UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-348/80-41 and 50-364/80-52

Licensee: Alabama Power Company
P. O. Box 2641
Birmingham, AL 35291

Facility Name: Farley

Docket Nos. 50-348 and 50-364

License Nos. NPF-2 and NPF-8

Inspection at: Farley site near Ashford, Alabama

Inspectors: C. M. Hosey — Date Signed 3/10/81

W. Perry — Date Signed 3/10/81

Accompanying Personnel: W. T. Bartlett, Battelle Pacific Northwest Laboratories
I. C. Nelson, Battelle Pacific Northwest Laboratories
J. L. Mims, Radiological Assessment Branch, NRR

Approved by: A. F. Gibson, Chief, Technical Inspection Branch
Engineering and Technical Inspection Division — Date Signed 3/10/81

Dates of Inspection: December 1-12, 1980

SUMMARY

Areas Inspected

This special announced inspection involved 356 inspector-hours onsite. The following areas were included as a part of the Health Physics Appraisal: radiation protection organization and management; personnel selection, qualification and training; exposure controls; ALARA program; radioactive waste management; and, facilities and equipment.

Results

Of the six areas inspected, no apparent violations or deviations were identified in five areas; one apparent violation was found in one area (failure to follow procedures for release of systems for maintenance).

DETAILS

1. Persons Contacted

Licensee Employees

*W. G. Hairston, III, Plant Manager
*K. W. McCracken, Technical Superintendent
*C. D. Nesbitt, Chemistry and Health Physics Supervisor
P. Farnsworth, Senior Health Physics Foreman
*J. M. Walden, C&HP Sector Supervisor
W. Gripentog, C&HP Sector Supervisor
*M. W. Mitchell, C&HP Sector Supervisor
L. S. Williams, Training Superintendent
D. Herrin, Licensing
D. Morey, Operations Superintendent
H. R. Garland, Maintenance Supervisor
*J. W. Kale, Jr., Operations Quality Assurance Engineer
W. C. Carr, Plant Quality Assurance Engineer
J. W. McGowan, Manager, Operations Quality Assurance (Corporate)
B. P. Patton, C&HP Sector Supervisor
B. Miller, Plant Training
R. E. Bryant, Utility Foreman

Other licensee employees contacted included 35 technicians, 5 operators, 15 mechanics, 10 security force members, and 5 office personnel.

NRC Resident Inspectors

*W.H. Bradford, Senior Resident Inspector
*J. P. Mulkey, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 12, 1980 with those persons indicated in paragraph 1 above. The inspector reviewed all aspects of the health physics program at the facility. This review included the radiation protection organization and management, personnel selection, qualification and training, exposure controls, radioactive waste management, ALARA programs, and facilities and equipment. The inspector stated that the areas of technician training, control of cross connections of the demineralized water system with radioactive systems and isolation of plant systems prior to maintenance should be reevaluated by the licensee. The plant manager agreed to review these areas. On December 23, 1980, additional discussions were held between the plant manager and members of the Regional staff concerning the plant's on-the-job training program for chemistry and

health physics technicians, criteria for crediting experience in non-technician jobs toward meeting the experience requirements of technicians, and administrative controls to reduce the possibility of contaminating the demineralized water system. On December 24, 1980, a Confirmation of Action letter was issued to the licensee confirming actions to be taken to strengthen the training program for technicians, reevaluate the criteria used for crediting experience received in non-technician jobs, and establish administrative controls of the demineralized water system. On March 13, 1981, the plant manager was informed that failure to follow procedures for release of systems for maintenance would be considered a violation of NRC requirements.

3. Licensee Action on Previous Inspection Findings

(Open) Noncompliance (348/79-42-01) Failure to follow procedures for isolation of system prior to maintenance. The inspector reviewed the corrective action taken by the licensee discussed in the licensee letter RE:RII:CMH 50-348/79-42 of February 21, 1980. This item is discussed further in paragraph 8.c of this report.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Listing of Violations of NRC Requirements and Inspector Followup Items

No violations of NRC regulatory requirements were identified. The following is a summary tabulation of inspector followup items identified throughout this report. Inspector followup items (IFI) are matters which will be examined in future inspections.

IFI (348/80-41-01) Criteria for crediting experience in non-technician jobs toward experience requirements of ANSI N18.1-1971 (paragraph 7).

IFI (348/80-41-02) Specific training of technicians and foremen in duties assigned (paragraph 7).

IFI (348/80-41-03) Academic training program for technicians (paragraph 7).

IFI (348/80-41-04) Technician OJT and qualification program (paragraph 7).

IFI (348/80-41-05) Formal retraining program (paragraph 7).

IFI (348/80-41-06) Calibration facility for exposing TLD (paragraph 8.a).

IFI (348/80-41-07) Formal investigation and documentation of TLD/self-reading dosimeter differences(paragraph 8.a).

IFI (348/80-41-08) Neutron exposure procedure (paragraph 8.a).

IFI (348/80-41-09) Beta dose through respirator lens (paragraph 8.a).

IFI (348/80-41-10) N-16 exposures (paragraph 8.a).

IFI (348/80-41-11) Quality control test of vendor TLD evaluations (paragraph 8.a).

IFI (348/80-41-12) Bioassay for beta emitters (paragraph 8.b(1)).

IFI (348/80-41-13) Internal dose assessment procedures (paragraph 8.b(1)).

IFI (348/80-41-14) Respiratory protection procedure changes (paragraph 8.b(2)).

IFI (348/80-41-15) Storage of respirators (paragraph 8.b(2)).

IFI (348/80-41-16) Respiratory equipment issuance facility (paragraph 8.b(2)).

IFI (348/80-41-17) Control of locked high radiation areas (paragraph 8.c).

IFI (348/80-41-18) Review of HP records (paragraph 8.c).

IFI (348/80-41-19) Personnel contamination monitoring program (paragraph 8.c).

IFI (348/80-41-20) Administrative controls for connections with Demineralized Water System (paragraph 8.c).

Violation (348/80-41-21) Isolation of systems for maintenance (paragraph 8.c).

IFI (348/80-41-22) Overflow of waste evaporators to ventilation system, (paragraph 8.c).

IFI (348/80-41-23) Safety evaluation of new solidification system (paragraph 9.d).

IFI (348/80-41-24) Waste reduction training for plant personnel (paragraph 9.d).

IFI (348/80-41-25) Isolation of dry waste compactor (paragraph 9.d).

IFI (348/80-41-26) Development of documents to train personnel in proper calibration of fixed monitors (paragraph 9.d).

IFI (348/80-41-27) Incorporation of ANSI N323-1978 into instrument calibration program (paragraph 11.b).

