GIBBSSAR
Amendment 15
Instruction Sheet

The following instructional information is being furnished to insert Amendment 15 into GIBBSSAR, the Gibbs & Hill Standard Safety Analysis Report.

Since in most cases the original contains information printed on both sides of the paper, a new sheet is being furnished to replace the sheets containing superseded material. As a result, the front or back of a sheet may contain information that is merely reprinted rather than changed.

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1.8.3 Utility-Applicant SAR Inputs

Table 1.8-3 lists the information which must be supplied in the Utility-Applicant's SAR. Format references are keyed to Revision 2 of NRC Regulatory Guide 1.70.

1.8.4 Structural and Seismic Design Interfaces

The following criteria are provided to ensure structural and seismic design compatibility between BOP structures and NSSS components:

1. The seismic response spectra and the differential displacements at the support points, as specified by the NSSS applicant will not be exceeded.

2. The envelopes of the loads that will be transmitted from Category I or non-Category I systems that will connect to the NSSS components, as provided by the NSSS applicant, will not be exceeded.

3. The seismic analysis of the BOP structures includes mass and stiffness properties of the NSSS as provided by the NSSS applicant.

4. The maximum number of earthquake cycles as specified for the NSSS components by the NSSS applicant will not be exceeded. 8

5. The elevation to which the constraint should be flooded after a LOCA, if required and as specified by the NSSS applicant, will be considered in the design of the containment as appropriate.

6. The maximum differential displacements at points of the NSSS that will interface with BOP structures, as specified by the NSSS applicant, will not be exceeded.

7. The structural properties of the BOP structures that support the NSSS components, as specified by the NSSS applicant, will be satisfied.

8. All the loads that will be transmitted to the BOP structures from the NSSS components as specified by the NSSS applicant, will be used in the design of the BOP structures.

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9. The allowable deflections of the BOP structures supporting the NSSS components, as specified by the NSSS applicant, will not be exceeded. 8

1.8.5 Electrical System Interfaces

Electrical interface requirements with the Utility-Applicant are described in Subsection 8.2.1. The GIBBSSAR/PESAR 414 interface requirements are described in Section 8.4. 15

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c. The periods of time during which the active equipment is required to operate following the DBA are as follows:

1) Up to first 5 minutes after a DBA for containment isolation valves with operators and related instrumentation

2) Up to 6 months after the DBA for containment sump instrumentation

3) Up to 24 hours after the DBA for reactor coolant pressure transmitters

4) Up to 6 months after the DBA for combustible gas control system

5) Up to 2 hours after the DBA for pressurizer water level transmitters. | 1

In addition to the above, the following is the balance of ESF-related equipment in the containment which is required to function following the DBA for period of time consistant with plant design:

1) Safety Injection System valves and piping

2) Accumulator tanks

3) Containment spray system nozzle, piping and valves

4) Hydrogen recombiners

5) Primary and Secondary Shielding

6) Process Instrumentation as follows:

a) Pressurizer pressure and level

b) High-head injection flow

c) Accumulator pressure

d) Containment pressure and sump level

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Engineered safety features and other safety-related equipment outside the Containment are discussed in these GIBBSSAP chapters:

1) Mechanical equipment-chapters 6 and 9

2) Instrumentation and controls-chapter 7

3) Class 1E electrical equipment-chapter 8.

3.11.2 Qualification Tests and Analyses

When sufficient reliable data are available and proven analytical methods are known, environmental adequacy is based on analysis. If such analytical methods are not available, qualification is based on environmental testing. For items which require environmental testing, at the present plant design stage, it is not possible to detail all items which are qualified based on past usage and those which are qualified based on tests and analyses for this specific plant. More detail concerning such testing is included in Section 3.11.2a through e below. All BOP Class 1E equipment will be qualified in accordance with the following requirements, the detailed qualification information and test results will be available for NRC audit. 15

It is anticipated that the majority of such equipment will be qualified by prior use because there are no environmental conditions identified for this plant which are more severe than those in corresponding locations during equivalent plant conditions in other licensed nuclear plants. Equipment which requires qualification testing specifically for this plant may include components whose sizes differ substantially from those previously qualified or components whose design or material has changed significantly from that previously qualified. For such equipment, specific test procedures which specify limits on test parameters, durations, and pertinent data are prepared. All such tests are performed by recognized testing agencies and use applicable recognized standards.

3.11.2.a Equipment Design Specifications

Equipment Design Specifications for Class 1E equipment and components will identify and define the environmental and seismic qualification requirements for each specific piece of equipment.

Design Specifications will define the required equipment, the boundary of that equipment and interfaces with other equipment 15

and services, material exclusions or restrictions or other special equipment requirement. 15

Each specification will define the applicable equipment operating conditions e.g., the environment, signal conditions, and power conditions under normal, abnormal (maximum) and post design basis event conditions. It will also define the time required to fulfill the equipment's safety function when subjected to any of the extremes of the environmental conditions. 13 15

The environmental conditions (Tables 3.11-1 and 3.11-2) and applicable electrical parameters will be defined. Equipment vendors will be required to apply specified margins consistent with manufacturing tolerances and variables associated with the qualification testing program. Acceptable levels of equipment performance required to satisfy safety functions will be defined in each specification for normal, abnormal (maximum) and post design basis event conditions. 13

Each design specification will require the vendor to submit documentation in accordance with IEEE 323 and associated standards.

3.11.2.b Test Plan

The Class 1E equipment vendor will be required to develop the detailed test plan for his equipment. This test plan shall also include a maintenance schedule and periodic component replacement schedule as required to obtain a qualified life consistent with the installed life of the equipment. 15

The qualified life of equipment will be 40 years consistent with the design life of the plant. Equipment which cannot be qualified for 40 years shall have a periodic replacement program established for it. This program will be implemented by the Utility-Applicant based on vendor recommendations. The equipment specifications will include all necessary information for the vendors to qualify the equipment. The equipment qualification programs will be in accordance with those standards in effect at the time equipment is ordered. 13

Bidders will be required to outline their proposed qualification methods. This will be done to provide proof of the qualification program's adequacy. A detailed qualification plan will be required to be submitted by the equipment supplier for review prior to qualification program initiation. Final documentation

will be submitted by the equipment supplier and reviewed for adequacy prior to acceptance.

Vendors are expected to propose qualification programs based on appropriate combinations of analysis, component test, type test and material property data. Functional tests will be performed in accordance with applicable industry standards. 13

Seismic Qualification of Class 1E equipment will be in accordance with IEEE-344. The qualification program (test, analysis or combinations of both) will be dependent upon the physical properties of the specific equipment. 15

Degradation of Class 1E instrumentation and control equipment due to aging will be considered when such degradation is expected to be significant over the design life of the equipment. Equipment aging will be determined on the basis of an appropriate combination of component tests, experience, material application data and the stresses that exist as a result of the design and the intended application of the equipment. 13

The testing sequence will follow the sequence specified in IEEE 323. Where this is not practicable or where a generic vendor test is utilized the test sequence shall be justified.

3.11.2.c Test Set Up

Vendors for Class 1E equipment will be responsible for the development of a detailed test set up necessary for their equipment qualification program. This vendor test will simulate actual operating conditions as closely as possible. Equipment to be be tested will be mounted, piped, and wired during the test to simulate the arrangement which will be utilized in the plant to the extent practicable. 15

The test monitoring equipment will be calibrated against standards and the calibration will be appropriately documented. The test monitoring equipment will have sufficient resolution to provide detection of meaningful changes in the monitored variables. 13

3.11.2d Test Procedure

Specifications for Class 1E equipment will be written to include equipment qualification information and requirements to enable the vendors to quality equipment. 15

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TABLE 3.11-6
(Sheet 1 of 2)

BOP CLASS 1E EQUIPMENT IDENTIFICATION

EQUIPMENT	PLANT (1) LOCATION
SWITCHGEAR	O
MOTOR CONTROL CENTERS	O
SOLENOID OR MOTOR OPERATED VALVE	I/O
MOTORS	O
LOGIC EQUIPMENT	O
CABLE	I/O
DIESEL GENERATOR AND CONTROL EQUIPMENT	O
SENSORS (PRESSURE, PRESSURE DIFFERENTIAL TEMPERATURE)	I/O
LIMIT SWITCHES	I/O
CONTROL BOARDS	O
INSTRUMENT RACKS AND PANELS	O
CONNECTORS	I/O
ELECTRICAL PENETRATIONS	I
TERMINAL MODULES	I/O
SEQUENCER	O

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TABLE 3.11-6
(Sheet 2 of 2)

BOP CLASS 1E EQUIPMENT IDENTIFICATION

EQUIPMENT	PLANT (1) LOCATION
125-V dc BATTERIES	O
BATTERY CHARGERS	O
INVERTERS	O
DISTRIBUTION PANELS	O

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NOTE:

(1) Plant location: O - outside containment
I - Inside containment

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Discussion

This regulatory guide is not within the GIBBSSAR scope of supply. See the Utility/Applicant's SAR.

Regulatory Guide 1.60, Rev. 1

Design Response Spectra for Seismic Design of Nuclear Power Plants.

Discussion

GIBBSSAR complies with this regulatory guide.

Regulatory Guide 1.61 | 13

Damping values for Seismic Design of Nuclear Power Plants.

Discussion

GIBBSSAR complies with this regulatory guide. Damping values for materials not specified in the guide shall be conservatively determined from test data, literature or acceptable analytical procedures.

Regulatory Guide 1.62

Manual Initiation of Protective Actions.

Discussion

See Section 7.1.2.1.h for a discussion of this regulatory guide.

Regulatory Guide 1.63, Rev. 2 | 15

Electric Penetration Assemblies in Containment Structures for Light-Water-Cooled Nuclear Power Plants.

Discussion

See Section 8.3.1.2.6 for a discussion of this regulatory guide. | 13

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Regulatory Guide 1.64 Rev. 2

Quality Assurance Requirements for the Design of Nuclear Power Plants.

Discussion

GIBBSSAR complies with this regulatory guide.

Regulatory Guide 1.65

Materials and Inspections for Reactor Vessel Closure Studs.

Discusion

This regulatory guide is not within the GIBBSSAR scope of supply. See the NSSS SSAR.

Regulatory Guide 1.66

Nondestructive Examination of Tubular Products. 13

Discussion

This regulatory guide has been withdrawn by the NRC.

Regulatory Guide 1.67

Installation of Overpressure Protection Devices.

Discussion

GIBBSSAR complies with this regulatory guide.

Regulatory Guide 1.68, Rev. 1

Preoperational and Initial Startup Test Programs for Water-Cooled Power Reactors.

Discussion

Preoperational and initial startup testing is within the scope of the Utility Applicant. The GIBBSSAR design does not preclude compliance with this regulatory guide. Further information will be provided in the Utility Applicant's FSAR.

8.1.3 Safety-Related Loads

The safety loads that require electric power to perform their safety functions are identified in Table 8.1-1. This table includes the safety load, safety functions performed, and type of electric power (ac or dc or both).

8.1.4 Design Criteria

The design bases, criteria, Regulatory Guides, standards, and other documents that are implemented in the design of the safety-related systems are listed below. These documents are described in Sections 3.1, 8.2 and 8.3. |10

1. 10 CFR Part 50, Appendix A; General Design Criteria for Nuclear Power Plants, U.S. Nuclear Regulatory Commission, January 1, 1976 |10 |10

2. Regulatory Guide 1.6, Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems, U.S. Nuclear Regulatory Commission, March 10, 1971

3. Regulatory Guide 1.9, Selection of Diesel Generator Set Capacity for Standby Power Supplies, U.S. Nuclear Regulatory Commission, March 10, 1971

4. Regulatory Guide 1.12, Instrumentation for Earthquakes, U.S. Nuclear Regulatory Commission, April 1974

5. Regulatory Guide 1.22, Periodic Testing of Protection System Actuation Functions, U.S. Nuclear Regulatory Commission, February 17, 1972

6. Regulatory Guide 1.29, Seismic Design Classification, U.S. Nuclear Regulatory Commission, February, 1976 |10

7. Regulatory Guide 1.30, Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electrical Equipment, U.S. Nuclear Regulatory Commission, August 11, 1972

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8. Regulatory Guide 1.32, Use of IEEE Std 308-1974, Criteria for Class 1E Electric Systems for Nuclear Power Generating Stations, U.S. Nuclear Regulatory Commission, February, 1977 | 10

9. Regulatory Guide 1.40, Qualification Tests of Continuous-Duty Motors Installed Inside the Containment of Water-Cooled Nuclear Power Plants, March 1973. | 10

10. Regulatory Guide 1.41, Preoperational Testing of Redundant Onsite Electric Power Systems to Verify Proper Load Group Assignment, U.S. Nuclear Regulatory Commission, March 16, 1973 | 10

11. Regulatory Guide 1.47, Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems, U.S. Nuclear Regulatory Commission, May 1973 | 10

12. Regulatory Guide 1.53, Application of the Single Failure Criterion to Nuclear Power Plant Protection Systems, U.S. Nuclear Regulatory Commission, June 1973 | 10

13. Regulatory Guide 1.62, Manual Initiation of Protective Actions, October 1973. | 10

14. Regulatory Guide 1.63, Electric Penetration Assemblies in Containment Structures for Water-Cooled Nuclear Power Plants, U.S. Nuclear Regulatory Commission, July 1978. | 10 | 15

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8.2 Offsite Power System

This section is provided in the Utility-Applicant's SAP.

8.2.1 Interface Requirements

The Gibbs & Hill Standard Nuclear Power Plant is designed to have two physically independent and separate offsite power sources. The primary offsite source provides power to the station service transformers. The alternate offsite source provides power via a backfeed connection from the unit output switchyard through the main transformers and the unit auxiliary transformers. This is as shown on the Simplified Main One Line Diagram, Figure 8.3-1. Both of the offsite sources may be in the same switchyard. Two independent circuits are required so that a failure of one circuit will in no way affect the other and result in the loss of both circuits. The Utility-Applicant must perform a system stability analysis and the offsite power system must be capable of satisfying the following station power requirement:

a. Two independent power sources as described above

b. Steady state plant auxiliary load of approximately 75 MVA

c. Nominal voltage (for station service transformers) as available for primary, 6.9 kV for secondary

d. Allowable voltage variation, assumed to be ±5 percent during normal operation

e. Nominal frequency, 60 Hz

The Utility Applicant must also perform an analysis to determine the frequency decay rate of the grid system. This frequency rate is required by RESAR-414, in setting of the reactor coolant pump underspeed trip set point.

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The plant has two three-winding, three-phase, 60-Hz unit auxiliary transformers with secondary voltage of 6900-V. The secondary windings of each unit auxiliary transformer are connected to the 6900-V buses by means of metal-enclosed bus ducts as follows (see Figure 8.3-1, Class 1E bus supply circuit breakers in normal cubicle): 10

Transformer		Buses
TIA-1	x winding	1A1, 1A5, 1EA1
	y winding	1A2, 1A6
TIA-2	x winding	1A3, 1A7
	y winding	1A4, 1A8, 1EA2

Alternate locations for circuit breaker elements provide a means for maintaining power to the Class 1E buses; the details are described in subsection 8.3.1.1.b.

Switchgear for all the 6900-V buses is standard 500 MVA interrupting-capacity 7.2-kV class metal clad medium-voltage switchgear. All circuit breakers are air-break type. Continuous current ratings are 1200 A for load feeder breakers. Incoming supply breakers for buses 1A1, 1A2, 1A3, and 1A4 are rated 2000 A continuous. Incoming supply breakers for reactor coolant pump buses are rated 1200 A continuous. The switchgear is metal clad with metal barriers between breakers. The 6900-V Class 1E switchgear and the 6900-V switchgear that energizes the non-Class 1E reactor coolant pumps are located in a seismic Category I structure, as shown in Figures 8.3-5 and 8.3-7, and are seismically qualified in accordance with the criteria discussed in Section 3.10. Two circuit breakers are connected in series to feed each reactor coolant pump motor, as shown in Figure 8.3-1. 10 10

The 6900V Switchgear that energizes the Non-Class 1E reactor coolant pumps is designed and manufactured in accordance with Class 1E Standards. 15

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Each of the circuit breakers on reactor coolant pump buses 1A5, 1A6, 1A7, and 1A8 receives a trip signal in the event of an underspeed condition. The underspeed trip signal design is described in Section 7.2 of the NSSS SSAR. In addition to the regular trip coil which is reserved for other non-safety-related tripping functions, each reactor coolant pump feeder circuit breaker is equipped with a second separate trip coil. This second trip coil which will be actuated on a reactor coolant pump underspeed trip signal will receive its control power from the Class 1E batteries as shown in Table 8.3-8. Tripping of the reactor coolant pumps on an underspeed trip signal will ensure that, the frequency decay rates of the grid do not influence or prevent the full coastdown of the reactor coolant pumps under this condition. 15

Generally, motor loads exceeding 250 hp are rated 6600-V, and are connected to the 6900-V buses for across-the-line starting.

Dry-type transformers (6900 V to 480 V, three-phase, 60 Hz) are connected to 480-V metal-enclosed switchgear (600-V-class) arranged as double-ended load centers. The switchgear is arranged in several independent station service distribution bus connections. Air-break circuit breakers are furnished with rated interrupting capability of 50,000 A. A bus tie between the buses provides service if one transformer is unavailable. The 480-V switchgear provides power to various motor control centers (MCC) and motors. 15

Generally, motors rated up to 100 hp are connected to MCC and larger motors are connected to 480-V switchgear.

The 118-Vac, single-phase, 60-Hz power, which is required for essential non-Class 1E loads is supplied by solid-state inverters IVIC-1, IVIC-2, and IVIC-3 as shown in Figure 8.3-1. Each inverter receives incoming normal power supply from either non-safety-related 480-Vac MCC 1B5-1 or 1B5-2, and a backup dc power supply from 125/250-V battery PT1D2-2 by means of an auctioneering-type circuit. The distribution panel PT1C1 provides an alternate source of regulated ac power to the 118-Vac buses during inverter maintenance periods. During blackout conditions, 480-Vac MCCs 1B5-1 and 1B5-2 receive power from a self-contained diesel generator 1G1 which ensures continuity of essential non-safety-related services.

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When unit auxiliary transformer T1A-2 is out of service, relocation of circuit breaker, item 13, to alternate cubicle, as shown in Figure 8.3-1 , enables unit auxiliary transformer T1A-1 to supply power to Class 1F bus 1EA2 in addition to Class 1E bus 1EA1.

When one unit auxiliary transformer or one station service transformer is out of service, or proper combination of both are out of service, and after their associated circuit breakers have been relocated, the safety-related buses of the unit can be supplied by two independent and reliable immediate-access offsite power sources.

In addition to the two offsite sources described previously, the onsite standby diesel generators can supply power to Class 1E buses 1EA1 and 1EA2; refer to Subsection 8.3.1.1.c.

2) Busing Arrangement

Two independent and redundant 6900-V Class 1F buses are provided for the unit,each capable of supplying the minimum safety-related loads required to safely shut down the unit following a DBA. Each bus can be fed from two independent offsite power sources or from the diesel generator assigned to the bus.

Each Class 1E 6900-V bus supplies a double-ended load center (600 V class) through dry-type transformers (6900 V to 480 V, three-phase, 60 Hz) which supplies 480-V, metal-enclosed switchgear. A bus tie between the bus sections of the double-ended load center provides continuity of service if one transformer is unavailable. In addition, each Class 1E 6900V bus also supplies two non-safety-related (blackout) load centers through dry-type transformers (6900 V to 480 V, three-phase, 60 Hz). One of these transformers is connected in delta-delta connection, supplying power to the pressurizer heaters via a 480 V metal enclosed switchgear. The second transformer is connected in a delta-wye connection, supplying power to other equipment which is operated during a loss of offsite power. The 6.9 kV feeder breakers for these transformers are qualified as Class 1E equipment, and trip on an accident signal in accordance with Regulatory Guide 1.75. Arrangement of buses is shown in Figure 8.3-1. 15

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The voltage levels at the safety related buses will be optimized for the full load and minimum load conditions that are expected throughout the anticipated range of voltage variations of the offsite power source by the automatic operation of the on-load tap changer of the Station Service and Unit Auxiliary Transformers. 10 12 10

The safety-related bus voltage levels will be measured as part of the preoperational test program and during plant startup. Since the extreme conditions assumed for the worst case calculations cannot be readily configured, the voltages on the buses will be measured and verified to be within acceptable limits for several different existing load conditions. Documentation of these measurements and their verification will be available for NRC inspection as part of the startup test results. 15

To permit verification that bus voltage is within the suitable range during plant operation, voltages on the safety related 6900-V and 480-V buses are indicated in the control room. 10

3) Loads Supplied From Each Bus

The loads supplied from each independent and redundant 6900-V bus and 480-V load centers are shown in Table 8.3- 7. The loads supplied from each of the various motor control centers will be shown in the Utility Applicant's FSAR. 10

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4) Manual and Automatic Interconnections Between Buses, Buses and Loads, and Buses and Supplies

There are no manual or automatic interconnections between a Class 1E bus and its redundant counterpart. There is no way of connecting a load of one Class 1E bus to the redundant Class 1E bus. Therefore, each Class 1E bus is completely independent of its redundant counterpart. The only time a Class 1E 6900-V bus is connected to more than one power source is after manual synchronization of one standby diesel generator to its related Class 1E bus. Paralleling of diesel generators is not possible due to electrical isolation and separation and administrative procedures which preclude testing more than one standby diesel generator at a time. Automatic transfer of a Class 1E 6900-V bus from the primary offsite power source to the alternate offsite power source is by sequential transfer fast transfer. 10 10

5) Interconnections Between Safety-Related and Non-Safety-Related Buses

There are no manual or automatic direct connections between any Class 1E (safety-related) bus and any non-Class 1E (non-safety-related) bus.

6) Redundant Bus Separation

All redundant buses are arranged to maintain electrical and physical isolation from each other in order to satisfy the single-failure criterion. Physical locations of these buses and related electrical distribution are shown in Figures 8.3-5 and 8.3-7. 10

The 6900-V and 480-V switchgear for the redundant safety-related loads are located in individual rooms in the seismic Category I auxiliary building. Each room contains only electrical equipment, thereby, minimizing exposure to mechanical, water, or fire damage caused by failure of equipment such as steam lines, waterlines, pumps and motors. Switchgear of redundant trains are further separated by placing the equipment on different floor elevations.

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7) Equipment Capacities

All switchgear is adequately sized and coordinated to permit safe and reliable operation under normal, short circuit, and momentary current conditions.

The diesel generators are sized so that each set is capable of carrying the safety-related loads of its respective train for a DBA. 10

The estimated capacity of each diesel generator set and the estimated loads used to determine this capacity are given in Table 8.3-1 and 8.3-2. This estimated size will be revised, if required, as the detailed plant design progresses and depending on the manufacturer's standard sizes. The design and continuous rating applied is consistent with NRC Regulatory Guide 1.9 and IEEE 387. 15

Capacities of individual loads are determined on the basis of nameplate rating, pump pressure, and flow conditions or pump runout conditions. The basis of selection is noted in Table 8.3-1 and 8.3-2. 15

Interrupting capacity of switchgear, load center, MCCs, and distribution panels are selected on the basis of short-circuit calculations. Transformer impedances are selected to permit starting the largest motor on the bus without the voltage at the motor terminals dropping below 80 percent of the motor voltage rating, while still remaining within the interrupting and momentary capabilities of the breakers.

8) Automatic Loading and Stripping of Buses

The 6.9 kV Class 1E buses are normally fed from the primary offsite power supply through the Station Service Transformers.

In the event of a DBA the following significant operations are initiated:

a) The reactor is shutdown and the turbine generator is tripped 10

b) Tripping of the turbine generator will open the generator load break switch automatically.

e) If the transfer is successfully completed plant shutdown proceeds with all auxiliary loads still available.

f) If the fast transfer is not completed within the design time limit, then fast transfer is automatically blocked and the loads on the 6.9 kV non Class 1E busses will be automatically shed by the bus undervoltage relays.

g) The loads on the Class 1E busses, which are being supplied by the preferred offsite source, continue to operate and any additional loads required for safe shutdown are sequenced on in accordance with Table 8.3-2.

Voltage conditions on the 6.9 kV Class 1E busses are monitored by two systems of undervoltage protection. One system senses a low or total loss of voltage and a second system which senses a sustained degradation of bus voltage. Each system consists of three voltage sensors connected in a two out of three coincidence scheme on each bus. The resultant output will incorporate a time delay to prevent spurious trips due to momentary voltage distrubances. Setpoints for the voltage sensors and time delay relays will be determined by analysis of the voltage requirement characteristics of the safety related equipment for all onsite distribution voltage levels. The time delay, including suitable margin, will not exceed the maximum time delay assumed in the Utility Applicant's FSAR accident analysis and will not result in a failure of any safety system component due to extended operation at a degraded voltage condition.

Each redundant safety-related train has a set of two automatic load sequencers; one for sequentially applying the ESF loads in the event of a Safety Injection Actuation Signal (SIAS) and one for sequentially applying loads required during either a loss of voltage or a sustained degradation of voltage on the 6.9 kV Class 1E bus. The set of sequencers associated with each Class 1E train are completely independent from the set on the other Class 1E train, thus eliminating the possibility on a common failure mode. Control of the 6.9 kV Class 1E bus supply breakers is accomplished separately and not by the sequencers; a failure of any

sequencer will not affect the availability of either the offsite or onsite power sources. In order for a sequencer to commence connecting the appropriate loads, proper bus voltage must be present on the 6.9 kV Class 1E buses, regardless of the source.

Load shedding is automatically blocked during the sequencing cycle of either of the sequencers and is automatically unblocked subsequent to the completion of the sequencing cycle. Indication of the load shed blocking status will be provided in the control room. Details of this design, including set points, system tolerences, sequencer realibility information and design detail drawings will be contained in the Utility Applicant's FSAR. 15

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9) Safety-Related Equipment Identification

Safety related equipment identification is discussed in Subsection 8.3.1.3.

