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REGION IV

Emergency Preparedness Appraisal

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1623 Harney Street
Omaha, Nebraska 68102

Facility Name: Fort Calhoun Station

Appraisal At: FCS, Fort Calhoun, Nebraska

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SUMMARY

During the period of December 7 - 16, 1981, the NRC conducted an appraisal of the state of the Emergency Preparedness Program at the Fort Calhoun Station. The results of this appraisal are based on approximately 500 man-hours of on-site review and evaluation, plus a preparation effort of approximately 100 to 200 man-hours in document review prior to the team appearing at the site. It should be noted that this appraisal was performed during an extended outage at the licensee's facility even though the appraisal had been postponed twice to try and prevent such an occurrence. While there were the inevitable scheduling problems to both the licensee and the Team, the Team would like to express their appreciation to the staff and management of the Fort Calhoun Station for their help in making personnel and documentation available to the Team and for their display of perseverance while coping with both an extended, difficult outage and the needs of the NRC Appraisal Team. It should also be noted that this report reflects the conditions and deficiencies as they existed when identified by the team. After deficiencies were identified to the licensee, during periodic briefings by the team leader, the licensee in many cases took immediate steps to correct deficiencies or to provide the team with additional documentation on which to base its findings.

The appraisal of the state of on-site emergency preparedness at the Fort Calhoun Station (FCS) involved seven general areas:

- Administration of the Emergency Preparedness Program Development;
- Emergency Organization;
- Emergency Training;
- Emergency Facilities and Equipment;
- Procedures Which Implement the Emergency Plan;
- Coordination with Off-site Agencies; and
- Walk-throughs of Emergency Duties, including exercises and drills.

The development of the FCS Emergency Preparedness Program was performed by a limited number of individuals at FCS with only minor input from general station personnel. The results of the appraisal indicated that the existing program

contained a number of deficient areas and that the major causes of these deficiencies were a very rapid number of substantive changes to the overall emergency preparedness program and a resulting limited scope of training of the station personnel in the specifics of the changes and of changes in their duties, responsibilities, authorities, and limits of action. Generally, the changes to the Emergency Plan Implementation Procedures (EPIPs) had not kept up with changes in the Emergency Plan, thus leading the auditors to determine that many of the provisions of the Emergency Plan had not in fact been implemented at the site at the time of this appraisal.

The licensee's emergency organization description was incomplete in that it did not adequately define the authorities, responsibilities, and interrelationships for performing the various emergency tasks and functions described in the Emergency Plan nor had specific assignment been made of personnel to the various parts of the overall Emergency Response Organization. Within the scope of procedures developed to implement the Emergency Plan, there were conflicting and unclear delineations of key duties and responsibilities.

The training program was not completely developed but individuals had received some training before the NRC Appraisal Team visit. Observation and questioning of selected individuals during walk-throughs of their assigned emergency tasks and functions indicated that the individuals were aware of many of the organizational, training, and procedural shortcomings but could perform reasonably effectively in spite of them for emergencies.

Licensee coordination with various non-licensee agencies was considered adequate.

The auditors concluded that the licensee appeared to be capable of responding to and managing the response to radiological emergencies at the Fort Calhoun Station. It should be noted that the Appraisal Team fully realizes that, due to the time and manpower limitations of the Appraisal, it has not identified all of the minute areas of the licensee's emergency preparedness and response program which may need correction to be in full compliance with the NRC Emergency Preparedness Regulations. Additional deficiencies may be identified during the observation of the licensee's emergency drills and exercises and during other normal NRC inspections.

1.0 ADMINISTRATION OF EMERGENCY PREPAREDNESS

The auditors reviewed the contents of the Fort Calhoun Station Radiological Emergency Response Plan (RERP) dated October 15, 1981, and its Implementing Procedures (EIPs) Revision 1, dated July 14, 1981. Further, the auditors held discussions and interviews with Omaha Public Power District personnel both at the site and at the corporate offices and obtained additional documentation from OPPD regarding their normal corporate structure and emergency duty assignments.

1.1 Responsibility Assigned

Section P-1.0 of the licensee's Emergency Response Plan indicates that, "...the authority and responsibility for radiological emergency response planning be a corporate function with the Supervisor - Chemistry and Radiation Protection providing site representation to the total planning effort. The Radiological Health and Emergency Preparedness Manager is the Emergency Coordinator whose responsibility shall include the coordination of offsite planning efforts. He also has overall authority and responsibility for the development, review, updating and distribution of the Emergency Plan to ensure it remains current. It shall also be the Emergency Coordinator's responsibility to ensure that all review and audit comments or recommendations are evaluated and implemented as appropriate."

During discussions with the Manager of Radiological Health and Emergency Preparedness (RH&EP) of the OPPD corporate offices, the auditors determined that his emergency preparedness planning duties represented one half of his total assigned duties. Further, the Supervisor of Chemistry and Radiation Protection at FCS stated that the Emergency Preparedness Planning Duties were in addition to his other normal duties but that no problems were expected due to that additional demand for his time.