6. Radiation Protection Organization and Management

The Appraisal Team reviewed the plant's radiation protection organization and how it relates to the overall plant organization. The radiation protection program at the plant is managed by the chemistry and health physics supervisor who reports to the superintendent of technical services. The chemistry and health physics supervisor has direct access to the plant manager regarding radiation protection matters. No apparent problems with this reporting chain were identified by the Appraisal Team, but this is considered to be strongly dependent on the individuals involved and should be reevaluated if personnel changes are made.

The health physics staff under the chemistry and health physics supervisor is as shown in figure 1. In addition to the section supervisors and foremen, the Chemistry and Health Physics Group (C&HP) has 40 C&HP technicians, 4 radiation detection men, and 30 nuclear operatives. A health physics foreman is on-duty 24 hours per day, 7 days per week. In addition, select senior C&HP personnel serve as emergency HP managers on a rotating basis and are on-call to assist the duty HP foreman.

The scope of responsibilities for the radition protection program is defined in the licensee's Health Physics Manual. Specific duties and responsibilities for the C&HP Group are contained in plant administrative and radiation control procedures.

The inspector discussed the audit program relating to radiation protection with licensee representatives and reviewed the following audits of the plant which were performed by the operations quality assurance group (OQA):

Report 80/18, Radiological Controls, October 15 - November 14, 1980
Report 80/9, Qualifications and Training, April 29 - June 2, 1980

Although most on-site audits performed by OQA personnel were procedural in nature, and were performed primarily to identify and correct noncompliances, reviews or assessments of the effectiveness of the plant's radiation protection program are performed. On July 28-30, 1980 an evaluation of the plant's health physics program was performed by senior members of the licensee's corporate office. In addition an assessment of the plant's health physics program was performed on Novmeber 21-24, 1980 by an outside vendor with expertise in radiation protection matters.

Summary: Based on the above findings, this portion of the licensee's program appears to be acceptable.

7. Personnel Selection, Qualification and Training

Health Physics Staff

Selection and qualification criteria for each of the positions in the radiation protection organization have been documented in plant procedures FNP-O-AP-17, Conduct of Operations Chemistry and HP Group, and FNP-O-AP-3,

Plant Organization and Responsibility. Experience and educational requirements are included in these selection criteria. These criteria are used in the formal selection process, and personnel are generally aware of the criteria.

The C&HP Supervisor promotes the company philosophy of hiring permanent staff who have at least 2 years of college credit. There is a strong tendency to try to retain qualified staff and to fill technical positions with existing staff. As an example, personnel with Bachelor's degrees in physics are preferentially selected to fill vacancies occurring in the counting laboratory. These persons have the fundamental technical training to advance to supervisory positions in the Environmental and Emergency Planning Section of the HP organization.

Persons with U.S. Navy nuclear experience are preferred for HP technician positions. The existing HP staff has a great deal of nuclear Navy experience, and therefore, Navy experience is reviewed very critically. Attention is focused on retaining persons with actual radiation monitoring experience. In lieu of actual experience and technical training, persons with college level scientific training are preferred.

Job applicants with neither HP experience nor scientific training are usually placed in positions as "nuclear operatives". The nuclear operative is allowed to function only in specified jobs, but opportunities are given for HP training and advancement to the HP technician ranks.

Temporary contract HP technicians are selected according to a formalized procedure. Those selected must meet the requirements of ANSI N18.1-1971. A form is used to document the amount of experience and training of each applicant. After selection, a contract HP technician is only allowed to perform those procedures for which he has been qualified by the HP staff.

The qualifications of the Chemistry and Health Physics Supervisor (radiation protection manager) were evaluated against the recommendations found in Regulatory Guide 1.8, September 1975 and found to be adequate.

Reporting directly to the Chemistry and Health Physics Supervisor was the Health Physics Section Supervisor who had over 26 years experience in health physics monitoring and health physics supervision. He also met the requirements of R.G. 1.8 for a radiation protection manager.

The qualification of all section supervisors and HP foremen were reviewed and found to meet or exceed the appropriate requirements set forth in ANSI N18.1-1971. In general, the inspector found the staff positions were filled by very well qualified persons.

At the time of the inspection, the plant was in an outage. Over 30 contract HP technicians had been hired to supplement the routine HP program. The resumes of all contract and permanently employed HP technicians were reviewed. The HP Section Supervisor and the C&HP supervisor were also

questioned on methods used to qualify these technicians. The review of resumes clearly indicated that "non-monitoring" HP experience was often disallowed, that academic training was carefully reviewed as appropriate to HP technician qualification, and that Navy nuclear experience was not unquestionably accepted as HP technician experience.

While reviewing the experience of the plant's permanent health physics technicians, the inspector noted that the plant had no criteria for assigning credit for experience received as a nuclear operative or radiation detection man toward the experience requirements of ANSI N18.1. A review of the job description and actual tasks performed by individuals with these job titles indicated that very little of the experience can be used to meet the ANSI N18.1 experience requirements. The inspector stated that the licensee should reevaluate the criteria used for crediting experience as a radiation detection man or nuclear operative in meeting the experience requirements of ANSI N18.1-1971 for chemistry and health physics technicians (348/80-41-01).

Plant procedure FNP-AP-17, Revision 2, Conduct of Operations - Chemistry and Health Physics Group, specified that HP technicians must complete the health physics training course before they are considered qualified technicians. Two individuals did not complete the HP training course. One individual was the foreman assigned the responsibility for decontamination of equipment and facilities. The licensee has no minimum training or experience requirements for C&HP foremen. The inspector stated that health physics foremen should, as a minimum, complete the health physics training course required of HP technicians.

The other individual was a lead technician responsible for portable instrument calibration. The individual appeared to have a good knowledge of the mechanics of instrument calibration, however, he did not have a good understanding of the fundamentals of radiation detection and the calibration techniques recommended in ANSI N323-1978. Although the technicians work was reviewed by a health physics foreman, he and other individuals assigned specific responsibilities, such as whole body counting, instrument calibration, inspecting, etc., should receive specific training in the duties assigned (348/80-41-02).

During the review of health physics technician duties, it was noted that the licensee has not formally determined what duties or tasks performed by technicians require the technician to be ANSI qualified. The inspector stated that the licensee should formally establish when a technician is performing in a responsible position and thus should be ANSI qualified.

All HP technician trainees are required to attend a basic health physics training course given by the plant's training group. In the past, this course consisted of 5 to 6 weeks of continuous classroom training. During 1980, the initial HP training was spread out over the entire year and consisted of one week training sessions given approximately monthly. Guidance for the HP training course can be found in FNP-0-AP-45, but this procedure only outlines lecture topics to be presented in the HP training.

The inspector questioned the training supervisor concerning the planning of HP technician training. At present, a new training plan is being developed. Instead of a protracted HP training schedule, the initial training will be completed in a 5 to 6 week period. At the time of the inspection there was no formal lesson plans, very few handouts to students, and no training manual. The initial HP training was not linked to an on-the-job training schedule, and technicians had complained of the lack of laboratory exercises or actual in-plant training sessions. There was no instructor available to plan or implement changes to the existing program. The inspector stated that appropriate staff should be assigned to develop and implement an effective HP technican training program.

