

MC-1

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	Signature or N/A	Date		TPC No	Effective Date of TPC	Expiration Date of TPC

TERMINATION SURVEY QUALITY CONTROL

1.0 PURPOSE

This procedure implements quality control provisions for the Shoreham Decommissioning Project Termination Survey.

2.0 RESPONSIBILITY2.1 Termination Survey Section Head

The Termination Survey Section Head is responsible for the content and implementation of this procedure.

2.2 Termination Survey Personnel

2.2.1 Termination Survey engineering and supervisory personnel are responsible for ensuring that the provisions of this procedure are satisfied.

2.2.2 Unless explicitly stated in this procedure, the primary responsibility for conduct of the operations described herein is established by the Termination Survey Section position responsibilities in SP 67X001.12 (Reference 11.1).

SR2-1021.600-6.421

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3.0 DISCUSSION

3.1 Scope

This procedure implements specific quality control measures identified in the Termination Survey Program Description (Reference 11.2) and the Termination Survey Plan (Reference 11.3). The Termination Survey Program also conforms to Decommissioning Project quality assurance requirements in the LIPA Quality Assurance Manual (Reference 11.4).

3.2 Contents

This procedure contains the following sections:

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4.0 PRECAUTIONS

N/A

5.0 PREREQUISITES

N/A

6.0 LIMITATIONS AND ACTIONS

N/A

7.0 MATERIALS AND/OR TEST EQUIPMENT

N/A

8.1 Criteria for Use of Historical Survey Data

Historical measurement data includes radiological measurements taken at Shoreham Nuclear Power Station prior to the initiation of Termination Survey measurements. Under certain conditions, historical measurement data may be used to supplement Termination Survey measurements for purposes of demonstrating that a survey unit satisfies the release criteria. The conditions and actions described below provide assurance that the quality of such data are adequate for inclusion with Termination Survey measurements and that such data are appropriately used:

- 8.1.1 The historical measurements shall have been performed using approved SNPS procedures (or work instructions) for the measurements and approved calibration and operating procedures for the instruments and detectors used.
- 8.1.2 A legible copy of the survey is available and is included in the survey data file for the survey unit.
- 8.1.3 All measurement data that are to be used must be shown on the survey form(s) as the numerical value. No "less than" results are acceptable. All information must be available on the survey forms to allow conversion of raw data to units reported, e.g., dpm/100 cm².
- 8.1.4 The location of the measurements must be specified accurately enough so that the approximate locations can be revisited and the measurement results verified, if necessary.
- 8.1.5 A reasonable basis must exist for concluding that changes have not occurred subsequent to the historical measurements which could invalidate the measurements. Involvement of the survey unit with decommissioning activities subsequent to the measurements, for example, may invalidate the results.
- 8.1.6 The selected historical measurement locations and measurement results are identified at the time of the Termination Survey design and included in the survey design.
- 8.1.7 Qualified historical measurements and Termination Survey measurements within a survey unit are combined into a single data set. This combined set is used to demonstrate satisfaction of the release criteria.
- 8.1.8 If QC replicate surveys were previously performed in support of historical surveys, additional QC replicate surveys of these locations are not required (see Section 8.2 below).

8.2 Replicate QC Measurements

Replicate measurements are performed at a fraction of the locations selected in the design of the Termination Survey for each survey unit. These are for the purpose of monitoring the level of control of the Termination Survey measurement process, i.e., to verify that measurements taken by any qualified technician and with any calibrated instrument are within the range of expected values. The replicate sample is also used to provide a check that systematic errors have not been introduced into the survey of a survey unit. The replicate measurements are implemented in accordance with the guidelines given below.