10 Instrumentation and Control

Control of the 6.9 kV Class 1E supply breakers is from the control room where voltmeters, ammeters, frequency meters, synchroscopes, control switches, and controls are available as required by the operator. Control of the supply breakers is also available at the switchgear, but synchronizing control is only provided in the control room. Control of each supply breaker from the control room is dependent on the remote-local control switch in the switchgear being in the remote position. To close a circuit breaker requires operation of two switches; the first, the synchronizing two position (off, sync) switch, and the second, the control four position (pull out, trip, neutral, close) switch. | 15 | 1

The electrical control circuits for all BOP safety related equipment are designed to assure that the disabling of one component does not, through incorporation of interlocking or sequencing controls, render other components inoperable. In the cases where this condition cannot be avoided, administrative procedure will be provided to assure the operating personnel's awareness of the system constraint during all modes of operation. These control circuits will be reviewed and the results discussed in the Utility Applicant's FSAR. | 15

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The unit auxiliary and station service transformers are protected by differential relays and overcurrent backup relaying. Faults within the differential relay zone of the unit auxiliary transformer cause the unit to trip and the unit output breakers in the unit output switchyard to open. The non-Class 1E 6900-V buses fast transfer to the primary offsite power source. A fault within the differential zone around either station service transformer opens the high-voltage breakers in the primary offsite power source substation. The 6900-V Class 1E buses automatically transfer to the alternate offsite power source through the unit auxiliary transformers with no loss of operation. 10

All protective devices are coordinated to isolate a fault or abnormal condition as quickly as possible without damaging or interfering with the effective operation of the rest of the system.

Only conventional protective relays of reliable designs with well-defined and proven theory of operation and operating characteristics will be selected for Class 1E application.

Relay settings are based on calculation which takes into account manufacturer's tolerances. 10

Acceptance tests and calibration tests for each relay will be performed in accordance with manufacturer's recommendation. Periodic testing is performed on each relay to verify proper relay operation. The testing interval will be established such that any set point drift will not exceed the allowable tolerance. The allowable tolerance will be determined by the Relay Coordination Analysis. Results of this analysis will be discussed in the Utility Applicant's FSAP. 15

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12) System Testing and Surveillance

Circuit design incorporates test provisions to periodically monitor the operational capability of the safety-related Class 1E systems during power operation. Initially, all safety-related equipment is tested to verify compliance with performance specifications after final assembly and during the startup testing phase.

The diesel generators are tested prior to plant startup to demonstrate their capability to satisfy design requirements. The following tests are administered to certify the adequacy of the units for the intended service:

a) Starting tests

b) Load acceptance tests

c) Rated load tests

d) Design load tests

e) Load rejection tests

f) Electrical tests

g) Functional tests

At the operating license review stage, a review of operating, maintenance, and testing procedures will be made to determine the extent of usage of jumpers or other temporary forms of bypassing functions for operating, testing, or maintaining of safety related systems. Results of this review will be provided in the Utility Applicant's FSAR. 15

The criteria for the use of jumpers in testing is in comformance with Regulatory Guide 1.118.

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8.3.1.4.2.2 General Plant Areas

In plant areas where hazards are limited to failures or faults internal to the electric equipment or cables, minimum spacing is 3 feet between redundant cable trays separated horizontally* and 5 feet between those separated vertically.** If minimum spacing is unattainable, a fire barrier is provided in accordance with IEEE 384-1974. | 11

*(measured from the side rail of one tray to the side rail of the adjacent tray)

**(measured from the bottom of the top tray to the top of the side rail of the bottom tray).

8.3.1.4.2.3 Hostile Environments

In general Class 1E wiring systems will not be routed through an area where there is potential for accumulation of large quantities of oil or other combustible material. If such routing is unavoidable, only one system of redundant cables is allowed in any such area, and the cables are protected by flame retardant material as discussed in Section 9.5.1. In areas containing potential missiles, physical arrangement or protective barriers preclude simultaneous loss of more than one redundant system. | 1

8.3.1.4.2.4 Electrical Penetration Areas

Separate penetrations are provided for 6900-V power, 480-V power, control, and instrumentation cables of each Class 1E train and protection channel. The design objective is maximum possible separation between Class 1E trains, and between any large piping penetrations and Class 1E trains to minimize damage from steam or waterline ruptures. Protection from the main steam and feedwater lines is provided by means of reinforced concrete walls or floors. Electrical penetration areas located on different floor elevations provide adequate physical separation between redundant circuits. In cases where redundant instrumentation channels will be routed on the same elevation, and in the same general area, the redundant channels will be located on opposite sides of the areas, if feasible. Minimum separation distance between individual penetration nozzles is 6 foot centerline to centerline.

Connectors, termination lugs, and terminal blocks will all be utilized in connecting the field cables inside the containment to the electrical penetrations. Connectors will be used on coax and | 15

triax cables, termination lugs will be used on large power cables, and terminal blocks located in terminal boxes will be utilized by all other cables.

All Class 1E connections between field cable and electrical penetrations inside the containment will be qualified to withstand the environmental conditions resulting from a LOCA or steam line break. After the penetration vendor has been selected, and the detailed design finalized, the supportive documentation will be provided in the Utility Applicant's FSAR. 15

Location and separation of penetrations are shown in Figure 8.3-3.

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8.3.1.4.2.5 Cable Tray Crossover Areas

In cases where redundant trays cross over each other in areas where only electrical equipment is located, there is a minimum vertical separation of 15 inches (free air space). Fire protection requirements are in accordance with Section 9.5.1. |10

8.3.1.4.3 Seismic Requirements

Cable trays, supports, and ducts carrying Class 1E circuits meet Seismic Category I requirements. In addition, trays and supports carrying non-Class 1E circuits that could jeopardize the integrity of Class 1E circuits or other safety related equipment are also designed to meet seismic requirements.

8.3.2 dc Power Systems

8.3.2.1 Description

The dc systems provide dc and ac (inverters) energy for plant control and instrumentation and emergency lighting under all modes of plant operation, including loss of all ac power sources, until these sources are restored. Safety-related loads are supplied by four redundant 125-Vdc systems designed to operate without interruption during and after a DBA, an SSE, or a tornado. These systems are classified Class 1E, seismic Category I, and as such, their design requirements conform to IEEE 308-1974, IEEE 344-1975, IEEE 384-1974, IEEE 450-1975, IEEE 484-1975, and NRC Regulatory Guides 1.6, 1.32, 1.75, and 1.93. Figure 8.3-1 depicts the main arrangement for the station dc systems. |1

The dc systems are comprised of four independent and redundant Class 1E 125-V systems and one 125/250-V battery system. Each Class 1E 125-V system consists of one battery, one main distribution bus with air circuit breakers, two static battery chargers, local distribution panels, and feeders.

Battery BT1ID1 feeds distribution panel 1ED1-1 and inverter 1V1PC-1 which supplies channel I and train A load requirements. Battery BT1ED3 feeds distribution panel 1ED3-1 and inverter 1V1PC-3 which supplies channel III load requirements.

Battery BT1ED2 feeds distribution panel 1ED2-1 and inverter 1C1PC-2 which supplies channel II and Train B load requirements. |10

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c. System Testing and Surveillance

Periodic maintenance testing of the dc systems is be performed to monitor the condition of the equipment to ensure reliable operation. Visual inspections, liquid level, specific gravity, and cell voltage checks are performed at regular intervals on each battery as well as a performance discharge test. All maintenance and testing procedures and criteria for replacement are in accordance with IEEE 450-1975. Visual checks and performance tests are also scheduled for the battery chargers. Testing intervals are in accordance with technical specifications as follows: | 1 | 1

Item	Periodic Test Description	Test Interval
Batteries	liquid level specific gravity, and cell voltage	pilot cell, weekly all cells, quarterly
	visual inspection and performance discharge test	weekly 5 years, during refueling
	service test	during each refueling operation but not to exceed 18 months
Battery charger	visual inspection	weekly
	Performance tests	Yearly, during refueling

The preoperational and initial startup programs of the Class 1E dc system are formulated in accordance with NRC Regulatory Guides 1.41 and 1.68.

At the operating license review stage, a review of operating, maintenance, and testing procedures will be made to determine the extent of usage of jumpers or other temporary forms of bypassing functions for operating, testing, or maintaining of safety-related systems. Results of this review will be provided in the Utility Applicant's FSAR. | 15

The criteria for the use of jumpers in testing is in conformance with Regulatory Guide 1.118.

8.3.2.2 Analysis

Design of the Class 1E 125-V dc systems meets the requirements of GDC 17, GDC 18, IEEE 308-1974, and Regulatory Guides 1.6, 1.32, and 1.93. Compliance with these criteria is described in subsection 8.3.1.2. Seismic requirements are incorporated into the dc system equipment specifications. The manufacturers are required to seismically qualify the equipment and document the | 1
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results in accordance with IEEE 344-1975, as supplemented by Branch Technical Position (EICSB) 10. |1

Redundant power supplies and equipment satisfy the GDC for a single failure. Load groups are connected to their related battery systems to prevent loss of power in one load group from causing loss of equipment in another load group. A failure mode analysis is presented in Table 8.3-6.

The quality assurance program discussed in Chapter 17 ensures compliance with established criteria. Equipment identification is discussed is subsection 8.3.1.3. Independence of redundant systems is discussed in subsection 8.3.1.4. The extent of implementation of the design criteria for NSSS equipment is discussed in the NSSS SSAR. |1

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TABLE 8.3-7

(Sheet 3 of 4)

LOADING CAPACITY(1) 13

(Westinghouse-414)

480-V Load Emergency Buses And MCCs	Buses 1EB1, 1EB3 and MCCs With Access to Bus 1EA1	Buses 1EB2, 1EB4 and MCCs With Access to Bus 1EA2
Containment air recirculation and cooling system fans	2@ 125	2@ 125
Neutron detector well cooling fan	40	40
CPDM fans	2@ 40	2@ 40
Plant ventilation chilled water system recirc. pumps	2@ 40	2@ 40
Control room emergency recirc. fan	10	10
Control room emergency recirc. heater	20 kW	20 kW
Diesel generator room supply fans	2@ 25	2@ 25
Diesel generator room supply fan	2@ 20	2@ 20
Centrifugal charging pump room aux. cooling unit fan	7.5	7.5
CCWS pump room aux. cooling unit fans	2@ 10	2@ 10
Aux. feedwater pump room aux. cooling unit fan	7.5	7.5
Centrifugal charging pump aux. lube oil pump	2	2
Station service water intake structure vent. supply unit fan	15	15
Containment spray and HHSI pump room aux. cooling unit fan	15	15
Safety features chilled water system main recirc. pumps	2@ 25	2@ 25
Controlled access area ventilation exhaust equipment room aux. cooling unit fan	7.5	7.5
Control room emergency pressurization fan	0.2	0.2
Control room emergency pressurization heater	1 kW	1 kW
Control room HVAC unit	30	30
Uncontrolled access areas ventilation system exhaust fans	2@ 20	2@ 20
Uncontrolled access area ventilation system supply fans	2@ 20	2@ 20
Heat tracing boron injection system	75 kW	75 kW
Instrument air compressor	150	150
Instrument air dryer	12 kW	12 kW

Notes:
(1) Loads supplied from each Bus. Ratings are Nameplate Horsepower (unless kW noted).

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TABLE 8.3-7

(Sheet 4 of 4)

LOADING CAPACITY(1) | 13

(Westinghouse-414)

480-V Load Emergency Buses And MCCs	Buses 1EB1, 1EB3 and MCCs With Access to Bus 1EA1		Buses 1EB2, 1EB4 and MCCs With Access to Bus 1EA2
Positive displacement charging pump	75		
Pos. displacement pump room aux. cooling unit fan	1		
Boric acid transfer pump	27 kW		27 kW
Uncontrolled access battery room exhaust fans	2@ 0.75		2@ 0.75
Spent fuel pool cooling room aux. cooling unit fan	7.5		7.5
Pressurizer heater	1292 kW (total)		808 kW (total)
RHR pump room aux. cooling unit fan	5		5
Controlled access area ventilation emergency exhaust unit fan	50		50
Controlled access area emergency exhaust unit heater	100 kW		100 kW
Diesel generator starting air compressors	15		15
Diesel generator fuel oil transfer pumps	2@ 3		2@ 3
Station service water screenwash pumps (site specific)	2@ 20		2@ 20
Station service water traveling screens (site specific)	2@ 5		2@ 5
Station service water screenwash strainers (site specific)	2@ 0.5		2@ 0.5
Battery chargers	4@ 50 kW		4@ 50 kW
Motor-operated valves (estimated)	190 (total)		190 (total)
Instrument and controls	10 kW		10 kW
Safety related 120 V inverters	2@ 10 kW		2@ 10 kW
Control room exhaust fan	1.5	1.5	
Control room air makeup fan	1.5		1.5
Fire protection booster pump	50		50
Containment hydrogen analyzer	20		20
Hydrogen recombiners	75 kW		75 kW
Miscellaneous sump pumps	8@3		8@3
Diesel auxiliaries (estimated)	20		20
Diesel jacket water motor driven aux. pump	2@5 kW		2@5 kW
Continuous Diesel Generator Rating = 7000 kW			

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Notes:
(1) Loads supplied from each Bus. Ratings are Nameplate Horsepower (unless kW noted).

8.4 Interface Information

Electrical interface requirements with the Utility-Applicant are described in subsection 8.2.1. The onsite dc electric system is designed on the basis of four Class 1E batteries and their respective distribution. The cable routing system is designed on the basis of the routings defined in subsection 8.3.1.3, Physical Identification of Safety-Related Equipment, wherein both a reactor protection channel and an actuation train are in the same routing; a difference in potential of the circuits is the only basis for the separation requirement.

The GIBBSSAR/RESAR-414 interface requirements that are listed below correspond to the same items listed in RESAR-414, Section 8.3.1.2

1. The AC electrical power supply system is separated into two redundant load groups or electrical power trains.

2. Each of these two electrical power trains has access to both a preferred and a standby power supply as described in Section 8.3.1.1. Therefore the Class 1E bus in each of the two electrical power trains, has access to an off-site power source and one emergency diesel generator.

3. Each of the two emergency diesel generators is sized to provide all the electrical power required to operate the engineered safeguards equipment assigned to the corresponding electrical power train. These diesel generators start automatically on receipt of an engineered safeguards actuation signal ("S" signal) independent of the availability of off-site power.

4. In the event that off-site power is available following the accident, the emergency diesel generators are not connected to the respective Class 1E buses in each electrical power train. With off-site power available, all equipment operating prior to the accident continues to operate. The safeguards equipment associated with each power train is sequentially started.

5. In the event that a loss of off-site power occurred coincident with or subsequent to the postulated accident, the two emergency diesel generators are automatically started and connected to the respective Class 1E buses when a loss of voltage is sensed. They will be designed to accept a

sequential loading of all the assigned safeguards equipment within 10 seconds after receipt of the "S" signal.

6. This temporary loss of voltage associated with the loss of off-site power terminates the operation of all dependent equipment and only the required engineered safeguards equipment will be sequentially started and loaded on the corresponding diesel generators. 10

7. On-site emergency standby electrical power systems frequency and voltage variations of a transient nature (i.e., not steady state) meet the requirements of Regulatory Guide 1.9, 1971. 15

8. The 6900 V and 480 V Class 1E buses provide sufficient voltage to start Class 1E motors. The minimum starting voltage for Class 1E motors is 80 percent of the motor rated voltage at the motor terminal.

9. Means will be provided through limited operator actions to manually transfer residual heat removal suction isolation valves 9000A, 9001B to the alternate Class 1E power supplies. 10

10. The GIBBSSAR design takes exception to the RESAR-414 requirement to provide redundant Class 1E power sources, through manual switch over to the positive displacement charging pump. As described in RESAR Section 9.3.4.2.5, the positive displacement charging pump is primarily used for hydrotesting the Reactor Coolant System but is capable of providing sufficient flow for reactor coolant pump seal injection during the abnormal conditions when both centrifugal charging pumps are inoperable. In addition, Table 8.3-1 of RESAR-414 indicates this pump is not required for the safe shutdown of the plant during accident conditions, and it is non-Class 1E. Therefore, the RESAR-414 requirement to provide redundant Class 1E power sources, through manual switchover, to the positive displacement pump is not safety related and does not justify the more complex design along with the possibility of compromising the independence of the redundant Class 1E systems. This pump, however, is supplied from one Class 1E bus as shown on Table 8.3.2. 15

In addition to the criteria described above, GIBBSSAR also complies with the following requirements required by the NRC in the "Report to the Advisory Committee on Reactor Safeguard by the Office of Nuclear Regulation in the Matter of Westinghouse

Electric Corporation Reference Safety Analysis Report RESAR-414", July 1978.

a. Four redundant and independent Class 1E 120 volt vital buses are provided. Each vital bus has the capability of being powered from either a Class 1E ac bus or a Class 1E dc bus via an inverter. 15

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system. The surge tank level is indicated both locally and in the control room, where high and low levels are annunciated.

One chemical addition tank is supplied. Upon detection of in-leakage, manual adjustments are made at the CCW surge tank, until dissolved solids and corrosion inhibitor design concentrations as specified in RESAR-414 Section 1.7.1. are achieved. 4 11 4 9

Makeup water is normally delivered to the surge tank from the demineralized water storage tank, with automatic operation of the tank level control valves. Under emergency conditions, makeup water can be supplied from the Safety Class 3, Seismic Category I portion of the fire protection system. See subsection 9.2.3 and 9.5.1 and Figures 9.2-6 and 9.5-1B. 11

Radiation detectors monitor the CCWS. If the radiation level of the cooling water exceeds a predetermined value, an alarm is given in the control room and the vent on the CCWS surge tank is automatically closed. A vacuum breaker and a relief valve are provided to protect the surge tank.

9.2.2.3 Safety Evaluation

The CCWS is comprised of two full-capacity essential loops and one nonessential loop. During emergency operation, the nonessential loop is automatically isolated from the essential loops. The two loops are separated from each other by two automatically operated valves. The failure of the nonessential cooling loop has no adverse affect on plant capability to safely shut down the plant or maintain the plant in a safe shutdown condition. 11 9

One branch of the nonessential loop supplies a header which penetrates the reactor containment and supplies the reactor coolant pumps with the required cooling water. A second branch of the nonessential loop provides cooling water to the heat exchangers inside the containment. If a rupture occurs in the thermal barrier cooler of a reactor coolant pump, the flow in the component cooling water line from the thermal barrier cooler would increase because of the in-leakage from the reactor coolant system. High flow is detected downstream of the thermal barrier cooler and results in the closure of the motor operated valve downstream of the cooler. The self-actuating excess flow check valve downstream of the motor operated valves from the four reactor coolant pumps also closes on high flow. The air operated bypass valve is actuated to open only in the event of failure of 15

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the excess flow check valve into a closed position. Detection of excess flow by any of the thermal barrier cooler flowmeters automatically overrides the opening signal to the bypass valve. The piping from the thermal barrier coolers up to the excess flow check valve and bypass valve is designed to withstand reactor coolant pressure and temperature. 15

The performance of all components is monitored from the control room. Low flow, low pressure, high temperature, and high radiation level, which are all indicative of system malfunctions, are annunciated in the control room.

Leakage from any system being cooled by the CCWS is detected by an increase in the level of the CCW surge tank or by an increase in the system radiation level, when the system being cooled is contaminated. Details of the radiation-monitoring equipment are given in Section 11.5. Leakage from the CCWS to the service water system or to the atmosphere is detected by a decrease in the CCW surge tank level. 11 11

A partition in the surge tank provides separate surge volumes for each essential loop. If one essential loop develops a leak and is taken out of service, the operation of the other loop is unaffected. If a leak develops in the nonessential loop, it can be isolated from the essential loops and operation is unaffected. The partition is designed to maintain its integrity while one side of the surge tank is empty. All components of the CCWS are located inside of a Seismic Category I structure. The CCW pumps, the heat exchangers, and the essential loops are in the ESF area. The components of the two essential loops are physically separated within the ESF area by a dividing structure. The CCWS pumps are located at elevation 94 feet, 6 inches, which is above the flooding level that can occur due to equipment failure within the building. These conditions, together with the classification of the CCWS as Seismic Category I, make the system capable of withstanding adverse environmental occurrences such as postulated earthquakes, tornadoes, and tornado-generated missiles. 9 11 9

The physical separation of the two essential loops precludes coincident damage to redundant equipment in the event of a postulated pipe rupture, equipment failure, or missile generation. Protection against dynamic effects associated with the postulated rupture of piping are discussed in Section 3.6.

9.2.2.4 Tests and Inspections

Periodic chemical examination of the component cooling water is made for pH, chloride content, and corrosion inhibitor content; if required, manual adjustment is made utilizing the chemical addition tank to meet the Westinghouse chemistry specifications listed in RESAR-414 Section 1.7.1. Periodic visual inspection and preventive maintenance can be conducted as necessary without interruption of cooling system operation. 6

GIBBSSAR

TABLE 9.2-10

COMPONENT COOLING WATER SYSTEM INTERFACE REQUIREMENTS
(Westinghouse-414)

Interface Item	RESAR-414 Reference	GIBBSSAR Reference	Comments	
Flows and heat loads	Table 9.2-1	Table 9.2-6 and Table 9.2-7	Interface item discussed throughout Section 9.2.2	1 6
Electric power	Section 8.3	Section 8.3		
Instrumentation and controls	subsection 7.1.2	subsection 7.3.1		
Compatibility of various plant operations	subsection 9.2.2	subsection 7.3.1		
Compatibility of NSSS components requiring cooling	subsection 9.2.2	subsection 9.2.2.2	Interface item discussed throughout Section 9.2.2	6
Compatibility of component design	subsection 9.2.2	subsection 9.2.2		
Single active failure of safeguard portion by system	subsection 9.2.2	Table 9.2-9		
Chemical addition and corrosion protection	subsection 9.2.2	subsection 9.2.2		
Component cooling water temperature limits	Table 9.2-1	subsection 9.2.2		
Reactor Coolant Pumps	subsection 9.2.2 and Appendix 5A	subsection 9.2.2		15

GIBBSSAR

TABLE 9.2-11

DEMINERALIZED WATER MAKEUP SYSTEM
INTERFACE REQUIREMENTS

(Westinghouse-414)

Interface Item	RESAR Reference	GIBBSSAR Reference	Comments
Chemical specification	subsection 9.2.3.1	Table 9.2-12	
Water requirements	subsection 9.2.3.2	subsection 9.2.3	

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FIGURE 9.2-4a

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GIBBSSAR
FIGURE 9.2-4b

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4) Fire stops are provided within the cable trays whenever the cables penetrate walls or floors designated as fire barriers. Fire stops are provided in long vertical runs and are located at intervals equivalent to floor spacings.

The fire stop specification will require that the fire stop design prevent the propagation of a fire for a minimum period of thirty minutes when tested for the largest number of cable routings and maximum cable density. 8

Vertical cable tray runs are provided with solid steel covers for a minimum distance of 6 feet-0 inches above the floor for physical protection of the cable.

5) The type of barrier employed on crossover trays, if required, will be described in the Utility Applicant's FSAR. 15

6) Only electric cable construction that passes the current IEEE Standard 383 are used in cable trays. Any exception will be addressed in the Utility-Applicant's SAR. 15 8

7) Cable raceways are used only for cables. 15

8) Miscellaneous storage and piping for flammable or combustible liquids or gases are situated such that they do not create a potential exposure hazard to safety related systems. 15

d) Ventilation

1) In all cases during a fire, the affected area will be isolated from the balance of the HVAC system. The smoke and hot gases will be contained in the area until monitored. Subsequent to monitoring, smoke removal will be generally accomplished by the use of manually controlled releases through the plant ventilation systems. Smoke control and removal is in compliance with NFPA-204. 8

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All ductwork that penetrates a designated fire barrier is equipped with an approved damper with a rating equivalent to that designated for the barrier. All fire dampers are equipped with heat-responsive elements which automatically release the fire damper blade when the air temperature in the ductwork exceeds the predetermined element operating temperature. Fire dampers are normally open and close during a fire condition. Fire 8

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dampers in the computer rooms are equipped with halon overrides to ensure closure prior to release of the halon system protecting the respective area. Fire dampers located in ductwork supplying ventilation to areas containing safety-related equipment are seismically qualified to ensure that the dampers will not close during a seismic event. Dampers located in fire barriers are fire rated. These dampers are equipped with fusible links to ensure closure in the event of a fire.

Fire detectors are located in the ductwork supplying air to the control room. This ensures that a fire in one train of the ventilation system will not impair safe shutdown, as the redundant train will be used.

2) Smoke and gases generated from fires involving radioactive materials are monitored for radioactivity using the monitors installed at the plant vent stack.

3) Ventilation power and control cables are separated by safety division, for safety related areas. Power supply and controls for the ventilation system are routed outside the fire area served by the system to the extent practical. 8

4) Engineered safety features filters are protected in accordance with the guidelines of NRC Regulatory Guide 1.52.

Charcoal filter fires are considered on the basis of the total quantity of charcoal in the filters. The filter train can be readily isolated from the remainder of the ductwork by fire dampers. The charcoal filter is contained within a steel container.

Each filter train is protected by a separate heat detection and water deluge system. The warning thermostats alert the operator to isolate the filter and actuate the deluge system if required.

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3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A. C. electrical power sources shall be OPERABLE:

a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and

b. Two separate and independent diesel generators each with:

1. Engine mounted (if any) and day fuel tanks containing a minimum of 1590 gallons of fuel, | 15

2. A separate fuel storage system containing a minimum of 90,000 gallons of fuel, and | 10

3. A separate fuel transfer pump.

APPLICABILITY MODES 1, 2, 3 and 4.

ACTION:

a. With either an offsite circuit or diesel generator of the above required A. C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A. C. sources by performing Surveillance Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least two offsite circuit and two diesel generators to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. | 10

b. With one offsite circuit and one diesel generator of the above required A. C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A. C. sources by performing Surveillance Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore | 10

at least one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore at least two offsite circuits and two diesel generators to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. | 10

c. With two of the above required offsite A. C. circuits inoperable, demonstrate the OPERABILITY of two diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter, unless the diesel generators are already operating; restore at least one of the inoperable offsite sources to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours. With only one offsite source restored, restore at least two offsite circuits to OPERABLE status within 72 hours from time of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. | 10 | 10

d. With two of the above required diesel generators inoperable, demonstrate the OPERABILITY of two offsite A. C. circuits by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter; restore at least one of the inoperable diesel generators to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore the two diesel generators to OPERABLE status within 72 hours from time of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

1541 188

ELECTRICAL POWER SYSTEMS

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A. C. electrical power sources shall be OPERABLE:

a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and

b. One diesel generator with:

1. Engine mounted (if any) and day fuel tanks containing a minimum of 1590 gallons of fuel, | 15

2. A fuel storage system containing a minimum of 90,000 gallons of fuel, and | 15

3. A fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum required A. C. electrical power sources OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until the minimum required A. C. electrical power sources are restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A. C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the Surveillance Requirements of 4.8.1.1.1 and 4.8.1.1.2 except for requirement 4.8.1.1.2a.6.

