



LONG ISLAND LIGHTING COMPANY

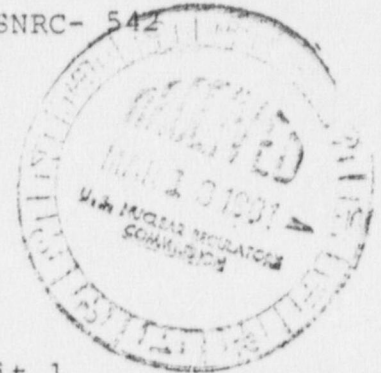
SHOREHAM NUCLEAR POWER STATION

P. O. BOX 604, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

March 12, 1981

SNRC- 542

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555



SER REVIEW
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Dear Mr. Denton:

The enclosed information reflects the understandings we have reached with members of your staff addressing their concerns related to the review of the Shoreham docket. This information will be formally incorporated into the FSAR at a later date.

Very truly yours,

J. P. Novarro
Project Manager
Shoreham Nuclear Power Station

RAH:mp

cc: J. Higgins

Attachment

Boo's

8103160539

Information Enclosed With SNRC-542, Dated March 12, 1981

- 1) Revision to FSAR pg. 14.1-6
- 2) Revision to FSAR Table 14.1.1-1
- 3) Revision to NRC Information Request Response 413.14
- 4) Response to NRC Information Requests 281.1 thru 281.5
- 5) Response to NRC Information Requests 331.32, as well as revisions to FSAR pages 12.5-4, 12.5-5, and 12.5-6
- 6) Revision to FSAR page 8.3-10
- 7) Response to NRC Information Requests 371.16 thru 371.20
- 8) Response to NRC Information Request 121.34
- 9) Revision to FSAR Table 1.3.2-1

14.1.1.8 Evaluation, Documentation, and Approval of Startup Test Results

The procedure to be followed for evaluating, documenting, and approving startup test results is shown in block diagram form on Fig. 14.1.1-2 and is outlined as follows:

When a test is completed, engineers from the Plant Operating Staff (POS), together with other engineers from GE or S&W, as appropriate, review the completed test procedure and test data for completeness and conformance to stated acceptance criteria, and provide an analysis and/or summary of the test results. The ROC then gives its approval of the test. An audit is performed by a member of the Operating QA Section to ensure that all quality requirements have been met, and formal acceptance of the test and documentation is made by the Plant Manager.

14.1.2 Administrative Procedures (Test Modification, Discrepancies/Deficiencies)

The administrative procedures for incorporating any needed pre-operational or startup testing modifications or approved test procedure changes are based on the following philosophy:

When a preoperational or startup test procedure has been formally approved and issued for use, the test itself must be performed in strict accordance with a fully approved test procedure. The test procedure may, however, be modified as necessary to complete the test. Types of modifications are classified in the following subsections.

14.1.2.1 Minor Modifications

Modifications involving only minor changes, such that they do not change the intent of the original approved preoperational test procedure, will normally be implemented via use of the "exception" section in each procedure. Minor modifications to a start-up test procedure require (a) approval by two members of the Plant Management Staff, at least one of whom holds a Senior Reactor Operators license and (b) review by the ROC and approval by the Plant Manager within 14 days of implementation. These minor modifications and their approval are documented on the official copy of the procedure and itemized on a special form which is attached to the official copy, prior to the modification being implemented. *In all cases, modifications to the test procedures are documented in the procedure.*

14.1.2.2 Major Modifications

A major modification, namely, one that changes the intent of the original approved preoperational test procedure, requires review by members of the POS, S&W and/or GE, the startup staff, and the approval of both the Startup Manager and the JTG. Similarly, major modifications to a startup test procedure require review by GE or S&W and the POS, and approval of the ROC and Plant Manager. The modification and its approval are documented on the official copy