The auditors noted that, during the development and revision of the RERP and its Implementation Procedures (EIPs), only senior persons (Managers and Supervisors), had any direct input to the effort and no specific provisions were made to actively solicit and incorporate input from the working level

staff. The auditors also noted that generally the station management and professionals were aware that the Manager-RH&EP was responsible for the Emergency Planning.

1.2 Authority Assigned

The auditors noted that the Manager of Radiological Health and Emergency Preparedness had been assigned his responsibilities and authorities by both the Emergency Plan and his position description. Further, he received the support of the corporate manager when exercising his authority. The auditors also noted, however, that the assignment of the site representative (Supervisor, Chemistry, and Radiation Protection) had not yet taken place.

1.3 Planning Coordination

During discussions with the Emergency Planning Coordinator (EPC), the auditors determined that coordination between the licensee and the general public/news media was done at the corporate level only; however, the auditors noted that the responsibility was not clearly specified in the Emergency Plan or its Implementation Procedures except when the Recovery Organization is fully activated during an emergency. The auditors further determined that coordination with off-site Nebraska and Iowa State Authorities appeared adequate and that the degree of cooperation and coordination with local county authorities also appeared to have been adequate (see Section 6.1 of this report).

The auditors noted that changes to the Emergency Response Plan and its Implementing Procedures were subject to the approval of the Plant Review Committee (PRC), however; the auditors were unable to determine if the persons responsible for emergency response planning had any direct input to budget planning.

Coordination between and among the various OPPD corporate and site groups appeared to be adequate; however, coordination for the purposes of assignment of individuals to the Emergency Response Organizations was still in progress at the time of this appraisal.

1.4 Personnel Selection and Qualification

During discussions with the site and corporate individuals responsible for the planning effort within the licensee's organization, the auditors noted that the individuals possessed a general understanding of the principles involved in developing plans and procedures. The auditors also noted, however, that there were no selection or qualification criteria for the individuals filling positions related to emergency preparedness planning activities. Since there were no explicit selection criteria or minimum qualification criteria implemented within the licensee's organization, there were no clear provisions established for training the individuals to fulfill minimum criteria of these positions. Section 0-6.3 of the FCS Emergency Plan addressed training for those individuals responsible for the emergency planning effort. The auditors noted that there were no provisions or existing plans to provide professional development training for those individuals currently holding emergency planning positions to ensure the maintenance of state-of-the-art knowledge.

1.5 Quality Assurance of Emergency Preparedness Organization

The auditors held discussions with the Manager of Radiological Health and Emergency Preparedness and various other licensee employees to determine the methods used by OPPD to verify that the licensee's Emergency Preparedness Program was adequate and that timed operability checks were performed when required.

The auditors noted that a set of "Emergency Preparedness Tests" (EPTs) had been established by the licensee as the method to "ensure the commitments of the Fort Calhoun Station 'Emergency Plan' are fully completed and documented within the time frequencies required." The procedure which implemented those EPTs was identified as DAS-EP-1, dated June 19, 1981.

The auditors were provided copies of the 12 existing of the projected 16 EPTs. The auditors noted that the EPTs would, in general, provide a means to determine the overall status of the licensee's Emergency Preparedness efforts and commitments. However, the auditors also noted that the use of the EPTs

was not a part of the plant QA department functions and that the EPTs had been established in lieu of normal QA audit procedures.

The auditors noted that part 2 of EPT-3 "Emergency Response Communications," did not require the testing of all four of the NRC ENS phones at the station and that the phone number for the NRC Region IV offices was incorrect. Further, part 2 of EPT-5 "Emergency Telephone Numbers" was only performed semiannually rather than quarterly per NRC guidance. Also, EPT-8 "Meteorological Instrument Calibration Verification" was only performed semiannually rather than quarterly per NRC guidance. Also, EPT-9 "Emergency Plan Reviews" did not call for the review of all letters of agreement annually per NRC guidance (the licensee's commitment in the Emergency Plan to do this every 5 years is not adequate).

1.6 Conclusions and Determinations

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Assign the site representative for the Emergency Preparedness Development Program (285/81-35-01);
- Develop and implement a program for professional development training for individuals, who are assigned Emergency Planning responsibilities, which will enable them to attain and maintain a state-of-the-art knowledge in the field of emergency preparedness (285/81-35-02);
- Develop and implement a method to provide substantive input from plant staff, down to the working level, to the development of emergency preparedness plans and procedures (285/81-35-03);
- Develop and implement explicit selection and qualification criteria for individuals performing emergency preparedness development activities (285/81-35-04);

- Develop and implement quality assurance procedures to evaluate the effectiveness of the emergency preparedness development training including the professional development program developed for persons assigned emergency preparedness development activities (285/81-35-05); and

- Correct Emergency Plan, EIPs, and EPTs to be consistent with the dated requirements of 10 CFR Part 50, Appendix E, and the guidance contained in NUREG-0654 (Regulatory Guide 1.101) (285/81-35/06).