1541 189

ELECTRICAL POWER SYSTEMS

3/4.8.2 ONSITE POWER DISTRIBUTION SYSTEMS

A.C. DISTRIBUTION - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.1 The following D. C. electrical busses shall be OPERABEL and energized from sources of power other than the diesel generators:

(6900) volt Emergency Bus No. 1EA1

(6900) volt Emergency Bus No. 1EA2

(480) volt Emergency Bus No. 1EB1, 1EB3

(480) volt Emergency Bus No. 1EB2, 1EB4

(118) volt A.C. Vital Bus No. 1PC1

(118) volt A.C. Vital Bus No. 1PC3

(118) volt A.C. Vital Bus No. 1PC2

(118) volt A.C. Vital Bus No. 1PC4

APPLICABLITY: MODES 1, 2, 3 and 4.

ACTION:

With less than the above complement of A. C. busses OPERABLE, restore the inoperable bus to OPERABLE status within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.1 The specified A. C. busses shall be determined OPERABLE and energized from A. C. sources other than the diesel generators at least once per 7 days by verifying correct breaker alignment and indicated power availability.

Question 010.90

Table 9.2-10 of your PSAR regarding component cooling water interfaces is not complete. RESAR-414 also has interface requirements for the CCW to the RCP's identified in Section 5A of RESAR-414. Verify that your CCW design meets these requirements. Also discuss how your design meets the safety related interface requirements in RESAR-414, Section 5A, regarding protection against a pressurizer relief tank rupture disc missile.

Response 010.90

The GIBBSSAR CCW system design meets the interface requirements for the CCW to the reactor coolant pumps identified in Section 5A of RESAR-414. See section 7.3.1.1.d, revised section 9.2.2.3, Table 9.2-10, and Figures 9.2-4, and 7.3-1 sheet 2F.

The pressurizer relief tank rupture discs are designed so failure should not result in the formation of missiles. Failure of the rupture disc results in splitting of the disc into quadrants. The quadrants are held in place at the circumference of the disc.

1541 191

Question 010.91

In your response to our request 010.43 you state that the reactor makeup water storage tank and associated safety related piping and pumps will be designed to seismic Category I requirement, but will be non-nuclear safety class. It is our position that those portions of the reactor water makeup system that are used as a seismic Category I makeup source be designed to Quality Group C requirements as shown on Figures 9.2-5 and 9.2-6. Revise your design Section 9.2.3 and Figure 9.1-3 as necessary. Also revise Table 3.2-1 to include the piping and valves of the reactor makeup water system that provide makeup to the spent fuel pool. 10

Response 010.91

The seismic Category I makeup source has been changed from the Reactor Makeup Water System to the Fire Protection System. Consequently, the Reactor Makeup Water System has been classified as non-nuclear safety related. The fire protection booster pumps and the system piping and valves used as the seismic Category I makeup source will be designed to Safety Class 3 and seismic Category I requirements. See Section 9.2.3.2, revised Sections 9.1.2.2, 9.5.1.1, 9.5.1.2, and 9.5.1.6.5, revised Table 3.2-1, and revised Figures 9.1-3, 9.2-1, 9.2-2, 9.2-6, 9.4-5, and 9.5-1B.

1541 192

Question 040.8 (8.2.1)

Include the power requirements (KVA ratings) for station service, unit auxiliary and main transformers and the corresponding input voltage requirements as interface requirements for the utility applicant.

Response 040.8

Input voltage requirements as interface requirements for the utility applicant are described in revised Section 8.2.1. See revised Figure 8.3-1 for transformer ratings.

1541 193

Question 040.9 (8.3.1.1.a)

Section 8.3.1.1.a discusses tripping the reactor coolant pump breakers in the event of a decrease-frequency condition. PESAR-414 interface requirements of Section 7A indicates that reactor coolant pump speed sensors provide a reactor trip on pump underspeed but does not trip the RCP breakers on power frequency decay rates of 5 Hz/second. Since Section 8.2.1 of GIBBSSAR specifies a frequency decay rate of 5 Hz/sec or less, it appears from the discussion in section 8.3.1.1.a that an inconsistency exists between the information presented in Section 8.3.1.1.a and that contained in Section 7A of RESAP-414. 10

Response 040.9

See revised Sections 8.2.1 and 8.3.1.1.a

1541 194

Question 040.19 (8.3.2.1.c)

DC System testing.

The DC testing delineated in 16.3/4.8.2.32 should include a resistance measurement cell-to-cell and terminal connections at least once each 18 months. 10

Response 040.19

See revised Section 16.3/4.8.2.3.2.

1541 195

Question 040.20 (8.3.2.3)

Regulatory Guide 1.40, 1.62 and 1.108 should be added to the list of references (per 040.6, 040,13).

Response 040.20

See revised Section 8.1.4.

1541 196

Question 040.31 (Fig. 8.3-1)

This figure should be revised to indicate input transformer ratings and major bus voltages (see 040.7). 10

Response 040.31

See revised Figure 8.3-1. 15

1541 197

Question 040.32 (Tables 8.3-1, 8.3-2)

Some of the component nomenclature and ratings of tables 8.3-1 and 8.3-2 do not correspond with those listed in RESAR 414, tables 8.3-1, 8.3-2. (Examples: Station Service Water Pumps vs. Essential Service Water Pumps, 450 HP rating for PHR Pumps vs. 500 HP.) 10

Review the RESAP-414/GIBBSSAR Tables 8.3-1, 8.3-2 and revise the listing as necessary to resolve the differences.

Response 040.32

See revised Tables 8.3-1 and 8.3-2 for updated nomenclature and ratings. Loads that are within the Architect Engineer's scope of design use the nomenclature established in GIBBSSAR. 12

1541 198

Question 040.41

The day tank associated with each diesel generator set should be provided with an overflow line to return excess fuel oil delivered by the transfer pump back to the fuel oil storage tanks. Show this on Fig. 9.5-2 (SRP 9.5.4, Part III, Item 5d). 10

Response 040.41

The overflow line is shown on revised Figure 9.5-2. Also see revised Section 9.5.4.2. 11

1541 199

Question 040.42

Identify any high energy piping system(s) in the diesel engine room areas and indicate what means are provided to protect the following diesel engine systems from the effects of a failure of high energy piping:

a. fuel oil systems

b. cooling water system

c. air starting system

d. lubrication system

e. combustion air intake and exhaust system

(SRP 9.5.4 Part III, Item 8; SRP 9.5.5, Part III, Item 4; SRP 9.5.6, Part III, Item 5; SRP 9.5.7, Part III, Item 3; SRP 9.5.8, Part III, Item 6c).

10

Response 040.42

There are no high energy piping systems in the diesel engine room areas. The consequences of a moderate energy line failure are described in revised Section 9.5.4.3.

11

1541 200

Question 040.75

Provide the results of a failure mode and effects analysis to determine the effect of malfunctions of the turbine bypass system on the operation of the reactor and main turbine generator unit (SRP 10.4.4, Part III, Item 4). 10

Response 040.75

Section 10.4.4.3 states that the steam dump system is not essential for the safe shutdown of the plant. The statements made in section 10.4.4.3 are made in accordance with SRP 10.4.4, Part III, Item 4a. 11

Section 3.6.1.1.a concerns itself with failure of Turbine Building high energy piping.

1541 201

Question 040.76

Regarding our original question 040.01, the interface information listed in Section 1.8 should include the GIBBSSAR and PESAR-414 information for the electrical power systems similar to the fluid systems information in Table 1.8.2. Section 1.8 should reference section 8.4 for the electrical interface information contained therein. Provide this information. 15

Response 040.76

See new Section 1.8.5.

1541 202

Question 040.77

General - Your response to our question 040.2 indicated a response will be provided by a given later date. The responses to our questions 040.8 and 040.31 are in the same category, however, dates for submittal of information on 040.8 and 040.31 were not given. Provide the dates that this information will be provided. 15

Response 040.77

See revised response to Question 040.8 and 040.31. Response to Question 040.2 was revised under Amendment 14.

1541 203

Question 040.78

General - Your responses to a number of our questions indicated that certain information will be discussed in the utility applicants FSAR. The questions involved are 040.11, 040.14, 040.15, 040.21, 040.24, 040.28, 040.29 and 040.31. The applicable sections of the SSAR should contain a notation to this effect, that is, that the specific information will be included in the utility applicants FSAR.

Response 040.78

The applicable sections of GIBBSSAR have been revised to incorporate the responses of the referenced Questions. The applicable sections are listed as follows: 15

Question No.	Revised Applicable GIBBSSAR Section
040.14	8.3.1.4.2.4
040.15	9.5.1.6.4.C
040.21	8.3.1.1.b(8)
040.24	8.3.1.4.2.4
040.28	8.3.1.1.b(12), 8.3.2.1.(C)
040.29	8.3.1.1.b(10)

No reference was made to the Utility Applicant's FSAR in the response to Question 040.11 and 040.31, therefore, no revision was made in GIBBSSAR.

1541 204

Question 040.79

Your response to our question 040.4 (revised section 3.1.17) states that automatic sequencing of safety-related loads will be performed whether the ESF buses are powered from the onsite or offsite power sources. Expand your description of ESF load sequencing and address whether or not you employ independent or common load sequencers when using either onsite or offsite power sources. If common sequencers are used, provide a detailed analysis to demonstrate that there are no credible sneak circuits or common failure modes in the sequencer design that could render both onsite and offsite power sources unavailable. In addition, provide information concerning the reliability of your sequencers and reference design detailed drawings. 15

Response 040.79

See revised Figure 8.3-2 and Section 8.3.1.1.b(8).

1541 205

Question 040.80

Your response to our question 040.11 included revisions to Section 8.3.1.1.b(8) and Figure 8.3-2. Explain the logic associated with the bus IEAI (System 1-loss of voltage) and (System 2-undervoltage) signals as these signals initiate load shedding, bus IAEI supply breaker tripping, and load sequencing. Figure 8.3-2 should show the option to sequence the ESF loads on either offsite or onsite power when a safety injection signal is received, load shedding associated with a safety injection signal with availability of offsite power and the load shed blocking logic (as explained in note 7). It is requested that system descriptions and detailed electrical control circuits for the standby DG automatic starting and loading sequencer system, including initiating curcuits and load shedding and sequencing when offsite power is available, be provided for information. 15

Response 040.80

See revised Figure 8.3-2 and Section 8.3.1.1.b(8).

1541 206

Question 040.81

Your response to our question 040.12 does not address the relay trip set point drift concern. Provide this information. 15

Response 040.81

See revised Section 8.3.1.1.b(11).

Question 040.82

Your response to our question 040.23 is not complete. Considering that the system includes automatic operation of on-load tap changers to compensate for load changes, we require that the adequacy of the design be verified and that the description of making the verification be provided. 15

Response 040.82

See revised Section 8.3.1.1.b(2).

1541 208

Question 040.83

Your responses to questions 040.26 and 040.27 are not complete. Regarding 040.26, we require your analysis of battery charger operation during transients (including disconnecting the battery) and other operating modes that could degrade battery charger operation. Regarding our question 040.27, the effect on equipment connected to the battery charger during overvoltage conditions should be addressed. The voltages and tolerance requirements for the connected systems are contained in the NSSS interface requirements, Chapter 7A, RESAR-414.

Response 040.83

a) In responding to question 040.26, Section 8.3.2.1.a was revised in Amendment 10 of GIBBSSAR to state that "The batteries will be connected to their respective buses under all modes of operation." Consequently, the possible instability which the battery charger may experience upon the disconnection of the battery is not applicable. The battery charger is sized to supply the largest steady-state load while maintaining the battery in a fully charged condition. During possible transient conditions, such as if the transient load demand exceeds the battery charger rating, the battery will supply the needed addtional current to the load and maintain the DC system stability. 15

b) In responding to question 040.27, Section 8.3.2.1.b was revised in Amendment 10 of GIBBSSAR to state that "Each charger is automatically regulated and equipped with a dc voltmeter, dc ammeter, ac failure, battery charger high voltage relay and battery low voltage relays. Malfunction of a charger annunciates in the control room and trips the charger main breaker; charger main breaker status is indicated in the control room and alarms for an off-normal position indication."

In addition, the dc equipment connected to the Class 1E 125 V dc system is designed to function properly between 105 V and 140 V dc. (This voltage and tolerance requirement is in agreement with the NSSS interface requirement stated in Appendix 7A of RESAR 414.) Therefore, the equipment connected to the battery chargers is protected against the battery charger overvoltage condition by the battery charger high voltage relay which trips the charger main breaker if the charger output voltage exceeds 140 V.

1541 209

Question 040.84

Paragraph 8.4-10 takes exception to the RESAR-414 requirement to provide redundant Class 1E power sources, through manual switchover, to the positive displacement charging pump. Provide justification for this exception. 15

Response 040.84

See revised Section 8.4.

1541 210

Question 040.85

Section 8.1-3(4) of the SSAR references IEEE 323 (1974) IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations.

In order to ensure that your environmental qualification program conforms with General Design Criteria 1, 2, 4 and 23 of Appendix A and Sections III and XI of Appendix B to 10 CFR Part 50, and to the national standards mentioned in Part II "Acceptance Criteria" (which includes IEEE Std 323) contained in Standard Review Plan Section 3.11, the following information on the qualification program is required for all Class 1E equipment.

1. Identify all Class 1E Equipment, and provide the following:

    a. Type (functional designation)
    b. Manufacturer
    c. Manufacturer's type number and model number
    d. The equipment should include the following, as applicable:

        1) Switchgear
        2) Motor control centers
        3) Valve operators
        4) Motors
        5) Logic equipment
        6) Cable
        7) Diesel generator control equipment
        8) Sensors (pressure, pressure differential, temperature and neutron)
        9) Limit Switches
        10) Heaters
        11) Fans
        12) Control Boards
        13) Instrument racks and panels
        14) Connectors
        15) Electrical penetrations
        16) Splices
        17) Terminal blocks

15

1541 211

2. Categorize the equipment identified in (1) above into one of the following categories:

   a. Equipment that will experience the environmental conditions of design basis accidents for which it must function to mitigate said accidents, and that will be qualified to demonstrate operability in the accident environment for the time required for accident mitigation with safety margin to failure.

   b. Equipment that will experience environmental conditions of design basis accidents through which it need not function for mitigation of said accidents, but through which it must not fail in a manner detrimental to plant safety or accident mitigation, and that will be qualified to demonstrate the capability to withstand any accident environment for the time during which it must not fail with safety margin to failure.

   c. Equipment that will experience environmental conditions of design basis accidents through which it need not function for mitigation of said accidents, and whose failure (in any mode) is deemed not detrimental to plant safety or accident mitigation, and need not be qualified for any accident environment, but will be qualified for its non-accident service environment. 15

   d. Equipment that will not experience environmental conditions of design basis accidents and that will be qualified to demonstrate operability under its normal or abnormal service environment. This equipment would normally be located outside the reactor containment.

3. For each type of equipment in the categories of equipment listed in (2) above provide separately the equipment design specification requirements, including:

   a. The system safety function requirements.

   b. An environmental envelope as a function of time which includes all extreme parameters, both maximum and minimum values, expected to occur during plant shutdown, normal operation, abnormal operation, and any design basis event (including LOCA and MSLB), including post-event conditions.

c. Time required to fulfill its safety function when subjected to any of the extremes of the environmental envelope specified above.

d. Technical bases should be provided to justify the placement of each type equipment in the categories 2.b and 2.c listed above.

4. Provide the qualification test plan, test set-up, test procedures, and acceptance criteria for at least one of each group of equipment of (1.d) as appropriate to the category identified in (2) above. If any method other than type testing was used for qualification (operating experience, analysis, combined qualification, or ongoing qualification), describe the method in sufficient detail to permit evaluation of its adequacy.

5. For each category of equipment identified in (2) above, state the actual qualification envelope simulated during testing (defining the duration of the hostile environment and the margin in excess of the design requirements). If any method other than type testing was used for qualification, identify the method and define the equivalent "qualification envelope" so derived.

6. A summary of test results that demonstrates the adequacy of the qualification program. If analysis is used for qualification, justification of all analysis assumptions must be provided.

7. Identification of the qualification documents which contain detailed supporting information, including test data, for items 4, 5,and 6.

In addition, in accordance with the requirements of Appendix B of 10 CFR 50, the staff requires a statement verifying: 1) that all Class 1E equipment has been (OL) or will be (CP) qualified to the program described above, and 2) that the detailed qualification information and test results are (or will be) available for an NRC audit.

15

Response 040.85

The following item numbers correspond with the numbers in the question:

1. See New Table 3.11-6 for identification of Class 1E equipment. The specific information concerning the type, manufacturer, manufacturer's type number and model number are not presently available. Upon selection of equipment vendors and after receipt, review and acceptance of this information from the vendor, it will be available for NRC review.

2. The equipment identified in Table 3.11-6 falls in the following categories:

   a. Category "a", all equipment shown located inside of the containment.

   b. Category "b" - none

   c. Category "c" - none

   d. Category "d", all equipment shown located outside of the containment.

3. a. See revised Section 3.11.2.a

   b. See revised Section 3.11.2.a

   c. See revised Section 3.11.2.a

   d. Not applicable.

4. See revised Sections 3.11.2.b,c,d.

5. The qualification envelope is shown on Table 3.11-3 and 4 for equipment located inside of and outside of the containment, respectively. The margin in excess of the design requirement will be in accordance with the factors described in Section 6.3.1.5 of IEEE 323-1974.

6. Test results and summaries that demonstrate the adequacy of the qualification program will be available for NRC review upon receipt of the test report from the Vendor.

15

7. Documentation will be consistant with Section 8 of IEEE 323 as described in Section 3.11.2.e.

In addition, GIBBSSAR Section 3.11.2 has been revised to include the following statement. "All BOF Class 1E equipment will be qualified in accordance with the following requirements, the detailed qualification information and test results will be available for NRC audit." 15

Question 131.62 (3.7.2)

Your response to Question 131.29 is not satisfactory. Clarify the following:

1. How are lateral earth pressure and hydrostatic pressure considered in your analysis?

2. An upward vertical acceleration will reduce the weight of a structure. Is this considered in the definition of W indicated in Equation (4) on Page 3.7-29? 8

Response 131.62

See revised Section 3.7.2.14

1541 216

Question 131.63 (3.7A)

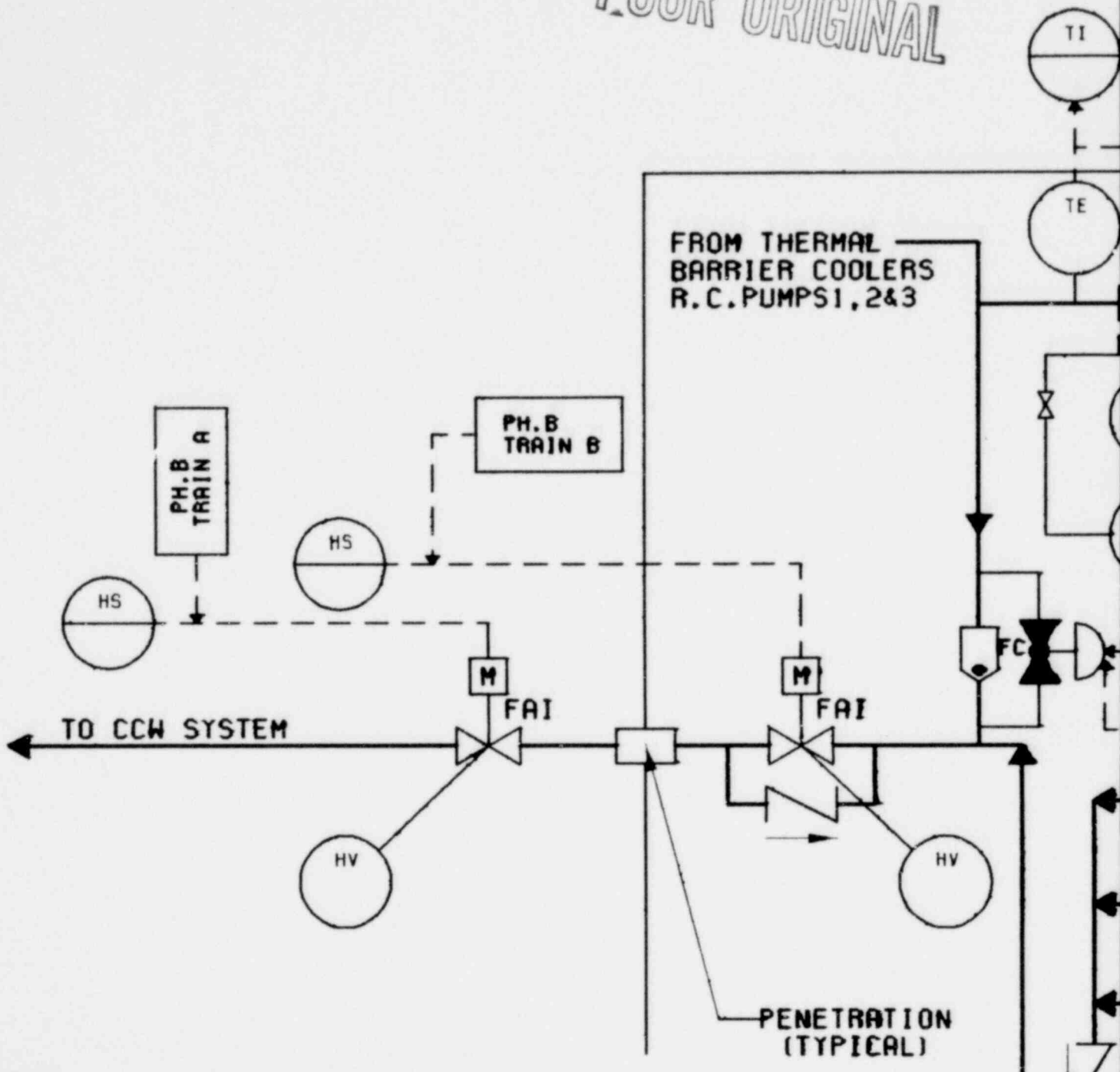
Your response to Item 131.34 is not complete. Referencing benchmark calculations is not enough.

You are requested to submit sample problems comparing the computer code solution with a solution obtained by either hand calculations or other computer code solution, which is in public domain, so that the reviewer has opportunity to review the results of the two solutions. In case that the computer code has been verified by means of tests, the test report should be submitted together with the computerized solution for review. 8

Response 131.63

The verification documentation of Gibbs & Hill in-house programs as listed in Section 3.7A, i.e., SCONV, SPECTRA, QUAKE, and TIME has been transmitted to you under separate cover by letter LGH-NRC-70. The verification of these programs are in accordance with the procedure outlined in the above question, and are clearly described in each program documentation. 15

1541 217

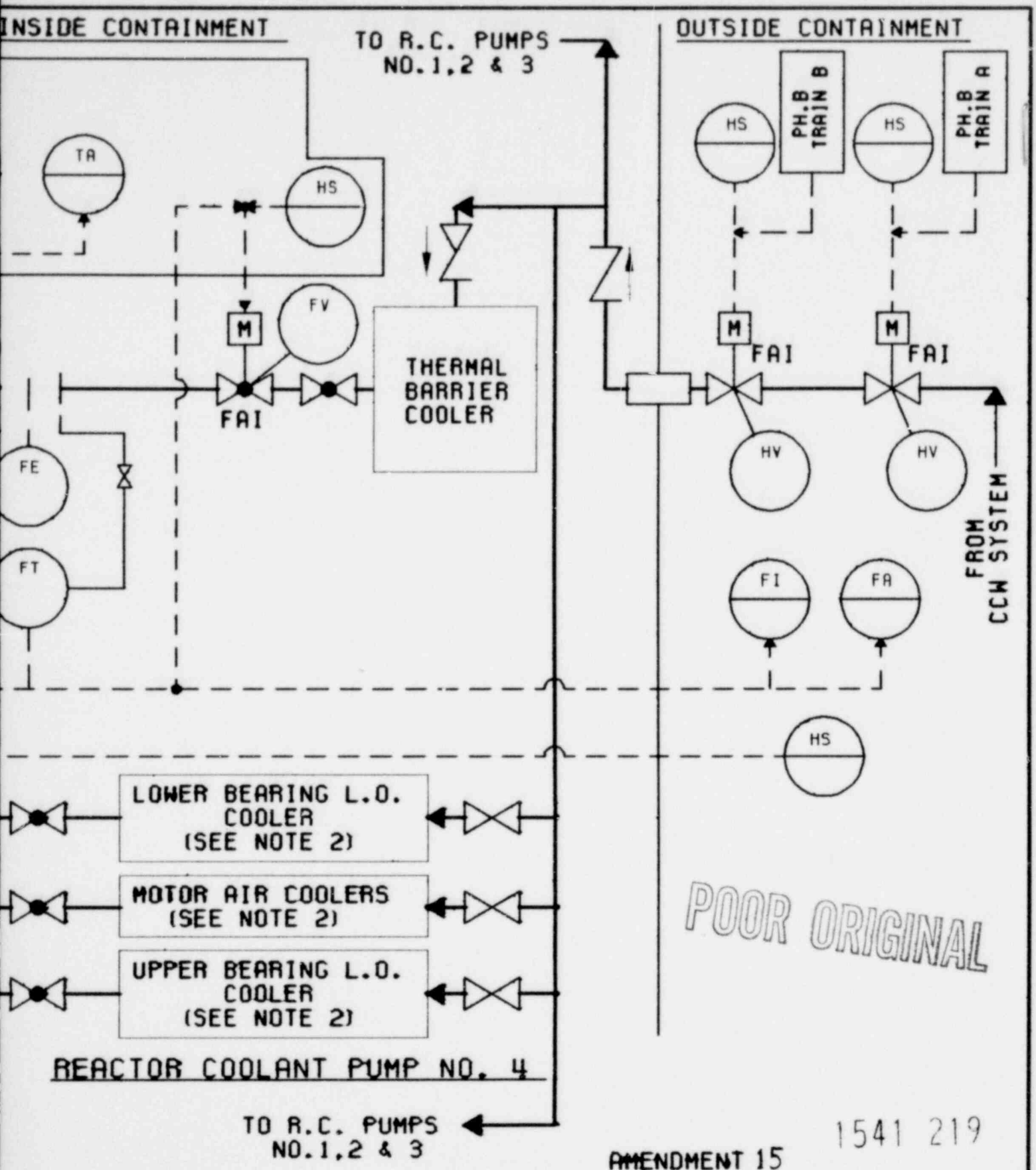


NOTE:

1. REACTOR COOLANT PUMP NO. 4 SHOWN-REACTOR COOLANT PUMPS 1,2 & 3 SIMILAR

2. INSTRUMENTATION APPLICATION FOR MOTOR AIR COOLERS & UPPER & LOWER BEARING L.O. COOLERS SIMILAR TO THERMAL BARRIER COOLER, EXCEPT FOR HIGH FLOW ISOLATION INTERLOCKS SHOWN.