The academic training program for technicians needs to be better organized and should include development of formal lecture plans, establishment of performance objectives (methods of evaluation), development of training manuals, and pre-course assessment to determine if students have the basics to succeed (348/80-41-03).

There was no formal on-the-job training (OJT) or qualification program for HP technician trainees. They are required to attend the Farley HP technician training course, review and become proficient with HP procedures, and perform monitoring duties for a period of time commensurate with the ANSI N18.1-1971 standard. There are no goals, time tables, or testing to indicate progression in the OJT program. The inspector stated that an on-the-job training and qualification program should be formalized with definite progression goals leading to the status of "responsible technician" (348/80-41-04).

In FNP-0-AP-45, Appendix G, retraining of HP staff is required, but this retraining is at the discretion of the C/HP supervisor. Most of the HP supervisory staff have been sent to the basic radiological protection training courses at Oak Ridge Associates Universities. In addition, selected staff have attended respiratory training programs. Other courses attended are simply auditing the basic HP technician training courses. The inspector stated that a formal retraining program designed to maintain the proficiency of the entire Health Physics staff should be established (348/80-41-05).

Two fulltime HP instructors were employed by the training section. Both instructors were found to have adequate academic training and experience as HP technicians and as instructors. Both individuals exhibited a high level of enthusiasm for their responsibility which was the general staff HP orientation training program.

The contents of the HP orientation training were reviewed and found to be adequate. All persons requiring access to the plant must attend the orientation training. Persons with obvious HP experience are given an abbreviated form of training which includes site specific information. All persons are required to take a written test composed of multiple choice and short

answer questions. Because of the short answers on the test, the instructor can easily determine if pracical information (such as dressing in protective clothing) was understood. If test responses are not adequate, the instructor may require each individual to respond verbally. He may also require individuals to dress in protective clothing or demonstrate proficiency in practical procedures. If persons cannot adequately read or comprehend information presented in the HP orientation, they are denied access to the plant.

Although the HP orientation training requires 2 full time instructors, benefits have been observed. There is increased efficiency in entering and exiting contaminated areas, and consequently better contamination control. In addition, emphasis on HP orientation and management support of this function have helped improve the staff attitude toward radiation protection.

Summary: Based on the above findings, improvements in the following areas are required to achieve an acceptable program:

a. criteria for crediting experience as Radiation Detection Man and Nuclear Operative in meeting requirements of ANSI N18.1-1971;

b. minimum training and experience requirements for C&HP foremen;

c. training and qualification requirements for individuals performing specific tasks (e.g., whole body counting, instrument calibration, etc.);

d. define "responsible positions" as it applies to technician qualifications;

e. upgrading academic training program for technicians;

f. establish formal on-the-job training and qualification program for technicians; and

g. formal retraining program for C&HP staff.

8. Exposure Control

a. External Exposure Control

The basis for the external exposure control program is contained in the health physics manual, revised October 23, 1980. Procedures specific to exernal exposure control are contained in Radiation Control Procedures FNP-O-RCP-8, Personnel Monitoring, revised December 4, 1980. External exposure is controlled as low as reasonably achievable within 10 CFR 20 limits. Physical control over entry into high radiation zones, use of radiation work permits to maintain worker control by HP

personnel, containment entry permits and use of administrative limits including ALARA review are included in the program to avoid over exposures of personnel.

The licensee relies on a vendor TLD system for determining external radiation exposures for compliance with 10 CFR 20. An additional plant TLD is assigned if the individual is not expected to receive more than 10% of the 10 CFR 20 limits (to confirm that such limits are not exceeded). Except during an outage, vendor TLDs are read at the vendor facilities. During outages a vendor representative reads the TLDs for those whose pocket dosimeters indicate an accumulated dose of 200 mr for the badge period. Vendor TLDs are read for both beta and gamma exposures. The means of calibration of vendor TLDs were not determine during the site visit. Whether or not the vendor QA program conformed to the draft ANSI Standard N13.11 was also not determined.

Plant TLDs are calibrated using a Cs-137 source and an R meter whose calibration is traceable to NBS. The calibration facility including the room and the apparatus for positioning source and TLD, are adequate for the plant TLD program, but are appraised as inadequate for exposure measurements of record. The licensee has indicated that it will establish an in-house TLD program in the near future. The inspector stated that the calibration facility be carefully planned and incorporate suggestions to be found in Draft ANSI N13.11 (348/80-41-06).

In addition to the two TLDs worn, self-reading pocket dosimeters in the range of 0-200 and 0-1000 mrem are issued singularly or together as appropriate. Pocket dosimeters are issued with security badge and TLD prior to entry to the protected area. Entry into a radiation controlled area requires filling out a form on which the pocket dosimeter reading is recorded prior to entry and after leaving. The current exposure status is posted daily for review by the worker prior to entry into the radiation control area. The licensee has experienced a significant loss of pocket dosimeters. The reason for this is not understood. However, the licensee is conducting an investigation to determine the cause and will develop a cost effective control system.

About 30% of the pocket dosimeter results differ significantly from the TLD measurements. Although investigations are conducted, there is no formal documentation of reconciliation of differences as a result of the exposure investigation. The inspector stated that the exposure investigation and documentation of the results should be formalized at least for exposures down to 100 mrem and where difference between pocket dosimeters and TLDs exceed 25% of the TLD reading. The investigation should include a review of stay times and dose rates, check of dosimetry devices and exposure recorded for other personnel performing similar work (348/80-41-07).

Neutron exposure is determined by time keeping and dose rate measurements. Calibration of neutron survey instruments is done using a PuBe source. Exposures are kept to less than 300 mrem/quarter to obviate

the requirement for dosimeter use. Although film dosimeters are required by procedures, it is recognized that film is useless for neutron measurement in the energy range encountered. The inspector stated that the procedure should be revised to reflect the current procedures (348/80-41-08).

The licensee has some concern for beta dose to the eye during eddy current testing of steam generator tubes. An experiment was performed to determine the attenuation of beta particles incident on the worker's lexan respirator lens. The result suggested a factor of approximately 6. The investigation is not complete. However, the expedient of doubling the lexan lens thickness is believed to be capable of obviating essentially all beta dose to the eye. As understood, it is not that beta dose to the eye is limiting, but that the licensee needs to assure himself that beta dose would not inadvertently become an undisclosed health hazard (348/80-41-09).

The licensee has not considered possible exposure from N-16 photons. The licensee should investigate areas of the plant where N-16 may be present (348/80-41-10).

According to RCP-8, once a quarter, a vendor TLD will be exposed to a known exposure as an in-house QA test. The appraiser concluded that to be meaningful and to give the licensee the degree of confidence desired, not less than five TLDs should be so tested and preferably on a monthly, rather than quarterly schedule (348/80-41-11).

