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Licensee: Georgia Power Company
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Facility Name: Hatch

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SUMMARY

Scope: This special, announced inspection was an Emergency Response Facility Appraisal. Areas examined during the appraisal included a review of selected procedures and representative records, the ERFs and related equipment, and interviews with licensee personnel. Select activities were observed during the 1987 annual exercise to ascertain the adequacy of the ERFs and related equipment.

Results: No violations or deviations were identified.

TABLE OF CONTENTS

1.0 Assessment of Radioactive Releases

1.1 Source Term

There were four normal release pathways at Hatch: the main stack, Unit 1 Reactor Building vent, Unit 2 Reactor Building vent, and the Recombiner Building vent. The main stack and the Reactor Building vents for Units 1 and 2 respectively, had both normal range and accident range (KAMAN) monitors. The Recombiner Building vent only had a normal range monitor since this pathway isolated on any accident of concern. The normal range monitors were scintillation detectors with two channels and a range of 10^1 to 10^6 cpm. Accident range monitors were GM detectors with one channel and a range of 5.0 E-2 to 1.0 E 5 µCi/cc.

Calibration factors had been generated for normal range monitors which would convert from a counts per second (cps) or counts per minute (cpm) monitor readout to a release rate in µCi/s using an appropriate vent or stack flow rate. Calibration factors were updated by procedure on a quarterly basis with updated graphs showing the relationship between monitor reading and release rate found in the Control Room. Accident range monitors readout in µCi/cc and could be converted to a release rate using an appropriate vent or stack flow rate.

The drywell wide range radiation monitor could be used to generate a source term. The monitor, located inside the drywell, was a sensitive ionization detector with two channels and a range of 1 to 10^7 R/h. Using the methodology from General Electric's core damage guidance (NEDO-22215), the drywell monitor reading could be related to percent core damage. The percent core damage could then be related to µCi/cc concentration of noble gases and radioiodines in the drywell based on the time after reactor shutdown. A source term (µCi/s) could then be generated assuming a leak rate of 1.2% per day (the Technical Specification maximum allowable leak rate) or by assuming the drywell to be vented at a given flow rate.

Containment (drywell) air sample analyses obtained using the post-accident sampling system (PASS) could be used to determine a release rate. The isotopic sample results could be converted to Xe-133 dose equivalent for noble gases and I-131 dose equivalent for radioiodines. Then a release rate could be calculated assuming a 1.2% leak rate or by assuming the drywell to vent at a given flow rate.

If all monitoring instrumentation used to generate a release source term were inoperable or offscale, a source

term could be generated by obtaining grab samples from or near the release points.

1.2 Dose Assessment

The licensee's primary dose assessment model, entitled "DOSE," was run on an IBM-AT, and was available for use in the EOF and the corporate office. The capabilities of DOSE and the operating instructions were found in Procedure 73EP-EIP-015-OS entitled, "Offsite Dose Assessment." DOSE calculates whole-body and child thyroid dose rates for both elevated and ground-level releases. The main stack releases were considered elevated and the vent releases (Reactor Building and Recombiner Building) were considered ground-level. Multiple source terms could be handled by this model (e.g. release from the main stack and the Reactor Building vent). Integrated doses were calculated for distances of 1, 2, 5, and 10 miles. Calculations could be updated every 15 minutes. Additionally, DOSE had the capability for calculating off center-line dose rates for specific offsite distances and center-line dose rates at distances other than 1, 2, 5, and 10 miles.

Source terms from the drywell wide range radiation monitors, chemistry samples (drywell air samples or grab samples from the release vents or the main stack), and effluent monitors could be entered into the model. A direct entry of Ci/s could also be handled by the model.

The computer code used for dose assessment in the EOF used a straight-line Gaussian model for estimating the transport and diffusion of radioactive material released to the atmosphere. This model satisfied the regulatory requirements and was appropriate for an initial assessment performed in the Control Room, but had limitations as a primary model for use in the EOF regarding tracking of radioactive material releases if the wind direction changes following the release.

In reviewing DOSE (Version IBM-2.02), it was also noted that the magnitude of the horizontal diffusion coefficient (sigma y) is limited to 1,000 m. The licensee did not provide the basis for this limitation. In addition, it was noted that the primary diffusion model in the code includes a meander correction term in calculations for ground-level releases. The manner in which the term was applied follows from Regulatory Guide 1.145. However, the Regulatory Guide assumes that the calculations are based on hourly average meteorological data. It is therefore inappropriate to apply the meander correction when diffusion computations

are based on short-term averages of data and are made at frequent intervals. Thus, the meander correction should not be applied to the 15-minute dose estimates. However, it is appropriate to continue to apply the correction to the 2-hour dose pr   tions. The licensee agreed to evaluate the limita   on the sigma y and the meander correction factor us...

DOSE estimates the distance to the location of the maximum dose for elevated releases using a relationship attributed to Turner's "Workbook of Atmospheric Dispersion Estimates." This relationship is based on a specific set of curves that describe vertical diffusion. The relationships used to evaluate vertical diffusion in DOSE are based on a different set of curves. As a result, the distances reported in the computer code output are not consistent with the actual model used to estimate doses. An additional computer code used for dose assessment in the EOF includes an optional diffusion model for elevated releases called a fumigation model that is taken from NRC Regulatory Guide 1.145. The inspector discussed with licensee representatives the guidance provided in 73EP-EIP-015-OS (Page 9) regarding the use of the cooling tower plume to determine when to use the fumigation model. Since the physical process that causes fumigation is entirely different from the processes that cause downwash of the cooling tower plume, the licensee agreed to evaluate this use in the procedure.