COMPONENT COOLING WA



1541 219

AMENDMENT 15

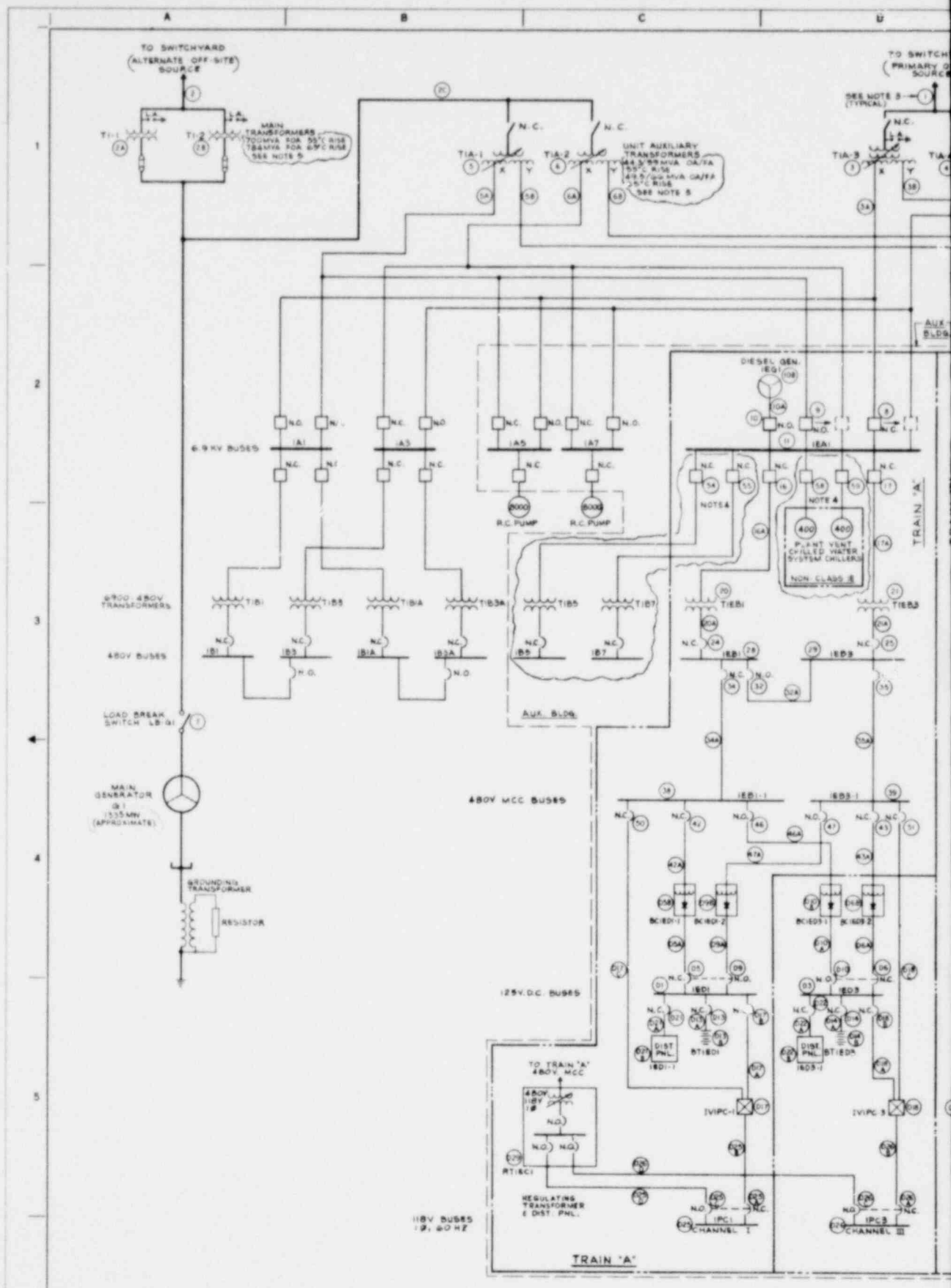
GIBBSSAR

INSTRUMENTATION AND CONTROL SYSTEM DIAGRAM

NSSS:
NOT SPECIFIC ☐
W-414 ■
CE ☐
B & W ☐

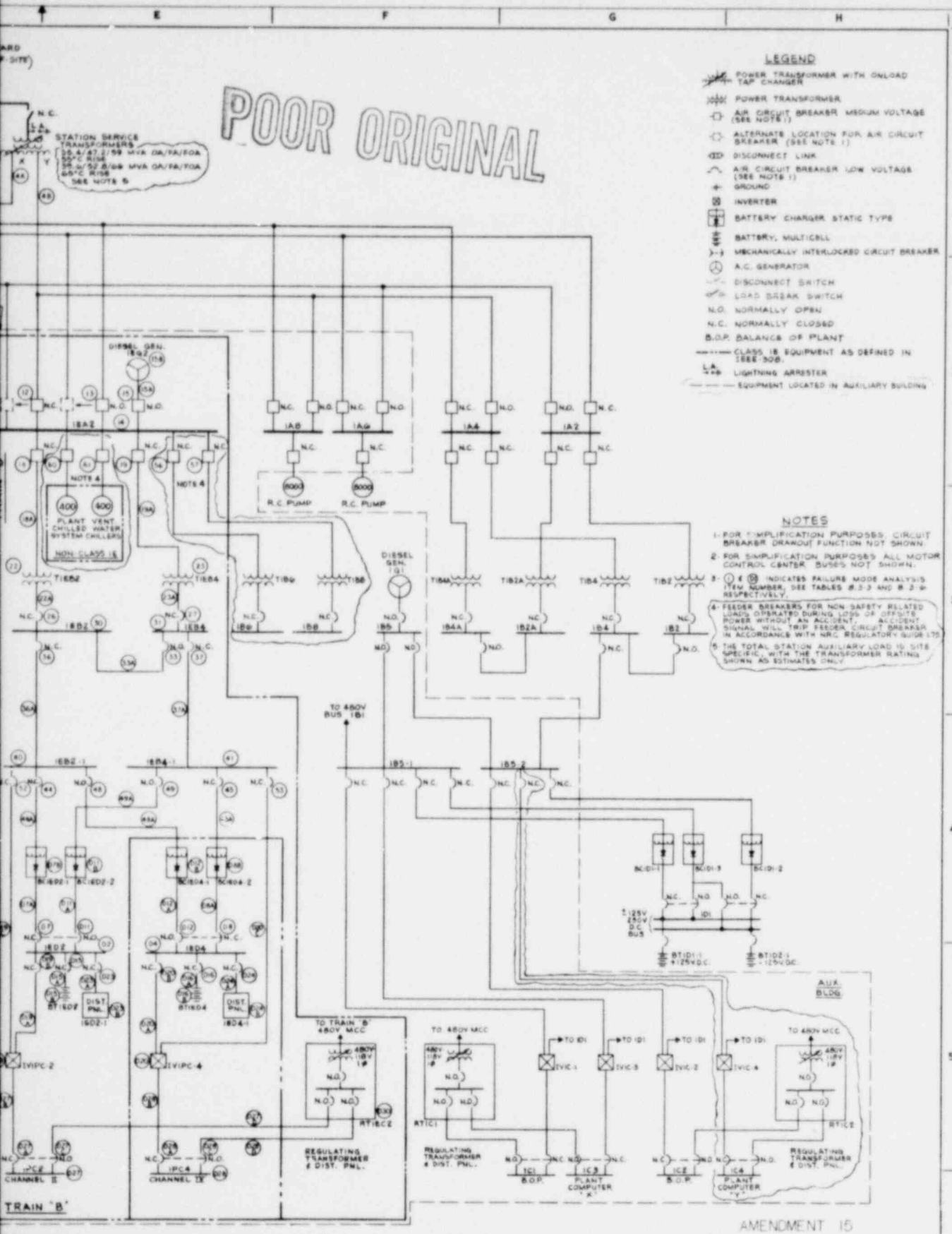
FIGURE NO. 7.3-1 SH.2F

CADRE/SPL/PWR12

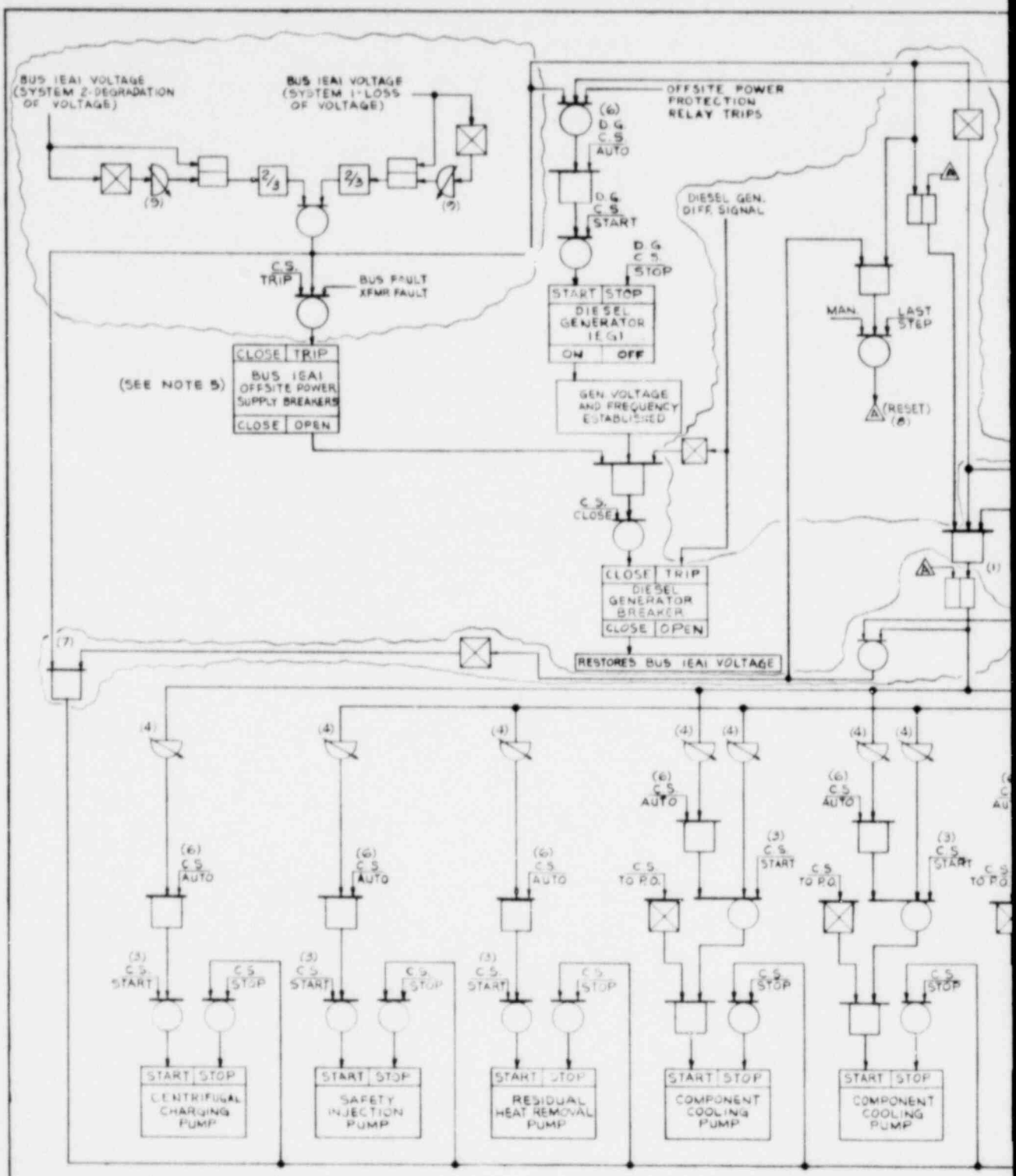


POOR ORIGINAL

1541 220



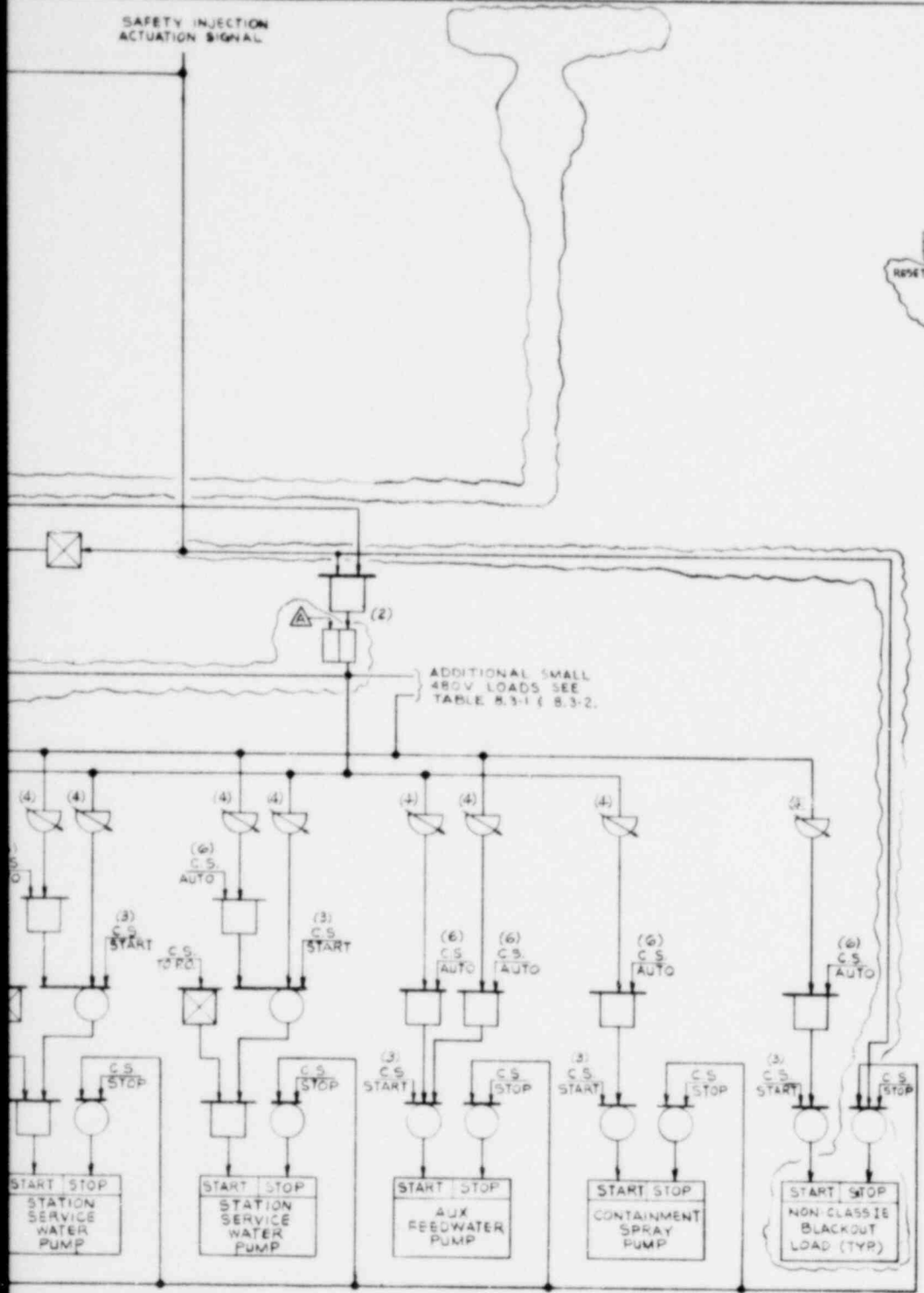
GIBBSSAR	SIMPLIFIED MAIN ONE LINE DIAGRAM	1541 221
NSSS: NOT SPECIFIC ☐ W-414 ■ CE ☐ B&W ☐	FIGURE NO. 8.3-1	



LOGIC START DIAGRAM - DIESEL GENERATOR

TRAIN A

(TYPICAL FOR DIESEL GENERATOR 1EG2)



LEGEND

- NOT
- ADJUSTABLE TIME DELAY
- OR
- AND
- CIRCUIT BREAKER WITH CONTROL FUNCTIONS AS SHOWN ON DIAGRAM
- RESET / SET – RETENTIVE MEMORY DEVICE (LATCH)
- A – CONTINUATION OF LOGIC LINE

D.G. - DIESEL GENERATOR
P.O. - PULL OUT
C.S. - CONTROL SWITCH

NOTES

1. DIAGRAM SHOWS THE AUTOMATIC SEQUENCE OF THE DIESEL-GENERATOR STARTING AND LOADING SEQUENCE. OTHER FUNCTIONS OPERATING ON THE CIRCUIT BREAKERS SHOWN ARE OMITTED FOR SIMPLICITY.
2. FOR THE ELECTRICAL ONE LINE DIAGRAM SEE FIGURE 8.3-1.
3. INDICATES THAT MANUAL STARTING IS BLOCKED DURING AUTOMATIC SEQUENCING. INDICATES THAT AUTOMATIC STARTING IS BLOCKED DURING SEQUENCING AND UNTIL THE SEQUENCER IS RESET.
4. FOR TIME SEQUENCE SEE TABLE 8.3-1 & 8.3-2.
5. RESTORATION OF BUS (EA) VOLTAGE BY DIESEL GENERATOR WILL NOT RECLOSE OFFSITE POWER SUPPLY BREAKERS OR INTERRUPT LOADING SEQUENCE.
6. WILL ALARM IN CONTROL ROOM WHEN CONTROL SWITCH IS NOT IN AUTO POSITION.
7. LOAD SHED WILL BE AUTOMATICALLY BLOCKED DURING SEQUENCER CYCLE AND AUTOMATICALLY REINSTATED AT THE COMPLETION OF THE SEQUENCER CYCLE.
8. RESET INITIATED BY 1) MANUAL, 2) COMPLETION OF LAST SEQUENCING STEP, 3) LOSS OF BUS VOLTAGE OR SUSTAINED DEGRADATION OF BUS VOLTAGE DURING SEQUENCING CYCLE.
9. TIME DELAY TO PREVENT SPURIOUS TRIPS.

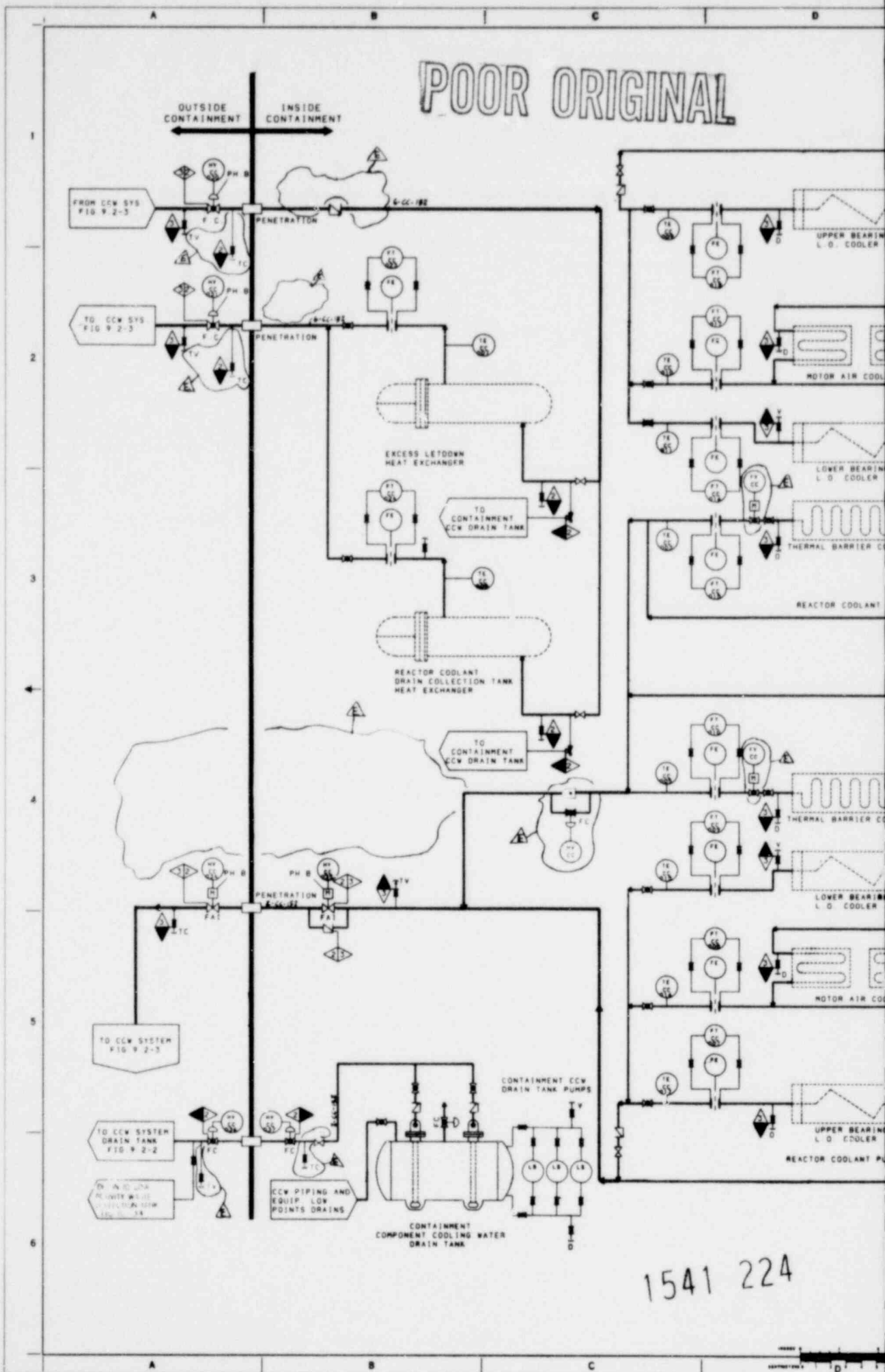
AMENDMENT 15

1EGI

1541 223

GIBBSSAR	STANDBY DIESEL GENERATOR AUTOMATIC STARTING & LOADING SEQUENCE
NSSS: NOT SPECIFIC ☐ W-4(1) ■ CE ☐ B&W ☐	FIGURE NO. 8.3-2

FIG. Nº 8.3-2


POOR ORIGINAL
OUTSIDE CONTAINMENT
INSIDE CONTAINMENT
FROM CCW SYS FIG 9.2-3
TO CCW SYS FIG 9.2-3
PENETRATION
EXCESS LETDOWN HEAT EXCHANGER
TO CONTAINMENT CCW DRAIN TANK
REACTOR COOLANT DRAIN COLLECTION TANK HEAT EXCHANGER
TO CCW SYSTEM FIG 9.2-3
TO CCW SYSTEM DRAIN TANK FIG 9.2-2
CCW PIPING AND EQUIP LOW POINTS DRAINS
CONTAINMENT CCW DRAIN TANK PUMPS
CONTAINMENT COMPONENT COOLING WATER DRAIN TANK
UPPER BEARING L.O. COOLER
MOTOR AIR COOLER
LOWER BEARING L.O. COOLER
THERMAL BARRIER COOLER
REACTOR COOLANT PUMP
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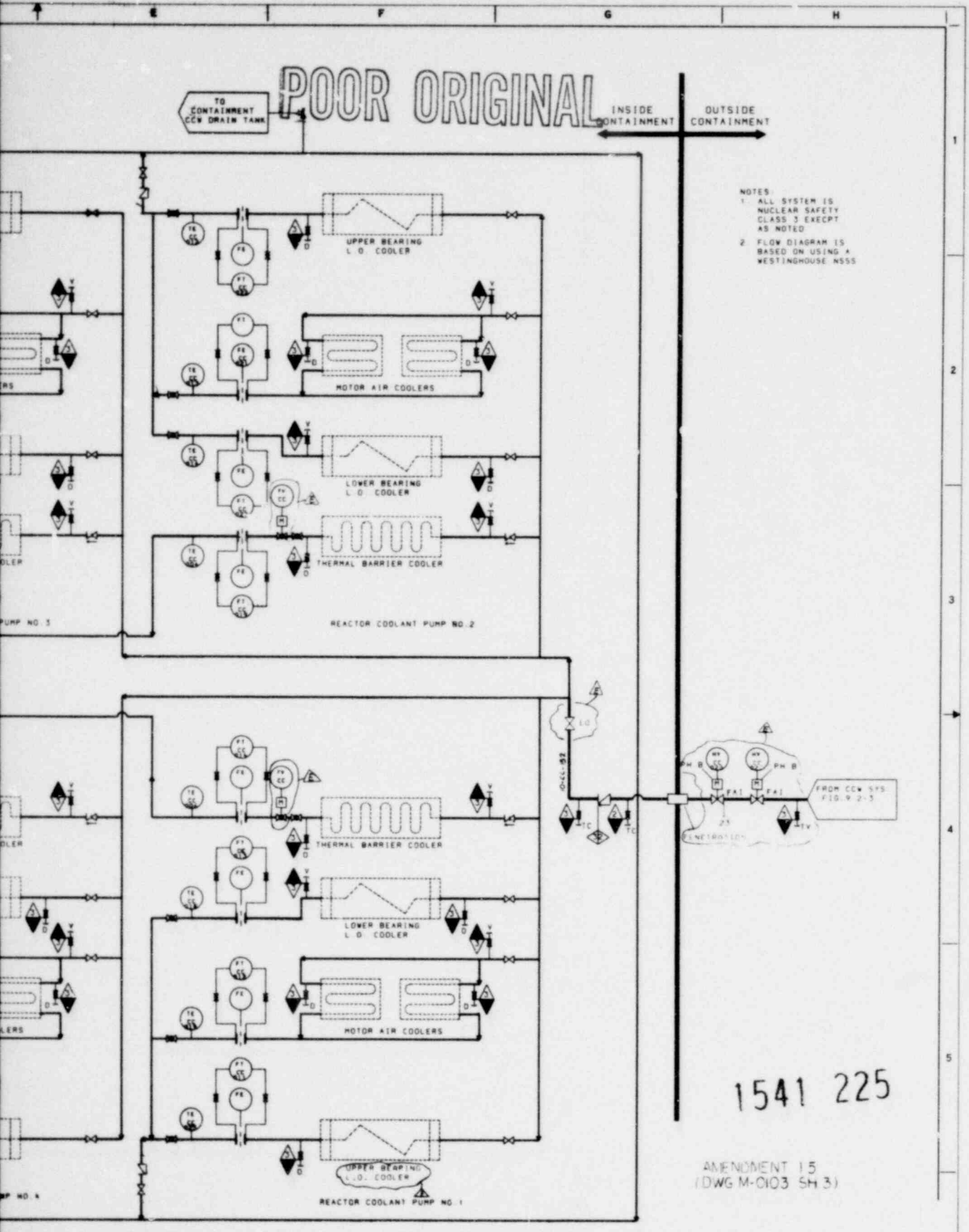