All external dosimetry records are maintained by individual on computer files. Records of exposure incidents and other pertinent data are contained in individual file folders. Records of TLDs processed and other data are also kept on microfilm in document control.

b. Internal Exposure Control

(1) Monitoring

Whole body counting is provided onsite and provision is made for urinalysis by an independent laboratory. There are no routine bioassays (excretion analysis). Operation and calibration of the whole body counter is described in plant procedure RCP-9, revised November 5, 1979. Bioassay sampling is described in RCP-13. Operators of the whole body counter are trained on-the-job.

The whole body counter system uses a three-detector, chair-style whole body counter. Each detector is calibrated for the following radionuclides: Cr-51, I-131, Cs-134, Cs-137, Co-58, Mn-54, Fe-59, Zn-65, and Co-60. A representative lower limit of detection, expected for Co-60 in the lungs and abdomen is 1 nCi; for Cs-137 in the lungs and abdomen 2nCi. The lower limit of detection for I-131 in the thyroid is 0.5 nCi. The counter is calibrated annually according to procedure RCP-9 using NBS traceable sources

for the radionuclides noted above. The most recent calibration was performed on December 2, 1980.

Although the computer calculates body burdens for only the standard nine radionuclides, a graph of the counter per channel is reviewed by the technicians. In one instance, the presence of Se-75 in an individual was quantified by manual analysis of the multichannel analyzer output. The isotope had been administered by a physician for scanning of the pancreas.

The licensee participated in an NRC spiked phantom study; results for Co-57 and Co-60 were reasonably close. However, the Cs-137 estimate was twice the spike value and 0.58 nCi of Cs-134 in the phantom was not reported.

Whole body counts are taken on individuals prior to issuance of dosimeters and entry into a radiation control area, at termination, and as deemed appropriate by HP. Although not seen as a procedural requirement, notice is given on the Radiation Work Permit that a WBC is required in the event of nasal smears (routine procedure after wearing a respirator) exceeding 200 d/m. Whole body counts are also conducted on an annual schedule. However, the procedure for HP activities (RCP-1) simply calls for "periodic" whole body counts. There appears to be a reluctance on the part of the licensee to be specific in some procedures because of the concern that they may be required to follow the procedural requirements. Since procedures lose effectiveness without specificity the licensee should consider having procedures state specific requirements.

In RCP-1, bioassay urinalysis (for gross beta, gamma and Tritium) is called for "periodically". Bioassay urinalysis is also required when expected body burdens exceed 10% of a maximum permissible body burden (MPBB) (RCP-8). It is understood that such levels have not been experienced at the plant. Urinalysis after a WBC detection of fission or activation products appears reasonable if, for example, Sr-90 or P-32 are expected as a result of the presence of gamma emitting radionuclides. Urine samples are to be sent to a vendor for analysis. There was no evidence that the procedure of bioassay analysis and measurement interpretation in terms of body burden and organ dose had been tested by the licensee. The inspector stated that if the licensee believes there is a potential for inhalation or ingestion of beta emitters present, the bioassay system should be tested at levels of about 10% of a MPBB. If evidence can be shown that bioassay is not needed, a summary statement to that effect should be given in the procedure and further reference deleted. Urinalysis for radionuclides whose presence in the body can be adequately followed by whole body counting should not be required (348/80-41-12). Little

attention has been given to the calculation of doses from organ burden aspects of internal dosimetry. The inspector stated that both training in and procedures for conversion of body or organ content of radionuclides to dose should be provided. Upon obtaining a more complete understanding of the interrelationship between organ-content-and-dose, procedures should be prepared for in-house use (348/80-41-13).

(2) Respiratory Protection Program

A management policy statement is given in Section I, Respiratory Protection, of the Health Physics Manual, revised October 23, 1980. Conformance to 10 CFR 20.103 is specified. The responsibility for the respiratory program rests with the Health Physics Section Supervisor.

Procedures for respiratory protection are detailed in RCP-101, Use and Testing of Respiratory Equipment; RCP-102, Selection of Respirators for Radiological Applications; RCP-103, Maintenance and Care of Respiratory Protection Equipment; RCP-4, Operation of AIR Tank Cascade Recharging System; RCP-106, Use and Operation of Full Face Filter Type Respirator; RCP-150, Operation of Qauntitative Man-Fit Test Booth and others. In addition to 10 CFR 20.103, RCP-101 also references NUREG 0041 and ANSI Z88.2-1969. Procedures dealing with respiratory protection were reviewed. Some errors of fact and some steps requiring clarification were brought to the attention of the licensee. Examples of such include RCP-101, Section 4.5 and RCP-102, Section 4.2 where self-contained breathing apparatus is said not to be used in atmospheres containing less than 19.5% oxygen; Sec. 15.2.1.5 and elsewhere, reference is made to a zero protection factor (the protection afforded is zero, but the factor is unity); and, Sec. 5.2.4, the equation for calculating stay time in a contaminated atmosphere was incorrect (348/80-41-14).

Initial worker trainng consisted of several hours of lecture on the need for, use of, and demonstration of respiratory protection equipment. A written test was given at the conclusion of the training. Mask fitting was done quantitatively in a test booth. Two individuals were tested at a time. Both physical exercises were performed and attempts at communication between masked individuals were made. Before mask fitting was done, a lung function test was required. A complete physical examination is conducted on plant employees by physicians on contract to the licensee.

Test results were reviewed by a physician and sent to HP. Two profile photographs are taken to confirm conformance to facial hair requirements and are placed together with the mask fit record

in the HP office for check before authorizing respirator issuance. Personnel not properly trained or fitted are not permitted in areas requiring respiratory protection. In unusual cases, a respirator may be issued, but the protection factor taken is one; no protection is assumed.

As part of the respiratory protection program, MPC-hrs of exposure are kept on each individual. The plant permits 38 MPC-hrs in any seven consecutive days. Permissible stay-times are calculated based on the individual exposure record, the concentration of nuclides in the work atmosphere, and the protection factor of the equipment.

The quantity of respirators (SCBA and Filter-type) appears to be adequate for routine operations. SCBA units are located at different points about the facility. It was suggested that a supply of respirators be outside the RCA in the event of loss of those stored in-plant as a result of an incident. Several HP staff members have received manufacturer's training in maintenance and repair of respirators.

Plant air is used for air-line supplied respirators and for filling tanks. Testing of the quality of air used for respiratory protection purposes appears to be adequate.

As a result of an earlier inspection, face mask units are now stored individually on shelves. it was suggested that, in addition, some means of rotation of respirators be made to preclude those least used from taking a set (348/80-41-15).

The respiratory equipment issue facility was appraised as inadequate. The facility is a makeshift arrangement that assures neither positive control of this important equipment, nor bears evidence of management's commitment to a good respirator protection program (348/80-41-16).

c. Health Physics Surveillance and Access Control

During plant tours, the inspectors reviewed the licensee's posting and control of radiation areas, high radiation areas, airborne radioactivity areas, contamination areas, radioactive material areas and the labelling of radioactive material. An inspector reviewed the administrative controls in use at the plant to prevent unauthorized access to locked high radiation areas.