- 8.2.1 A sample of at least five per cent of the measurement locations specified in the survey design for a survey unit is selected at random after the survey design is completed. This is done using a random number generator in accordance with SP 67X001.10, (Reference 11.5).
- 8.2.2 A minimum of one population (subunit) in each survey unit is selected for QC replicate measurements by the responsible Radiological Engineer.
- 8.2.3 A separate survey sub-package is prepared under the direction of the responsible Radiological Engineer for the QC replicate measurements for each survey unit. This package contains the standard forms for a survey package as defined in the Termination Survey Procedure (SP 67X001.02) (Reference 11.6).
- 8.2.4 The survey instructions for the QC replicate survey shall require the same number and type of measurements as were performed in the original survey (including scan surveys, if performed in the original surveys).
- 8.2.5 The QC replicate survey is a "blind" replicate.
 - .1 The location of the QC replicate measurements is not known to the original survey team.
 - .2 The results of the original survey measurements are not known to the technicians performing the QC replicate survey.
- 8.2.6 The QC replicate measurements are implemented independently from the original measurements, i.e., a different technician and different instruments are used. Replicate QC measurements are initiated after the original survey measurements are complete and approved by the responsible Radiological Engineer.

Note: In system surveys, the QC replicate survey measurements may be taken prior to completion of the remainder of Termination Survey measurements when components may only be accessible for a short time.

8.2.7 Replicate smears for removable surface contamination should be taken adjacent to the original smear path, if possible, because the original smear may have perturbed the surface contamination condition. Care should be taken, however, to ensure that the replicate smear is as "representative" as possible of the original smear.

8.2.8 Evaluation of the QC replicate sample is performed under the direction of the designated Radiological Engineer as follows:

- .1 The measurements in the original Termination Survey design data set are converted to the reporting units, e.g., dpm/100 cm².
- .2 The mean and standard deviation are calculated for each type of measurement in the survey design.
- .3 The QC replicate measurements are converted to reporting units.

8.2.9 The acceptance criterion for the replicate QC measurements is given in Section 9.0.

8.2.10 If the acceptance criterion is not satisfied, the original survey is reviewed to determine the source(s) of the discrepancy. This review is performed by the assigned Radiological Engineer under the supervision of the Termination Survey Engineer to identify the appropriate corrective action.

8.2.11 If a new QC replicate sample is indicated, it is designed and steps 8.2.1 through 8.2.10 (as applicable) are repeated.

8.3 Instrument Quality Control

8.3.1 Instrument Calibration

The instruments used in the Termination Survey are calibrated and controlled to provide a high degree of assurance that Termination Survey measurements are valid.

- .1 Each instrument and detector used in the Termination Survey, except as noted in the following subsection shall be calibrated under an approved station calibration procedure. The frequency is established by procedure on a six months (plus or minus 90 days) rolling schedule based on the time of calibration.
- .2 The Reuter-Stokes pressurized ion chamber is calibrated by the manufacturer at two year intervals or after each repair. A calibration certificate provided by the manufacturer shall be maintained on file with the instrument records.
- .3 Laboratory smear counting systems are calibrated annually in accordance with approved procedures.

- .1 The Canberra smear counter is calibrated in accordance with SP 66X026.02 (Reference 11.7).
- .2 The Tennelec smear counter is calibrated in accordance with SP 66X026.01 (Reference 11.8).

8.3.2 Response Check Control Charts

A control chart shall be maintained for each detector, or detector-meter combination as appropriate, to monitor the instrument response to a check source. A control chart is maintained for each detector or instrument used for measurements recorded in the survey package for each survey unit. The control charts are prepared and maintained in accordance with SP 61X081.01 (Reference 11.9).

8.3.3 Background Control Charts

A control chart shall be maintained for the background response of each detector, or instrument-detector combination as appropriate. This Section, (8.3.3) applies to portable instruments not already covered under specific procedures for background control charts.