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AMENDMENT 15
(DWG M-C103 SH 3)

GIBBSSAR	FLOW DIAGRAM COMPONENT COOLING WATER SYSTEM
NSSS:	
NOT SPECIFIC ☐	
W-414 ■	
CE ☐	
B&W ☐	FIGURE NO. 9.2-4

EFFECTIVE PAGE LISTING
GIBBSCAE: VOLUME 1

1-i		(0) (1)
1-ii		(0)
1-iii		(0)
1-iv		(0)
1-v		(0)
1.1-1		(0) (1) (10)
1.1-2		(0) (1) (6)
T1.1-1		(6)
1.2-1		(0) (7)
1.2-2		(0) (1) (4) (7)
1.2-3		(0) (1) (7)
1.2-4		(0) (1) (7)
1.2-4a		(7)
1.2-5		(0) (1) (7)
1.2-6		(0) (7)
1.2-7		(0) (1) (7)
1.2-8		(0) (7)
1.2-9		(0) (7)
1.2-10		(0) (7)
F1.2-1		(0)
F1.2-2		(0)
F1.2-3		(0) (2) (5) (6)
F1.2-4		(0) (2) (5) (6)
F1.2-5		(0) (2) (5) (6)
F1.2-6		(0) (2) (4) (5) (6)
F1.2-7		(0) (2) (5) (6)
F1.2-8		(0) (2) (5) (6)
F1.2-9		(0) (2) (4) (5) (6)
F1.2-10		(0) (2) (5) (6)
1.3-1		(0)
T1.3-1	Sh. 1	(0)
T1.3-1	Sh. 2	(0)
T1.3-1	Sh. 3	(0)
T1.3-1	Sh. 4	(0)
T1.3-1	Sh. 5	(0)
T1.3-1	Sh. 6	(0) (1)
1.4-1		(0) (1)
1.5-1		(0)
1.6-1		(0)
T1.6-1	Sh. 1	(0) (3)
T1.6-1	Sh. 2	(3)
T1.6-2	Sh. 1	(0)
T1.6-2	Sh. 2	(0)
T1.6-2	Sh. 3	(0)
T1.6-2	Sh. 4	(0)
T1.6-2	Sh. 5	(0)
T1.6-2	Sh. 6	(0)
1.7-1		(0)
1.8-1		(0)

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

1.8-2		(0)				(8)		
1.8.2a						(8)		(15)
T1.8-1	Sh. 1	(0)						
T1.8-1	Sh. 2	(0)						
T1.8-1	Sh. 3	(0)						
T1.8-1	Sh. 4	(0)					(10)	
T1.8-1	Sh. 5	(0)						
T1.8-1	Sh. 6	(0)						
T1.8-1	Sh. 7	(0)						
T1.8-1	Sh. 8	(0)	(1)					
T1.8-1	Sh. 9	(0)					(10)	
T1.8-1	Sh. 10	(0)						
T1.8-1	Sh. 11	(0)					(10)	
T1.8-1	Sh. 12	(0)						
T1.8-1	Sh. 13	(0)						
T1.8-1	Sh. 14	(0)					(10)	
T1.8-1	Sh. 14a						(10)	
T1.8-1	Sh. 15	(0)					(10)	
T1.8-1	Sh. 15a						(10)	
T1.8-1	Sh. 16	(0)						
T1.8-1	Sh. 17	(0)						
T1.8-1	Sh. 18	(0)						
T1.8-1	Sh. 19	(0)						
T1.8-1	Sh. 20	(0)						
T1.8-2	Sh. 1	(0)	(1)	(3)	(4)			
T1.8-2	Sh. 1a			(3)	(4-deleted)	(8)		
T1.8-2	Sh. 2		(1)	(3)	(4)			
T1.8-2	Sh. 2a			(3)	(4-deleted)			
T1.8-2	Sh. 3		(1)	(3)	(4)			
T1.8-2	Sh. 3a			(3)	(4-deleted)			
T1.8-2	Sh. 4		(1)	(3)	(4)			
T1.8-2	Sh. 5		(1)	(3)	(4)			
T1.8-2	Sh. 6		(1)	(3)	(4)	(8)		
T1.8-2	Sh. 6a			(3)	(4-deleted)	(8)		
T1.8-2	Sh. 7		(1)	(3)	(4)	(8)		
T1.8-2	Sh. 8		(1)	(3)	(4)	(8)		
T1.8-2	Sh. 9		(1)	(3)	(4)	(8)		
T1.8-2	Sh. 10		(1)	(3)	(4)	(8)		
T1.8-2	Sh. 10a					(8)		
T1.8-2	Sh. 11		(1)	(3)	(4)			
T1.8-2	Sh. 11a			(3)	(4-deleted)			
T1.8-2	Sh. 12		(1)	(3)	(4)			
T1.8-2	Sh. 12a			(3)	(4-deleted)			
T1.8-2	Sh. 13		(1)	(3)	(4)	(8)		
T1.8-2	Sh. 14		(1)	(3)	(4-deleted)			
T1.8-2	Sh. 15		(1)	(3)	(4-deleted)			
T1.8-2	Sh. 15a			(3)	(4-deleted)			
T1.8-2	Sh. 16		(1)	(3)	(4-deleted)			
T1.8-2	Sh. 17		(1)	(3)	(4-deleted)			

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

T1.8-2	Sh. 18		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 18a				(3)	(4-deleted)		
T1.8-2	Sh. 19		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 20		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 21		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 22		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 22a				(3)	(4-deleted)		
T1.8-2	Sh. 23		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 23a				(3)	(4-deleted)		
T1.8-2	Sh. 24		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 24a				(3)	(4-deleted)		
T1.8-2	Sh. 25		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 25a				(3)	(4-deleted)		
T1.8-2	Sh. 26		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 26a				(3)	(4-deleted)		
T1.8-2	Sh. 27		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 28		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 29		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 30		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 31		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 32		(1)		(3)	(4-deleted)		
T1.8-2	Sh. 32a				(3)	(4-deleted)		
T1.8-2	Sh. 32b				(3)	(4-deleted)		
T1.8-3	Sh. 1	(0)						
T1.8-3	Sh. 2	(0)					(7)	(8)
T1.8-3	Sh. 2a							(8)
T1.8-3	Sh. 3	(0)						(8)
T1.8-3	Sh. 3a							(8)
T1.8-3	Sh. 4	(0)						
T1.8-3	Sh. 5	(0)						
1.9-1		(0)	(1)		(3)	(4)		
1.9-1a					(3)	(4)		
1.9-1b					(3)	(4)		
1.9-2		(0)			(3)	(4)		
1.9-2a					(3)	(4)		
1.9-3		(0)			(3)	(4)		
1.9-3a					(3)	(4)		
1.9-3b					(3)	(4)		
1.9-4		(0)			(3)			
1.9-4a					(3)	(4)		
1.9-5		(0)			(3)	(4)		
1.9-5a					(3)	(4)		
F1.9-1		(0)		(2)			(6)	
2-i		(0)	(1)				(6)	
2-ia							(6)	
2-ii		(0)						
2-iii		(0)					(6)	
2-iv		(0)						
2-v		(0)						

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

2-vi		(0)
2-vii		(0) (1)
2-viii		(0) (6)
2-ix		(0)
2.1-1		(0)
2.2-1		(0)
2.3-1		(0) (1)
2.3-2		(0)
2.3-3		(0)
2.3-4		(0) (1)
2.3-5		(0) (3)
2.3-6		(0) (1) (3)
2.3-7		(0) (3)
2.3-8		(0) (1)
2.3-9		(0) (1)
2.3-9a		(1) (3)
2.3-9b		(1)
2.3-9c		(1)
2.3-9d		(1)
T2.3-1		(0) (1) (3)
T2.3-2		(0) (1) (3)
T2.3-3	Sh. 1	(0) (1)
T2.3-3	Sh. 2	(0) (1)
T2.3-3	Sh. 3	(0) (1) (3)
T2.3-4		(0) (1) (3)
T2.3-5		(0) (3-deleted)
T2.3-6		(0) (1) (3-deleted)
T2.3-7		(0)
T2.3-8		(0)
T2.3-9		(0)
T2.3-10		(0)
T2.3-11		(0)
T2.3-12		(0)
T2.3-13		(0)
T2.3-14		(0)
T2.3-15		(0)
T2.3-16		(0)
T2.3-17		(0)
P2.3-1		(0)
P2.3-2		(0)
P2.3-3		(0)
P2.3-4		(0)
P2.3-5		(0) (1)
P2.3-6		(0) (1)
P2.3-7		(0) (1)
2.4-1		(0)
2.4-2		(0)
2.4-3		(0)
2.4-4		(0)

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

2.4-5	(0)				
2.4-6	(0)				
2.4-7	(0)				
2.4-8	(0)				
2.4-9	(0)				
2.4-10	(0)				
2.4-11	(0)				
2.4-12	(0)				
2.4-13	(0)	(2)			
2.4-14	(0)				
2.5-1	(0)				
2.5-2	(0)				
2.5-3	(0)				
2.5-4	(0)				
2.5-5	(0)		(5)		
2.5-6	(0)				
2.5-7	(0)				
2.5-8	(0)				
2.5-9	(0)				
2.5-10	(0)				
3-i	(0)				
3-ii	(0)				
3-iii	(0)				
3-iv	(0)				
3-iva					(6)
3-v	(0)	(1)			
3-vi	(0)	(1)			
3-vii	(0)				(6)
3-viii	(0)				(6)
3-viiia					(6)
3-ix	(0)				(6)
3-x	(0)	(1)			
3-xi	(0)	(1)			(6)
3-xii	(0)		(2)		(6)
3-xiia			(2)		(6)
3-xiii	(0)				(6)
3-xiv	(0)		(2)		(6)
3-xv	(0)		(2)		(6)
3-xvi	(0)		(2)		(6)
3-xvia			(2)		
3-xvii	(0)				(6)
3-xviii	(0)				
3.1-1	(0)				
3.1-2	(0)				
3.1-3	(0)				
3.1-4	(0)				
3.1-5	(0)	(1)			
3.1-6	(0)				
3.1-7	(0)				

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

3.1-8	(0)			
3.1-9	(0)			
3.1-10	(0)			
3.1-11	(0)			
3.1-12	(0)			(10)
3.1-13	(0)			
3.1-14	(0)	(1)		
3.1-15	(0)			
3.1-16	(0)			
3.1-17	(0)			(10)
3.1-18	(0)	(1)		
3.1-19	(0)			
3.1-20	(0)			
3.1-21	(0)			
3.1-22	(0)			
3.1-23	(0)			
3.1-24	(0)			
3.1-25	(0)			
3.1-26	(0)			
3.1-27	(0)			
3.1-28	(0)			
3.1-29	(0)			
3.1-30	(0)			
3.1-31	(0)			
3.1-32	(0)			
3.1-33	(0)			
3.1-34	(0)			
3.1-35	(0)			
3.1-36	(0)			
3.1-37	(0)			
3.1-38	(0)		(4)	
3.1-39	(0)		(4)	
3.1-40	(0)		(4)	
3.1-41	(0)		(4)	
3.1-42	(0)		(4)	
3.1-43	(0)		(4)	
3.1-44	(0)			
3.1-45	(0)			
3.1-46	(0)			
3.1-47	(0)	(1)		
3.1-48	(0)	(1)	(3) (4)	
3.1-49	(0)	(1)		
3.1-50	(0)			
3.1-51	(0)			
3.1-52	(0)			
3.1-53	(0)			
3.1-54	(0)			
3.1-55	(0)	(1)		
3.1-56	(0)	(1)		

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

3.1-57		(0)
3.1-58		(0) (1)
3.1-59		(0)
3.1-60		(0) (1)
3.1-61		(0)
3.1-62		(0)
3.2-1		(0)
3.2-2		(0) (10)
3.2-3		(0) (4)
3.2-3a		(4)
T3.2-1	Sh. 1	(0) (1) (5)
T3.2-1	Sh. 2	(0) (1) (5)
T3.2-1	Sh. 3	(0) (1) (5)
T3.2-1	Sh. 4	(0) (1) (3) (5)
T3.2-1	Sh. 4a	(2) (3) (5)
T3.2-1	Sh. 5	(0) (1) (2) (5)
T3.2-1	Sh. 6	(0) (1) (5)
T3.2-1	Sh. 7	(0) (1) (5) (9)
T3.2-1	Sh. 7a	(5) (6)
T3.2-1	Sh. 7b	(6)
T3.2-1	Sh. 8	(0) (1) (2) (5) (9)
T3.2-1	Sh. 9	(0) (1) (5)
T3.2-1	Sh. 10	(0) (1) (5) (9)
T3.2-1	Sh. 10a	(5) (10)
T3.2-1	Sh. 11	(0) (1) (5)
T3.2-1	Sh. 12	(0) (1) (2) (5)
T3.2-1	Sh. 12a	(5)
T3.2-1	Sh. 13	(0) (1) (2) (5) (6)
T3.2-1	Sh. 13a	(2) (5) (6)
T3.2-1	Sh. 14	(0) (1) (2) (5) (6)
T3.2-1	Sh. 14a	(2) (5) (6)
T3.2-1	Sh. 15	(0) (1) (2) (5) (6)
T3.2-1	Sh. 15a	(2) (5) (6)
T3.2-1	Sh. 16	(0) (1) (2) (5) (6)
T3.2-1	Sh. 17	(0) (1) (5) (6)
T3.2-1	Sh. 17a	(5)
T3.2-1	Sh. 18	(0) (1) (5)
T3.2-1	Sh. 19	(0) (1) (5)
T3.2-1	Sh. 20	(0) (1) (2) (5)
T3.2-1	Sh. 21	(0) (1) (5) (6)
T3.2-2		(0) (1)
T3.2-3	Sh. 1	(4)
T3.2-3	Sh. 2	(4)
3.3-1		(0) (1)
3.3-2		(0) (1) (5)
3.3-3		(0) (1) (5)
3.3-4		(0) (1) (5)
3.3-5		(0) (1) (5)
3.4-1		(0) (5) (6)

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

3.4-1a		(6)
3.4-2	(0)	
3.5-1	(0)	(7)
3.5-1a		(7)
3.5-2	(0)	(7)
3.5-2a		(7)
3.5-3	(0)	(7)
3.5-3a		(7)
3.5-4	(0)	
3.5-5	(0) (1) (2)	
3.5-6	(0) (1) (2)	
3.5-7	(0)	(6) (7) (10)
3.5-7a		(6) (7)
3.5-8	(0) (2)	(5) (8)
3.5-8a	(2)	(5) (8)
3.5-9	(0) (1) (2)	(5)
T3.5-1	(0) (1)	
T3.5-2 Sh. 1	(0) (1)	
T3.5-2 Sh. 2	(0) (1)	
T3.5-3	(0) (1)	
T3.5-4	(0) (1)	
T3.5-5	(0) (1)	
T3.5-6	(0) (1)	
T3.5-7	(0)	
T3.5-8	(0)	
T3.9-9	(0) (1) (2)	
T3.5-10	(0) (4)	
T3.5-11 Sh. 1		(7)
T3.5-11 Sh. 2		(7)
T3.5-11 Sh. 3		(7)
T3.5-11 Sh. 4		(7)
P3.5-1	(0)	
P3.5-2	(0)	
P3.5-3	(0)	
P3.5-4	(0) (4)	
3.6-1	(0) (1)	(6)
3.6-2	(0) (1)	(6) (9)
3.6-2a		(6)
3.6-3	(0) (1)	(7) (10)
3.6-3a		(7) (10)
3.6-3b		(7)
3.6-4	(0) (1)	(7)
3.6-5	(0) (1) (2)	(7)
3.6-5a		(7)
3.6-5b		(7)
3.6-6	(0) (2) (4)	(9)
3.6-7	(0) (1) (2-deleted)	
3.6-8	(0) (2-deleted)	
3.6-9	(0) (2-deleted)	

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

3.6-10		(0) (2) (4) (6)
3.6-11		(0) (1) (2) (4-deleted)
3.6-12		(0) (1) (2-deleted)
3.6-13		(0) (1) (2-deleted)
3.6-14		(0) (2)
3.6-15		(0) (2)
3.6-15a		(2) (4)
3.6-16		(0) (1) (2)
3.6-16a		(2)
3.6-17		(0) (1)
3.6-18		(0)
3.6-19		(0)
3.6-20		(0) (6) (7)
3.6-20a		(6) (7)
3.6-20b		(6)
3.6-21		(0) (2) (4)
3.6-21a		(2) (4)
3.6-22		(0) (2)
3.6-23		(0)
3.6-24		(0)
T3.6-1	Sh. 1	(0) (1) (6) (9)
T3.6-1	Sh. 2	(0) (1) (6) (9)
T3.6-1	Sh. 3	(6)
T3.6-2	Sh. 1	(0) (7)
T3.6-2	Sh. 2	(7)
T3.6-3		(0)
F3.6-1.1		(0) (2-deleted)
F3.6-1.2		(0) (2-deleted)
F3.6-1A		(2) (10)
F3.6-1B		(2) (11)
F3.6-2		(0)
F3.6-3		(0)
F3.6-4		(0)
F3.6-5		(0)
F3.6-6		(2)
F3.6-7		(2)
F3.6-8		(6)
F3.6-9		(6)
F3.6-10		(6)
F3.6-11		(6)
F3.6-12		(6)
F3.6-13		(6)
F3.6-14		(6)
3.7-1		(0) (2) (4) (5) (8)
3.7-1a		(2)
3.7-2		(0) (2)
3.7-3		(0) (1) (2) (5) (6)
3.7-3a		(2) (5)
3.7-4		(0) (1)

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

3.7-5	(0)					(6)		
3.7-6	(0)					(6)		
3.7-7	(0)		(2)		(5)			
3.7-7a			(2)					
3.7-8	(0)							
3.7-9	(0)			(4)			(8)	
3.7-9a				(4)				
3.7-10	(0)	(1)	(2)	(4)	(5)			
3.7-10a				(4)				
3.7-11	(0)	(1)			(5)			
3.7-12	(0)				(5)			
3.7-12a					(5)			
3.7-13	(0)	(1)			(5)			
3.7-14	(0)							
3.7-15	(0)						(8)	
3.7-16	(0)	(1)			(5)		(8)	
3.7-17	(0)				(5)		(8)	
3.7-18	(0)	(1)			(5)		(8)	
3.7-19	(0)	(1)			(5)			
3.7-20	(0)				(5)		(8)	
3.7-20a					(5)		(8)	
3.7-21	(0)			(4)	(5)			
3.7-22	(0)			(4)	(5)	(6)		
3.7-23	(0)							
3.7-24	(0)			(4)	(5)		(8)	
3.7-25	(0)				(5)			
3.7-26	(0)				(5)			
3.7-26a					(5)			
3.7-27	(0)				(5)			
3.7-28	(0)	(1)						
3.7-29	(0)				(5)			
3.7-30	(0)	(1)			(5)		(8)	
2.7-30a					(5)			
3.7-31	(0)				(5)			
3.7-31a					(5)			
3.7-32	(0)							
3.7-33	(0)				(5)			
3.7-34	(0)	(1)			(5)			
3.7-35	(0)							
3.7-36	(0)				(5)			
3.7-37	(0)							
3.7-38	(0)							
3.7-39	(0)							
3.7-40	(0)							
3.7-41	(0)					(6)		
3.7-42	(0)							
3.7-43	(0)	(1)						
3.7-44	(0)				(5)			
3.7-45	(0)	(1)						

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

3.7-46		(0)			
3.7-47		(0)		(5)	
3.7-48		(0)			
3.7-49		(0)			
3.7-50		(0)		(6)	(8)
T3.7-1		(0)	(1)		
T3.7-2	Sh. 1	(0)			
T3.7-2	Sh. 2	(0)	(1)		
T3.7-3		(0)			
T3.7-4		(0)			
T3.7-5		(0)	(1)		
T3.7-6	Sh. 1	(0)	(1)		
T3.7-6	Sh. 2	(0)	(1)		
3.7A-1		(0)		(6)	
3.7A-2		(0)		(6)	
3.7A-3		(0)	(1)	(6)	
3.7A-4		(0)		(6)	
3.7A-5		(0)	(1)	(6)	
3.7A-6		(0)		(6)	
3.7A-7		(0)		(6)	
3.7A-8		(0)	(1)	(6)	
3.7A-9		(0)		(6)	
3.7A-10		(0)		(6)	
3.7A-11		(0)		(6)	
3.7A-12		(0)		(6)	
3.7A-13		(0)	(1)	(6)	
3.7A-14		(0)	(1)	(6)	
3.7A-15		(0)	(1)	(6)	
3.7A-16		(0)		(6)	
3.7A-17		(0)		(6)	
3.7A-18		(0)		(6)	
3.7A-19		(0)		(6)	
3.7A-20		(0)		(6)	
3.7A-21		(0)		(6)	
3.7A-22		(0)	(1)	(6-deleted)	
3.7A-23		(0)		(6-deleted)	
3.7A-24		(0)		(6-deleted)	
3.7A-25		(0)		(6-deleted)	
3.7A-26		(0)		(6-deleted)	
3.7A-27		(0)		(6-deleted)	
3.7A-28		(0)		(6-deleted)	
3.7A-29		(0)		(6-deleted)	
3.7A-30		(0)		(6-deleted)	
3.7A-31		(0)		(6-deleted)	
T3.7A-1	Sh. 1	(0)	(1)	(6)	
T3.7A-1	Sh. 2	(0)	(1)	(6)	
F3.7-1		(0)			
F3.7-2		(0)			(8)
F3.7-3		(0)			

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 1

P3.7-4	(0)		
P3.7-5	(0)		
P3.7-6	(0)		
P3.7-7	(0)		
P3.7-8	(0)		(10)
P3.7-9	(0)		(10)
P3.7-10	(0)		(10)
P3.7-11	(0)		(10)
P3.7-12	(0)		(10)
P3.7-13	(0)		
P3.7-14	(0)		(10)
P3.7-15	(0)		
P3.7-16	(0)		
P3.7-17	(0)		
P3.7-18		(5)	
P3.7A-1	(0)		

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

3.8-1	(0)		(4)	
3.8-2	(0)		(4)	
3.8-3	(0)			
3.8-4	(0)			
3.8-5	(0)		(4)	
3.8-6	(0)		(4)	
3.8-7	(0)		(4)	
3.8-8	(0)			
3.8-9	(0)			
3.8-10	(0)			
3.8-11	(0)			
3.8-12	(0)			(5)
3.8-13	(0)			
3.8-14	(0)			(5)
3.8-14a				(5)
3.8-15	(0)	(1)		
3.8-16	(0)	(1)		(5)
3.8-16a				(5) (8)
3.8-17	(0)			
3.8-18	(0)			(5)
3.8-19	(0)	(1)		
3.8-20	(0)	(1)		
3.8-21	(0)			
3.8-22	(0)			(5)
3.8-22a				(5)
3.8-23	(0)			
3.8-24	(0)			
3.8-25	(0)			(5)
3.8-26	(0)		(4)	
3.8-27	(0)			(8)
3.8-27a				(8)
3.8-28	(0)	(1)		(5)
3.8-28a				(5)
3.8-29	(0)			
3.8-30	(0)			
3.8-31	(0)			
3.8-32	(0)			
3.8-33	(0)			
3.8-34	(0)			
3.8-35	(0)			
3.8-36	(0)			
3.8-37	(0)			
3.8-38	(0)			
3.8-39	(0)		(4)	
3.8-40	(0)	(3)	(4)	
3.8-41	(0)		(4)	
3.8-42	(0)			
3.8-43	(0)	(1)	(4)	
3.8-44	(0)			

3.8-45	(0)	(1)		(4)
3.8-46	(0)	(1)		(4)
3.8-47	(0)			
3.8-48	(0)			
3.8-49	(0)			
3.8-50	(0)			
3.8-51	(0)			(4)
3.8-52	(0)			(4)
3.8-53	(0)			
3.8-54	(0)			(5)
3.8-55	(0)	(1)		(5)
3.8-56	(0)			
3.8-57	(0)	(1)		
3.8-58	(0)			(5)
3.8-58a				(5)
3.8-59	(0)	(1)		
3.8-60	(0)			
3.8-61	(0)			(5)
3.8-61a				(5)
3.8-62	(0)			
3.8-63	(0)	(1)		
3.8-64	(0)	(1)		(5)
3.8-65	(0)	(1)		
3.8-66	(0)			
3.8-67	(0)			
3.8-68	(0)	(1)	(2)	
3.8-68a			(2)	
3.8-69	(0)			(4)
3.8-70	(0)			(5)
3.8-71	(0)	(1)		
3.8-72	(0)			(4) (5)
3.8-73	(0)			(4)
3.8-74	(0)			
3.8-75	(0)			
3.8-76	(0)	(1)		
3.8-77	(0)			
3.8-78	(0)			
3.8-79	(0)			
3.8-80	(0)			
3.8-81	(0)			
3.8-82	(0)			(5)
3.8-83	(0)			
3.8-84	(0)			
3.8-85	(0)			
3.8-86	(0)			
3.8-87	(0)			
3.8-88	(0)			
3.8-89	(0)			(5)
3.8-89a				(5)