2.0 EMERGENCY ORGANIZATION

2.1 On-site Organization

The auditors reviewed the contents of the licensee's Radiological Emergency Response Plan, dated October 15, 1981; Revision 1 to the Fort Calhoun Station Emergency Plan Implementing Procedures, dated July 14, 1981; and held discussions with licensee personnel to evaluate the nature and adequacy of the licensee's on-site emergency response organization and the assignment of emergency duties, responsibilities and authorities. The auditors also reviewed the licensee's entire organizational structure from the Board of Directors down to the individual working level at FCS and reviewed the job descriptions of key emergency response personnel.

Sections A, B, C, G, L, and M of the licensee's Emergency Response Plan described the OPPD on-site Emergency Response Organization and the Recovery Organization. The licensee's EIPs were divided into groups by the location where the procedure would be used. Thus, procedures used in the Control Room and Operations Support Facility (OSC) were the "EIP-OSC" series of procedures. Likewise, there were separate series of procedures for the Emergency Operations Facility (EOF), Technical Support Center (TSC), Re-entry and Recovery Organization (RR) and Public Information Organization (PI). The auditors also reviewed the supporting procedures such as the Radiation Protection Procedures, Chemistry Procedures, Plant Standard Operating Procedures (SOPs), Emergency Operating Procedures (EPs) and the Operating Instructions for Post-Accident Sampling Procedures (OIPAPs).

The auditors determined that an On-Site Emergency Organization had been established in the Emergency Plan including: 1) an "Initial Emergency Organization" of 3 persons in the Control Room; 2) a "Technical Augmentation Staff" (TAS) of a minimum of 12 persons in the TSC; and an "Emergency Team" of a minimum of 31 persons in the EOF. The auditors noted that, when fully activated and established, the licensee's on-site emergency organization would fulfill the general guidance as to the types of functions which must be covered by such an organization.

The auditors also noted, however, that neither the licensee's Emergency Plan nor EIPs specified the names or titles of persons assigned to fill each emergency duty position for the On-Site Emergency Organization. Further, the auditors determined that the licensee could produce no documentation that assignment of personnel to the On-Site Emergency Organization had, indeed, taken place. Upon questioning, by the auditors, the licensee produced a proposed draft revision to EIP-OSC-2 "Emergency Plan Activation" which, when issued, would partially fulfill this requirement. However, the normal duty title of the proposed assigned individual was not included nor was there any other indication of formal assignment to the On-Site Emergency Organization other than the names appearing on the "Emergency Call List" of the proposed revision to EIP-OSC-2.

Upon cross-checking the duties of members of the On-Site Emergency Organization as they appeared in the Emergency Plan and the EIPs, the auditors noted that in many cases the EIPs did not match with the EP and that as many as three persons were given the responsibility for a single action (e.g., personnel accountability).

The auditors also noted that neither the EP nor the EIPs contained specific indications that all personnel assigned to the licensee's On-Site Emergency Organization had been specifically given the required authorities to enable them to carry out their assigned duties and responsibilities. Upon being informed of this deficiency, the licensee produced a draft of a resolution which was being proposed by the OPPD Management to the OPPD Board of Directors. That resolution, if approved, would delegate the authority to respond to an emergency at FCS from the Board of Directors to the General Manager of OPPD, or his designee. Attached to that proposed resolution was a memorandum from the General Manager of OPPD which would designate the Radiological Emergency Response Plan as the District's official plan for responding to a radiological emergency at FCS and to authorize persons occupying positions identified in the plan "to conduct those activities necessary to fulfill their responsibilities as described in the plan." Approval of both of those documents and incorporation of them into the EP and EIPs would greatly clarify the questions of assignment of authority.

The auditors noted that the EP and EIPs did contain provisions for a designated management structure for the On-Site Emergency Organization and that provisions had been implemented to ensure that an Emergency Coordinator (i.e., Emergency Duty Officer (EDO) - initially the Shift Supervisor) was available on-site at all times who had the authority and responsibility to initiate any emergency actions within the provisions of the EP, including the exchange of information with off-site authorities responsible for coordinating and implementing off-site emergency measures. Further, the auditors noted that lines of succession had been established for the EDO position but that no specific lines of succession had been established for all other positions in the management structure for the various functional response areas of the On-Site Emergency Organization.

The auditors determined that formal selection and qualification criteria for each emergency functional area, had not been established to govern the assignment of personnel to emergency functions or duty positions. Instead, assignment of personnel to the emergency organization was based only on the individual's position and experience. Specific provisions have not been made to first determine what type of training and experience would be needed to perform an emergency function and then determine those types of persons whose normal duties most closely fulfilled the requirements and what additional training would be needed.