- .1 The reference background for each type of detector as established in accordance with SP 67X001.09 (Reference 11.10) is used as the mean background value.
- .2 A background measurement shall be taken each day in a location free from non-background radiation sources. Locations used for daily background checks shall be in a location for which a background assessment has been conducted and documented in accordance with SP67X001.09 (Reference 11.10).
- .3 The measurement shall be taken in a manner consistent with the way the detector is used for measurements. That is, for instruments used for direct surface measurements, the detector is placed within one centimeter of a structure surface known to be free from contamination, held stationary and the count rate observed.
- .4 The control chart is prepared and maintained in accordance with SP 61X081.01 (Reference 11.9)

8.3.4 Control of Instruments

Instruments used for Termination Survey measurements shall be maintained in a central location and issued daily to technicians performing Termination Survey measurements. Instruments are returned at the end of each shift. The issue, receipt by the designated responsible technician and return to the issue location are documented in accordance with SP 61X080.01 (Reference 11.11). Personal custody of ESP-2 data logging instruments is also maintained while in transit to, and return from data downloading in accordance with SP 67X001.05 (Reference 11.12).

8.4 Custody of Samples

8.4.1 Smears

- .1 Smears are labeled in accordance with the instructions in SP 67X001.02 (Reference 11.6). It is the responsibility of the designated HP technician to maintain custody of and to deliver smears from each survey unit to the smear counting location. The designated technician relinquishes custody of the smears upon delivery to the counting location and documenting the turnover of custody.
- .2 A log is maintained to document the transfer of custody of smears to the count room. Appendix 12.1 contains a sample smear custody log form and instructions (sample) for completion of the form. Smears are not retained after counting is completed, unless specifically directed by a Radiological Engineer or supervisor.

8.4.2 Special Samples

Special samples include miscellaneous material samples such as loose paint chips, dust, dirt and sediments as described in Section 4.0 in the Termination Survey Plan (Reference 11.3). These are identified by labeling the sample container with the survey unit ID, the date of collection and the name of the technician who collected the sample. The technician who collected the sample is responsible for delivering the sample to the SNPS Radiochemistry counting laboratory. All special samples are logged into and tracked in the Radiochemistry sample log. Special samples are not retained after counting and analysis unless specifically requested by the responsible Termination Survey Radiological Engineer.

8.4.3 Soil Samples

Termination Survey soil samples are collected and chain of custody maintained by LILCO Environmental Engineering Department procedures.

8.5 Survey Documentation

8.5.1 Measurement Documentation

Each survey measurement is documented to identify the: survey unit, date, technician name, instrument serial No. (and detector serial No. if applicable), type of measurement, the measurement value and the measurement units. Documentation of measurements is controlled by the Termination Survey Procedure (Reference 11.6)

8.5.2 Supporting Documentation

.1 Instrument Calibration and Repair Records

Termination Survey instrument calibration and repair records are maintained per SP 61X080.01 (Reference 11.11).

.2 Other Documentation

Termination Survey supporting documents and records essential to survey quality are identified in Section 8.7 of this procedure.

8.5.3 Personnel Signature File

A file shall be established and maintained to document the signatures of personnel who sign Termination Survey documents. The file will contain an entry for each individual who is authorized to perform Termination Survey tasks. Each entry contains: printed full name; Social Security Number; job title, e.g., Jr Technician, Sr Technician, Lead Technician, Foreman, Radiological Engineer, etc.; signature; and initials. The signature file is controlled in accordance with SP 67X001.07 (Reference 11.13). A sample signature file form is shown in Appendix 12.2.

8.6 Data and Documentation Review

8.6.1 The description and classification of each survey unit shall be reviewed by the Termination Survey Engineer or a designated Radiological Engineer who was not involved in preparation of the description or its classification. The review shall verify the accuracy of the description, and its classification as "affected" or "unaffected".

8.6.2 The survey design of each survey unit shall be reviewed by the Termination Survey Engineer or a designated Radiological Engineer (who was not involved in the survey design). The review is conducted to ensure that the design satisfies the applicable design guidelines in Appendix A of the Termination Survey Plan (Reference 11.3). The reviewer also ensures that the design is accurate and legibly documented via the survey instructions in the survey package. This review is documented on the Termination Survey Control Form (SP 67X001.02, Reference 11.6).