SNPS-1 FSAR

TABLE 14.1.1-1

STARTUP TEST PROGRAM

Test No.	Test Name	Open Vessel	Heat Up	Test Conditions ⁽¹⁾						Warranty
				1	2	3	4	5	6	
14.1.4.8.1	Chemical & Radiochemical	X	X	X		X		X	X	
14.1.4.8.2	Radiation Measurements	X	X	X		X			X	
14.1.4.8.3	Fuel Loading	X								
14.1.4.8.4	Full Core Shutdown Margin	X								
14.1.4.8.5	Control Rod Drive	X	X		X	X			X	
14.1.4.8.6	Water Level Measurement		X	X	X	X	X	X	X	
14.1.4.8.7	SRM Performance & C.R. Sequence	X	X	X						
14.1.4.8.8	IRM Performance	X	X	X						
14.1.4.8.9	LPRM Calibration			X		X			X	
14.1.4.8.10	APRM Calibration		X	X	X	X		X	X	X
14.1.4.8.11	Process Computer	X	X		X				X	
14.1.4.8.12	RCIC System Startup Test		X		X					
14.1.4.8.13	HPCI System Startup Test		X			X				
14.1.4.8.14	Selected Process Temperatures		X			X	X		X	
14.1.4.8.15	System Expansion		X	X	X	X				
14.1.4.8.16	Core Power Distribution					X			X	
14.1.4.8.17	Core Performance			X	X	X	X	X	X	X
14.1.4.8.18	Steam Production									X
14.1.4.8.19	Core Power Void Mode Response						X	X		
14.1.4.8.20	Pressure Reg.:									
	Setpoint Changes			X, BP	X	X, No BP	X	X	X, A(13)	
	Backup Regulator			X, BP	X	X, No BP	X	X	X, A(13)	
14.1.4.8.21	Feedwater Control System:									
	FW Pump Trip								M(12)	
	Water Level Stpt. Chg.				X	X	X	X	X, A	
	Heater Loss								X(10)	
14.1.4.8.22	Main Steam Isolation Valve:									
	Each Valve		X		X(4), SP					
	One Valve							X(5, 6), SP		
	Full Isolation								X(2, 6, 8), SD	
14.1.4.8.23	Relief Valves: Flow Demo Operational			X(11)	X(4, 11)					
				X(4)	X(4)					
14.1.4.8.24	Turbine Trip & Generator Load Rejection					X(5, 11), SD			Y(2, 11), SD	
14.1.4.8.25	Shutdown from Outside the Control Room				L, SP	X(4, 11), SD			X(2, 11), SD	
14.1.4.8.26	Recirculation Flow Control		X	X						
					M(4), A(4)	M, A(12)		M(5), A(5)	M, A	

SNPS-1 FSAR

Request 413.14 (14.1):

Your startup test program should be modified to include measurement of the capacity of the turbine bypass valves.

Response:

The response is incorporated in Section 14.1.4.8.23.

Request: 281.1

Describe how resin transfers will be monitored in the reactor water cleanup system (acceptance criterion 1.d of SRP 5.4.8).

Response:

Transferring resin from the reactor water cleanup system is performed by an operator at a local panel in the reactor building in the vicinity of the cleanup system. Level gauges for the phase separator tanks receiving this resin are located on another local panel in the same vicinity and will be used to monitor the resin transfer process.

Request: 281.2

Table 5.2.3-2 specifies the conductivity and chloride concentration limits for the reactor water to be 2 umho/cm and 0.1 ppm, respectively, during reactor operation up to 10 percent of rated power. Table 1 of Regulatory Guide 1.56, revision 1, specifies the same limits, but for power operation at steaming rate less than one percent of rated steam flow. Verify that steaming rates will be less than one percent of the rated steam flow at power levels up to 10 percent of the rated power.

Response:

Steaming rates will not normally be less than one percent of rated steam flow at reactor power levels up to 10 percent of rated power. Reactor water chloride concentration limit of 0.1 ppm and conductivity limit of 2 umho/cm should apply for power operation at steaming rates less than one percent of rated steam flow. This is as stated in Table 1 of Regulatory Guide 1.56, revision 1. A voluntary change to FSAR Table 5.2.3-2 will be submitted.

Request: 281.3

Summarize the procedures for determining the pH, chloride concentrations, and conductivity in the reactor vessel water (regulatory position C.6 of Regulatory Guide 1.56, revision 1).