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

3.8-90		(0) (5) (6)
3.8-90a		(5) (6)
3.8-91		(0) (6)
3.8-92		(0)
3.8-93		(0) (4)
3.8-94		(0) (5)
3.8-95		(0)
T3.8-1	SH. 1	(0)
T3.8-1	SH. 2	(0) (1)
F3.8-1		(0) (3) (6-deleted)
F3.8-1A		(6)
F3.8-1B		(6)
F3.8-1C		(6)
F3.8-1D		(6)
F3.8-1E		(6)
F3.8-1F		(6)
F3.8-1G		(6)
F3.8-1H		(6)
F3.8-2		(0) (3) (5) (6) (8)
F3.8-3		(0) (3) (6)
F3.8-4		(0) (3)
F3.8-5		(0) (4)
F3.8-6		(0)
F3.8-7		(0) (6)
F3.8-8		(0)
F3.8-9		(0)
F3.8-10		(0)
F3.8-11		(0) (5)
F3.8-12		(0)
F3.8-13		(0) (5)
F3.8-14		(0)
F3.8-15		(0)
3.9-1		(0)
3.9-2		(0) (2)
3.9-2a		(2)
3.9-3		(0) (2)
3.9-4		(0) (2)
3.9-5		(0) (2)
3.9-6		(0) (1) (2)
3.9-6a		(2)
3.9-7		(0) (1) (2)
3.9-8		(0) (2)
3.9-8a		(2)
3.9-9		(0) (2)
3.9-10		(0) (1) (2)
3.9-11		(0) (2)
3.9-12		(0) (2)
3.9-13		(0) (1) (2)
3.9-14		(0) (2)

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

3.9-15		(0)							
3.9-16		(0)	(1)						
3.9-17		(0)	(1)	(2)					
3.9-18		(0)							
3.9-19		(0)	(1)	(2)		(4)			
3.9-19a				(2)		(4-deleted)			
3.9-20		(0)				(4)			
3.9-21		(0)		(2)					(13)
3.9-21a				(2)					
3.9-22				(2)					
T3.9-1	SH. 1	(0)		(2)					
T3.9-1	SH. 2	(0)		(2)					
T3.9-2	SH. 1	(0)		(2)		(4)		(7)	
T3.9-2	SH. 2			(2)		(4)		(7)	
T3.9-2	SH. 3			(2)				(7)	
T3.9-2	SH. 4							(7)	
T3.9-3	SH. 1	(0)	(1)	(2)		(4)		(7)	
T3.9-3	SH. 2	(0)	(1)	(2)		(4)		(7)	
T3.9-3	SH. 3	(0)	(1)	(2)		(4)			
T3.9-3	SH. 4	(0)	(1)	(2)		(4)			
T3.9-4	SH. 1	(0)	(1)	(2)					
T3.9-4	SH. 2	(0)	(1)	(2)					
T3.9-4	SH. 3	(0)	(1)	(2)					
T3.9-5	SH. 1	(0)	(1)	(2)			(5)		
T3.9-5	Sh. 1a			(2)			(5)		
T3.9-5	SH. 2	(0)	(1)	(2)			(5)	(7)	
T3.9-5	SH. 2a						(5)		
T3.9-5	SH. 3	(0)	(1)	(2)			(5)	(7)	
T3.9-5	SH. 4	(0)	(1)	(2)			(5)		
T3.9-5	SH. 4a			(2)			(5)		
T3.9-5	SH. 4b						(5)	(7)	
(UNNUMBERED PAGE)		(0)		(2-deleted)					
F3.9-1		(0)							
F3.9-2		(0)							
F3.9-3		(0)							
F3.9-4		(0)							
F3.9-5		(0)							
F3.9-6		(0)							
F3.9-7		(0)							
F3.9-8		(0)							
3.10-1		(0)							(9)
3.10-1a									(9)
3.10-2		(0)		(2)					(9)
3.10-3		(0)	(1)	(2)					
3.11-1				(0)	(1)				
3.11-2		(0)							
3.11-3		(0)	(1)						
3.11-4		(0)							
3.11-4a									(13) (15)
									(13) (15)

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

3.11-4b					(13)	(15)
3.11-4c					(13)	
3.11-5		(0)				
3.11-6		(0)				
3.11-7		(0)				
3.11-8		(0) (1)				
3.11-9		(0) (1)				
3.11-10		(0) (1)				
3.11-11		(0) (1)				
3.11-12		(0)				
3.11-13		(0) (1)				
T3.11-1	SH. 1	(0)				
T3.11-1	SH. 2	(0)				
T3.11-2		(0) (1)				
T3.11-3	SH. 1	(0)		(8)	(13)	
T3.11-3	SH. 2	(0)		(8-deleted)		
T3.11-4	SH. 1	(0)		(8) (10)	(13)	
T3.11-4	Sh. 1a			(10)		
T3.11-4	SH. 2			(8)	(13)	
T3.11-5	SH. 1		(6)	(8)		
T3.11-5	SH. 2		(5)			
T3.11-6	SH. 1					(15)
T3.11-6	SH. 2					(15)
P3.11-1				(8)		
P3.11-2				(8)		
3A-1					(13)	
3A-2					(13)	
3A-3					(13)	
3A-4					(13)	
3A-5					(13)	
3A-6					(13)	
3A-7					(13)	
3A-8					(13)	
3A-9					(13)	
3A-10					(13)	
3A-11					(13)	
3A-12					(13)	
3A-13					(13)	
3A-14					(13)	
3A-15					(13)	(15)
3A-16					(13)	
3A-17					(13)	
3A-18					(13)	
3A-19					(13)	
3A-20					(13)	
3A-21					(13)	
3A-22					(13)	
3A-23					(13)	
3A-24					(13)	

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

3A-25					(13)
3A-26					(13)
3A-27					(13)
3A-28					(13)
3A-29					(13)
3A-30					(13)
3A-31					(13)
3A-32					(13)
3A-33					(13)
3A-34					(13)
3A-35					(13)
3B-1					(14)
T3B-1	SH. 1				(14)
T3B-1	SH. 2				(14)
T3B-1	SH. 3				(14)
T3B-1	SH. 4				(14)
T3B-1	SH. 5				(14)
T3B-1	SH. 6				(14)
T3B-1	SH. 7				(14)
T3B-1	SH. 8				(14)
T3B-1	SH. 9				(14)
T3B-1	SH. 10				(14)
T3B-1	SH. 11				(14)
T3B-1	SH. 12				(14)
T3B-1	SH. 13				(14)
T3B-1	SH. 14				(14)
T3B-1	SH. 15				(14)
T3B-1	SH. 16				(14)
4-i		(0)			(7)
5-i		(0) (1)		(5) (6)	
5-ia				(6)	
5-ii		(0) (1)		(5)	
5-iia				(5)	
5-iii		(0)			
5-iv		(0)		(6)	
5-v		(1)		(5) (6)	
5.1-1		(0)			
T5.1-1		(0)			
5.2-1		(0) (1)		(5)	
5.2-1a				(5)	
5.2-1b				(5)	
5.2-1c				(5)	
5.2-2		(0)			
5.2-3		(0)			
5.2-4		(0)		(5)	
5.2-4a				(5)	
5.2-5		(0)		(5)	
5.2-5a				(5)	
5.2-5b				(5)	(7)

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GIBBSSAR: VOLUME 2

5.2-5c								(5)	(7)				
5.2-5d								(5)	(7)			(12)	
5.2-6				(0)				(5)	(7)				
5.2-7				(0)				(5)	(7)				
5.2-7a								(5)	(7)				
5.2-8				(0)				(5)	(7)				
5.2-8a								(5)	(7)				
5.2-9				(0)				(5)	(7)				
5.2-10				(0)				(5)	(7)				
5.2-11				(0)				(5)	(7)				
5.2-12				(0)				(5)	(7)				
T5.2-1								(5)	(7)				
T5.2-2									(7)				
F5.2-1				(0)				(5-deleted)					
5.3-1				(0)									
5.4-1				(0)									(13)
5.4-2				(0)	(2)								
T5.4-1				(0)									
(UNNUMBERED CONTENTS PAGES)				(0)	(1-deleted)								
6-i					(1)								
6-ii					(1)								
6-iii					(1)				(5)				
6-iiia									(6)				
6-iv					(1)	(2)			(5)				
6-iva					(1)								
6-v					(1)				(6)				
6-vi					(1)								
6-vii					(1)	(2)							
6-viii					(1)	(2)			(6)				
6-viiia						(2)							
6-ix					(1)				(6)				
6-x					(1)								
6-xi					(1)	(2)			(6)				
6-xia						(2)			(5)				
6-xii					(1)				(5)				
6.1-1				(0)									
6.1-2				(0)	(1)								
6.1-3				(0)	(1)								
6.1-4				(0)	(1)				(5)				
6.1-5				(0)									
6.1-6				(0)									
T6.1-1	SH.1			(0)		(3)							
T6.1-1	SH.2					(3)							
T6.1-1	SH.3					(3)							
T6.1-2	SH.1			(0)	(1)								
T6.1-2	SH.2			(0)	(1)								
T6.1-3				(0)	(1)								
T6.1-4				(0)	(1)								

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

T6.1-5	(0)								
T6.1-6	(0)			(4)				(9)	
T6.1-7	(0)	(1)							
T6.1-8	(0)								
6.2-1	(0)	(1)			(5)	(7)	(8)		
6.2-1a						(7)			
6.2-2	(0)	(1)			(5)	(7)			
6.2-2a					(5)	(7)			
6.2-3	(0)					(7)			
6.2-4	(0)	(1)				(7)	(8)		
6.2-5	(0)	(1)				(7)	(8)		
6.2-6	(0)					(7)			
6.2-7	(0)					(7)			
6.2-7a						(7)			
6.2-8	(0)					(7)			
6.2-9	(0)	(1)				(7)			
6.2-9a						(7)	(8)		
6.2-10	(0)	(1)				(7)	(8)		
6.2-10a							(8)		
6.2-11	(0)					(7)	(8)		
6.2-12	(0)					(7)	(8)		
6.2-13	(0)	(1)							
6.2-14	(0)								
6.2-15	(0)	(1)							
6.2-16	(0)	(1)	(2)				(8)		
6.2-16a							(8)		
6.2-17	(0)	(1)					(8)		
6.2-18	(0)						(8)		
6.2-19	(0)								
6.2-20	(0)	(1)							
6.2-21	(0)								
6.2-22	(0)	(1)							
6.2-23	(0)	(1)						(9)	
6.2-24	(0)	(1)						(9)	
6.2-25	(0)	(1)		(4)				(9)	
6.2-25a				(4)				(9)	
6.2-26	(0)	(1)		(4)		(7)		(9)	
6.2-27	(0)	(1)		(4)		(7)		(9)	
6.2-28	(0)	(1)		(4)		(7)		(9)	
6.2-29	(0)	(1)		(4)	(5)	(7)		(9)	
6.2-29a				(4)	(5)	(7)			
6.2-29b					(5)	(7)		(9)	
6.2-29c						(7)		(9)	
6.2-30	(0)		(2)	(4)		(7)			
6.2-31	(0)	(1)							(13)
6.2-31a									(13)
6.2-32	(0)	(1)							(13)
6.2-33	(0)	(1)							(13)
6.2-34	(0)	(1)							(13)

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

6.2-34a							(13)
6.2-35		(0) (1)					(13)
6.2-35a							(13)
6.2-36		(0) (1)					(13)
6.2-37		(0) (1)					(13)
6.2-37a							(13)
6.2-38		(0)					(13)
6.2.38a							(13)
6.2-39		(0) (1)					
6.2-40		(0)					
6.2-41		(0)					
6.2-42		(0) (1)					
6.2-42a		(1)					
6.2-43		(0) (1)					
6.2-44		(0) (1)					
6.2-45		(0)					
6.2-46		(0) (1)		(6)			(13)
6.2-47		(0) (1)		(6)		(9)	(13) (14)
6.2-47a						(9)	(13)
6.2-47b							(13)
6.2-48		(0) (1)				(9)	(13)
6.2-49		(0) (1)		(6)		(9)	(13)
6.2-49a				(6)			(13)
6.2-49b							(13)
6.2-50		(0)	(3)	(6) (13)			
6.2-50a			(3)	(6-deleted)			
6.2-51		(0)	(3)	(6)			
6.2-52		(0)	(3)	(6)			
6.2-52a			(3)	(6-deleted)			
6.2-53		(0)	(3)	(6)			
6.2-54		(0) (1)					
6.2-55		(0) (1)					
6.2-56		(0)					
6.2-57		(0)					
6.2-58		(0) (1)					
6.2-59		(0)					
T6.2-1		(0)			(7) (8)		
T6.2-2		(0)	(4)		(7)		
T6.2-3		(0) (1)	(4)		(7)		
T6.2-4	SH.1	(0) (1)	(4)		(7)		
T6.2-4	SH.2				(7)		
T6.2-5		(0)			(8)		
T6.2-6	SH.1	(0) (1)			(7) (8)		
T6.2-6	SH.2	(0) (1)			(7) (8)		
T6.2-6	SH.3				(7) (8)		
T6.2-7	SH.1	(0) (1)			(7)		
T6.2-7	SH.2	(0) (1)			(7)		
T6.2-7	SH.3				(7)		
T6.2-8		(0)					

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

T6.2-9		(0)	(4)	(7)
T6.2-10A		(0) (1)		(7)
T6.2-10B				(7)
T6.2-10C				(7)
T6.2-10D				(7)
T6.2-11		(0) (1)		(8)
T6.2-12		(0) (1)		(8)
T6.2-13		(0) (1) (2)		
T6.2-14	SH. 1			(8)
T6.2-14	SH. 2			(8)
T6.2-14a	SH. 1	(0)		(8-deleted)
T6.2-14a	SH. 2	(0)		(8-deleted)
T6.2-14a	SH. 3	(0)		(8-deleted)
T6.2-14a	SH. 4	(0)		(8-deleted)
T6.2-14a	SH. 5	(0)		(8-deleted)
T6.2-14a	SH. 6	(0)		(8-deleted)
T6.2-14a	SH. 7	(0)		(8-deleted)
T6.2-14a	SH. 8	(0)		(8-deleted)
T6.2-14a	SH. 9	(0)		(8-deleted)
T6.2-14a	SH. 10	(0)		(8-deleted)
T6.2-14a	SH. 11	(0)		(8-deleted)
T6.2-14a	SH. 12	(0)		(8-deleted)
T6.2-14a	SH. 13	(0)		(8-deleted)
T6.2-14b	SH. 1	(0)		(8-deleted)
T6.2-14b	SH. 2	(0)		(8-deleted)
T6.2-14b	SH. 3	(0)		(8-deleted)
T6.2-14b	SH. 4	(0)		(8-deleted)
T6.2-14b	SH. 5	(0)		(8-deleted)
T6.2-14b	SH. 6	(0)		(8-deleted)
T6.2-14b	SH. 7	(0)		(8-deleted)
T6.2-14b	SH. 8	(0)		(8-deleted)
T6.2-14c	SH. 1	(0)		(8-deleted)
T6.2-14c	SH. 2	(0)		(8-deleted)
T6.2-14c	SH. 3	(0)		(8-deleted)
T6.2-14c	SH. 4	(0)		(8-deleted)
T6.2-14c	SH. 5	(0)		(8-deleted)
T6.2-14d	SH. 1	(0)		(8-deleted)
T6.2-14d	SH. 2	(0)		(8-deleted)
T6.2-14d	SH. 3	(0)		(8-deleted)
T6.2-14d	SH. 4	(0)		(8-deleted)
T6.2-14d	SH. 5	(0)		(8-deleted)
T6.2-14d	SH. 6	(0)		(8-deleted)
T6.2-14d	SH. 7	(0)		(8-deleted)
T6.2-14d	SH. 8	(0)		(8-deleted)
T6.2-14d	SH. 9	(0)		(8-deleted)
T6.2-14e	SH. 1	(0)		(8-deleted)
T6.2-14e	SH. 2	(0)		(8-deleted)
T6.2-14e	SH. 3	(0)		(8-deleted)
T6.2-14e	SH. 4	(0)		(8-deleted)

T6.2-14e	SH.5	(0)						(8-deleted)		
T6.2-15a	SH.1	(0)	(1)							
T6.2-15a	SH.2	(0)	(1)							
T6.2-15a	SH.3	(0)	(1)							
T6.2-15a	SH.4	(0)	(1)							
T6.2-15b		(0)	(1)							
T6.2-15c		(0)	(1)							
T6.2-15d		(0)	(1)	(2)						
T6.2-16a	SH.1	(0)	(1)							
T6.2-16a	SH.2	(0)	(1)							
T6.2-16a	SH.3	(0)	(1)							
T6.2-16a	SH.4	(0)	(1)							
T6.2-16b		(0)	(1)							
T6.2-16c		(0)	(1)							
T6.2-16d		(0)	(1)							
T6.2-17a	SH.1	(0)	(1)							
T6.2-17a	SH.2	(0)	(1)							
T6.2-17a	SH.3	(0)	(1)							
T6.2-17b		(0)	(1)							
T6.2-17c		(0)	(1)							
T6.2-17d		(0)	(1)							
T6.2-17e		(0)	(1)	(2)						
T6.2-18	SH.1	(0)				(4)			(9)	
T6.2-18	SH.2	(0)		(2)		(4)			(9)	
T6.2-18	Sh.2a					(4)				
T6.2-18	SH.3	(0)		(2)					(9)	
T6.2-19	SH.1, PT A	(0)				(4)	(5)			(13)
T6.2-19	SH.1, PT B	(0)								(13)
T6.2-19	SH.1, PT C	(0)	(1)	(2)	(3)		(5)			(13)
T6.2-19	SH.2, PT A	(0)		(2)			(5)			(13)
T6.2-19	SH.2, PT B	(0)	(1)				(5)			(13)
T6.2-19	SH.2, PT C	(0)	(1)				(5)			(13)
T6.2-19	SH.3, PT A	(0)	(1)				(5)			(13)
T6.2-19	SH.3, PT B						(5)			(13)
T6.2-19	SH.3, PT C	(0)	(1)				(5)			(13)
T6.2-19	SH.4, PT A						(5)			(13)
T6.2-19	SH.4, PT B	(0)	(1)	(2)			(5)			(13)
T6.2-19	SH.4, PT C						(5)			(13)
T6.2-19	SH.5, PT A	(0)	(1)				(5)			(13)
T6.2-19	SH.5, PT B	(0)	(1)				(5)		(9)	(13)
T6.2-19	SH.5, PT C	(0)	(1)				(5)		(9)	(13)
T6.2-19	SH.5a, PT C	(0)	(1)			(4)	(5)			(13)
T6.2-19	SH.6, PT A	(0)	(1)			(4)	(5)			(13)
T6.2-19	SH.6, PT B	(0)	(1)				(5)			(13)
T6.2-19	SH.6, PT C									(13)
T6.2-19	SH.7									(13)
T6.2-20		(0)								
T6.2-21		(0)								
T6.2-22		(0)								(13)

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

T6.2-23	SH.1	(0)											(13)
T6.2-23	SH.1a												(13)
T6.2-23	SH.2	(0)	(1)										(13)
T6.2-23	SH.2a												(13)
T6.2-23	SH.3	(0)	(1)	(2)									
T6.2-23	SH.3a			(2)									(13)
T6.2-23	SH.4	(0)											(13)
T6.2-24		(0)			(3-deleted)								
T6.2-25		(0)		(2)									
T6.2-26				(2)									
T6.2-27				(2)									
T6.2-28	SH.1			(2)									
T6.2-28	SH.2			(2)									
T6.2-29						(7)							
T6.2-30						(7)							
T6.2-31						(7)							
P6.2-1		(0)											
P6.2-2		(0)											
P6.2-3		(0)				(7)							
P6.2-4		(0)				(7)							
P6.2-5		(0)											
P6.2-6		(0)				(7)							
P6.2-7		(0)				(7)							
P6.2-8		(0)				(7)							
P6.2-9		(0)				(7)							
P6.2-10		(0)				(7)							
P6.2-11		(0)				(7)							
P6.2-12		(0)				(7)							
P6.2-13		(0)					(8-deleted)						
P6.2-14		(0)					(8-deleted)						
P6.2-15		(0)					(8-deleted)						
P6.2-16		(0)					(8-deleted)						
P6.2-17		(0)					(8-deleted)						
P6.2-17A							(8)						
P6.2-17B							(6)						
P6.2-18		(0)					(8-deleted)						
P6.2-19		(0)					(8-deleted)						
P6.2-20		(0)					(8-deleted)						
P6.2-21A		(0)											
P6.2-21B	SH. 1	(0)											
P6.2-21B	SH. 2					(6)							
P6.2-21B	SH. 3					(6)							
P6.2-21C		(0)											
P6.2-21D		(0)		(2)									
P6.2-22A		(0)											
P6.2-22B		(0)											
P6.2-22C	SH. 1	(0)		(2)									
P6.2-22C	SH. 2					(6)							
P6.2-22C	SH. 3					(6)							

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

P6.2-22D		(0) (2)
P6.2-22E		(0) (2)
P6.2-23A		(0)
P6.2-23B	SH. 1	(0)
P6.2-23B	SH. 2	(6)
P6.2-23B	SH. 3	(6)
P6.2-23C	SH. 1	(0)
P6.2-23C	SH. 2	(6)
P6.2-23C	SH. 3	(6)
P6.2-23D		(0)
P6.2-23E		(0)
P6.2-23F		(2)
P6.2-24		(0)
P6.2-25		(0) (2) (10)
P6.2-26		(0)
P6.2-27		(0) (6)
P6.2-28	SH.1	(0) (5) (6)
P6.2-28	SH.2	(0) (1) (5) (6)
P6.2-28	SH.3	(0) (2) (5) (6)
P6.2-28	SH.4	(0) (2) (5) (6)
P6.2-28	SH.5	(0) (6)
P6.2-29		(0) (1)
P6.2-30		(1)
P6.2-31		(1)
P6.2-32		(1)
P6.2-33		(1)
P6.2-34		(1)
P6.2-35		(6)
P6.2-36		(7)
P6.2-37		(7)
P6.2-38		(7)
P6.2-39		(7)
P6.2-40		(7)
6.3-1		(0) (5)
6.4-1		(0) (1) (2)
6.4-2		(0) (1) (2)
6.4-3		(0)
6.4-4		(0) (1) (2)
6.4-5		(0) (1) (2)
6.4-5a		(2)
6.4-6		(0) (1) (2)
6.4-7		(0) (1) (2) (5)
6.4-7a		(5)
6.4-8		(0) (1) (2)
6.4-9		(0) (1) (2)
6.4-9a		(2)
6.4-10		(1)
T6.4-1		(0)
T6.4-2		(0)

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

T6.4-3	SH. 1	(0)	(2)				
T6.4-3	SH. 2	(0)	(2)				
F6.4-1		(0)					
6.5-1		(0)	(1)	(4)		(8)	
6.5-2		(0)	(1)	(4)		(8)	
6.5-2a						(8)	
6.5-3		(0)	(1)	(4)			
6.5-4		(0)	(1)	(4)			(9)
6.5-5		(0)	(1)	(4)			(9)
6.5-5a							(9)
6.5-6		(0)	(1)	(4)			(9)
6.5-7		(0)	(1)	(4)			(9)
6.5-7a							(9)
6.5-8		(0)	(1)	(4)			(9)
6.5-9		(0)	(1)	(4)			(9)
6.5-10		(0)	(1)	(4)			(9)
6.5-10a							(9)
6.5-11		(0)	(1)	(4)			
6.5-12		(0)	(1)	(4)			
6.5-13		(0)	(1)	(4)			
6.5-14		(0)	(1)	(4)			
6.5-15		(0)	(1)	(4-deleted)			
6.5-16		(0)	(1)	(4-deleted)			
6.5-17		(0)	(1)	(4)			(9)
6.5-18		(0)	(1)				(9)
6.5-19		(0)	(1)	(4)	(5)		(9)
6.5-19a				(4)			(9)
6.5-20		(0)	(1)				
6.5-21		(0)	(1)	(4)			
6.5-22		(0)	(1)	(4)			
T6.5-1	SH. 1	(0)		(4)	(5)	(8)	
T6.5-1	SH. 1a					(8)	
T6.5-1	SH. 2	(0)		(4)	(5)	(8)	
T6.5-1	SH. 3	(0)		(4)	(5)	(8)	
T6.5-1	SH. 3a					(8)	
T6.5-1	SH. 4	(0)		(4)	(5)	(8)	
T6.5-1	SH. 5	(0)		(4)	(5)		
T6.5-1	SH. 5a					(8)	
T6.5-1	SH. 6	(0)		(4)	(5)	(8)	
T6.5-1	SH. 6a					(8)	
T6.5-1	SH. 7	(0)		(4)	(5)	(8)	
T6.5-1	SH. 8	(0)		(4)	(5)	(8)	
T6.5-1	SH. 9	(0)		(4)	(5)	(8)	
T6.5-1	SH. 10	(0)		(4)	(5)	(8)	
T6.5-1	SH. 11	(0)		(4)	(5-deleted)		
T6.5-1	SH. 12	(0)		(4)	(5-deleted)		
T6.5-1	SH. 13	(0)		(4)	(5-deleted)		
T6.5-1	SH. 14	(0)		(4)	(5-deleted)		
T6.5-1	SH. 15	(0)		(4)	(5-deleted)		

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 2

T6.5-2		(0) (1)	(4)		
T6.5-3		(0)		(6)	(9)
T6.5-4	SH. 1	(0)			(9)
T6.5-4	SH. 2	(0)			(9)
T6.5-5		(0)	(4)		(9)
T6.5-6		(0)	(4)		(9)
T6.5-7				(5)	(9)
F6.5-1		(0)			
F6.5-2		(0)			
F6.5-3				(5)	
F6.5-4		(0)		(5)	
6.6-1		(0)			
(UNNUMBERED PAGE)		(0)			

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 3

7-i		(0)	(1)	(2)			(6)						
7-ia							(6)						
7-ii		(0)		(2)	(3)		(6)						
7-iia							(6)						
7-iii		(0)							(9)				
7-iv		(0)	(1)	(2)					(9)				
7-iva									(9)				
7-ivb									(9)				
7-ivc									(9)				
7.1-1		(0)	(1)										
7.1-2		(0)	(1)										
7.1-3		(0)	(1)		(3)								(14)
7.1-4		(0)	(1)		(3)				(9)				
7.1-5		(0)	(1)						(9)				
7.1-6		(0)	(1)										(14)
7.1-7			(1)										
7.1-8			(1)										(14)
7.1-9			(1)		(3)								(14)
7.1-10			(1)										(14)
7.1-11			(1)										(14)
7.1-12			(1)										(14)
7.1-13			(1)										
7.1-14			(1)		(3)	(4)							(14)
7.1-15			(1)									(13)	
7.1-15a												(13)	
7.1-15b												(13)	
7.1-15c													(14)
7.1-16			(1)										(14)
7.1-17			(1)										(14)
7.1-18			(1)										(14)
7.1-18a													(14)
T7.1-1	SH. 1								(8)			(13)	
T7.1-1	SH. 2								(8)			(13)	
T7.1-1	SH. 3								(8)			(13)	
T7.1-1	SH. 4								(8)			(13)	
T7.1-1	SH. 5								(8)			(13)	
T7.1-1	SH. 6								(8)				
T7.1-1	SH. 7								(8)			(13)	
T7.1-1	SH. 8								(8)			(13)	
T7.1-1	SH. 8a											(13)	
T7.1-1	SH. 9								(8)				
T7.1-1	SH. 10								(8)				
7.2-1		(0)	(1)									(13)	
7.3-1		(0)	(1)		(3)		(5)	(6)					
7.3-2		(0)	(1)				(5)						
7.3-2a			(1)										
7.3-3		(0)	(1)				(5)	(6)		(9)		(13)	
7.3-3a								(6)		(9)		(13)	
7.3-4		(0)	(1)					(6)		(9)			
7.3-4a								(6)					