Both the primary and backup meteorological systems included modules that compute the standard deviation of the wind direction (Sigma Theta). This information was recorded on strip charts in the Control Room and EOF. The inspector discussed with licensee representatives the fact that sigma theta was a better predictor of horizontal diffusion than Delta T. The licensee agreed to consider sigma theta for estimating horizontal diffusion coefficients in the dose assessment model. The inspector noted that Regulatory Guide 1.23 provides a means of converting sigma theta to stability class, and that delta T could continue to be the basis for estimating vertical diffusion coefficients.

Meteorological and source term data were manually entered into the dose assessment procedure. Meteorological data could be obtained from strip charts or the SPDS terminals in the EOF, or from the Control Room via phone communications. Similarly, effluent monitor readings and flow rate readings could be obtained from the SPDS terminals in the EOF or from the Control Room via phone communications. Current calibration factors for converting

normal range effluent monitor readings from cps to μCi/cc were obtained from the Control Room.

The inspector observed that the procedure used to obtain meteorological data for use in dose assessment was subject to error and bias. Meteorological data used for dose assessment in the EOF was obtained from the Control Room. In the Control Room, the meteorological data were manually estimated from strip charts containing instantaneous measurements. Meteorological data was also available from the SPDS. However, the meteorological data displayed on the SPDS was not averaged; the SPDS data reflected instantaneous variations as they occurred in the atmosphere. Consequently, the SPDS data was inappropriate for use in dose assessment. On January 20, 1988, members of the Region II Emergency Preparedness staff discussed with the licensee's Site Emergency Preparedness Coordinator the current method for obtaining meteorological data used in dose assessment. The licensee was informed that the current method of obtaining meteorological data for dose assessment presented several probable sources of error. The licensee agreed to conduct an evaluation to determine if a more reliable and less subjective procedure was necessary to ensure that meteorological data was being compiled and computed in accordance with RG 1.23.

DOSE must consider a certain mix of radionuclides when entering release rate information in Ci/s determined from effluent monitoring readings. The whole-body dose rates were calculated using a fixed mixture of noble gas radionuclides that represent an average mixture for two hours after reactor shutdown. No consideration was given to the change of this mixture beyond two hours after shutdown. The inspector noted that by not considering this mixture of noble gases to change, the offsite whole-body dose rates could be overestimated. Calculations using IRDAM indicated that whole-body dose rates could be approximately a factor of 10 greater for a unit release of noble gases immediately following shutdown compared to a unit release of noble gases 24 hours after shutdown.

Child thyroid dose calculations with DOSE used the I-131 dose conversion factor from Regulatory Guide 1.109, thereby assuming all the radioiodine activity to be I-131. The inspector noted that similar to the discussion above regarding noble gas nuclide mixtures, the mixture of radioiodine nuclides would also vary with time after reactor shutdown. Considering all the radioiodines to be I-131 would overestimate the child thyroid dose during the first 24 hours after reactor shutdown. Calculations using IRDAM showed that the child thyroid dose could be

approximately a factor of 5 greater for a unit release of I-131 compared to a unit release of a "0-hour after shutdown mix" of radioiodines.

DOSE had an option entitled "chemistry samples" which allows the input of individual radionuclide concentrations. These concentrations were converted into dose equivalent Xe-133 and dose equivalent I-131 values by the model for calculation purposes. DOSE only allowed the input of noble gas and radioiodine nuclides. The licensee agreed to consider improving the model to allow evaluation of additional fission products such as Cs-134 and Cs-137.

Backup dose calculations would be performed in the Corporate Office using DOSE. If the EOF must be evacuated, the dose assessment responsibility would be transferred to the Corporate Office until the Alternate EOF was activated. Manual calculations could be performed in the EOF as a backup method using the verification tables in Procedure 73EP-EIP-015-OS (Offsite Dose Assessment). During the exercise, the inspector noted that dose assessment personnel in the EOF used the manual, labor-intensive method to verify DOSE results. The inspector discussed with the licensee the use of the DOSE results in the EOF to compare with those being done simultaneously in the Corporate Office, since the manual calculations using the verification tables could be more subject to error.

Procedure 63EP-EIP-053-OS (Prompt Offsite Dose Assessment) was used to perform the initial dose assessment required for decisionmaking in the Control Room and the TSC. The procedure provides for a manual method that calculated site boundary whole-body dose rates, assuming worst case meteorological conditions. The method could be used for making initial assessment from any of the four release pathways (main stack, Unit 1 Reactor Building vent, Unit 2 Reactor Building vent, and Recombiner Building). The procedure contained nomograms relating effluent monitor readings to site boundary dose rates. During the exercise observation, the inspector noted that a Control Room player had difficulty in reading the graphs. The licensee agreed to consider providing enlarged versions of these graphs in the Control Room and TSC.

Based on the above review, the licensee agreed to evaluate the following:

- Review the primary dose assessment code (DOSE) to assure that its use of atmospheric transport and diffusion models is appropriate, that corrections are

made for radioactive decay and radionuclide mix after reactor shutdown, and that it can adequately track the release during changes in wind direction (50-321, 366/87-32-01).