Response:

A summary of the procedures for determining pH, chloride concentrations, and conductivity in the reactor vessel water follows:

Conductivity in the reactor vessel water is continuously monitored using process conductivity instruments in sample streams taken from the reactor water cleanup system inlet and/or the reactor water recirculation system. These samples are depressurized and cooled to approximately 25C before measurement by these instruments. When conductivity analysis of reactor vessel water is required by another method, a sample is drawn at the sample tap from one of the above process streams. This sample is cooled to approximately 25C before being analyzed. Its conductivity is then measured using a flow through or dip type conductivity element connected to a laboratory bench style conductivity bridge with sufficient precision and accuracy to permit measurements in the range of 1 umho/cm at 25C. If temperature correction is necessary it is done manually using charts or graphs appropriate for low conductivity measurements, not by automatic correction in the instrument.

Chloride concentration analysis of reactor vessel water when required is performed by drawing a sample at the sample tap for the reactor water cleanup system inlet or the reactor water recirculation system. This sample will be analyzed by one of these methods: colorimetric with ferric thiocyanate (ASTM 512), turbidimetric with silver chloride (GE endorsed), or chloride ion specific electrode (a recently developed accurate method). Written analytical procedures have been prepared for all three methods. The first two methods involve maintaining a current standard curve relating the measured parameter to chloride concentration. The chloride electrode analysis involves establishing a concentration curve in a laboratory bench style millivolt meter using standards, and measuring the sample with this meter.

pH analysis of reactor vessel water when required is performed by drawing a sample at the sample tap for the reactor water cleanup system or the reactor water recirculation system. This sample is analyzed at approximately 25C using a hydrogen ion specific electrode and a laboratory bench style millivolt meter. A pH curve is established in the instrument using buffers and the sample measured with this meter. If temperature correction is required, it is accomplished automatically in the instrument.

Request 281.4

Your FSAR does not indicate that chemical analysis for suspended impurities will be performed in accordance with regulatory position c.1 of Regulatory Guide 1.56, revision 1. Verify that such analysis are to be performed and state the sampling and analysis frequency and established limits and the basis for such limits.

Response:

Regulatory position C.1 of Regulatory Guide 1.56, revision 1 states "chemical analyses for dissolved and suspended impurities should be performed as called for in the technical specifications." However, current Standard Technical Specifications contain no requirements for suspended impurities monitoring of purified condensate or reactor vessel water. We anticipate our Technical Specification will be similar to the current drafts. If the Technical Specifications require such analyses, an appropriate change to the FSAR will be made. The present sampling system design for Shoreham accommodates suspended impurities monitoring for other than regulatory compliance reasons. It is equipped with an inline Millipore filter apparatus on a sample stream from the feedwater system.

Request: 281.5

Describe the water chemistry control program to assure maintaining the condensate conductivity within the limits of Table 2 of Regulatory Guide 1.56, revision 1. Include conductivity meter alarm set points and the corrective actions to be taken when the limits of Table 2 are exceeded.

Response:

The water chemistry control program is established to maintain the required condensate conductivity with the reactor water quality limits in the technical specifications.

At the maximum limits (10 umho at demineralizer inlet; 0.5 and 0.2 umho at individual and combined demineralizer outlet, respectively) Table 2 recommends orderly shutdown and/or corrective action to be taken immediately. Our operating procedure for the condensate demineralizer system, its associated alarm response procedures and the related emergency procedure, require orderly shutdown and/or corrective action immediately at verified conductivity readings at or below the maximum limits recommended in Table 2.

At the limits (0.5 umho at demineralizer inlet; 0.2 and 0.1 umho at individual and combined demineralizer outlet, respectively) Table 2 recommends corrective action be taken as specified in plant technical specifications to deal with the condenser leakage or marginal demineralizer performance indicated by such conductivity readings. Current standard technical specifications do not require actions to be taken based on condensate system water quality. We anticipate our technical specifications will be similar to these drafts.

331.32

Section 12.5.2.2.2, "Portable Radiation Survey Instrumentation" shows quantities of instrumentation not adequate to meet the anticipated needs of a single unit plant. The staff position is that sufficient numbers of instrumentation be available in operating condition to accommodate the need to monitor such large numbers of operations that may be required in radiation areas and high radiation areas throughout the plant during major maintenance and refueling outages and/or accidents. In arriving at a total number, consideration should also be given to the survey instruments that may be in a calibration, maintenance or inoperative-on-the-shelf status during the outage and/or accident. Additionally the inventory should include the requirements for selected ranges, sensitivities, types of radiation to be monitored, accuracy required, and types of monitoring to be performed.* Therefore this section of the FSAR should be revised to reflect these needs.