The auditors noted that the licensee had not met the on-shift manning and staff augmentation times as required by Table B-1 of the February 18, 1981, Generic Letter 81-10 to all licensees from Darrell G. Eisenhut, Director of the Division of Licensing, Office of Nuclear Reactor Regulation, USNRC. The auditors reviewed a letter dated April 2, 1981, from Mr. W. C. Jones, Division Manager for Production Operations of OPPD, to Mr. D. G. Eisenhut, NRC. In that letter, OPPD described their deficiencies in meeting the Table B-1 shift staffing and augmentation requirements. The auditors noted that OPPD indicated that they were unable to commit to the augmentation time requirements of Table B-1 due to the distances that people lived from the FCS site. However, the auditors were unable to find any definitive study as to how far away from the site the necessary persons lived or what their projected response times would be during various conditions of weather, time of day, etc.

2.2 Augmentation Organization

The auditors reviewed Sections A, B, C, G, L, and M of the licensee's Emergency Response Plan and EIPs (especially the EOF, RR, and PI series) and held discussions with the licensee representatives to verify that the corporate organization, which will augment the On-Site Emergency Organization, had been defined; that interfaces among the corporate organizations and the station organization had been delineated; and that the identified corporate functions were consistent with the licensee's overall Emergency Response Organization, the procedures which implement the Emergency Plan, and the guidance contained in NUREG 0654, Revision 1. The auditors determined that a Recovery Organization had been defined and that the individuals in the Recovery Organization had been identified by position title, down to the working level, with provisions for a line of succession for the management of the various Recovery Organization activities. However, the auditors again noted that formal assignment of persons to the Recovery Organization had not been completed.

The auditors determined that the corporate individuals assigned to the Recovery Organization did possess work experience in the general types of duties of their assigned functional area in the emergency response program, but that again no specific selection and qualification criteria had been established to assign individuals to the Recovery Organization. The auditors noted that the licensee had made provision for 24 hour per day coverage of the Health Physics (H.P.) functions by planning for 12 hour on and 12 hour off shifts for their existing H.P. support staff during accident conditions. The auditors determined that the licensee's Radiological Emergency Response Plan did not contain copies of all letters of agreement with the off-site organizations which might be requested to provide technical assistance to, and augmentation of, the licensee's Emergency Organization. Also, all of the existing letters were not up-to-date and of sufficient detail as to determine the nature and extent of agreed support. Further, the authorities, responsibilities, and limits of actions by such support organizations were not specified in either the EP, EIPs, or the letters of agreement.

The auditors determined that the provisions for support by local services for handling emergencies (e.g., ambulance, medical, hospital, and fire fighting

organizations) had been identified and letters of agreement were available in the Radiological Emergency Response Plan although the letters were not of adequate specificity.

2.3 Conclusions and Determinations

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Correct the EP and EIPs to unambiguously specify, by normal duty title and emergency duty title, all persons assigned to the licensee's On-Site Emergency Organization and Recovery Organization (285/81-35-07);
- Provide documentation that formal assignments of all persons assigned to the On-Site Emergency Organization and Recovery Organization has been made (285/81-35-08);
- Remove inconsistencies between the EP and EIPs including corrections to remove unintended duplication of assigned responsibilities (285/81-35-09);
- Correct the EP and EIPs by unambiguously defining the authorities of all individuals assigned to the On-Site Emergency Organization and Recovery Organization (285/81-35-10);
- Develop and implement specific lines of succession for all positions in the management structure for the various functional response areas of the On-Site Emergency Organization (285/81-35-11);
- Develop and implement selection and qualification criteria for individuals assigned to perform emergency actions and decision making as members of the On-Site Emergency Organization and Recovery Organization (285/81-35-12);
- Revise the emergency plan and procedures to include the augmentation of emergency personnel as specified in NUREG-0654, Revision 1,

Table B-1 and provide a method to verify that there is reasonable assurance that the augmentation times can be met for the specified minimum augmentation staff (285/81-35-13); and

- Provide in the Emergency Plan copies of up-to-date letters of agreement or contracts which demonstrate that arrangements have been made with off-site organizations (both commercial and private) to supply specifically defined support or cooperation during an emergency including their authorities, responsibilities, and limits of actions (285/81-35-14).

3.0 TRAINING/RETRAINING

The auditors noted that an inspection by NRC Region IV and other inspectors had been conducted at the licensee's site from July 20 - 23, 1981 with regard to the licensee's performance during their annual full-scale exercise.

Training of the licensee's emergency response teams was one of the items covered in the NRC inspection report No. 50-285/81-19. The auditors reviewed the inspection report and considered the current level of licensee's training and readiness against the report findings.

The auditors noted that the licensee had a formal emergency plan, "Radiological Emergency Response Plan for the Omaha Public Power Districts Fort Calhoun Nuclear Station", dated October 15, 1981.