The inspector observed that doors leading to two high radiation areas (RHR heat exchanger room and Volume Control Tank room) were unlocked, although the signs posted on the door stated that the doors must be kept locked. Radiation levels in both rooms were less than 1,000 mrem/hr. Therefore, the rooms were not required to be locked by

Technical Specifications. A review of quality assurance audits and the plant's radiation incident report file indicated that keeping doors leading to locked high radiation areas (greater than 1,000 mr/hr) locked has been a problem. The inspector stated that the licensee should consider revising their key control system to better control access to locked high radiation areas (348/80-41-17).

Radiation work permits (RWPs) are the principal means of establishing radiological controls for entry into radiologically controlled areas and for work on radioactive systems. Selected RWPs were reviewed for appropriateness of radiation protection requirements based upon work scope, location and conditions. The radiation protection requirements specified on the RWPs appeared appropriate.

During tours of the plant the inspectors discussed the methods for controlling work in radiologically controlled areas with health physics personnel (plant staff and contract technicians) and other members of the plant staff. The individuals questioned had an adequate knowledge of the protective clothing requirements, radiological conditions, work to be performed and specific radiation work permit requirements.

The inspectors reviewed selected records of radiation, contamination, and airborne radioactivity surveys performed between November 1, 1980 and December 10, 1980, discussed the survey results with licensee representatives, observed technicians performing various surveys and performed independent radiation and contamination surveys in the plant. The inspector noted that RWPs and survey results are not formally reviewed by Health Physics supervision. The inspector stated that the review requirements for records generated by health physics should be formally specified (348/80-41-18).

At the request of the inspector, a licensee representative checked each detector on the portal monitors at the exit from the auxiliary building by placing a 1 µCi Cs-137 source four inches away from the detector. The monitor alarmed as each detector was tested. The portal monitors would apparently detect the unauthorized removal of radioactive material or gross contamination on personel.

Portal monitors were set to count for 10 seconds and alarm if the count rate exceeded 200 counts per minute over background. A hand and shoe monitor was the final check before leaving the radiation control area. This monitor was set to alarm at 100 cpm over background, which is equivalent to the plant's release limit. The monitor had no timer and few individuals remained on the monitor an adequate amount of time. RM-14/HP-210 personnel friskers were located at the exit from containment and at various locations in the auxiliary building. The workers were encouraged to monitor themselves as they exit areas of high contamination levels. An RM-14/HP-210 frisker was located at the exit of the auxiliary building and workers were required to frisk prior to

passing through the portal monitors. The licensee has purchased two liquid scintillation portal monitors. However, at the time of the appraisal the systems were inoperable. The systems are expected to provide increased assurance that personnel contamination levels are below the plant limit. The inspector stated that the licensee should consider upgrading their personnel contamination monitoring program by requiring that each employee perform or receive, under the direct surveillance of health physics personnel, a whole body contamination survey using an RM-14/HP-210 personnel frisker or instrument of equivalent sensitivity when they exit the protected area (348/80-41-19).

IE Circular 80-14, Radioactive Contamination of Plant Demineralized Water (DW) System and Resultant Internal Contamination of Personnel, recommended that licensees take action to prevent the inadvertent introduction of radioactive materials into the DW system via improper use of temporary connections, install backflow prevention devices, and prohibit consumption by humans of plant-supplied demineralized water. On September 15, 1980, the licensee submitted a Design Change request to install check valves between contaminated systems and the demineralized water system, and check valves in the outlets of the DW storage tanks. At the time of the appraisal the plant modifications had not been performed. The plant also posted the DW system outlet and issued a memo to plant workers informing them that DW was not to be used for human consumption, nor removed from the plant for personal use. The licensee, however, did not take interim measures that would assure that the DW system is not inadvertently contaminated before the permanent corrective action is completed. On October 14, 1980 the DW header became contaminated as a result of the temporary connection of a hose between the DW system (V025A) and the spent resin storage tank sluicing pump. The hose was reading 22 mr/hr when detected by health physics personnel. The concentration of radioactive material at V025A was 2.6 X E-05 microcuries per milliliter. The header was flushed and concentration reduced to 5.0E-07 µCi/ml. The inspector stated that the licensee should establish administrative controls to assure that radioactive material is not inadvertently introduced into the plant's DW system by the improper use of temporary connections (348/80-41-20).

IE Inspection Report 50-348/79-42 of February 4, 1980 identified an item of noncompliance with the plant's Technical Specification 6.8.1, in that written procedures which governed the release of systems for maintenance were not followed. The licensee indicated in a letter dated February 21, 1980, that corrective actions had been accomplished on February 8, 1980. During the appraisal an inspector reviewed the licensee's corrective action. During this review the inspector identified the following four instances which occurred after February 8, 1980 when the maintenance work request was released for work when the system or equipment to be worked was not properly isolated:

November 18, 1980, a maintenance work request for work on an RHR check valve was released, the valve was not isolated. The system was still pressurized to 138 psi with a 3,100 gpm flow through the valve.

August 5, 1980, a maintenance work request for work on the Steam Generator Blowdown System was released, SGBD drain line valve not properly set.

June 12, 1980, the 1B waste gas compressor unloader manual isolation valve was not closed when the 1B WGC was isolated for maintenance. This resulted in a release of gaseous radioactivity into the auxiliary building.

June 6, 1980, improper valve position when clearing of a Tagging Operations Order resulted in a spill at the primary sample sink. The reactor coolant and pressurizer liquid and steam sample lines had been isolated for maintenance.

Each of these incidents was brought to the plant management attention through the radiation incident report system; however, appropriate corrective action was not taken to prevent a recurrence.

The inspector stated that the corrective action taken was apparently ineffective in preventing a recurrence. The inspector stated that failure of the person releasing the work request to perform a thorough review of the work request to ensure that the lant conditions necessary for the work specifted was in effect and failure to position valve as required by the Tagging Operation Order would be considered in violation of Technical Specification 6.8.1 (348/80-41-21).

An inspector reviewed surveys performed during the transfer of spent fuel in the transfer tube after the completion of modifications (PNC-78-235, Rev. 2) to the facility. The need for additional shielding was identified by the licensee during the initial refueling survey performed in 1979. The highest reading identified during the initial survey was 120 R/hr on the 100' elevation at a cork seam between the reactor building and the auxiliary building. After the plant modifications had been completed the levels were reduced to approximately 100 mr/hr. The modifications appeared to be effective in reducing the exposure rates from spent fuel in the fuel transfer tube.