*For example, it appears that 2 teletectors and one neutron survey meter are inadequate numbers of these types of instruments taking into account the above considerations.

Response

The response to this question has been incorporated into section 12.5.2,

SNPS-1 FSAR

The equipment selected will be sufficiently sensitive to perform the tasks for which it was intended and will be selected in light of regulatory measuring and reporting requirements at the time it is ordered. Locations of these instruments within the plant may be changed as indicated by appropriate operating experiences and approved by the HP Engineer.

12.5.2.2.1 Laboratory Radiation Detection Instrumentation

The laboratory type radiation instrumentation located in the counting room in the turbine building includes the following instruments: (Numbers in parentheses indicate the minimum number of instruments of the specified types which are furnished.)

1. NaI detector - well-type-crystal usually used for gross gamma measurements. (1)
2. Low background gas flow proportional counter - usually used for gross alpha and/or beta measurements on air samples. (1)
3. 4096 - channel pulse height analyzer - usually used for analyzing samples which contain numerous gamma emitting radionuclides. An NaI, Ge(Li), or equivalent detector system is used, with a computer for analysis of the gamma spectra. (1)
4. Liquid scintillation counter - usually used for measuring tritium. (1)
5. TLD reader - used to evaluate thermoluminescent dosimeters to determine personnel exposure. (1)

The laboratory type radiation instrument located in the Health Physics Office is one (1) GM counter which is used primarily for gross beta-gamma measurements on smears.

12.5.2.2.2 Portable Radiation Survey Instrumentation

The portable radiation detection instruments are available from the Health Physics Section. They include the following or equivalent: (Numbers in parentheses indicate the minimum number of instruments of the specified types which are furnished.) In arriving at the numbers, consideration is given to instruments that may be in a calibration, maintenance or inoperative status.

1. GM survey count rate meter for beta-gamma detection. The range of instrument operation is 0 to ~~200,000~~ 80,000 counts/min in ~~10⁴~~ decades. Used primarily to measure low levels of radiation and/or contamination levels on smears. (18)
2. GM survey count rate meter for beta-gamma detection. The range of instrument operation is 0 to 50,000

SNPS-1 FSAR

counts/min in three ranges. Used primarily as friskers for personnel monitoring. (42)→(30)

3. Air ion chamber dose rate meter for beta, gamma, and x-ray radiation detection. The range of instrument operation is 0 to 5,000 mR/hr in four linear ranges. Used primarily to measure low and moderate dose rates. (42)→(24) OR 0 to 50,000 mR/hr
4. GM survey dose rate meter for beta, gamma and x-ray radiation detection. Equipped with a telescoping probe. The range of instrument operation is 0.1 mR/hr to 1,000 R/hr in five ranges. Used primarily to measure high dose rates or dose rates in areas which are difficult to reach with other instruments. The telescoping probe allows the user to remain well outside the radiation field and permits him to make accurate measurements, without significantly increasing his exposure. This instrument is a good example of equipment selection in implementing an effective ALARA policy. (2)→8
ALARA
5. Neutron rem counter used to measure neutron dose rates ^{equivalc.} The range of instrument operation is 0 to 5,000 mrem/hr in four decades. Used for neutron dose rate surveys. (1)→2 42 mrem/hr to 10 Rem/hr
6. Alpha survey meter used to measure alpha radiation. The range of instrument operation is 0 to 2,000,000 counts/min in four decades. Used for alpha radiation surveys. (4)→2
7. Continuous air monitors equipped with sample pump, moving filter tape, charcoal cartridge, gas sample container, and beta and gamma scintillation detectors. Instrument readout is 0-50,000 counts/min in three ranges. Used primarily to measure airborne radioactive particulate matter. (3)
8. Air samplers, low-volume type (1-4 cfm), equipped with filters and charcoal cartridges. Used to obtain long-term air samples for analysis in the laboratory counting room. (5)→18
9. Air samplers, high-volume type (4-40 cfm), equipped with filter paper, charcoal cartridge, or annular impactor. Used to collect short-term air samples in local work areas for analysis in laboratory counting room. (5)→9

Supplementary portable radiation survey instrumentation is available in the control room and the radwaste control room and includes, as a minimum, GM survey count rate meters for beta-gamma detection as in item 1, above (one in each location);

and air ion chambers for beta and gamma detection as in item X, 3 above (one in each location).