- Review the meteorological equipment and procedures used for the collection of meteorological data used in dose assessment to assure it is in accordance with RG 1.23 (50-321, 366/87-32-02).

The following items should be considered by the licensee for improvement:

- Use of Sigma Theta to estimate stability class rather than Delta T.
- Inclusion of additional fission products to the "chemistry samples" option of "DOSE" which presently allow entry of only noble gas and radioiodine nuclides.
- Elimination of the use of hand calculations in the EOF to verify "DOSE" results. Comparison of results with Corporate Office personnel conducting parallel calculations using "DOSE."
- Providing the Control Room with enlarged versions of prompt dose assessment normograms relating effluent monitor readings to site boundary dose rates.

2.0 Meteorological Information

Onsite meteorological data is provided by primary and backup meteorological systems. The primary system includes the following measurements: wind at 10, 60 and 100 m; temperature differences between 10 and 100 m, and 10 and 60 m; temperature at 10 m; and dew point at 10 m. In addition, precipitation is measured near the primary meteorological tower. Meteorological measurements made by the backup system include wind at the 23 m level and temperature difference between the 10 and 45 m levels. No problems related to instrument specifications, installation or exposure were noted. The inspector discussed with the licensee the fact that there could be problems in the future if trees surrounding the towers are allowed to grow without restriction.

Signals from the meteorological instruments go to instrument sheds located near the bases of the towers, where they would be conditioned and displayed. The signals would then be transmitted from the shed to the Control Room and EOF. Although the sheds are not within tightly controlled areas, they were within the plant fence. The instruments and towers were protected from lightning, and the sheds

appeared to have adequate environmental control to permit the instrumentation to operate reliably. Instrument electrical power was obtained from an uninterruptable power supply.

Plant procedures provided for daily inspections, quarterly functional checks, and semi-annual calibrations of the meteorological instrument systems. Records indicated that there have been some reliability problems with individual instruments. However, as a result of the redundancies in the systems, the availability of onsite meteorological data had been maintained at an acceptable level.

Meteorological data were available in the Control Room from strip chart recorders and via the SPDS. To obtain meteorological data appropriate for use in dose assessment, average wind directions, speeds and stabilities had to be estimated from the strip chart recorders. As a result, biases and errors in the estimation of average meteorological conditions were possible as discussed above in Paragraph 1. It was noted that several of the recorders for wind data were adjusted so that the wind speed zero was off-scale on the low side. This data could subsequently result in a source of potential error in the data used in dose assessment. The meteorological data presented by the SPDS was not a 15 minute average. The data reflected the second-to-second variations that were common in the atmosphere. As a result, the SPDS meteorological data were not appropriate for use in dose assessment.

Meteorological data for use in dose assessment were passed to the EOF from the Control Room and posted on a status board. Meteorological data were also available directly from the primary and backup towers. The data were recorded on strip charts. The inspector discussed with the licensee the fact that the strip chart in the EOF containing the temperature differences was difficult to read due to the location. The area was dimly lit. In addition, the range of the temperature difference recorder was too wide to permit easy determination of the differences required to resolve stability Classes B and C.

Fifteen minute averaged meteorological data were available in the EOF from the AutoData 10 data logger. However, 73EP-EIP-015-OS did not list the AutoData 10 as a source of meteorological data. The only sources listed were the status board containing data from the Control Room and the General Office Operations Center in Atlanta (which did not provide averaged, onsite meteorological data). The inspector discussed with the licensee that the algorithm used by the AutoData 10 to average wind directions was incorrect, in that the algorithm produced an arithmetic average that could be in error by as much as 180 degrees under rather common wind direction combinations.

Based on the above review, and as discussed in Paragraph 1, above (although the licensee's meteorological system complies with RG 1.97), relevant recording systems and procedures for obtaining meteorological data used in dose assessment might not provide

reliable 15 minute averages of meteorological data. The inspector discussed the above issues with licensee representatives who agreed to consider the following:

- Evaluation of the algorithm used by the AutoData 10 to compute average wind directions for accuracy.
- Relocation, or improvement of the lighting for the EOF meteorological strip charts used to record Delta T and Sigma Theta.
- Verification that the zero adjustment setting for the wind speed recorders are on scale.

3.0 Technical Support Center

The Technical Support Center (TSC) was located in the Service Building Annex, approximately two minutes walk from the main Control Room. The total size of the TSC was over 1,800 square feet of space.

3.1 Regulatory Guide 1.97 Variables Availability

Regulatory Guide 1.97 variables were provided in the TSC via the Emergency Response Data System (ERDS). Two components of ERDS, the Safety Parameter Display System (SPDS) and Emergency Response Facility Display System (ERFDS), provided the TSC Managers with information required for performance of their emergency response functions. Units 1 and 2 shared a common ERDS console in the TSC.