During the appraisal the inspectors observed that the piping and wire trays in the overhead on the 100' elevation was posted as a "contaminated area". Licensee representatives stated that the 100' elevation and the 121' elevation were contaminated when the waste evaporator overflowed. Water is released to the waste evaporator room ventilation when the rupture disk blows. The plant received Plant Change Notice 78-253, Rev. 2, for implementation on April 6, 1979. However, the

corrective action has not been taken. A licensee representative stated that the modification had been made in Unit 2 and they would determine if the problems had been corrected prior to expending the radiation exposure necessary to modify Unit 1 (348/80-41-22).

d. Summary: Based on the above findings, improvements in the following areas are required to achieve an acceptable program:

(1) calibration facility for exposing TLDs (paragraph 8.a);
(2) formal investigation and documentation of TLD/self-reading dosimeter differences (paragraph 8.a);
(3) neutron exposure procedures (paragrpah 8.a);
(4) evaluation of beta dose through respirator lens (paragraph 8.a);
(5) evaluation of Nitrogen-16 exposure (paragraph 8.a);
(6) quality control test of vendor TLD evaluations (paragraph 8.a);
(7) bioassay for beta emitters (paragraph 8.b.(1));
(8) procedures for determining internal dose (paragraph 8.b.(1));
(9) formula for calculating stay-time (paragraph 8.b.(2));
(10) storage of respirators (paragraph 8.b.(2));
(11) respirator issuance facility (paragraph 8.b.(2));
(12) control of locked high radiation areas (paragraph 8.c);
(13) review of health physics records (paragraph 8.c);
(14) personnel contamination monitoring (paragraph 8.c);
(15) administrative controls for connections to Demineralized Water System (paragraph 8.c);
(16) isolation of systems for maintenance (paragraph 8.c); and,
(17) overflow of waste evaporators to ventilation system (paragraph 8.c).

9. Radioactive Waste Management

a. General

The waste and decontamination section within the Chemistry and Health Physics group is a separate organizational unit assigned responsibility for overall waste management as a primary function. Provision is made for reporting to plant management through the chemistry and health physics supervisor. A monthly radioactive waste report is submitted to plant management and corporate management for review. Assurance was received by the inspector from the waste and decontamination section that proper attention and support for the waste management program is provided by management, including corporate management.

b. Waste Processing Systems

The waste evaporator system is apparently the major system causing problems in attaining design objectives. As has been the case at other nuclear power plants, the licensee has experienced difficulty in consistently maintaining the system operating efficiently enough to

meet decontamination factor design objectives. This has necessitated recycling which may generate additional unwanted wastes to process. This led to the decision to install a new demineralization system to replace the waste evaporator for routine uses. The waste manager stated that the waste evaporator will be maintained and operated as an alternate to the new demineralizer system. The new Hittman demineralizer system has been evaluated in accordance with 10 CFR 50.59 and Regulatory Guide 1.143 and the system is currently being installed. The licensee's decision to install the new demineralizer system was influenced by informtion obtained from other power plants indicating improved performance. The safety evaluation projects significant reduction in volumes of waste shipped and exposure to plant personnel. Although offsite liquid releases are expected to increase slightly, increases in decontamination factors are expected to decrease the total radioactivity in liquid discharges.

c. Liquid and Gaseous Wastes

The waste management program provides review to minimize waste and effluent releases. Employees are also given incentives to reduce radioactive wastes by emphasis from supervision if there is an unusual buildup of wastes. The waste management program is keyed to the ALARA program and there appears to be free interchange between responsible organizational units to accomplish this. Licensee procedures address minimizing wastes. In adition to the new demineralizer system described above, the licensee has plans for other improvements to minimize wastes.

The licensee's procedures cover the movement and discharge of liquid and gaseous wastes; release rates, alarm setpoints, laboratory analysis results, compliance with Technical Specification limits, total activity released, total volume released, valve lineup, types of samples to be collected, the analysis performed and sampling and analysis schedules. This was determined through discussions with the plant staff and review of the following licensee procedures:

RCP-57	Radioactive Material and Waste Handling
RCP-58	Waste Management
RCP-372	Sampling Points
RCP-376	Administrative Management of Radioactive Liquids in Waste Systems
RCP-377	Liquid Waste Releases
RCP-378	Preparation of Composite Effluent Samples
RCP-381	Gaseous Waste Releases

Liquid and gaseous sample locations were observed and found to provide capability for collection of routine grab samples. Containment samples are collected remotely during operation. The licensee has conducted studies including tracing of systems to determine that potential radioactive effluent pathways are monitored and/or sampled. This

resulted in several improvements including the turbine building sumps where liquid level measurements, recirculation capability prior to sampling and improved sampling equipment have been provided. Records and discussions indicate that waste equipment is adequately maintained and operated. The waste evaporator has been an ongoing problem and disproprotionate effort has been required to maintain efficient operation of this equipment. Even so, there has been a definite downward trend in waste volumes.

d. Solid Waste Processing

Observation of shipping containers, review of shipping papers, review of licensee procedures and discussions with licensee representatives indicate that waste packaging conforms to Department of Transportation and NRC regulations. The licensee's procedures contain requirements for meeting DOT regulations. Licensee records contained certifications of shipping containers. The licensee's procedures contain requirements for burial sites including the absence of liquids. The licensee plans to install a new Hittman solidification system and the equipment was arriving onsite at the time of this appraisal. The safety evaluation under 10 CFR 50.59 was in progress. The inspector stated that the safety evaluation will be reviewed during subsequent inspections (348/80-41-23). The new solidification system is expected to reduce volumes of waste . A more efficient compactor has reduced the volume of dry waste about 35%. The licensee plans to use strippable paint in the reactor cavity for future refueling outages which should reduce the volume of decontamination liquids and solids which require disposal. It should be noted that allotments imposed on the amount of waste that will be accepted at burial sites such as Barnwell, SC, give the licensee incentive to reduce volumes of waste. As an indicator of the licensee's efforts to reduce waste volumes, signs have been posted throughout the plant admonishing personnel not to generate unnecessary wastes. Records and graphs maintained by the waste manager indicate that the volume reduction program has been effective in that a definite downward trend is reflected. The inspector stated that during tours of the plant, it was observed that workers were still taking cardboard boxes, packing material and other disposal material into contaminated areas. Radioactive wastes reduction should be stressed during the radiation protection orientation training (348/80-41-24). Licensee procedures address the requirements of 10 CFR 71 for packaging and transportation of wastes. The licensee has depended primarily on contractors for certified shipping containers. Licensee records contained certificates for the contractor shipping containers and decriptions of the contractors QA program for shipping containers. A problem has been experienced in maintaining spent resin flow through piping with excessive bends and steep slopes. The present location of the dry waste compactor is undesirable from the standpoint of degree of isolation necessary to reduce the potential of exposure to other personnel in the vicinity. The exhaust from the compactor is filtered; however, it

exits directly to the room which is occupied by other personnel not associated with the compacting operations. Licensee personnel indicated that the compactor may be moved to a new waste handling and storage facility on which construction is soon to begin. The inspector stated that prompt action should be taken to enclose the compactor (e.g., tent, metal building, etc.) (348/80-41-25). Wastes have apparently been shipped in a timely manner as evidenced by good housekeeping in the midst of an outage. Discussions were held with licensee personnel concerning the caution to be exercised in not accumulating excess wastes in the new storage facility when it becomes available.

