey unit is suitable for implementation of FSS
- Large excavations (removal of sub-grade <u>basement</u>) or prior remediation require FSS.



Chapter 5: Final Status Survey Plan: Remedial Action Support





Realtime measurements guide remediation Formal surveys conducted in survey units to support remediation, followed by subsequent FSS

RASS normally performed in survey units undergoing FSS as a result of:

- o a measurement exceeding the DCGL
- a measurement exceeding an elevated measurement comparison (EMC)
- o the survey unit failing the statistical testing





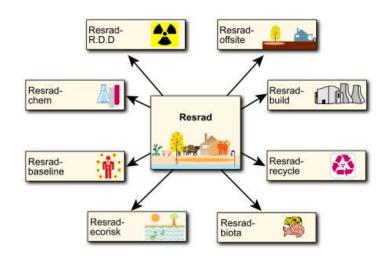


Compliance Exposure Scenario

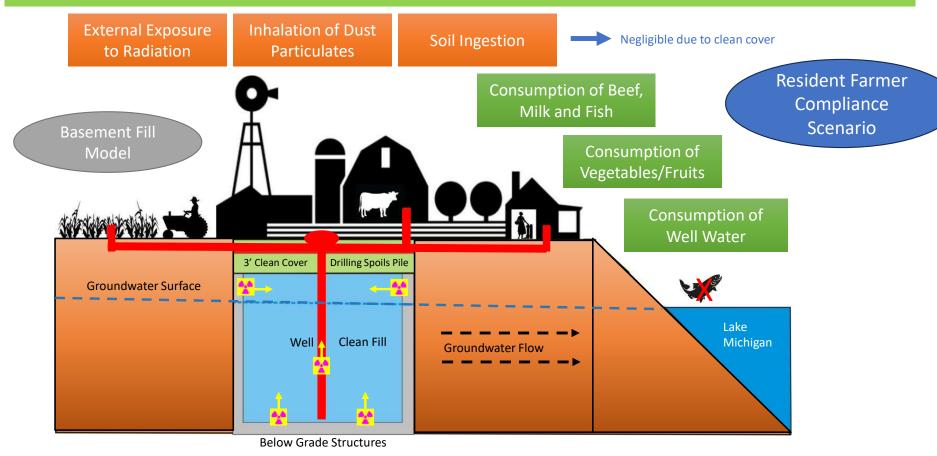
- Excavation of basement walls ≤ 3 m below ground surface included in Resident Farmer scenario.
- Excavation of basement walls, floors and foundations below 3 m included in Industrial Use scenario.
- Bounding Building Occupancy exposure scenario is applied to demonstrate compliance with above-grade buildings.

Less Likely But Plausible Exposure Scenarios

- Excavation below 3 meters
- Contaminated drilling spoils brought to the ground surface (drilling through embedded piping in basement floors)
- Offsite disposal/recycling of excavated basement concrete walls and Containment steel liner.









Base Case DCGLs (DCGL_W)

Radionuclide specific

- Below-grade basement surfaces (floor, walls, and penetrations)
- Embedded piping
- Surface Soil (0.15 m)
- Subsurface Soil (1.0 m)
- Buried piping

Screening Values in NUREG-1757, Vol. 2, Table H.1 will be used as DCGLs for above-grade buildings

Operational DCGLs

To ensure the summation of dose from each source term is \leq 25 mrem/year after ALL FSS is completed, Base Case DCGLs are reduced based on an expected, or *a priori*, fraction of the 25 mrem/year dose limit from each source term.

Used as the DCGL for survey design and investigations levels.

Existing groundwater Dose Conversion Factors (DCFs)

Basement Fill dose to source ratios (DSRs) *(if on-sight fill used)

* Not planned at Kewaunee Power Station (KPS)

Area Factors will be applied to Soil and Basement Concrete surfaces



Compliance Dose Summation

- The final dose to demonstrate compliance is the summation of the average dose from each site media:
 - Soil (s),
 - Basement concrete (b,c),
 - Basement embedded pipe (b,ep),
 - Buried pipe (bp),
 - Above ground buildings (aqb), and
 - Existing groundwater (egw).

$$D_c = D_s + D_{b,c} + D_{b,ep} + D_{bp} + D_{agb} + D_{egw} \le 25 \text{ mrem/year}$$

Chapter 7: Update of the Site-Specific Decommissioning Costs



- Cost Assumptions Used, Including a Contingency Factor (normally 25%)
- Cost Estimates Previously Docketed with the NRC
- Cost Estimate Description and Methodology
- Summary of the Site-Specific Decommissioning Cost Estimate
- Radiological Decommissioning Costs
 - Class A Large Components
 - Class A Bulk Materials
 - Class A Containerized Wastes
 - Class B/C Waste
- Spent Fuel Management Costs
- Site Restoration Costs
- Decommissioning Funding Plan



Typical Chapter 7 submittals include a redacted version (withheld from public disclosure under 10 CFR 2.390 for proprietary reasons) and a non-redacted version

Chapter 8: Supplement to the Environmental Report



- Site Location and Description
- Remaining Dismantlement & Decommissioning Activities
- Impacts on the PSDAR
- KPS Environmental Description
- Environmental Effects of Decommissioning
 - · Radiological Effects of Decommissioning
 - Non-radiological Effects of Decommissioning
- Overview of Regulatory Governing Decommissioning Activities and Site Release
 - NRC
 - EPA
 - State & Local
- Conclusion
 - Verify there are no new or significant environmental change associated with decommissioning



QUESTIONS?