The auditors further noted that the licensee had developed a radiological emergency training manual with detailed lesson plans covering all positions identified by title in the emergency plan. The auditors also noted that this manual had sections covering "Planning Personnel" and "Retraining". The title of this manual was "Fort Calhoun Station Emergency Preparedness Training Manual" and was dated November 12, 1981.

The auditors reviewed the "Fort Calhoun Station, Unit No. 1 - Operating Manual" containing Fort Calhoun Emergency Plan Implementing Procedures (EIPs) and noted that procedures had been implemented or were in the process of being finalized and implemented into the manual for all individuals responding by title to the licensee's emergency manual.

The auditors noted during the review of the licensee's manuals on emergency preparedness that some EIP's did not exist. Interviews with the Emergency Preparedness Coordinator indicated that EIP-OSC-10, "Initial Assessment of Plant Parameters and Effluent Monitors to Determine Source Term", EIP-OSC-11, "Initial Dose Assessment Based on Plant Instrumentation", EIP-EOF-16, "Continuing Dose Assessment Based on Plant Instrumentation", EIP-EOF-15, "Determination of Contamination Released from the Stack", and EIP-EOF-18, "Off-Site Radiological Surveys" had been written and reviewed for comments, but at the time of the appraisal, not implemented into the EIP Procedure

Manual. The auditors further noted during the interview with the Emergency Coordinator that training of the applicable licensee staff members responding to the aforementioned EPIP's had been accomplished. The auditors determined by auditing the licensee's training records and conducting walk-throughs with radiological emergency team, recovery organization, and off-site support members that comprehensive training had been accomplished and had included both the unimplemented EPIP's as well as the adopted EPIP's.

As previously mentioned, the auditors noted that an Emergency Preparedness Training Manual detailing: purpose; objectives; schedule; responsibilities; instructor; participants; program requirements; program description; program documentation; and requiring a passing score on a written examination of 80 percent as a minimum, had been established for all team members of the following groups - Emergency Organization, Recovery Organization, and Off-Site Support. The auditors noted that the Planning Personnel function identified and detailed in the manual was exempted from the testing required of all other organizations.

The auditors reviewed several of the approximately 70 emergency preparedness tests that had been generated by the licensee to test emergency team members in all organizations. Those examinations were available to the auditors at the OPPD 6th Street facility in Omaha, in the office of the licensee's Emergency Preparedness Coordinator.

The auditors reviewed training records at the licensee's Fort Calhoun facility to determine that emergency training was conducted annually. Training records were checked by identifying licensee personnel by name and emergency function for 1980 and 1981. Random selections were made from TSC, EOF, Recovery Operations and EDO personnel. Documentation existed in licensee's files to indicate licensee personnel were trained in 1980 and 1981 for their specific emergency assignment. The auditors noted that the licensee's Emergency Plan, EPIP's, and Training Manual specified annual re-training and exercises.

The auditors noted that the licensee conducted a varied program of drills and exercises some having scenarios and some involving local support groups such as: 1) Fire Departments - Blair, Fort Calhoun, and Missouri Valley Fire and

Rescue; 2) Sheriff's Departments from Nebraska and Iowa; 3) Nebraska State Patrol; and 4) the University of Nebraska Medical Center (UNMC), Radiation Medical Center. The auditors noted documentation of letters sent to local support groups inviting them to attend exercises at Fort Calhoun. Documentation of local support groups participating in Fort Calhoun exercises were also noted.

The auditors toured the UNMC facility to determine its adequacies in meeting the criteria defined on page 0-6 of the licensee's Emergency Plan. "The Radiation Medical Center was developed to provide comprehensive evaluation and treatment of persons exposed to or presumed to have been exposed to ionizing radiations." The auditors noted that the UNMC facilities appeared adequate and that UNMC staff personnel were highly trained in procedures and methods governing the handling of patients who have been exposed to high levels of radiation or contamination.

The auditors conducted interviews with licensee personnel having various functions on emergency teams and a random selection of residents living within the 10-mile Emergency Planning Zone (EPZ) zone around the licensee site, to determine the licensee's adequacies in training emergency team members and education of residents residing within the 10-mile EPZ of what actions residents should take in a nuclear emergency (See Section 6.2 of this report). The auditors determined through these interviews and reviewing a copy of the notification letter and brochure that the licensee had provided instruction to the emergency team members as well as to members of the general public.

The auditors did note, however, that the licensee had made no provisions to require that members of the emergency teams train to perform their assigned function while using all the equipment and protective clothing/respiratory protection equipment (SCBAs) that they might be required to don and use during an actual emergency. This could lead to serious problems during actual emergencies.

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Complete the implementation of all existing EIPs (285/81-35-15); and

- Develop and implement a program to train all emergency response personnel in the proper use of all equipment which would actually be required to safely perform their assigned tasks under emergency conditions, including walk-through training while wearing full respiratory protection and protective clothing (285/81-35-16).