Procedures for calibration of particulate, iodine, noble gas and area monitor detectors were reviewed. There are over 40 systems used for monitoring area, process and effluent releases. Most of these systems were identified in-plant and their operating conditions verified. Two portable Eberline SPING-4 systems were in-plant, but these units had just been received from the manufacturer and had not been made operational.

Routine calibrations are scheduled from monthly to 18 month intervals, depending on the type monitor. Setpoints have been justified and documented in FNP-1-RCP-252, May 6, 1980, Rev. 3. The Instrument and Control (I&C) Group has the responsibility for routine instrument calibration, but the radiation protection section has responsibility for actual source calibrations. This working arrangement is beneficial because skills not usually found in the I&C group can be supplemented by health physics personnel.

The written procedures are not useful for OJT. This problem has been identified by the HP technicians. The licensee should develop documents that can be used to train personnel in the proper calibration of the monitors (348/80-41-26).

Area Radiation monitors are set by positioning a Cs-137 source at a distance from the detector to produce the desired exposure rate. Two point calibrations are generally used. Detectors containing G.M. detectors are required to have H.V. plateaus set during initial calibration of the G.M. detector with no more than 15% slopes. Particulate detectors are also calibrated with Cs-137 sources, but fixed geometry is maintained and there is a method for calculated source decay in the procedures.

The Westinghouse fixed monitors use Sr-90/Y-90 secondary source calibrators, commonly called "cap" sources. These sources fit over the G.M. detectors that are pulled from the shield in the fixed monitor. The secondary calibration source is related directly to a "typical" calibration of the monitor to gaseous levels of Xe-133 and Kr-85.

Other monitors have been calibrated with I-129, Sr-90/Y-90, Tc-99 and Cl-36. The sources and procedures appear appropriate for the respective monitors and detectors. Iodine monitors are generally calibrated

with "mock iodine" sources (a combination of Cs-137 and Ba-133 that simulates the I-133 energy).

The G.M. tubes used for noble gas monitoring are open to the air stream (by manufacturer design). Because of this design, the beta particles can be detected. It has been found that G.M. tube wall thickness vary from manufacturer to manufacturer. Therefore, beta secondary standards are not appropriate for every type G.M. tube. The licensee has identified this problem and adjusted the calibration correction factors for "cap" sources according to G.M. tube manufacturer.

Several maintenance problems were identified with fixed monitors. Because of extreme heating, air pump failures occur in some fixed monitors every six months or so. Failure of the system necessitates recalibration of the air flow system. In units with movable filter paper, modifications of systems were necessary when the original type filter paper was no longer available. Strip chart recorders are also frequent repair problems because of jamming or poor feeding of paper. This latter problem was noted by the inspector in a control room air monitor readout.

Although every fixed monitor did not have a "primary calibration" as required in ANSI N13.10-1974, typical calibrations of Westinghouse monitors were available and effort was being made to properly relate calibrations to secondary standards. No calibration procedures had been established for newly procured SPING-4 monitors.

e. Summary: Based on the above findings, this portion of the licensee's program appears to be acceptable, but the followup matters should be considered for improvement of the program:

(1) waste reduction training for plant personnel;
(2) isolation of the dry waste compactor; and
(3) development of documents to train I&C and HP personnel in the calibration of fixed radiation monitors.

10. ALARA Program

10 CFR 20.1c states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposure as low as reasonably achievable (ALARA). The recommended elements of an ALARA program are contained in Regulatory Guide 8.8, Information Relevant to Ensuring that Occupational Radiation Exposure at Nuclear Power Stations will be ALARA, and Regulatory Guide 8.10, Operating Philosophy for Maintaining Occupational Radiation Exposures ALARA.

The licensee has a written policy and commitment to an ALARA program. A section supervisor has been assigned the responsibility for the ALARA program and he reports directly to the C&HP supervisor. The program is the

sole job responsibility of the ALARA supervisor. Written procedures are available to implement the program. ALARA Problem and Evaluation Reports, by which any plant personnel can report an identified problem in the ALARA program, are routinely used. The ALARA supervisor reviews design changes, equipment changes and performance of specific work activities to assure that ALARA concepts are considered. This was verified by review of records which revealed input by the ALARA supervisor for the new demineralizer system, solidification system and waste storage facility. The ALARA supervisor closely coordinates his activities with plant Health Physics. Several items observed by the inspectors during plant tours were enumerated to the ALARA supervisor such as: (1) higher than normal general radiation background in the area of the Hydrogen recombiner control panel; (2) potential for unnecessary exposure to personnel in the new compactor and drum storage areas; (3) temporary sampling facilities for waste evaporator distillate; and (4) outside storage of plywood boxes containing waste. The ALARA supervisor was aware of all the items and indicated corrective actions were in progress or planned.

Summary: Based on the finding above, this portion of the licensee's program appears to be acceptable.

11. Facilities and Equipment

a. Facilities

The health physics foreman's office is located adjacent to the entrance to the radiation control area. Although this space is conveniently located, it is small and inadequate for the in-plant health physics staff. Additional work space is needed for the health physics foremen.

The counting room is located in the auxiliary building. High airborne radioactivity experienced during an accident probably will render this area unusable. However, the licensee has considered this possibility and is planning to locate an alternate counting facility at the training center now under construction.

b. Equipment

Calibrations and control of fixed and portable health physics instrumentation is described in Farley Nuclear Plant Procedure, FNP-O-RCP-201, July 11, 1978, Revision 3. This procedure calls for identification, inventory, maintenance, calibration and record keeping of portable instruments. Although this procedure is generally adequate, the inspector recommended that it be updated to include record keeping information found in ANSI N323-1978, Radiation Protection Instrumentation Test and Calibration.

At the time of the inspection, an adequate number of protable survey instruments was available. Unit No. 2 was nearing fuel loading status and purchase orders had been placed to essentially double the number of routinely used instruments.

Instrument calibration procedures were reviewed by the inspector. Most of these procedures were written in 1978 or before. There are no references to the ANSI N323-1978 standard. In FNP-O-RCP-207 and -208, G.M. survey meters are referred to as "dose rate" instruments. Other procedures refer to "gamma field" but do not specify the isotope (i.e., Cs-137). Instrument responses are required to be "within 10%", but factors affecting accuracy (i.e., temperature, pressure, humidity, geometry, scatter, positioning and NBS intercomparisons) are generally not considered. The procedures allow the use of "off-site" calibration, but no guidance is provided as to when it is necessary for off-site calibration. The inspector recommended that the procedures be revised to meet current standards (348/80-41-27).