The inspector reviewed a Safety Evaluation Report (SER) provided by the licensee to demonstrate conformance with RG 1.97 requirements. According to documentation, Georgia Power Company received a final, satisfactory SER from NRC on the implementation of RG 1.97 on July 30, 1985. The only missing thermal-hydraulic or radiological parameter of interest in the ERFs from the ERDS was the Unit 1 Recombiner Building vent radiation monitor; however, this parameter alarms in the TSC on the analog annunciator panel. The Recombiner Building vent would isolate on any accident of concern and the value would be available by telephone. Since 1985, several additional parameters were added to the ERDS system, including meteorological parameters and drywell sump level. No problems were observed regarding the availability of parameters on the ERDS computer system. The ERDS system was scheduled for daily surveillance testing to insure reliability of data transmission.

The primary means of obtaining RG 1.97 variables was via the ERDS system. In addition to the parameters available electronically on the ERDS system, during activation of the emergency plan, three dedicated data-oriented telephone Communicator/Recorder personnel were stationed in the TSC with status boards. These personnel were in communication with personnel in the Control Room and other locations, and continuously recorded plant status, radiological parameters, and key thermal-hydraulic parameters on large status boards. The status boards provided a rough trending capability, using 15 minute data updates, to supplement the trending capabilities of the ERDS.

In addition to the ERDS and status boards discussed above, the TSC had an analog status wall consisting of an annunciator panel and a Nuclear Steam Supply System (NSSS) mimic for each reactor unit. The annunciator panels contained repeater annunciators for selected annunciators located in the Control Room. The NSSS mimics (data acquisition panels) contained pump and valve indicators for the primary emergency and normal core cooling/recirculation systems (e.g. HPCI, RCIC, RHR), safety relief valves, main steam isolation valves, etc.

Based on the above review and written procedures, the RG 1.97 variable availability was determined to be adequate.

3.2 TSC Functional Capabilities

The following areas of power continuity were considered in evaluating the ability of the TSC to function during a station blackout without interruption: TSC data acquisition systems, communications equipment, lighting, and the ventilation system (HVAC).

Non-instrument loads (e.g. ventilation) in the TSC were powered from the following diverse sources:

- 4 KV Bus 1F and 2F (Class 1E)
- Unit 1 and 2 Offsite 115 KV Power
- Essential Diesel B

Lighting and instrument loads (e.g. lights, ERDS Computer System) were powered from the following diverse sources:

- Security diesel
- Normal plant 600 V station service
- Battery backed uninterruptable power supply (UPS)

Therefore, all TSC equipment, lighting, and ventilation systems were supplied by reliable, redundant power. The inspector noted that some distribution panel switches in the TSC mechanical equipment room were poorly labeled or mis-labeled. The licensee, when informed of this matter, provided documentation to indicate that a plant-wide distribution panel labeling program was reviewed by the Plant Safety Review Board, and would be implemented upon approval by the appropriate authorities. This program should correct the problems noted in the TSC.

Several systems were available to support the TSC in the performance of emergency functions. Plant system status was available on the ERDS (SPDS, ERFDS), the annunciator panels, NSSS mimics, and status boards. The SPDS portion of ERDS had considerable trending capability for parameters associated with the primary displays. The ERDS stored two hours of historical data on disk for rapid access and trending back in time. The standard ERDS trend plots were selectable to either six or sixty minutes of historical data. Trends were also maintained by listing the most recent 4 sets of 15 minute data updates on the TSC manual status boards.

Emergency Plan Implementing Procedure 63EP-RCL-005-OS (Determination of the Extent of Core Damage Under Accident conditions) described a procedure for determining the extent of core damage as a function of the drywell radiation monitor under accident conditions, based on the General Electric NEDOs. Pre-calculated relationships for the following were contained:

- Coolant radionuclide concentration to core damage
- Containment radiation levels to core damage
- Drywell hydrogen concentration versus core damage and percent metal-water reaction
- Containment airborne radioactivity concentration to core damage

The inspector further noted that the SPDS/ERFDS thermal-hydraulic alarm setpoints were closely related to both Technical Specification limits and Emergency Action Level (EAL Procedure 73EP-EIP-001-OS) trigger points. While SPDS/ERFDS radiological trigger points were not generally programmed with setpoints, the TSC annunciator panel contained alarms which were anticipatory to, or the same as the EAL radiological trigger points. Radiological parameters alarmed on the TSC annunciator panels included Reactor Building vents, main stack, containment high range dome monitor, Unit 1 Recombiner Building vent, main steam line monitors, and offgas pre-treatment.

Based on the above review, the area of the TSC functional capability was determined to be adequate.

3.3 TSC Habitability

The TSC Ventilation System operated satisfactorily to pressurize the TSC via a filter train consisting of series components in the following order: prefilter - heater - HEPA - charcoal - charcoal - HEPA. This arrangement for the emergency ventilation system was consistent with the recommendations in RG 1.52. The emergency ventilation train was aligned upstream of and in series with the normal ventilation train, thereby minimizing the chance of bypass flow during emergency operation. During system operation, the differential pressure across all filters was satisfactory. A radiation monitor was installed at the combined normal/emergency suction louver to the outside atmosphere which automatically initiated the system upon sensing increased radiation levels. The system was observed to pressurize the TSC to approximately .09 inches wg during the emergency exercise. The low differential pressure (DP) alarm was set at about 0.1 inches wg. This resulted in frequent low DP alarms. The inspector discussed with licensee representatives that it appeared that the 0.09 inches wg of DP was satisfactory to pressurize the facility and they needed to either lower the setpoint or take actions to improve the sealing of the TSC to eliminate the spurious low DP alarms. The inspector also noted that the charcoal adsorber sample laboratory test conditions were not specified in Procedure 425V-X75-001-1 (Testing of TSC Filter Train by Vendor, Revision 1, October 22, 1985). The licensee representative agreed to evaluate these issues.