4.0 EMERGENCY FACILITIES AND EQUIPMENT

4.1 Emergency Facilities

4.1.1 Assessment Facilities

4.1.1.1 Control Room (CR)

The auditors reviewed the OPPD Emergency Response Plan Section H-4.0 and Surveillance Test ST-RM-3-1. The auditors also toured the Control Room facilities and held discussions with the Control Room personnel on all three shifts.

The Control Room was located on the 1025 foot level of the Auxiliary Building. The auditors noted that the emergency cabinet contained: two copies of the Emergency Plan (one copy had not been updated); an Emergency Call List, dated September 1975; an Emergency Log (last entry July 22, 1981); an Emergency Duty Officer book (issued January 27, 1978); three emergency kits (labeled off-site); TLD badges (12); pencil dosimeters (12 each, 0-500 Mrem and 0-50 Rem); a small hand gun type high-range radiation detector (0-10KR); KI tablets; portable air samplers; three pressure demand SCBA kits; and seven full-face respirator masks.

The auditors noted that the meteorological tower had read-out instrumentation in the Control Room and also had read-out capability on the computer. Further, the auditors determined that the Control Room contained adequate communication equipment for contacting off-site personnel, as well as State, local, Federal, and other response agencies.

The auditors noted that the Control Room did not have either a continuous monitor for radioactive airborne contamination or a direct radiation monitor.

The auditors noted that there were two copies of the Emergency Plan (one copy had not been updated); one copy of the Emergency Procedures; P&IDs, Technical Specifications, and call lists (several existed and contained wrong numbers) in the Control Room.

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Develop and implement, for the Control Room, a controlled telephone list of personnel and agencies to be contacted during emergencies, including provisions to maintain and verify the phone numbers at least quarterly (285/81-35-17); and
- Provide radiological monitoring equipment, with both visual and audible alarms, to detect direct radiation and airborne radioactive contamination in the Control Room (285/81-35-18).

4.1.1.2 Technical Support Center (TSC)

The auditors reviewed the OPPD Emergency Plan Section H-1.0, and Surveillance Test ST-RM-3, and toured the interim and permanent Technical Support Centers.

The auditors noted that presently the licensee was using a portion of the third floor area in the Service Building as the interim Technical Support Center. It should be noted that the permanent Technical Support Center had been constructed, however, the planned equipment including additional communication equipment must be installed before the facility will be completed.

The interim Technical Support Center had adequate communication equipment located in the general office area, however, the main meeting areas of the Technical Support Center did not have adequate communications available such that continuity could be maintained with the Emergency Operation Facility and the Control Room.

The auditors noted, in the interim TSC, the presence of dedicated equipment including one SAM-2, one air sampler, four silver zeolite filters, four charcoal filters, one VAMP and other equipment not listed on the surveillance check sheet.

The auditors also noted, however, the absence of any respiratory protection equipment for emergency personnel in the Technical Support Facility, nor were there any dedicated and permanently installed monitors to determine the

radiological habitability of the interim TSC. The licensee indicated that the SAM-2 and air samples would be used by station H.P. staff to perform this function, however, the auditors noted that the H.P. staff would already be too taxed with other duties during emergencies to be burdened by this additional duty when dedicated and permanently installed equipment would better fulfill this needed assessment.

The Technical Support Center had available copies of the plant P&IDs, Emergency Plans and Procedures, and a Xerox facsimile machine.

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Provide adequate respiratory protection equipment, in the Technical Support Center, for all emergency workers assigned to that area during an emergency (285/81-35-19);
- Provide permanently installed radiation monitoring equipment, with both visual and audible alarms, to indicate both radioactive airborne contamination and direct radiation in the TSC (285/81-35-20); and
- Provide adequate communications in the main conference room of the TSC for communicating with the Control Room and the Emergency Operations Facility (285/81-35-21).

4.1.1.3 Operations Support Center (OSC)

The auditors reviewed the Emergency Plan Section H-3.0 and Emergency Plan Implementation Procedure EPIP-OSC-1.

The auditors toured the Operation Support Center located on the 1025 foot level of the Auxiliary Building adjacent to the Control Room, and noted that there were adequate communication facilities available for communicating with on-site and off-site personnel. The auditors also noted that there were copies of the P&IDs, Emergency Procedures, and Operating Manuals. Due to the close proximity of the Control Room, there were no provisions for emergency equipment in the

Operation Support Center. The auditors further noted that during a previous exercise, the Operation Support Center was not manned during the exercise and concern still exists that persons reporting to the Operations Support Center may end up in the Control Room during an emergency and create a congestion problem. It should be noted that the licensee intended that this OSC be used only by plant operations personnel during an emergency, with the TSC and EOF used as assembly points for manpower pools of other necessary personnel.

Based on the above findings, this portion of the licensee's program appeared to be adequate for the licensee's intended restricted use of the OSC.

4.1.1.4 Emergency Operations Facility (EOF)

The auditors reviewed the Emergency Plan, Section H-2.0; Emergency Plan Implementing Procedure EPIP-EOF-1, Surveillance Test ST-RM-3, and the Radiation Protection Manual, Section 2.9.