8.6.3 Each completed survey package shall be reviewed by the assigned Lead technician (under the supervision of a Termination Survey HP Foreman) prior to returning the package to the cognizant Termination Survey Radiological Engineer. The package is reviewed to ensure that: all measurements in the survey instructions have been performed and properly documented, all required supporting information is accurately documented, and that all samples of material have been properly identified and transferred to the individual responsible for counting or analysis. This review is documented on the Survey Control Form (SP 67X001.02, Reference 11.6).

8.6.4 Each survey package shall be reviewed by the assigned Termination Survey Radiological Engineer after all field measurements are completed. He approves the package for data entry into the Termination Survey Database. After all data from the survey of a survey unit has been entered into the database in accordance with SP 67X001.05 (Reference 11.12), the assigned Termination Survey Engineer reviews the database data entry verification report (echo report) to ensure that the data report is an accurate report of all the measurements taken in the survey. This review is documented on the Termination Survey Control Form (SP 67X001.02, Reference 11.6).

8.6.5 The Termination Survey Engineer or an assigned Radiological Engineer shall review the Release Record for each survey unit prior to releasing it for final review and approval by the Site Review Committee. This review shall check the accuracy of all results, and supporting documentation which attest to the attainment of the release criteria. This review is documented on the Release Record Report (SP 67X001.06, Reference 11.14).

8.7 Document Control

8.7.1 Essential Documents

Certain documents and records produced during the Termination Survey are determined to be essential for survey data quality or overall survey quality. These are:

- a. History File (History File Report) (SP 67X001.01, Reference 11.15),
- b. Survey Package (SP 67X001.02, Reference, 11.6),
- c. Release Record (SP 67X001.06, Reference 11.14).

Other documents and records may also be determined by the Termination Survey Engineer to be essential to survey quality.

8.7.2 Control of Essential Documents

Termination Survey documents and records identified as essential to survey quality are controlled. Documents controlled by the Termination Survey Section are controlled under an approved procedure (SP67X001.07, Reference 11.13).

8.8 Software Verification

8.8.1 Termination Survey Database Management System

Termination Survey measurement data are entered into a computerized database management system (DBMS). This system is used to process survey data, perform calculations and generate survey data reports. Data processing requirements are established by SP 67X001.11 (Reference 11.16). The Termination Survey DBMS is not used as the principal means to store measurement results. These results are maintained in documents controlled in accordance with SP 67X001.07 (Reference 11.13).

8.8.2 Software Verification

Testing and verification of the Termination Survey DBMS shall be performed and documented under a test plan. The scope includes:

1. testing and verification of data entry and data storage subroutines
2. testing and verification of data processing and reporting facilities. This includes independent testing of the calculation algorithms used to convert raw measurement data to reporting units (dpm/100 cm², etc), and calculation of survey unit population statistics defined in SP67X001.11 (Ref.11.16).

8.8.3 Documentation of Results

Results of the Termination Survey DBMS testing and verification shall be documented in a report. The report shall include a description of the testing performed, including identification of the software modules and subroutines tested; and test results. This documentation shall be retained in the Termination Survey Section files until transmitted to SR2 for archival storage in accordance with SP 67X001.07 (Reference 11.13).

9.0 ACCEPTANCE CRITERIA

- 9.1 Acceptance criteria for use of historical survey measurements in Termination Survey results are described in Section 8.1.