Based on the above review, TSC habitability appeared to be adequate.

Based on the above, licensee representatives agreed to evaluate the following:

- Elimination of spurious TSC HVAC low DP alarms by lowering alarm setpoint or improving the facility sealing

- Inclusion of the laboratory test condition requirements to the TSC charcoal vendor test procedure.

3.4 TSC Data Collection, Storage, Analysis and Display

Real-time data acquisition, storage, and display were performed by two separate computer systems for Hatch Units 1 and 2, namely: (1) a Safety Parameter Display System; and (2) an Emergency Response Facility Display System. The computers, signal generators, and graphics display devices were military standard units. The SPDS consisted of 1 ROLM MSE/14 computer, 1 OTI graphic display system, and a fiber optic communications link. The configuration of the ERFDS included 1 ROLM MSE/14 computer system, 1 Ramtek graphics display generator, 2 Ramtek graphics display CRTs (GM-850's) in the TSC and 2 GM-850's in the EOF, a magnetic tape system, and a fiber optic communications link.

The following table shows the sensor distributions for Hatch Units 1 and 2.

Unit #	SPDS Analog Sensors	ERFDS Analog Sensors	ERFDS Digital Sensors	Total Sensors
1	81	110	698	889
2	87	113	704	904

Sensor information was collected from Foxboro analog, Validlyne analog, and Cutler Hammer Digital intelligent front ends. With the use of a fiber optic link and ROLM 3552 transducers, sensor information gathered by either the SPDS or the ERFDS was routinely passed to the other at 5 megabits/second. This data was written to shared memory in each computer system so that immediate access to all sensors monitored by both systems was available for processing. Failure of either the SPDS or the ERFDS would cause only part of the safety parameter data to be available at the ERF display CRTs.

SPDS and ERFDS systems were configured with ROLM 4050/5042 8" hard disks. Every second, complete sensor sample sets were collected, analyzed, stored to hard disk, and displayed to the ERF CRTs.

In the TSC, there were two graphic display CRTs (cathode ray tubes) controlled by Ramtek-9400M/I graphics generators (located in the Control Room), Ramtek GM-850 display CRTs were driven by RGB (red-green-blue) video signals transmitted from the Ramtek graphics generator at 10 MHZ (megaherz). Users could select the Hatch Unit desired and display safety parameters or parameter sets of interest.

On request an RGB encoder translated the video signal into a faster format to produce a black and white hard copy.

Graphics displays were updated by the SPDS/ERFDS computer systems every 1 to 10 seconds depending on the priority of the graphics display task in use. Users could select critical parameter displays using function keys and a screen menu. Displays that the user could select included the following:

- Primary
- Trend
- Diagnostic
- Emergency
- Log in/Log out

Typical displays included a graphical representation of a plant system with real-time updated parameters. In several cases, trend graphs of safety parameters could be shown on the display to provide additional information about how these critical parameters were changing.

A user's manual defining operation and use of the display system was reviewed. The manual provided adequate instructions and examples of typical safety parameter displays. The function key/menu system was user-friendly and systems' functions could be easily learned.

Unit 1 SPDS and ERFDS computers read, analyzed, and stored to hard disk 889 analog and digital sensors every second. Unit 2 SPDS/ERFDS computers read, analyzed, and stored to hard disk 904 analog and digital sensors every second. The SPDSs were dedicated systems and were not used to support other data processing tasks. The ERFDSs were also dedicated systems; however, they did read meteorological data from the MDCS and produced a meteorological display on request. Licensee representatives reported that load testing, such as requesting displays concurrently on all available display terminals, produced no observed system degradation.

Class 1E optical isolators had been used to isolate the SPDS from the signal source. Also, the ERFDS was reported to be isolated from Class 1E plant systems through suitable means. Validation and verification (V&V) performed independently by Bechtel, Gaithersburg indicated that no evidence of signal degradation, interference, or damage was observed (documentation entitled "Emergency Response Data Systems Units 1 and 2 Validation Report," by H. S. Kassel, Jr. Project Engineer and L. D. Wechsler, both of Bechtel Eastern Power Corporation, July 1986).

The data communications components of the SPDS and the ERFDS were adequate to support data acquisition, analysis, display, and storage for TSC requirements. As mentioned earlier, the SPDS and the ERFDS shared data via a 5 megabit/second fiber optic CPU to CPU link. Error checking devices were installed to insure correct data transmissions. CRT displays in the TSC were updated through the use of RGB balanced line cabling at a rate of 45 megahertz. Time resolution for data communications was adequate.

The SPDS and the ERFDS were dedicated systems designed to support plant safety monitoring and reporting needs. Utility personnel interviewed reported that running all display monitors concurrently caused no observable system degradation. The ROLM computers were multi-tasking units that were programmed to acquire, analyze, and store data on a first priority approach. The SPDS primary display showing real-time critical reactor parameters also executed at highest priority. Other displays and functions were handled at lower priorities. The way that software tasks were scheduled allowed the SPDS and ERFDS systems to complete critical tasks without degrading the systems.