The interim near-site Emergency Operations Facility was located West of the station just outside of the protected area fence. The near-site Emergency Operations Facility was the focal point for coordinating all onsite activities with off-site agencies and the public. The auditors noted that EPIP-EOF-1-1-IIIA indicated that, "The EOF must be surveyed for habitability. If not habitable, the alternate EOF must be activated." The auditors noted, however, that there were no directions given as to where the alternate EOF was located or how to get there. Further, no instructions were given as to who should report to the EOF (e.g., support personnel for mechanical, electrical, fire brigade, etc.). The auditors noted that under Definitions and Abbreviations in the Emergency Plan, item #2 defined the Alternate EOF, "as being located at North Omaha Station and is manned if the EOF is not habitable. It is equipped in a manner comparable to the EOF."

The auditors toured the interim near-site EOF and noted that there were either dedicated or standard telephone lines available to the: Nebraska State EOC; Iowa State EOC; Iowa local EOC; Nebraska/Washington County EOC; Nebraska Field Command Post; Iowa local EOC; Media Release Center; and the Harrison County

EOC. Additional communications were available via a portable UHF radio and a VHF radio.

The auditors determined that there were sector maps for both the 50-mile EPZ and 10-mile EPZ, as well as a 4-mile sector map. There was also a full complement of documents which included P&ID's, Emergency Plans and Procedures, FSAR, and a "Tag Board" with individual instructions. The auditors noted that the off-site monitor (tag #7) had instructions for the monitor to obtain the emergency kit, two Staplex air samplers, and the key to the emergency vehicle. The auditors inspected the emergency kits and found that the silver zeolite filters and air filters for the samplers were missing. Further discussion with plant personnel revealed that this procedure had been changed and that the RADeCO air samplers were to be used and the filters were in a cardboard box located in the emergency vehicle. The auditors noted that the EIPs had not been changed to reflect this monitoring procedure. The auditors also noted that the filter removal was a communications problem and the technician misunderstood what was to be done to the kits. The auditors noted that the filters were replaced in the kits and the present procedure still was intact.

The auditors toured the decontamination facility in the interim EOF and determined that personnel were not instructed to contact Health Physics personnel upon discovering that they are contaminated. Further, the auditors determined that the implementing procedures did instruct personnel to contact Health Physics only if they could not decontaminate themselves. The auditors noted that the only decontamination agent in the decontamination locker was standard bar-type soap and instructions in the procedures directed the personnel to acquire other decontamination supplies at the "storeroom", which the auditors determined was in the station warehouse. This would require the contaminated individual to enter and possibly contaminate a normally "clean" area which did not have any instrumentation to detect the presence of contamination.

The auditors noted that the interim Emergency Operations Facility had available a whole body counter, respiratory protection testing booth, and a compressed air bottle refill manifold for refilling SCBA bottles.

The auditors noted that there were no radioactive air monitors or gamma monitors that would give a visual and audible alarm at a pre-set level in the interim EOF.

The auditors further noted that there were no provisions made for the news media in the interim EOF or plans to have the media present at the interim EOF, however, provisions had been made for news releases and news media personnel in Omaha (see Section 6.2 of this report).

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Develop or revise existing procedures to reflect the location of the Alternate EOF and directions from the station to that facility (285/81-35-22);
- Develop and implement methods and procedures (e.g., seals, minimum stock levels, etc.) to assure that dedicated emergency equipment and supplies are indeed available when needed for emergency response (285/81-35-23);
- Develop and implement procedures for re-inventory of equipment or supplies when tamper indicating devices are removed or broken (285/81-35-24); and
- Upgrade existing personnel decontamination facilities to provide ready access to all necessary decontamination agents at the decontamination room (285/81-35-25).

4.1.1.5 Post-Accident Sampling and Analysis

4.1.1.5.1 Post-Accident Coolant Sampling and Analysis

The auditors examined the primary coolant liquid sampling facility in Room 60 of the Auxiliary Building and noted that the primary sample line designated for obtaining this sample (e.g., reactor coolant loop-1 hot leg) was situated

within the fume hood/sample sink. The auditors also noted that the sample lines in the sink were not shielded. The auditors were shown a shielded sample vessel which was specially designed for containing and transporting the sample, although it would have been hand carried to the radio-chemistry laboratory as no specially shielded transport cart was available (even though one was identified in the emergency plan as being available).

The auditors were shown a facility for the collection of a gaseous sample in the rear of the WD-32 waste analyzer. This facility was designed to draw samples from the gas decay tanks. The auditors noted that the sample lines leading to the sampling apparatus were located directly overhead and would be in close proximity to the head of personnel taking the sample. The auditors also noted that analysis methods were keyed to the type of sample (e.g., liquid or gaseous) and to isotope identification criteria described in the Chemical Manual Procedures (CMPs).