12.5.2.2.3 Miscellaneous Radiation Monitoring Instrumentation

(Numbers in parentheses indicate the minimum number of instruments of the specified types which are furnished.)

2. see Insert attached
 3. see Insert attached
 5. See Insert attached
 6. See Insert attached

1. Direct ~~or indirect~~-reading pocket ion chambers with a range of 0 to 200 mrem. Available in the Health Physics Office. (250) → 500

4 2. Direct ~~or indirect~~-reading pocket ion chambers with a range of 0 to 5 rem. Available in the Health Physics Office. (24) → 50

7 3. Thermoluminescent dosimeters with a range of a few mrem to at least 10⁴ rem, and/or ~~beta gamma film badges with a range of a few mrem to about 1,000 rem,~~ conforming to the performance criteria of Regulatory Guide 8.3. Available in the Health Physics Office. (250) → 750

8 4. Personnel Radiation Monitors, with audible alarm which "chirps" at a rate proportional to the gamma radiation field. Range ~~0.1 mR/hr to 5,000 mR/hr.~~ Available in the Health Physics Office. (12) → 18

or Alarms at a preset dose

9 5. Multi-channel GM portal monitors to provide head to foot beta-gamma detection. The monitors are equipped with ~~eight GM detector channels with adjustable alarm setpoints of 160 to 7,000 counts per min. Counting time is adjustable from one to ten sec.~~ These monitors are located at the exit from the controlled access on E1 15, and the employee exit in the ~~guard house.~~ (5)

liquid
 walk through
 security building

6. Multi-channel GM beta-gamma hand and foot monitors with a range of 0-50,000 counts per min in three decades. The monitors are equipped with an external probe for personnel frisking. These monitors are located at the exit from the controlled access area on E1 15. (2)

10 7. Whole body counter, furnished by outside laboratory, capable of quickly performing quantitative isotopic measurements for the whole body and

critical organ.

12.5.2.3 Personnel Protective Equipment

Special protective clothing such as shoe covers, gloves, lab coats, coveralls, head covers, waterproof shoe covers, waterproof gloves, etc., will be available for use as anti-contamination clothing. Tape will be provided so that openings in clothing and between pieces can be sealed. This protective clothing will be available in the clean clothes storage facility in the controlled access area.

Insert

2. Direct reading pocket ion chambers with a range of 0-500 mrem. Available in the Health Physics Office (250)
3. Direct reading pocket ion chambers with a range of 0-1 rem. Available in the Health Physics Office (100)
5. Direct reading pocket ion chambers with a range of 0-20 rem. Available in the Health Physics Office (25)
6. Direct reading pocket ion chambers with a range of 0-200 rem. Available in the Health Physics Office (5)

The power supplies to the RPS distribution panel from safety related motor control centers 1R24*MCC-1115 (Div. I) and 1R24*MCC-1125 (Div. II) are essentially non-divisional after the RPS motor generator sets. The M-G sets act as isolation devices since there is no direct electrical connection between the safety related MCC's and the RPS distribution panel. The worst case situation on each of the two safety related buses supplying the M-G sets, assuming damage to the RPS panel, would be an additional load due to a locked rotor condition of the 25 hp M-G set motor. Since the fault current on the output of the generator will not be transmitted through the M-G set, the overloaded motors will be cleared either by the motor thermal overload protection or the air circuit breaker installed between the MCC and the RPS M-G sets. The M-G sets are also provided with their own protective relaying. Overload coordination of the molded case breakers and the 480 V load center switchgear breakers for this locked rotor condition (the next protective device) will prevent disruption of power to safety related equipment on either of these two safety related buses. This equipment is all Class IE.

Insert

3. → Uninterruptible Power System

The uninterruptible power systems supply power to nonsafety related controls and instrumentation required for orderly operation of the plant and to part of the main control room lighting. Each system consists of a rectifier, inverter, static transfer switch, manual transfer switch, and a distribution panel. One uninterruptible power system supplies power to the computer and the other to the vital instruments and controls and part of the main control room lighting. A third system supplies power to the station security system. The inverter normally receives dc power from an internal rectifier which is supplied from the emergency 480 V ac power system. A dc auctioneering circuit allows the inverter to receive dc power, without interruption, from the station battery in the event of failure of the ac system. A static transfer switch allows operation of the ac bus loads from an alternate ac feeder in the event of inverter failure.