Data storage was functionally implemented to meet NUREG-0696 requirements. Interviewees reported that at any time, three hours of historical data were available to provide trending information on critical plant parameters. On demand, or on a reactor "SCRAM," plant parameter data would be continuously stored on a magnetic tape. This data would continue to be stored until the tape storage process was manually halted or until another tape was mounted. Tapes would fill to capacity every 14 hours and require changing. Data storage capability could continue indefinitely as long as it was needed. Currently if a computer failed and needed restarting ("rebooting"), historical data filed on the computer disks would be lost. If this occurs, data storage requirements would not be met. The utility was in the process of correcting this software problem (Software Modification Request (SMR) No. 45).

The V&V report by Bechtel Eastern Corporation was discussed above. In addition, the inspector reviewed the model descriptions in the Utility Functional Specification. On reviewing model descriptions in the Utility Functional Specification, an error was discovered in the "rate" algorithm documentation. The error was reported to the licensee, and later during the ERF appraisal, the Functional Specification document was updated with a new hand written "rate" algorithm (Page 3.1 of the Functional Specification).

Utility contacts reported that SPDS analog sensors were redundantly sampled. The following describes how two independent values for each safety parameter were handled:

- If both sensor values were within pre-established limits, their average was displayed using a green background

- If only one value was outside specified limits, the other was displayed using a yellow background

- If both sensor values were outside limits, their average was displayed using a red background

Manual logging of computer system unavailability was performed by the licensee. The unavailability was reported to be less than .05 which is acceptable. However, the licensee contact stated that no manual data entry processes were employed. The computer systems used to support ERF functions were military standard units and did not require special environmental control. Air conditioning was reported b, licensee personnel to be functional in the CR, TSC, and the EOF.

The licensee received a final SER on RG 1.97 variable implementation in 1985. Additional parameters have been added to the ERDS system since the 1985 SER. All of the RG 1.97 parameters approved by NRC were included as inputs to the ERDS. Plant Hatch was one of the six plants evaluated in the 1985 SPDS Pilot Evaluation Program. Although no formal SER was received by GPC on the SPDS, the Pilot Program report stated that the system met or exceeded the NUREG-0737, Supplement 1 requirements. According to the documentation, the SPDS was shown as complete on the Hatch integrated schedule. As a result of the aforementioned reports and additional reviews of the ERDS system during the ERF Appraisal, the TSC data base met the ERF requirements of NUREG-0737.

Based on the above review the licensee agreed to evaluate and take appropriate action on the following:

- Verify that the completionof the data acquisition system program upgrade (SMRN45) includes the capability to produce full data (50-321, 366/87-32-03).

4.0 Emergency Operations Facility

4.1 EOF Location and Habitability

The EOF was located in the East Wing of the Training Center approximately 0.2 miles south of the plant. An Alternate EOF was located in the Georgia Power Company District Office in Baxley, GA beyond the 10 mile radius (i.e., approximately 10.1 miles from the power block). This was consistent with Option 1 in Table 1 of NUREG-0737, Supplement 1.

The EOF ventilation system emergency mode isolated the facility from the outside atmosphere and placed a HEPA filter in the recirculation flow path. The system was designed to meet the minimum requirements of NUREG-0737 for near-site EOFs. A periodic testing program (including DOP testing) was in place. The inspector discussed with licensee representatives test procedure, 42SP-111187-RY-1N, "Test of EOF Filter Train by Vendor," regarding its revision and status. The licensee agreed to review the procedure to determine the need for additions to a final procedure to include provisions to perform bypass testing to insure closure of the outside air damper and the two dampers which isolate the normal, parallel dust filter flow path.

The licensee agreed to investigate and correct the apparent HEPA filter bypass flow problem which was identified during the Appraisal. In addition, the licensee agreed, through the use of procedures and warning signs, to keep the doors to the three access points to the EOF closed during potential airborne radiological problems (and exercises).

Based on the above review, EOF location and habitability appeared to be adequate.

Licensee representatives agreed to evaluate and take appropriate action on the following items:

- Revision of and establishment as permanent the EOF HVAC testing procedure, and inclusion of steps to test the isolation dampers in the system.
- Revision of Section H-3 of the Hatch Emergency Plan to reflect the EOF HVAC system as an isolated recirculating system versus a pressurized system.
- Investigation and correction of the apparent HEPA filter bypass flow problem which was identified during the appraisal.

- Use of procedures and warning signs to keep the doors to the three access points to the EOF closed during potential airborne radiological problems and annual emergency preparedness exercises.

4.2 EOF Functional Capabilities

With the exception of the TSC analog annunciator and mimic panels, the EOF data acquisition system and procedures were almost identical to those in the TSC (see Paragraph 3). Status boards in the EOF were more oriented toward dose assessment than those in the TSC, since the EOF would be the primary facility for this function.

In the Alternate EOF, four work areas were available. Two of the areas provided room for six desks, and the remaining two areas had room for about two desks. There were approximately eight phones available in the building. A storeroom was packed with extra tables and approximately 50 chairs. Backup power was provided by a gas-powered generator which was tested weekly. All other equipment would be brought from the primary EOF. The Alternate EOF was not capable of handling all personnel staffing the primary EOF. The licensee agreed to identify the key staff to be required to report to the Alternate EOF and define their placement in the facility.