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 3

7.3-5		(0)	(1)						
7.3-6		(0)	(1)		(3)				
7.3-7		(0)			(3-deleted)				
7.3-8		(0)	(1)		(3)		(6)		
7.3-9		(0)	(1)						
7.3-10		(0)	(1)		(3)		(6)	(9)	
7.3-11		(0)	(1)		(3)				
7.3-12		(0)	(1)		(3)				
7.3-13		(0)		(2)		(5)			
7.3-14		(0)	(1)	(2)	(3)				(13)
7.3-14a				(2)					(13)
7.3-15		(0)		(2)	(3)	(5)	(6)		
7.3-15a			(1)			(5)	(6)		
7.3-16		(0)	(1)				(6)		
7.3-16a							(6)		
7.3-17		(0)	(1)					(9)	
7.3-18		(0)	(1)	(2)					
7.3-19				(2)	(3)				(13)
7.3-19a									(13)
7.3-20				(2)					
7.3-21				(2)					
7.3-22				(2)	(3)				
7.3-23				(2)	(3)				
7.3-24				(2)	(3)				
7.3-25				(2)	(3)				
7.3-26				(2)	(3)				
T7.3-1	SH. 1								(13)
T7.3-1	SH. 2								(13)
T7.3-1	SH. 3								(13)
T7.3-1	SH. 4								(13)
T7.3-1	SH. 5								(13)
T7.3-1	SH. 6								(13)
F7.3-1	SH. A							(9)	
F7.3-1	SH. B							(9)	
F7.3-1	SH. C							(9)	
F7.3-1	SH. D							(9)	
F7.3-1	SH. 1	(0)						(9)	
F7.3-1	SH. 1A							(9)	
F7.3-1	SH. [illegible]							(9)	
F7.3-1	SH. [illegible]							(9)	
F7.3-1	S[illegible]							(9)	
F7.3-1	S[illegible]	(0)						(9)	
F7.3-1	SH [illegible]							(9)	
F7.3-1	SH. 2B							(9)	
F7.3-1	SH. 2C							(9)	
F7.3-1	SH. 2D							(9)	
F7.3-1	SH. 2E							(9)	
F7.3-1	SH. 2F							(9)	
F7.3-1	SH. 2G							(9)	
F7.3-1	SH. 3	(0)	(1)					(9 deleted)	
F7.3-1	SH. 4	(0)	(1)				(6)	(9 deleted)	

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 3

P7.3-1	SH. 5	(0)	(2)		(9 deleted)		
P7.3-1	SH. 6	(0)	(2)		(9 deleted)		
P7.3-1	SH. 7	(0)	(2)		(9 deleted)		
P7.3-1	SH. 8	(0)	(2)		(9 deleted)		
P7.3-1	SH. 9	(0)	(2)		(9 deleted)	(11)	
P7.3-1	SH. 9A					(11)	
P7.3-1	SH. 9B					(11)	
P7.3-1	SH. 10	(0) (1)			(9)		
P7.3-1	SH. 10A				(9)		
P7.3-1	SH. 10B				(9)		
P7.3-1	SH. 10C				(9)		
P7.3-1	SH. 11				(9)		
P7.3-1	SH. 11A				(9)		
P7.3-1	SH. 12				(9)		
P7.3-1	SH. 13				(9)		
P7.3-1	SH. 13A				(9)		
P7.3-1	SH. 14				(9)		
P7.3-1	SH. 15				(9)		
P7.3-1	SH. 16				(9)		
P7.3-1	SH. 16A				(9)		
P7.3-1	SH. 16B				(9)		
P7.3-1	SH. 16C				(9)		
P7.3-1	SH. 16D				(9)		
P7.3-2	SH. 1	(0) (1)					
P7.3-2	SH. 2	(0) (1)					
P7.3-2	SH. 3	(0) (1)					
7.4-1		(0) (1)		(6)		(13)	
7.4-1a				(6)		(13)	
7.4-1b						(13)	
7.4-2		(0) (1)		(6)			
7.5-1		(0) (1)		(6)			
7.5-2		(1)					
7.5-3		(1)		(6)			
7.5-4		(1)					
T7.5-1	SH. 1	(0) (1)		(6)			
T7.5-1	SH. 2	(0) (1)		(6)			
T7.5-1	SH. 3	(0) (1-deleted)					
7.6-1		(0)		(6)		(13)	
7.6-1a				(6)		(13)	
7.6-1b				(6)		(13)	
7.6-1c						(13)	
7.6-2		(0)		(6)		(13)	
7.6-3		(0) (1)		(6)		(13)	
7.6-3a				(6)		(13)	
7.6-4		(0) (1)		(6)		(13)	
7.7-1		(0) (1)	(3)				
7.7-1a		(1)	(2) (3)				
7.7-1b		(1)	(2) (3) (4)				
7.7-1c			(2) (3) (4)	(6)			
7.7-1d			(3)				
7.7-2		(0) (1)	(2) (4)				

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 3

7.7-3					(3)						
T7.7-1										(14)	
F7.7-1			(1)	(2)							
F7.7-2				(2)							
7.8-1		(0)	(1)	(2)							
7.8-2		(0)	(1)	(2)							
7.8-2a				(2)							
7.8-3			(1)	(2)							
7.8-3a				(2)							
7.8-4			(1)	(2)							
7.8-5			(1)	(2)							
7.8-5a				(2)							
7.8-6			(1)	(2)					(13)		
7.8-7			(1)	(2)	(3)						
7.8-8					(3)						
8-i		(0)	(1)			(10)					
8-ii		(0)	(1)			(10)					
8-iia							(11)				
8-iii		(0)	(1)			(10)					
8-iv		(0)	(1)			(10)					
8.1-1		(0)	(1)			(10)					
8.1-2		(0)				(10)					
8.1-3		(0)				(10)					
8.1-4		(0)				(10)					(15)
8.1-5		(0)				(10)					
8-1-5a						(10)					
8.1-6		(0)				(10)					
8.1-7		(0)				(10)					
8.1-8		(0)				(10)					
8.1-9		(0)				(10)					
8.1-10		(0)				(10)					
8.1-11		(0)	(1)			(10)					
T8.1-1	SH. 1	(0)	(1)			(10)					
T8.1-1	SH. 2	(0)	(1)			(10)					
T8.1-1	SH. 3	(0)	(1-deleted)								
T8.1-2	SH. 1					(10)					
T8.1-2	SH. 2					(10)					
T8.1-2	SH. 3					(10)	(11)				
T8.1-2	SH. 4					(10)					
T8.1-2	SH. 5					(10)					
8.2-1		(0)				(10)					(15)
8.3-1		(0)	(1)			(10)					
8.3-1a							(11)				
8.3-2		(0)				(10)					(15)
8.3-3		(0)	(1)			(10)					(15)
8.3-4		(0)				(10)					
8.3-5		(0)				(10)					
8.3-6		(0)				(10)		(12)			(15)
8.3-6a						(10)					(15)
8.3-7		(0)				(10)					
8.3-8		(0)				(10)					(15)

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 3

8.3-9	(0) (1)	(10)	
8.3-9a		(10)	
8.3-9b		(10)	
8.3-9c		(10)	
8.3-9d		(10)	
8.3-9e			(15)
8.3-10	(0) (1)		(15)
8.3-11	(0) (1)	(10)	(15)
8.3-11a		(11)	
8.3-12	(0)	(10)	
8.3.12a		(10)	(15)
8.3-13	(0) (1)	(10)	(15)
8.3-13a		(10)	
8.3-14	(0) (1)	(10)	
8.3.14a		(10)	
8.3-15	(0) (1)	(10)	
8.3.15a		(10)	
8.3-16	(0)	(10)	
8.3-17	(0)	(10)	
8.3-18	(0)	(11)	
8.3-18a		(11)	
8.3-19	(0) (1) (2)	(10)	
8.3-20	(0) (1)	(10)	
8.3-21	(0) (1)	(10)	
8.3-21a		(10)	
8.3-22	(0) (1)	(10)	
8.3-23	(0) (1)	(10)	
8.3-24	(0) (1)		
8.3-25	(0) (1)	(10)	
8.3-26	(0) (1)	(10)	
8.3-27	(0) (1)	(11)	
8.3-27a		(10)	
8.3-28	(0) (1)	(10)	
8.3-28a	(1)	(10)	
8.3-29	(0)	(10)	
8.3-30	(0) (1)	(11)	(15)
8.3-30a			(15)
8.3-31	(0) (1)	(10)	
8.3-31a	(1)	(10)	
8.3-32	(0)	(10)	
8.3-32a		(10)	
8.3-33	(0)	(10)	
8.3-34	(0)	(10)	
8.3-35	(0) (1)		(15)
8.3-35a			(15)
8.3-36	(0) (1)		
8.3-37	(0) (1)	(10 deleted)	
8.3-38	(0) (1)	(10 deleted)	
8.3-39	(0)	(10 deleted)	
8.3-40	(0)	(10 deleted)	
8.3-41	(0)	(10)	

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EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 3

8.3-42		(0)	(10)	
8.3-43		(0)	(10)	
8.3-44		(0) (1)		
T8.3-1a	SH. 1	(0)		(12)
T8.3-1a	SH. 2	(0)		(12)
T8.3-1a	SH. 3	(0)		(12)
T8.3-1a	SH. 4	(0)		(12)
T8.3-1a	SH. 5	(0)		(12)
T8.3-1a	SH. 6	(0)		(12)
T8.3-1a	SH. 7	(0)		(12)
T8.3-1a	SH. 8	(0)		(12)
T8.3-1a	SH. 9	(0)		(12)
T8.3-1a	SH. 10			(12)
T8.3-1b	SH. 1			(12)
T8.3-1b	SH. 2			(12)
T8.3-1b	SH. 3			(12)
T8.3-1b	SH. 4			(12)
T8.3-1b	SH. 5			(12)
T8.3-1b	SH. 6			(12)
T8.3-1b	SH. 7			(12)
T8.3-1b	SH. 8			(12)
T8.3-1b	SH. 9			(12)
T8.3-1b	SH. 10			(12)
T8.3-1b	SH. 11			(12)
T8.3-2	SH. 1	(0)		(12)
T8.3-2	SH. 2	(0)		(12)
T8.3-2	SH. 3	(0)		(12)
T8.3-2	SH. 4	(0) (1)		(12)
T8.3-2	SH. 5	(0)		(12)
T8.3-2	SH. 6	(0)		(12)
T8.3-2	SH. 7	(0)		(12)
T8.3-2	SH. 8	(0)		(12)
T8.3-2	SH. 9			(12)
T8.3-2	SH. 10			(12)
T8.3-3	SH. 1	(0)		
T8.3-3	SH. 2	(0)		
T8.3-3	SH. 3	(0)		
T8.3-3	SH. 4	(0)		
T8.3-3	SH. 5	(0)		
T8.3-3	SH. 6	(0)		
T8.3-3	SH. 7	(0)		
T8.3-3	SH. 8	(0)		
T8.3-3	SH. 9	(0)		
T8.3-3	SH. 10	(0)		
T8.3-3	SH. 11	(0)		
T8.3-3	SH. 12	(0)		
T8.3-3	SH. 13	(0)		
T8.3-3	SH. 14	(0)		
T8.3-3	SH. 15	(0)		
T8.3-3	SH. 16	(0)		
T8.3-3	SH. 17	(0)		

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 3

T8.3-3	SH. 18	(0)							
T8.3-3	SH. 19	(0)	(1)						
T8.3-4		(0)				(10)			
T8.3-5		(0)				(10)			
T8.3-6	SH. 1	(0)							
T8.3-6	SH. 2	(0)							
T8.3-6	SH. 3	(0)							
T8.3-6	SH. 4	(0)							
T8.3-6	SH. 5	(0)							
T8.3-6	SH. 6	(0)							
T8.3-6	SH. 7	(0)							
T8.3-6	SH. 8	(0)							
T8.3-6	SH. 9	(0)							
T8.3-6	SH. 10	(0)							
T8.3-6	SH. 11	(0)							
T8.3-6	SH. 12	(0)							
T8.3-7	SH. 1	(0)					(13)		
T8.3-7	SH. 2	(0)					(13)		
T8.3-7	SH. 3	(0)					(13)		
T8.3-7	SH. 4	(0)					(13)		
T8.3-8						(10)			
F8.3-1		(0)	(2)			(10)			
F8.3-2		(0)				(10)			
F8.3-3		(0)				(10)			
F8.3-4		(0)				(10)			
F8.3-5		(0)				(10)			
F8.3-6		(0)				(10)			
F8.3-7		(0)				(10)			
F8.3-8		(0)				(10)			
F8.3-9		(0)				(10 deleted)			
F8.3-10		(0)				(10 deleted)			
F8.3-11		(0)				(10 deleted)			
8.4-1		(0)				(10)		(15)	
8.4-2						(10)		(15)	
8.4-2a								(15)	
8.4-3						(10)			
T8.4-1	SH. 1	(0)	(1)			(10 deleted)			
T8.4-1	SH. 2	(0)	(1)			(10 deleted)			
T8.4-1	SH. 3	(0)	(1)			(10 deleted)			
T8.4-1	SH. 4	(0)	(1)						
(12 unnumbered contents pages Section 9)		(0)	(2-deleted)						
9-i			(2)	(6)					
9-ii			(2)	(6)					
9-iii			(2)	(6)					
9-iiia				(6)					
9-iv			(2)	(6)					
9-iva				(6)					
9-v			(2)	(6)					
9-vi			(2)						

EFFECTIVE PAGE LISTING
GIBBSSAR: VOLUME 3

9-vii				(2)			(6)		
9-viii				(2)			(6)		
9-viiia							(6)		
9-ix				(2)			(6)		
9-ixa							(6)		
9-x				(2)			(6)		
9-xa							(6)		
9-xi				(2)			(6)		
9-xia				(2)			(6)		
9-xii				(2)			(6)		
9.1-1			(0)	(2)			(6)		
9.1-1a							(6)		
9.1-2			(0)	(2)			(6)		
9.1-2a				(2)			(6)		
9.1-2b							(6)		
9.1-3			(0)	(2)				(9)	
9.1-3a							(6)		
9.1-4			(0)	(2)					(10)
9.1-5			(0)	(2)					
9.1-5a				(2)					
9.1-6			(0)	(2)			(6)		
9.1-6a				(2)			(6)		
9.1-7			(0)	(1)					(10)
9.1-7a				(1)					
9.1-8			(0)						
9.1-9			(0)	(1)					
9.1-10			(0)	(1)	(2)				(10)
9.1-10a				(1)					(10)
9.1-11			(0)	(1)	(2)		(6)		
9.1-12			(0)	(1)	(2)		(6)		
9.1-12a							(6)		
9.1-13			(0)	(1)	(2)				(10)
9.1-14			(0)	(1)					(10)
T9.1-1			(0)	(1)			(6)		
T9.1-2			(0)	(1)					
T9.1-3		SH. 1	(0)	(1)					
T9.1-3		SH. 2		(1)					
T9.1-4		SH. 1	(0)	(1)					
T9.1-4		SH. 2		(1)					
T9.1-4		SH. 3	(0)	(1)					
T9.1-4		SH. 4		(1)					
T9.1-5		SH. 1	(0)	(1)					(10)
T9.1-5		SH. 2	(0)	(1)					(10)
T9.1-6							(6)		
P9.1-1			(0)	(1)	(2)		(6-deleted)		
P9.1-2			(0)	(1)	(2)		(6-deleted)		
P9.1-3			(0)			(4)	(6)		(10)
P9.1-3a		SH. 1					(6)		
P9.1-3a		SH. 2					(6)		(10)
P9.1-3b		SH. 1					(6)		
P9.1-4			(0)						

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GIBBSSAR: VOLUME 3

F9.1-5			(2)		(6)			
9.2-1		(0)			(6)	(9)	(11)	
9.2-1a					(6)	(9)		
9.2-2		(0)				(9)	(11)	
9.2-3		(0)				(9)	(11)	
9.2-4		(0)	(1)				(11)	
9.2-5		(0)	(1)			(9)	(11)	
9.2-6		(0)				(9)	(11)	
9.2-6a							(11)	
9.2-7		(0)		(4)		(9)	(11)	
9.2-8		(0)	(2)	(4)		(9)	(11)	
9.2-8a						(9)		
9.2-9		(0)				(9)	(11)	
9.2-10		(0)		(4)		(9)	(11)	(15)
9.2-10a								(15)
9.2-11		(0)			(6)	(9)	(11)	
9.2-12		(0)	(1)		(6)	(9)		
9.2-12a					(6)			
9.2-13		(0)	(1)		(6)	(9)		
9.2-13a					(6)	(9)		
9.2-14		(0)	(1)	(2)				
9.2-15		(0)	(1)					
9.2-16		(0)	(1)		(6)	(9)	(11)	
9.2-17		(0)	(1)			(9)	(11)	
9.2-18		(0)	(1)		(6)	(9)	(11)	
9.2-18a					(6)	(9)		
9.2-19		(0)				(9)		
9.2-20		(0)				(9)	(11)	
9.2-20a						(9)	(11)	
9.2-21		(0)				(9)	(11)	
9.2-22		(0)				(9)	(11)	
9.2-23		(0)	(1)			(9)	(11)	
9.2-24		(0)				(9)	(11)	
9.2-25		(0)				(9)	(11)	
9.2-26		(0)	(1)		(6)	(9)	(11)	
9.2-26a					(6)			
9.2-27		(0)	(1)		(6)	(9)	(11)	
T9.2-1	SH. 1	(0)	(1)			(9)	(11)	
T9.2-1	SH. 2		(1)			(9)	(11)	
T9.2-2	SH. 1	(0)	(1)			(9)	(11)	
T9.2-2	SH. 2		(1)			(9)	(11)	
T9.2-3		(0)	(1)			(9)		
T9.2-4		(0)						
T9.2-5	SH. 1	(0)	(1)		(6)			
T9.2-5	SH. 2	(0)	(1)		(6)			
T9.2-6	SH. 1	(0)	(1)	(4)		(9)	(11)	
T9.2-6	SH. 2	(0)	(1)	(2) (4)		(9)	(11)	
T9.2-6	SH. 3	(0)	(1)	(2) (4)		(9)	(11)	
T9.2-6	SH. 4		(1)	(4)		(9)	(11)	
T9.2-6	SH. 5		(1)	(2) (4)		(9)	(11)	
T9.2-6	SH. 6		(1)	(2) (4)		(9)	(11)	

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T9.2-6	SH. 6a					(9)	(11)		
T9.2-7	SH. 1	(0)	(1)		(4)	(9)	(11)		
T9.2-7	SH. 2	(0)	(1)	(2)	(4)	(9)	(11)		
T9.2-7	SH. 3	(0)	(1)	(2)	(4)	(9)	(11)		
T9.2-7	SH. 4		(1)		(4)	(9)	(11)		
T9.2-7	SH. 5		(1)	(2)	(4)	(9)	(11)		
T9.2-7	SH. 6		(1)	(2)	(4)	(9)	(11)		
T9.2-7	SH. 6a					(9)	(11)		
T9.2-8	SH. 1	(0)	(1)			(9)			
T9.2-8	SH. 2	(0)	(1)			(9)			
T9.2-8	SH. 3	(0)	(1)			(9)			
T9.2-9	SH. 1	(0)							
T9.2-9	SH. 2	(0)							
T9.2-10		(0)	(1)			(6)			(15)
T9.2-11		(0)							
T9.2-12		(0)	(1)						
T9.2-13		(0)				(6-deleted)			
T9.2-14				(2)					
F9.2-1		(0)				(6)	(9)	(10)	
F9.2-1a	SH. 1					(6)			
F9.2-2b	SH. 1					(6)			
F9.2-2		(0)				(6)	(9)	(10)	
F9.2-3		(0)		(2)	(4)	(6)		(11)	
F9.2-4		(0)		(2)	(4)	(6)			(15)
F9.2-4a	SH. 1					(6)	(10)		(15 deleted)
F9.2-4a	SH. 2					(6)			(15 deleted)
F9.2-4a	SH. 3					(6)			(15 deleted)
F9.2-4b	SH. 1					(6)			(15 deleted)
F9.2-4b	SH. 2					(6)			(15 deleted)
F9.2-5		(0)		(2)			(9)	(10)	
F9.2-6		(0)		(2)			(9)	(10)	
F9.2-7		(0)	(1)			(6)			
9.3-1		(0)	(1)		(4)				
9.3-2		(0)	(1)						
9.3-3		(0)			(4)				
9.3-4		(0)		(2)	(4)				
9.3-4a				(2)	(4)			(11)	
9.3-4b				(2)				(11)	
9.3-5		(0)	(1)	(2)	(4)			(11)	
9.3-5a				(2)				(11)	
9.3-6		(0)							
9.3-7		(0)	(1)					(11)	
9.3-8		(0)		(2)				(11)	
9.3-8a				(2)					
9.3-9		(0)		(2)				(11)	
9.3-9a				(2)				(11)	
9.3-9b				(2)				(11)	
9.3-9c								(11)	
9.3-10		(0)		(2)		(6)			
9.3-10a						(6)	(10)		
9.3-11		(0)	(1)	(2)		(6)	(10)		

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9.3-12		(0)	(1)						(10)
9.3-12a									(10)
9.3-13		(0)	(1)				(6)		
T9.3-1		(0)		(2)					
T9.3-2		(0)		(2)					
T9.3-2	(cont.)	(0)		(2-deleted)					
T9.3-2	(cont.)	(0)		(2-deleted)					
T9.3-2	SH. 1	(0)		(2-deleted)					
T9.3-2	SH. 2	(0)		(2-deleted)					
T9.3-2	SH. 3	(0)		(2-deleted)					
T9.3-2	SH. 4	(0)		(2-deleted)					
T9.3-3				(2)					
T9.3-4	SH. 1			(2)					
T9.3-4	SH. 2			(2)					
T9.3-4	SH. 3			(2)					
T9.3-4	SH. 4			(2)					
9.3-5					(4)				
9.3-5a									(10)
T9.3-6							(6)		
F9.3-1		(0)		(2)					
F9.3-2				(2)			(6)		
F9.3-2a	SH. 1						(6)		
F9.3-2b	SH. 1						(6)		
F9.3-3	SH. 1						(6)		
F9.3-3	SH. 2						(6)		
F9.3-4							(6)		
9.4-1		(0)	(1)				(6)	(8)	
9.4-1a							(6)	(8-deleted)	
9.4-2		(0)	(1)	(2)		(5)	(6)	(8)	
9.4-3		(0)	(1)				(6)	(8)	
9.4-3a								(8)	
9.4-4		(0)		(2)			(6)	(8)	
9.4-5		(0)	(1)	(2)				(8)	
9.4-6		(0)	(1)	(2)				(8)	
9.4-6a				(2)				(8)	
9.4-6b								(8)	
9.4-7		(0)	(1)	(2)	(3)	(5)		(8)	
9.4-7a			(1)					(8)	
9.4-8		(0)	(1)		(3)	(5)	(6)	(8)	
9.4-9		(0)	(1)	(2)			(6)		(10)
9.4-9a				(2)			(6)		(10)
9.4-10		(0)	(1)	(2)	(3)	(5)	(6)		(10)
9.4-10a				(2)	(3)				(10 deleted)
9.4-11		(0)	(1)	(2)		(5)	(6)		(10)
9.4-11a							(6)		(10)
9.4-12		(0)	(1)						(10)
9.4-12a									(10)
9.4-13		(0)					(6)		(10)
9.4-14		(0)	(1)	(2)		(5)	(6)		(10)
9.4-14a							(6)		(10 deleted)
9.4-15		(0)	(1)		(3)	(5)	(6)		(10)

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9.4-16		(0)	(1)	(2)	(3)		(5)	(6)		(10)
9.4-16a				(2)						(10)
9.4-17		(0)	(1)	(2)				(6)		(10)
9.4-18		(0)	(1)	(2)						(10)
9.4-19		(0)	(1)	(2)			(5)	(6)		(10)
9.4-20		(0)	(1)	(2)						(10)
9.4-20a				(2)	(3)					(10 deleted)
9.4-21		(0)	(1)		(3)		(5)	(6)		(10)
9.4-21a										(10)
9.4-22		(0)	(1)		(3)		(5)	(6)		(10)
9.4-23		(0)	(1)		(3)					(10)
9.4-23a			(1)		(3)					(10)
9.4-24		(0)	(1)	(2)	(3)		(5)			(10)
9.4-24a				(2)			(5)			
9.4-25		(0)		(2)	(3)					(10)
9.4-25a				(2)						(10)
9.4-26		(0)	(1)		(3)		(5)	(6)		(10)
9.4-27		(0)	(1)	(2)	(3)					(10)
9.4-27a					(3)					(10)
9.4-28		(0)	(1)		(3)			(6)		(10)
9.4-28a								(6)		(10)
9.4-29		(0)	(1)							(10)
9.4-29a										(10)
9.4-30		(0)	(1)	(2)				(6)		(10)
9.4-31		(0)	(1)	(2)				(6)		(10)
9.4-31a				(2)				(6)		(10)
9.4-32		(0)	(1)	(2)				(6)		(10)
9.4-32a										(10)
9.4-33		(0)		(2)	(3)			(6)		(10)
9.4-34		(0)						(6)		
9.4-34a				(2)				(6)		(10)
9.4-35			(1)	(2)				(6)		(10)
T9.4-1		(0)	(1)					(6)		(10)
T9.4-2		(0)	(1)					(6)		(10)
T9.4-3		(0)	(1)	(2)					(8)	(10)
T9.4-4	SH. 1	(0)	(1)	(2)	(3)					(10)
T9.4-4	SH. 2	(0)	(1)	(2)	(3)					(10)
T9.4-5	SH. 1	(0)	(1)		(3)					
T9.4-5	SH. 2	(0)								
T9.4-6	SH. 1	(0)	(1)	(2)				(6)		
T9.4-6	SH. 2	(0)	(1)	(2)				(6)		
T9.4-6	SH. 2a			(2)				(6-deleted)		
T9.4-6	SH. 3	(0)	(1)	(2)				(6-deleted)		
T9.4-7		(0)	(1)					(6)		
T9.4-8	SH. 1	(0)			(3)		(5)			(10)
T9.4-8	SH. 2	(0)			(3)		(5)			(10)
T9.4-8	SH. 3	(0)		(2)						
T9.4-9	SH. 1	(0)	(1)	(2)	(3)		(5)			(10)
T9.4-9	SH. 2	(0)	(1)	(2)	(3)		(5)			(10)
9.4-10								(6)		
9.4-11								(6)		