Simple instrument maintenance is accomplished by the health physics section. Routinely used instruments are repaired by the Farley instrument group. Inventories of spare parts are kept for these instruments. Other instruments, such as teletectors, are sent to the manufacturers for repair. Instrument repair has not been a problem as evidenced by the fact that over 85% of the instruments were functional at the time of the inspection.

Instruments are normally response checked on a daily basis. Gamma check sources are maintained inside the instrument storage cabinet. Other check sources are maintained in the calibration laboratory.

An Eberline Model 1000B Multiple Source Gamma Calibrator had recently been purchased for instrument calibrations. Although this instrument does not conform to all the requirements set forth in ANSI N323-1978, it is especially useful in reducing personnel exposure and in verifying the "precision" of the instrument calibration. The inspector cautioned that the energy distribution within the calibrator should be known and that survey instruments with broad energy responses may be difficult to accurately calibrate in this device. Intercomparison with laboratories conforming to ANSI N323-1978 is recommended.

The teletector survey instrument had not been calibrated on the high range scales. The inspector recommended that a calibration procedure for the teletector be implemented to determine the relative response on high ranges. Other facilities have typically reported underresponses of 50% on high range scales of the teletectors.

NBS traceability is established for gamma sources by condenser R-meter calibrations at the manufacturer's regional calibration laboratory. A uranium slab source was available for beta source calibration. Neutron

calibrations are established with an 8.5 Ci PuBe source. Standard Pu-239 alpha sources are available for use.

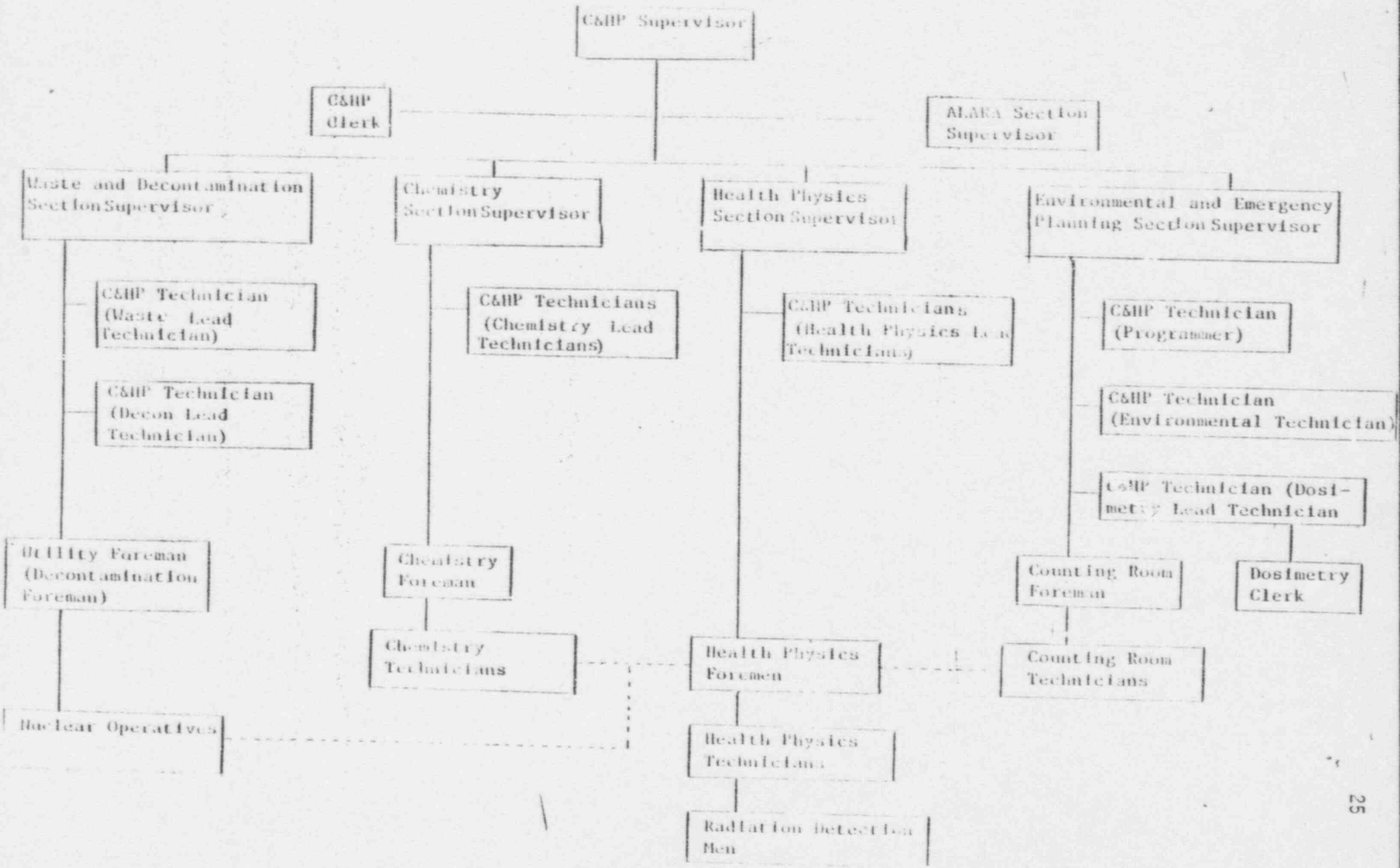
The RO2/2As were routinely used for beta radiation surveys. A correction factor of 4 had been established for contact beta measurements.

Air sampler calibration flow rates had been established by manometric methods and magnehelic gauges. These methods are described in the appropriate procedures.

A calibration laboratory was built in the auxiliary building. This facility is convenient and allowed ample storage for broken instruments and for record keeping.

In general, instrument calibration training was regimented. Most of the technical knowledge of instrument calibration was supplied by the HP foreman. The inspector recommended additional technical training for Lead Technicians involved in and responsible for instrument calibrations.

Summary: Based on the above findings, this portion of the licensee's program appears to be acceptable, but consideration should be given to upgrading instrument calibration procedures.


C&HP Supervisor
C&HP Clerk
ALARA Section Supervisor
Waste and Decontamination Section Supervisor
Chemistry Section Supervisor
Health Physics Section Supervisor
Environmental and Emergency Planning Section Supervisor
C&HP Technician (Waste Lead Technician)
C&HP Technicians (Chemistry Lead Technicians)
C&HP Technicians (Health Physics Lead Technicians)
C&HP Technician (Programmer)
C&HP Technician (Decon Lead Technician)
C&HP Technician (Environmental Technician)
C&HP Technician (Dosimetry Lead Technician
Utility Foreman (Decontamination Foreman)
Chemistry Foreman
Counting Room Foreman
Dosimetry Clerk
Chemistry Technicians
Health Physics Foremen
Counting Room Technicians
Nuclear Operatives
Health Physics Technicians
Radiation Detection Men