Locations of the primary and alternate EOFs are defined in Section 4.1, above. Both facilities were on a major north-south 115 KV distribution line; however, the line was divided between the facilities by the Baxley Substation. The two sections of the 115 KV line had independent feeds. The likelihood of common mode failure was very small since both sides of the Substation would have to be damaged to disrupt power to both EOF facilities. On this basis, the near-site EOF power supplies were not reviewed in detail or tested during the Appraisal. All instruments (e.g. ERDS and Dose Assessment computers) in the near-site EOF were supplied by reliable, UPS backed power. Non-instrument loads (e.g. lights) were on normal offsite 115 KV power, but the facility had several wall mounted, battery powered emergency lighting units.

Based on the above review, the licensee agreed to evaluate and take appropriate action on the following:

- Verification that plans and/or procedures for the backup EOF to identify key staff who would report to the Alternate EOF, where they would be positioned in the facility, and other logistical requirements such

as transportation, equipment, etc. would be provided (50-321, 366/87-32-04).

4.3 Regulatory Guide 1.97 Variable Availability

The data availability in the EOF was essentially the same as that in the TSC, with both the ERDS computer system and Communicator/Recorder personnel serving as the primary and backup sources of data. With minor exceptions, information in the paragraphs that follow were identical to the corresponding TSC section of this report.

The Georgia Power Company (GPC) RG 1.97 SAR submission to NRC was reviewed. This document contained an excellent summary of the RG 1.97 variables available in the TSC and EOF on the ERDS. ERDS consists of two Milspec subsystems, SPDS and the ERFDS. GPC received a final, satisfactory SER from NRC on implementation of RG 1.97 on July 30, 1985. The only "missing" radiological parameter of interest in the ERFs from the ERDS was the Unit 1 Recombiner Building Vent Radiation Monitor. The Recombiner Building vent isolates on any accident of concern and the value would be available by telephone.

As discussed in the above paragraph, parameter availability was satisfactory in 1985. Subsequently, several additional parameters were added to the ERDS system including meteorological parameters and drywell sump level. No problems were noted with availability of containment condition and radiological parameters on the ERDS computer system. In addition to the parameters available electronically on the ERDS system, GPC stationed dedicated telephone Communicator/Recorder personnel in the EOF. These personnel were in communication with personnel in the Control Room, the TSC, and other locations. Additionally plant status records, radiological parameters, and key thermal-hydraulic parameters were periodically posted on large status boards. The status boards provided a rough trending capability, using 15 minute data updates, to supplement the trending capabilities of the ERDS.

The combination of data available on the ERDS system, facility status boards, and communicators appeared to be satisfactory.

Based on the above review, EOF variable availability was determined to be adequate.

4.4 EOF Data Collection, Storage, Analysis and Display

The same computers supporting TSC activities also supported the EOF. These systems and details of their functions have have been described in Paragraph 3 above. EOF display CRTs were the same as those located in the TSC, and allowed users to view Units 1 or 2 parameters on request. The EOF was reported to be approximately 0.2 miles from the ERF computers in the service building, and as such, used the same cabling scheme as the TSC for the display CRTs.

GPC received a final SER on RG 1.97 variable implementation in 1985. Additional parameters have been added to the ERDS system since the 1985 SER. All of the RG 1.97 parameters approved by NRC were included as inputs to the ERDS. Hatch was one of the six plants evaluated in the 1985 SPDS Pilot Evaluation Program. Although no formal SER was received by GPC on the SPDS, the Pilot Program report stated that the system met or exceeded the NUREG-0737, Supplement 1 requirements. Based on these two reports and additional reviews of the ERDS system during the ERF Appraisal, the EOF data base met the ERF requirements of the referenced supplement.

Based on the above review, EOF data collection, storage, analysis, and display were determined to be adequate.

5.0 Persons Contacted

*J. Beckham, Vice-President
*S. Bethay, Supervisor, Nuclear Safety and Compliance
*C. Coggin, Manager, Training and Emergency Preparedness
*G. Creighton, Regulatory Specialist, Nuclear Safety and Compliance
*R. Dedrickson, Assistant to Vice-President
#S. Ewald, Manager, Radiological Safety
*P. Fornel, Manager, Maintenance
*O. Fraser, Manager, Site Quality Assurance
*R. Hayes, Deputy Manager, Operations
*J. Heidt, Manager, Nuclear Licensing
*L. Hill, Manager, Nuclear Emergency Preparedness
###*R. Mothena, Supervisor, Nuclear Emergency Preparedness
*H. Nix, Plant Manager
*T. Powers, Manager, Engineering Support
*D. Read, Manager, Plant Support
*D. Smith, Superintendent, Health Physics
P. Underwood, Shift Technical Advisor
*E. Wahab, Superintendent, Balance of Plant Engineering
*R. Zavadoski, Manager, Health Physics/Chemistry

Other licensee employees contacted included engineers, technicians, operators, and security force members.