9.2 Acceptance criteria for replicate QC measurements.

9.2.1 Fixed Point Measurements

Fixed point measurements include direct surface and removable surface contamination, and gamma exposure rate measurements. Acceptable results for QC replicate survey measurements are determined as follows:

- .1 The original Termination Survey measurements are considered to be the parent population defined by their mean and standard deviation (assumed to be normal).
- .2 The QC replicate measurements must be a valid sample of the parent population. The QC replicate measurements should fall within plus and minus 1.96 standard deviations, (σ) of the population mean, (μ). However, there is a finite probability that sample values outside this range can still be members of the population. The number of measurements in a specified sample size which may fall outside the range $\mu \pm 1.96 \sigma$, (at the 95 % confidence level) is given in the table below, (Reference 11.17). No QC sample values can fall outside the range: $\mu \pm 3 \sigma$. If this occurs, the acceptance criterion is not met.

Table 9.1

QC Replicate Sample Acceptable No. of Values outside $\mu \pm 1.96 \sigma$

QC Replicate Sample Size (No. of measurements)	Acceptable No. of Measurements outside the range: $\mu \pm 1.96 \sigma$
2 to 7	1
8 to 16	2
17 to 28	3
29 to 40	4

9.2.2 Scan Surveys

Replicate measurements for scan surveys must not be greater than 5,000 dpm/100 cm².

10.0 FINAL CONDITIONS

N/A

11.0 REFERENCES

- 11.1 SP 67X001.12, Termination Survey Section Conduct of Operations.
- 11.2 Long Island Power Authority, Nuclear Management Control Manual, "Nuclear Organization Management Control Program for Decommissioning Termination Survey Program Description", PDXOM-01.
- 11.3 Long Island Power Authority, "Shoreham Decommissioning Project, Termination Survey Plan".
- 11.4 Long Island Power Authority, Quality Assurance Manual, Appendix N, "Decommissioning Activities", June 1992.
- 11.5 SP 67X001.10, Termination Survey Design.
- 11.6 SP 67X001.02, Shoreham Decommissioning Project Termination Survey Procedure.
- 11.7 SP 66X026.02, Calibration of the Canberra 2400 Alpha/Beta Counting System.
- 11.8 .P 66X026.01, Calibration of the Tennelec Automatic Proportional Counter.
- 11.9 SP 61X081.01, Chi-Square Test and Control Chart for HP Labor- atory Counting and Termination Survey Field Instruments.
- 11.10 SP 67X001.09, Termination Survey Background Assessment.
- 11.11 SP 61X080.01, Control of Health Physics Instrumentation.
- 11.12 SP 67X001.05, Termination Survey Data Receipt and Management.
- 11.13 SP 67X001.07, Termination Survey Document Control and File Management.
- 11.14 SP 67X001.06, Termination Survey Release Record Content and Preparation.
- 11.15 SP 67X001.01, Termination Survey History File Content and Preparation.
- 11.16 SP 67X001.11, Termination Survey Data Processing.
- 11.17 Long Island Power Authority, Nuclear Engineering Division, Calculation CGI#039479, "Maximum Number of Samples Expected Outside 95% Confidence for a Given Sample Size".

12.0 APPENDICES

- 12.1 Termination Survey Smear Custody Log and Instructions - Sample
- 12.2 Termination Survey Signature File Form - Sample

Smear Custody Log and Instructions
(Sample)

1.0 Completion and Maintenance of Termination Survey Smear Custody Log

1.1 The smear custody log is maintained at the location of the smear counters used for counting Termination Survey smears.

1.2 An entry is made in the log form each time smears are delivered for counting, i.e., a complete row of the form is completed.

1.3 A separate entry is required for smears from each survey unit.

1.4 Instructions for completing a smear custody log form entry.

1.4.1 The survey technician who delivers the smears legibly completes the following for each batch of smears delivered.

.1 Date/time

Indicate the date and time (in 24 hour military time) the smears are delivered for counting.

.2 Survey Unit #

Fill in the survey unit number (ID code from SP 67X001.09) to identify where the smears were taken

.3 Survey Type (Orig, QC, etc)

Indicate whether, the smears are from a regular termination survey, (original survey), a QC replicate survey, or a resurvey.

.4 Smears/Survey Point #

Indicate the starting and ending number of the survey points of the smears. Show all breaks in sequence by indicating the starting and ending numbers of each continuous sequence of smears.