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9.4-12						(6)			(10)	
P9.4-1		(0)	(2)			(6)	(8)			
P9.4-2		(0)	(1-deleted)		(5)	(6)				
P9.4-3		(0)	(1-deleted)			(6)				
P9.4-4		(0)	(1-deleted)						(10)	
P9.4-5		(0)				(6)		(9)	(10)	
P9.4-6		(0)		(3)	(5)	(6)		(9)	(10)	
P9.4-7		(0)			(5)				(10)	
P9.4-8		(0)	(2)						(10)	
P9.4-9		(0)		(3)	(5)				(10)	
P9.4-10	SH.1	(0)	(2)		(5)				(10)	
P9.4-10	SH.2								(10)	
P9.4-11		(0)	(2)							
P9.4-12		(0)		(3)	(5)				(10)	
P9.4-13		(0)	(2)					(9)		
P9.4-14		(0)	(2)		(5)	(6)			(10)	
P9.4-15		(0)	(2)						(10)	
P9.4-16		(0)	(2)				(8)			
P9.4-17		(0)	(2)							
P9.4-18			(2)							
P9.4-19									(10)	
9.5-1		(0)	(1)				(8)		(10)	
9.5-2		(0)					(8)		(10)	
9.5-2a									(10)	
9.5-3		(0)					(8)			
9.5-4		(0)	(1)				(8)			
9.5-5		(0)	(1)				(8)			
9.5-6		(0)					(8)			
9.5-7		(0)					(8)		(10	
9.5-7a									(10)	
9.5-8		(0)					(8)			
9.5-9		(0)					(8)			
9.5-10		(0)	(1)				(8)			
9.5-11		(0)					(8)			
9.5-12		(0)					(8)			
9.5-13		(0)					(8)			
9.5-14		(0)	(1)				(8)			
9.5-15		(0)	(1)				(8)			
9.5-16		(0)	(1)				(8)			
9.5-17		(0)					(8)			
9.5-18		(0)					(8)			
9.5-19		(0)	(1)				(8)			(15)
9.5-19a										(15)
9.5-20		(0)	(1)				(8)			
9.5-21		(0)	(1)				(8)			
9.5-22		(0)	(1)				(8)			
9.5-23		(0)	(1)				(8)			
9.5-23a							(8)			
9.5-23b							(8)		(10)	
9.5-23b1									(10)	
9.5-23c							(8)			

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9.5-23d							(8)			
9.5-23e							(8)			
9.5-23f							(8)			
9.5-23g							(8)			
9.5-23h							(8)			
9.5-23i							(8)			
9.5-23j							(8)			
9.5-23k							(8)			
9.5-23l							(8)			
9.5-24		(0)						(9)		(11)
9.5-24a								(9)		
9.5-25		(0) (1)						(9)		(11)
9.5-25a								(9)		(11)
9.5.25b										(11)
9.5-25c								(9)		(11)
9.5-25d								(9)		(11)
9.5-26		(0) (1)						(9)		
9.5-27		(0) (1)						(9)		
9.5-27a								(9)		
9.5-28		(0)								(11)
9.5-28a										(11)
9.5-28b										(11)
9.5-29		(0) (1)				(6)				(11)
9.5-29a						(6)			(10)	
9.5-29b									(10)	
9.5-30		(0) (1)				(6)			(10)	
9.5-30a						(6)			(10)	
9.5-31		(0)				(6)		(9)	(10)	
9.5-32		(0) (1)				(6)		(9)	(10)	
9.5-32a						(6)		(9)	(10)	
9.5.32b									(10)	
9.5-32c									(10)	
9.5-32d									(10)	
9.5-33			(1)						(10)	
9.5-34				(3)			(7)			
9.5-34a							(7)			
9.5-35				(3)		(6)				
9.5-35a						(6)				
9.5-36				(3)						
T9.5-1	SH. 1	(0) (1)								(11)
T9.5-1	SH. 2	(0) (1)								(11)
T9.5-1	SH. 3	(0)								
T9.5-2		(0)								(11)
T9.5-3	SH. 1	(0) (1) (2)							(10)	
T9.5-3	SH. 2	(0) (1)							(10)	
T9.5-4		(0) (1)							(10)	
T9.5-5		(0) (1)							(10)	
T9.5-6				(3)						
T9.5-7	SH. 1						(8)			
T9.5-7	SH. 2						(8)			
T9.5-8							(8)			

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T9.5-9						(10)	
T9.5-10	SH. 1					(10)	
T9.5-10	SH. 2					(10)	
T9.5-11	SH. 1					(10)	
T9.5-11	SH. 2					(10)	
T9.5-12						(10)	
F9.5-1		(0)			(8 deleted)		
F9.5-1A					(8)		
F9.5-1B					(8)	(10)	
F9.5-2		(0)					(11)
F9.5-3		(0)					(11)
F9.5-4		(0)		(6)		(10)	
F9.5-5		(0)		(6)		(10)	
F9.5-6			(3)	(6)			
F9.5-7			(3)				
F9.5-8						(10)	
F9.5-9						(10)	

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GIBBSSAR: VOLUME 5

14-i		(0)		(2)				
14-ii		(0)						
14-iii				(2)				
14.1-1		(0)	(1)	(2)				
14.1-2		(0)		(2)				
T14-1	Sh. 1	(0)	(1)					
T14-1	Sh. 2	(0)		(2)				
T14-1	Sh. 3	(0)						
T14-1	Sh. 4	(0)						
T14-1	Sh. 5	(0)						
T14-1	Sh. 6	(0)	(1)					
T14-1	Sh. 7	(0)	(1)	(2)				
T14-1	Sh. 7a			(2)				
T14-1	Sh. 8	(0)		(2)				
T14-1	Sh. 9	(0)		(2)				
14.2-1		(0)						
14A-1				(2)				
14A-2				(2)				
F14A-1				(2)				
F14A-2				(2)				
F14A-3				(2)				
15-i		(0)						
15-ii		(0)						
15-iii		(0)						
15-iv		(0)						
15-v		(0)						
15-vi		(0)			(3)			
15-vii		(0)			(3)		(6)	
15-viia							(6)	
15-viii		(0)						
15-ix		(0)						
15-x		(0)		(2)			(6)	
15-xa							(6)	
15-xi		(0)		(2)				
15.1-1		(0)						
15.1-2		(0)						
15.1-3		(0)		(2)		(4)	(6)	
15.1-4		(0)	(1)			(4)	(6)	
T15.1-1	Sh. 1	(0)	(1)					
T15.1-1	Sh. 2	(0)	(1)			(4)	(6)	
T15.1-1	Sh. 3	(0)				(4)		
F15.1-1		(0)				(4)		
F15.1-2		(0)				(4)		
F15.1-3		(0)				(4)		
F15.1-4		(0)				(4)		
15.2-1		(0)	(1)					
15.2-2		(0)	(1)	(2)				
15.3-1		(0)						
15.4-1		(0)						

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15.4-2		(0) (6)
15.4-3		(0) (4)
15.4-4		(0) (6)
15.4-5		(0) (1) (4)
T15.4-1	Sh. 1	(0) (1) (4)
T15.4-1	Sh. 1a	(1)
T15.4-1	Sh. 2	(0) (1) (4)
T15.4-1	Sh. 3	(0) (4)
P15.4-1		(0) (4)
P15.4-2		(0) (4)
P15.4-3		(0) (4)
P15.4-4		(0) (4)
P15.4-5		(0) (4)
P15.4-6		(0) (4)
P15.4-7		(0) (4)
P15.4-8		(0) (4)
15.5-1		(0)
15.6-1		(0) (1)
15.6-2		(0) (1) (2)
15.6-3		(0)
15.6-4		(0) (2) (4)
15.6-5		(0) (1) (4) (6)
15.6-6		(0)
15.6-7		(0) (3)
15.6-7a		(3)
15.6-8		(0) (3)
15.6-8a		(3)
15.6-9		(0) (3)
15.6-10		(0)
15.6-11		(0) (2) (3) (6)
15.6-11a		(2) (3)
15.6-12		(0) (2) (3)
15.6-13		(0) (1) (2) (3)
15.6-13a		(6)
15.6-14		(0) (1) (3) (6)
T15.6-1	Sh. 1	(0) (1) (4)
T15.6-1	Sh. 2	(0) (4)
T15.6-1	Sh. 3	(0)
T15.6-2		(0) (3)
T15.6-3		(0) (3-deleted)
T15.6-4	Sh. 1	(0) (3)
T15.6-4	Sh. 2	(0) (3)
T15.6-4	Sh. 2a	(3)
T15.6-4	Sh. 2b	(3)
T15.6-5		(0)
T15.6-6		(0)
T15.6-7		(0) (3)
T15.6-8		(6)
T15.6-9		(6)

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P15.6-1		(0)			(4)		
P15.6-2		(0)			(4)		
P15.6-3		(0)			(4)		
P15.6-4		(0)			(4)		
P15.6-5		(0)		(3)			
P15.6-6		(0)		(3)			
P15.6-7		(0)		(3)		(6)	
P15.6-8		(0)		(3)		(6)	
P15.6-9		(0)		(3)		(6)	
P15.6-10		(0)		(3)		(6)	
P15.6-11		(0)		(3)			
P15.6-12		(0)		(3)		(6)	
P15.6-13		(0)		(3)		(6)	
P15.6-14		(0)		(3)		(6)	
P15.6-15		(0)		(3)			
P15.6-16		(0)		(3)			
P15.6-17		(0)		(3)		(6)	
P15.6-18		(0)		(3)		(6)	
P15.6-19						(6)	
P15.6-20						(6)	
15.7-1		(0)	(2)				
15.7-2		(0)					
15.7-3		(0)	(2)				
15.7-4		(0)	(2)			(6)	
15.7-4a			(2)			(6)	
15.7-4b						(6)	
15.7-4c						(6)	
15.7-5		(0)				(6)	
15.7-6		(0)	(2)				
T15.7-1	Sh. 1	(0)					
T15.7-1	Sh. 2	(0)					
T15.7-2		(0)	(2)				
T15.7-3	Sh. 1	(0)	(2)				
T15.7-3	Sh. 2		(2)	(3)			
T15.7-4	Sh. 1		(2)				
T15.7-4	Sh. 2		(2)				
T15.7-4	Sh. 3		(2)				
T15.7-5			(2)				(7)
P15.7-1		(0)	(2)			(6)	
P15.7-2		(0)	(2)			(6)	
P15.7-3		(0)	(2)				
P15.7-4		(0)	(2)				
P15.7-5		(0)	(2)			(6)	
P15.7-6		(0)	(2)			(6)	
P15.7-7		(0)	(2)				(7)
P15.7-8		(0)	(2)				(7)
P15.7-9			(2)			(6)	(7)
P15.7-10			(2)			(6)	(7)
15.8-1		(0)					

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15.A-1			(3)
15.A-2			(3)
15.A-3			(3) (4)
15.A-4			(3) (4) (6)
15.A-5			(3) (6) (7)
T15.A-1	Sh. 1		(3)
T15.A-1	Sh. 2		(3)
i		(0) (1)	
ii		(0) (1)	
iii		(0) (1)	
iv		(0) (1)	
v		(0) (1)	
vi		(0) (1)	
vii-A		(0) (1)	
viii		(0) (1)	
ix		(0) (1)	
x		(0) (1)	
xi		(0) (1)	
xii		(0) (1)	
xiii-A		(0) (1)	
xiv		(0) (1)	
xv		(0) (1)	
xvi		(0) (1)	
xvii		(0) (1)	
xviii		(0) (1)	
0-1		(0)	
0-2		(0)	
1-1		(0)	
1-2		(0)	
1-3		(0)	
1-4		(0)	
1-5		(0)	
1-6		(0)	
1-7		(0)	
1-8		(0)	
2-1		(0)	
B2-1		(0)	
3/4 0-1		(0)	
3/4 1-1		(0)	
3/4 2-1		(0)	
3/4 3-1		(0)	
3/4 3-2		(0)	
3/4 3-3		(0)	
3/4 3-4	(T3.3-6)	(0) (1)	
3/4 3-5	(T3.3-6 cont)	(0) (1)	
3/4 3-6	(T4.3-3)	(0)	
3/4 3-7		(0) (1)	
3/4 3-8		(0)	
3/4 3-9	(T3.3-7)	(0)	

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3/4 3-10	(T4.3-4)	(0)
3/4 3-11		(0)
3/4 3-12		(0)
3/4 3-13	(T3.3-9)	(0)
3/4 3-14	(T4.3-6)	(0)
3/4 3-15		(0)
3/4 4-1		(0)
3/4 4-2		(0)
3/4 4-3		(0)
3/4 4-4		(0)
3/4 4-5		(0)
3/4 4-6		(0)
3/4 4-7		(0)
3/4 4-8		(0)
3/4 4-9		(0)
3/4 4-10		(0)
3/4 4-11		(0)
3/4 4-12	(T4.4-2)	(0)
3/4 4-13		(0)
3/4 4-14		(0)
3/4 4-15		(0)
3/4 4-16		(0)
3/4 4-17		(0)
3/4 5-1		(0)
3/4 5-2		(0)
3/4 5-3		(0)
3/4 5-4		(0)
3/4 5-5		(0)
3/4 5-6		(0)
3/4 6-1A		(0)
3/4 6-2A		(0)
3/4 6-3A		(0)
3/4 6-4A		(0)
3/4 6-5A		(0)
3/4 6-6A		(0)
3/4 6-7A		(0)
3/4 6-8A		(0)
3/4 6-9A		(0)
3/4 6-10A		(0)
3/4 6-11A		(0)
3/4 6-12A		(0)
3/4 6-13A		(0)
3/4 6-14A		(0)
3/4 6-15A		(0)
3/4 6-16A		(0)
3/4 6-17A	(T3.6-1)	(0) (1)
3/4 6-18A	(T3.6-1 cont)	(0) (1)
3/4 6-19A	(T3.6-1 cont)	(0) (1)
3/4 6-20A	(T3.6-1 cont)	(0) (1)

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3/4 6-21A	(T3.6-1 cont)	(0) (1)		
3/4 6-22A	(T3.6-1 cont)	(0)		
3/4 6-23A	(T3.6-1 cont)	(0)		
3/4 6-24A	(T3.6-1 cont)	(0) (1)		
3/4 6-25A	(T3.6-1 cont)	(0) (1)		
3/4 6-26A		(0)		
3/4 6-27A		(0)		
3/4 6-28A		(0)		
3/4 6-29A		(0)		
3/4 6-30A		(0)		
3/4 6-1B		(0)		
3/4 6-1C		(0)		
3/4 6-1D		(0)		
3/4 7-1		(0)		
3/4 7-2	(T3.7-1)	(0)		
3/4 7-3	(T3.7-2)	(0)		
3/4 7-4	(T4.7-1)	(0)		
3/4 7-5		(0)		
3/4 7-6		(0)		
3/4 7-7		(0)		
3/4 7-8		(0)		
3/4 7-9	(T4.7-2)	(0)		
3/4 7-10		(0)		
3/4 7-11		(0)		
3/4 7-12		(0)		
3/4 7-13		(0)		
3/4 7-14		(0)		
3/4 7-15		(0)		
3/4 7-16		(0)		
3/4 7-17		(0)		
3/4 7-18		(0)		
3/4 7-19		(0)		
3/4 7-20		(0)		
3/4 7-21		(0)		
3/4 7-22		(0)		
3/4 7-23		(0)		
3/4 7-24		(0)		
3/4 8-1		(0)	(10)	(15)
3/4 8-2		(0)	(10)	
3/4 8-3		(0)	(10)	
3/4 8-3a			(10)	
3/4 8-4		(0)	(10)	
3/4 8-4a			(10)	
3/4 8-4b			(10)	
3/4 8-4c			(10)	
3/4 8-5		(0)		(15)
3/4 8-6		(0)		
3/4 8-7		(0)		
3/4 8-8		(0)	(10)	

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3/4 8-8a		(10)
3/4 8-9	(0)	(10)
3/4 8-9a		(10)
3/4 8-10	(0)	(10)
3/4 8-11	(0)	
3/4 9-1	(0)	
3/4 9-2	(0)	
3/4 9-3	(0)	
3/4 9-4	(0)	
3/4 9-5	(0)	
3/4 9-6	(0)	
3/4 9-7	(0)	
3/4 9-8	(0)	
3/4 9-9	(0)	
3/4 9-10	(0) (1)	
3/4 9-11	(0)	
3/4 9-12	(0)	
3/4 9-13	(0)	
3/4 9-14	(0)	
3/4 10-1	(0)	
B3/4 0-1	(0)	
B3/4 0-2	(0)	
B3/4 1-1	(0)	
B3/4 2-1	(0)	
B3/4 3-1	(0)	
B3/4 3-2	(0)	
B3/4 3-3	(0)	
B3/4 4-1	(0) (1)	
B3/4 4-2	(0) (1)	
B3/4 4-3	(0) (1)	
B3/4 5-1	(0)	
B3/4 6-1A	(0)	
B3/4 6-2A	(0)	
B3/4 6-3A	(0)	
B3/4 6-4A	(0)	
B3/4 5-1	(0)	
B3/4 6-1B	(0)	
B3/4 6-1C	(0)	
B3/4 6-1D	(0)	
B3/4 7-1	(0)	
B3/4 7-2	(0)	
B3/4 7-3	(0)	
B3/4 7-4	(0)	
B3/4 7-5	(0)	
B3/4 8-1	(0)	
B3/4 9-1	(0)	
B3/4 9-2	(0)	
B3/4 10-1	(0)	

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5-2	(0)
5-3	(0)
6-1	(0)
17i	(0)
17.1-1	(0)
17.2-1	(0)

TABLE 18.0-1
NRC QUESTION STATUS

Question Number	response Transmitted via Amendment
005.1	6
005.2	6
005.3	6
005.4	6
005.5	This question to be withdrawn per meeting with NRC on 11-07-78
010.1	2
010.2	2
010.3	2
010.4	2
010.5	2
010.6	2
010.7	2
010.8	2
010.9	2
010.10	2
010.11	2
010.12	2
010.13	6
010.13A	8
010.14	6
010.15	6
010.16	8
010.17	6
010.18	6
010.19	6, 10
010.20	6
010.21	6
010.22	6
010.23	6
010.24	6
010.25	6
010.26	6
010.27	6
010.28	6
010.29	6
010.30	6
010.31	6, 10
010.32	6
010.33	6
010.34	7

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TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	Response Transmitted via Amendment
010.35	6
010.36	6
010.37	6
010.38	6
010.39	none received
010.40	6
010.41	6
010.42	none received
010.43	6
010.44	6
010.45	6
010.46	6
010.47	6
010.48	6
010.49	6
010.50	6
010.51	6
010.52	6
010.53	6
010.54	6
010.55	6
010.56	6
010.57	6
010.58	6
010.59	7
010.60	6
010.61	6
010.62	6
010.63	6
010.64	8
010.65	6
010.66	7
010.67	6
010.68	6
010.69	6
010.70	6
010.71	6
010.72	6
010.73	6
010.74	6
010.75	6
010.76	none received
010.77	none received

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	Response Transmitted via Amendment
010.78	10
010.79	10
010.80	10
010.81	10
010.82	10
010.83	10
010.84	10
010.85	10
010.86	10
010.87	10
010.88	14
010.89	11
010.90	15
010.91	10
010.92	10
010.93	10
010.94	10
010.95	10
010.96	10
010.97	10
010.98	10
010.99	10
010.100	10
010.101	10
010.102	14
010.103	10
022.1	2
022.2	8
022.3	2
022.4	2
022.5	2, 6
022.6	6
022.7	7
022.8	6
022.9	8
022.10	6
022.11	6
022.12	6
022.13	6
022.14	6
022.15	6
022.16	6
022.17	6

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	response Transmitted via Amendment
022.18	6
022.19	6
022.20	6
022.21	6
022.22	6
022.23	7
032.1	2
032.2	2
032.3	2
032.4	2
032.5	2
032.6	2
032.7	2
032.08	13
032.09	13
032.10	13
032.11	none received
032.12	13
032.13	13
032.14	13
032.15	14
032.16	13
032.17	13
032.18	13
032.19	13
032.20	13
032.21	13
032.22	13
032.23	13
032.24	13
032.25	13
032.26	13
032.27	14
032.28	13
032.29	13
032.30	13
032.31	13
032.32	13
040.1	10
040.2	14
040.3	10
040.4	10
040.5	10

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	Response Transmitted via Amendment
040.6	10
040.7	10
040.8	10,15
040.9	10
040.10	10
040.11	10
040.12	10
040.13	10
040.14	10
040.15	10
040.16	10
040.17	10
040.18	10
040.19	10
040.20	10,15
040.21	10
040.22	10
040.23	10
040.24	10
040.25	10
040.26	10
040.27	10
040.28	10
040.29	10
040.30	11
040.31	10,15
040.32	12
040.33	10
040.34	10
040.35	11
040.36	11
040.37	11
040.38	10
040.39	10
040.40	11
040.41	11
040.42	11
040.43	11
040.44	11
040.45	11
040.46	10
040.47	10
040.48	10

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	response Transmitted via Amendment
040.49	10
040.50	10
040.51	12
040.52	10
040.53	10
040.54	10
040.55	10
040.56	10
040.57	10
040.58	10
040.59	10
040.60	10
040.61	10
040.62	10
040.63	10
040.64	10
040.65	10
040.66	10
040.67	11
040.68	11
040.69	10
040.70	11
040.71	10
040.72	11
040.73	10
040.74	11
040.75	11
040.76	15
040.77	15
040.78	15
040.79	15
040.80	15
040.81	15
040.82	15
040.83	15
040.84	15
040.85	15
111.1	2
111.2	2
111.3	2
111.4	2
111.5	4
111.6	4

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	response Transmitted via Amendment
111.7	2
111.8	2
111.9	2
111.10	2
111.11	2
111.12	2
111.13	2
111.14	2
111.15	2
111.16	2
111.17	2
111.18	2
111.19	4
111.20	4, 7, 11
111.21	5
111.22	2
111.23	2
111.24	2, 4
111.25	4
111.26	2
111.27	2
111.28	2
111.29	4
111.30	4
111.31	4
111.32	4
111.33	4
111.34	4
111.35	4
111.36	4
111.37	4
111.38	4
111.39	4
111.40	7
111.41	7
111.42	7
111.43	8, 11
111.44	7
111.45	7
111.46	7
111.47	7
111.48	7
111.49	7

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	response Transmitted via Amendment
111.50	7
111.51	7
111.52	7
111.53	7
111.54	7
111.55	9
111.56	9
121.1	2
121.2	2
121.3	5
121.4	5
121.5	5
122.1	4
122.2	4
122.3	5
122.4	4
122.5	4
122.6	5
122.7	9
122.8	9
122.9	9
122.10	9
122.11	9
131.1	2
131.2	4
131.3	2
General Comments A	6
General Comments B	5
131.1	5
131.2	5
131.3	5
131.4	5
131.5	5
131.6	5
131.7	5
131.8	5
131.9	5
131.10	6
131.11	6
131.12	5
131.13	5
131.14	5
131.15	5

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TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	Response Transmitted via Amendment
131.16	5
131.17	5
131.18	5
131.19	5
131.20	5
131.21	5
131.22	5
131.23	5
131.24	5
131.25	5
131.26	5
131.27	5
131.28	5
131.29	5
131.30	5
131.31	5
131.32	6
131.33	5
131.34	6
131.35	5
131.36	5
131.37	7
131.38	5
131.39	5
131.40	5
131.41	5
131.42	5
131.43	5
131.44	5
131.45	5
131.46	5
131.47	5
131.48	5
131.49	5
131.50	5
131.51	5
131.52	8
131.53	5
131.54	5
131.55	5
131.56	8
131.57	8
131.58	8

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	response Transmitted via Amendment
131.59	8
131.60	8
131.61	8
131.62	8
131.63	15
131.64	8
131.65	8
131.66	8
131.67	8
131.68	8
131.69	8
131.70	8
131.71	8
131.72	8
131.73	8
131.74	8
131.75	8
131.76	8
212.1	4
212.2	5
212.3	5
212.4	5
212.5	4
212.6	5
212.7	5
212.8	4
212.9	4
212.10	4 and 5
212.11	5
212.12	5
212.13	4
212.14	5
212.15	4
212.16	4 and 5
212.17	4
212.18	4
212.19	5
212.20	4
212.21	4
212.22	5
212.23	5
212.24	5
212.25	5 and 7

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	Response Transmitted via Amendment
212.26	4
212.27	4
212.28	4
212.29	7
212.30	7
212.31	7
212.32	7
212.33	7
212.34	7
212.35	8
212.36	7
212.37	7
212.38	7
221.1	7
222.1	8
222.2	8
222.3	8
222.4	response to be submitted upon completion of analysis
222.5	8
222.6	8
311.1	2
311.2	2
311.3	2
311.4	2
311.5	2
311.6	2
311.7	2
311.8	2
311.9	3
311.10	3
311.1	6
311.2	7
311.3	5
311.4	5
311.5	6
311.6	5
311.7	5
311.8	6
311.19	8
311.20	8
311.21	8

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	Response Transmitted via Amendment
320.1	2
320.2	2
321.1	6
321.2	6
321.3	6
321.4	6
321.5	6
321.6	6
321.7	6
321.8	6
321.9	6
321.10	6
321.11	6
321.12	6
321.13	6
321.14	6
321.15	6
321.16	8
321.17	8
321.18	8
321.19	8
321.20	8
321.21	8
321.22	8
321.23	8
321.24	8
321.25	8
331.1	2
331.2	2
331.3	2
331.4	2
331.5	2, 6
331.6	2
331.7	2
331.8	6
331.9	7
331.10	6
331.11	6
331.12	6
331.13	7
371.1	2
371.2	2
421.0	2

TABLE 18.0-1 (Continued)
NRC QUESTION STATUS

Question Number	Response Transmitted via Amendment
423.1	2
423.2	2
432.0	8