Other Organizations

*B. Edmark, Senior Startup Engineer, Bechtel Corporation

Nuclear Regulatory Commission

*L. Crocker, Project Manager, NRR
#A. Cunningham, Senior Radiation Specialist, RII
##T. Decker, Chief, Emergency Preparedness Section, RII
*G. Lapinsky, Engineering Psychologist, NRR
*J. Menning, Resident Inspector
*M. Sinkule, Section Chief, Reactor Projects, RII

*Attended exit interview on December 10, 1987
#Participated in conference call on January 15, 1988
##Participated in telephone exit interview on January 20, 1988

6.0 Exit Interview

The inspection scope and findings were summarized on December 10, 1987, with those persons indicated in Paragraph 5 above. The inspector described the areas inspected and discussed in detail the inspection findings listed below. Additionally, the inspector discussed actions initiated by the licensee during the inspection to address some of the inspection findings (as noted in Paragraphs 3.2 and 3.4).

Members of the Region II Emergency Preparedness staff telephoned licensee representatives on January 15, 1988, and January 20, 1988, to inform the licensee that a review of the report details presented in Paragraph 1.2 above resulted in an additional open item. A detailed review of the licensee's dose assessment procedure resulted in an Inspector Followup Item (review and assure that the meteorological data used in dose assessment is 15-minute averaged data). No dissenting comments were received from the licensee. Although proprietary material was reviewed during the inspection, such material was neither removed from the site nor entered into this report.

Item Number	Status	Description/Reference Paragraph
50-321, 366/87-32-01	Open	IFI - Evaluation of the adequacy of the EOF dose assessment model (assumptions, correction factors, computer codes, etc.) for continuously assessing the consequences of a radioactive release to the environment (Paragraph 1.2).

50-321, 366/87-32-02	Open	Review of the meteorological instruments and/or equipment and procedures, and assure that the meteorological data used in dose assessment is in accordance with RG 1.23 (Paragraph 1.2).
50-321, 366/87-32-03	Open	IFI - Complete Software Modification Request No. 45 to ensure that the data acquisition system program upgrade includes the capability to produce full data file recovery following computer failures (Paragraph 3.4).
50-321, 366/87-32-04	Open	IFI - Verification that the plans and/or procedures for the backup EOF identify key staff who would report to the alternate EOF, where they would be positioned in the facility and other logistical requirements such as transportation, equipment etc. (Paragraph 4.2).
50-321, 366/87-18-04	Closed	IFI - Verification of timely shift staff augmentation times using periodic announced and unannounced communications drills (Paragraph 7.a).
50-321, 366/87-18-06	Closed	IFI - Compare dose assessment results from the prompt dose assessment, computerized dose assessment, state dose assessment, and NRC dose assessment (IRDAM) methods using standard benchmark problems (Paragraph 7.6).
50-321, 366/85-25-03	Closed	Exercise Weakness - Improvements to Public Information program in coordination of press releases and emergency news information between the licensee and offsite officials (Paragraph 7.c).

7.0 Licensee Actions on Previously Identified Inspection Findings (92701)

a. (Closed) Inspector Followup Item 321, 366/87-18-04. Verify timely shift staff augmentation times using periodic announced and unannounced communication drills.

The inspector determined that the availability of augmentation personnel for the onsite emergency organization, as specified in the Emergency Plan, was uncertain because such availability had not been tested by announced or unannounced drills.

The inspector reviewed documentation dated September 14, 1987, and October 18, 1987, entitled, "Announced and Unannounced Callout." The aforementioned documentation verified that personnel were contacted for estimated time of arrival at the plant to ensure Table B-1 augmentation times as specified in the Emergency Plan.

b. (Closed) Inspector Followup Item 321, 366/87-18-06. Compare dose assessment results from the prompt dose assessment, computerized dose assessment, State dose assessment, and NRC dose assessment (IRDAM) methods using standard benchmark problems.

A previous inspection resulted in the absence of documentation by the licensee to show that a comparison test between the licensee, NRC, and State dose assessment model had been conducted.

The inspector was provided documentation which verified a comparison of the licensee computerized method ("DOSE") and prompt dose assessment method to NRC's IRDAM (Rev. 5) and the State of Georgia's had been performed for 10 test cases. Differences between the models were identified.

c. (Closed) Exercise Weakness 321, 366/85-25-03. Improvements to Public Information Program in the coordination of press releases and emergency news information between the licensee and offsite officials.

During a FEMA/NRC meeting following the 1985 annual exercise, problems were noted in the coordination of news releases and emergency information between the licensee and offsite officials.

The inspector noted during the 1987 annual exercise that press releases were well coordinated between the licensee and offsite officials, and releases were made in a timely manner.

8.0 Glossary of Acronyms and Initialisms

CPU	Central Processing Unit
CR	Control Room
CRT	Cathode Ray Tube
DAS	Data Acquisition System
DP	Differential Pressure
EAL	Emergency Action Level
EOF	Emergency Operations Facility
ERDS	Emergency Response Data System
ERFs	Emergency Response Facilities
ERFDS	Emergency Response Facility Display System
GM	Geiger Muller
GPC	Georgia Power Company
HEPA	High Efficiency Particulate Air (Filter)
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation, Air Conditioning
IRDAM	Interactive Rapid Dose Assessment Model
MDCS	Meteorological Data Collection System
NSSS	Nuclear Steam Supply System
PASS	Post Accident Sampling System
RCIC	Reactor Core Isolation Cooling
RG	Regulatory Guide
RGB	Red Green Blue
RHR	Residual Heat Removal System
SER	Safety Evaluation Report
SPDS	Safety Parameter Display System
TSC	Technical Support Center
UPS	Uninterruptable Power Supply
V&V	Validation and Verification
wg	Water Gauge