.5 Delivered by, Print/Sign.

The delivering technician prints his or her name on the top line and signs on the bottom line of the entry row.

- 1.4.2 The counting technician completes the last column entry, "Received by (count room tech) Print/Sign," by printing his or her name on the first line and by signing the second line.
- 1.4.3 The counting technician identifies the model & serial number of the smear counter in the last column of the entry line.
- 1.5 A supervisor (Foreman or designee) reviews the smear custody log periodically and signs and dates each completed log sheet.

TERMINATION SURVEY SIGNATURE FILE FORM

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[illegible]

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Rev. 0

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TEMPORARY PROCEDURE CHANGE NOTICE

Date 1-28-93TPC No. 93-05Procedure No. 67X 001.03Rev. 0Title Termination Survey Quality Control

Yr.-Seq. No.

Procedure Section 8.2 "Replicate G.C. Measurements"TPC Effective Date 1/29/93Procedure Page 4,5TPC Expiration Date 2/27/93Procedure Change: Section 8.2.3 & 8.2.7 re-written[See attached mark-up]

(Use reverse side if necessary)

Reason for Change: To list specific forms needed instead of referencing a procedure and to clarify replicate survey measurements to more detail.Recommended for permanent procedure change Yes X No Originator Print Name: Ward G. BrunkowDate: 1-28-93

Safety Evaluation:

INITIALS

Does this change, revision, or deletion:

- | | |
|---|---------------------------|
| 1. Change the facility as described in the DSAR? | Yes <u>✓</u> No <u>CM</u> |
| 2. Change the procedures as described in the DSAR? | Yes <u>✓</u> No <u>CM</u> |
| 3. Conduct tests/experiments not described in the DSAR? | Yes <u>✓</u> No <u>CM</u> |

If the answer to any of the above three questions is YES, then a Safety Evaluation Checksheet, Appendix 12.1 of SP 12X004.02, shall be used.

Plant Management Staff

review and approval signature: Clyde T. Hansen Date: 1/29/93

Technical Specification Evaluation

Does this change, revision or deletion:

- | | | |
|--|---------------------------|--|
| 1. Alter the intent of the original procedure: | | |
| A. Change the purpose of the procedure? | Yes <u>✓</u> No <u>CM</u> | |
| B. Change the acceptance criteria of the procedure? | Yes <u>✓</u> No <u>CM</u> | |
| C. Substantially and significantly modify the method of procedure performance. | Yes <u>✓</u> No <u>CM</u> | |
| 2. Create a condition or conduct an operation which exceeds, or could result in exceeding, the Tech. Spec. Limits? (including PCP, FHAR and ODCM). | Yes <u>✓</u> No <u>CM</u> | |

If the answer to any of the above questions is YES, do not approve the use of this form. An SPCN must be submitted in order to make this procedure change.

SRO review and approval

Date 1/29/93

SRC COMMITTEE Approved-No longer required Approved for days.
 Review: Not Approved-Discontinue use X Approved for procedure revision.

Disapproval Reason NAPlant Actions Req'd. NoneDivision Manager/SRC Chairman [Signature]Date 2-10-93Meeting No. 93-007Resident Manager Approval [Signature]Date 2-10-93

8.2.7

The replicate survey measurements are intended to verify the reproducibility of the original survey results within the tolerance established by the acceptance criterion. This requires that the replicate survey of a location involve the same number and type of measurements as taken in the original survey. The precise "location" of each original survey measurement need not be duplicated. Smears should not be taken over the exact location of the original smear if possible.

8.2.3

A separate survey package is prepared under the direction of the responsible Radiological Engineer for the QC replicate measurements for each survey unit. This package contains Termination Survey Instruction forms, Termination Survey Data sheets, comment sheets and maps as determined by the responsible Radiological Engineer to be necessary for performance and documentation of the survey.