A manual transfer switch allows operation of the ac bus loads during maintenance of the inverter and the static switch. The distribution panels contain manually operated circuit breakers for sub-circuit protection for the services supplied from the panels.

INSERT

The electrical protection assembly (EPA), consisting of Class 1E protective circuitry is installed between the RPS and each of the power sources. The EPA provides redundant protection to the RPS and other systems which receive power from the RPS busses by acting to disconnect the RPS from the power source circuits.

The EPA consists of a circuit breaker with a trip coil driven by logic circuitry which senses line voltage and frequency and trips the circuit breaker open on the conditions of overvoltage, undervoltage, and underfrequency. Provision is made for set point verification, calibration, and adjustment under administrative control. After tripping, the circuit breaker must be reset manually. Trip set points are based on providing 115 VAC, 60 Hz power at the RPS logic cabinets. The protective circuit functional range is ± 10 per cent of nominal AC voltage and -5 percent of nominal frequency.

The EPA assemblies are packaged in an enclosure designed to be wall mounted. The enclosures are mounted on a seismic Category I structure separately from the motor generator sets and separate from each other. Two EPA's are installed in series between each of the two RPS motor generator sets and the RPS busses and between the auxiliary power source and the RPS busses. The EPA is designed as a Class 1E electrical component to meet the qualification requirements of IEEE 323-1974 and IEEE 344-1975. It is designed and fabricated to meet the quality assurance requirements of 10CFR50, Appendix B.

The enclosure containing the EPA assemblies are located in an area where the ambient temperature is between 40 F and 122 F. The circuits within the enclosure are qualified to operate under accident conditions from 40 to 137 F, at 10 to 95 percent relative humidity and survive a total integrated radiation dose of 2×10^5 rads. The assemblies are seismically qualified per IEEE 344-1975, to the Safe Shutdown Earthquake (SSE) and Operating Base Earthquake (OBE) acceleration response spectra and environmentally qualified to the requirement of IEEE 323-1974. The enclosure dimensions are approximately 16x20x8 in. and accommodate power cable sizes from 6 AWG to 350 MCM.

Request 371.16:

Provide descriptions of the floodplains of all water bodies, including intermittent water courses; within or adjacent to the site. On a suitable scale map provide delineations of those areas that will be flooded during the one-percent chance flood in the absence of plant effects (i.e., preconstruction floodplain).

1.9
1.10
1.11
1.12
1.13

Response:

There are two water bodies adjacent to the Shoreham site; the Wading River and Long Island Sound. The Sound's floodplain includes a barrier beach, a marsh area landward of the barrier beach, and small wooded areas behind the marsh area. The Wading River flooding is dominated by the Long Island Sound flooding because of its small drainage area. The computed 1 percent chance elevation for Long Island Sound is 11.4 ft NGVD, which is shown as a dashed line on the USGS map of the site prior to construction (Fig. 371.16-1).

1.14
1.15
1.16
1.18
1.19
1.20

Final

Request 371.17:

Provide details of the methods used to determine the floodplains in response to 1. (R371.16) above. Include your assumptions of and bases for the pertinent parameters used in the computation of the one-percent flood flow and water elevation. If studies approved by Flood Insurance Administration (FIA), Housing and Urban Development (HUD) or the Corps of Engineers are available for the site or adjoining area, the details of analyses need not be supplied. You can instead provide the reports from which you obtained the floodplain information.

Response:

Harris - Toups Planning Resource Corporation has submitted a draft of the Flood Insurance Report for Belle Terre, Long Island to the Federal Emergency Management Agency. Belle Terre is located approximately 10 miles west of the Shoreham site. The 100 year flood elevation cited in the report and used for this response is 11.5 ft NGVD. This elevation is based on gaged readings at Port Jefferson Harbor, which forms the westerly border of Belle Terre Village. A copy of the Harris - Toups' draft report is in Exhibit 371.17.

EXHIBIT 371.17

Flood Insurance Study
Village of Belle Terre
Suffolk County, New York