4.1.1.5.2 Post-Accident Containment Atmosphere Sampling and Analysis

The auditors examined the containment air sampling apparatus (RM-060) which was located in Room 69 of the Auxiliary Building. The auditors noted that this system contained both an in-line particulate pre-filter and a charcoal cartridge for radioiodine sampling. The auditors also noted that an area radiation monitor (RM-088) was in place and functioning in Room 69.

The auditors toured the containment building and observed lines (sample ports) from which the containment atmosphere sample was drawn. These ports appeared to be sampling representative air from the containment.

The auditors noted that no shielded transport devices were provided for transporting the samples to the radio-chem lab. The auditors also noted that sample analysis methods were keyed to isotope identification and that sample counting was to be done by a GeLi system.

4.1.1.5.3 Post-Accident Gaseous and Particulate Effluent Sampling & Analysis

The auditors examined the radioactive gas and particulate sample collection apparatus (RM050 and RM-051) located in Room 69 of the Auxiliary Building and determined that the systems were operable and functioning. The auditors noted that the area was monitored by detector RM-088, located opposite the stairs in Room 69. The auditors also noted that in addition to the charcoal cartridge/millipore type pre-filter, continuously moving strip filters were in place for stack effluent particulate monitoring. (RM061 and RM-062). Further, a sample line was available at the base of the stack on the Auxiliary Building roof from which charcoal and pre-filter samples could be collected if the Auxiliary Building sample locations were not accessible.

The auditors noted that there were no specially shielded containers available for transporting samples to the radio-chem lab. Analysis procedures were keyed to isotope identification and counting of samples would be done by the GeLi systems.

4.1.1.5.4 Post-Accident Liquid Effluent Sampling and Analysis

The auditors examined the liquid effluent sampling facilities in Room 10 of the Auxiliary Building and noted that two storage tanks preceded the two monitor tanks. The auditors also noted that the final drain lines leading from the monitor tanks to the river were constantly monitored by scintillation detectors (RM-055 and RM-055-A) and fail-safe valves were keyed to radiation levels detected by these monitors for automatic closure. The auditors further noted that the drain lines were situated below the outfall line to the river which would require pumping the waste for release to the river.

The auditors noted that CMP-1 and CMP-2 described sampling methods. These procedures specified circulation of the liquid within the tanks to mix the contents thus providing a representative sample. The auditors also noted that the sample was to be drawn through a gravity type valve into a one gallon plastic container and transported to the radio-chem lab for analysis. The auditors further noted that no specifically shielded sample transport devices were available. Analytical methods were again keyed to isotope identification

and counting was to be done by the GeLi systems, with the exception of tritium (3H) which required liquid scintillation techniques (Packard Tri-Carb).

4.1.1.5.5 Off-Site Laboratory Facilities

The auditors reviewed the Fort Calhoun Emergency Plan and noted that Appendix A contained letters of agreement with both Eberline (Chicago) and the Cooper Nuclear Power Station to provide backup support in emergency situations. The auditors also noted that the Eberline agreement (letter G-4) listed an extensive amount of equipment, instrumentation, sample analysis services, and personnel which could be made available. Discussions with the OPPD Environmental Monitoring Coordinator and his alternate indicated that Eberline presently did the analysis of routine Fort Calhoun environmental samples, thus providing a history of baseline environmental data.

The auditors toured the alternate EOF at OPPD's North Omaha facility and were shown a sodium-iodide (No. I) counting system which could be used as a backup to Fort Calhoun's. The auditors noted that the system was operable and in an apparent state of readiness, however, the system was not a recent state-of-the-art system, therefore, adequate resolution may be difficult to achieve with this counting system. A Cs-137 source was provided for calibration purposes, however, the auditors found no documentation of a routine calibration and maintenance schedule even though this equipment was dedicated to emergency use.

4.1.1.5.6 Conclusions and Determinations

The auditors reviewed the procedures and examined the facilities for post-accident sampling and analysis at the Fort Calhoun Nuclear Power Station and noted that deficiencies which existed were common to most categories of the total post-accident sampling and analysis programs. Generally, radiological shielding could be provided to reduce exposure levels in most sample collection areas. Further, specially designed shielded, handling and transport devices could also aid in dose reduction to personnel.

The auditors noted that the radio-chem lab was almost directly above the gas decay tanks with only one floor separating them. This close proximity gave rise to the probability of high radiation levels during severe emergency conditions. Further, since GeLi detectors require moderate radiation levels to avoid excessive "dead time" while counting samples, the auditors were skeptical as to whether present counting geometries would accommodate even reduced or diluted high level samples. It should be noted that Fort Calhoun sample counting equipment included shielded (approximately 4 inches of lead) GeLi detectors which are interfaced by multi-channel analyzers, and computer systems capable of expedient isotope determination, data processing, and storage.

Based upon the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Provide additional fixed and portable radiological shielding where practical to aide in the reduction of exposure to sample and analysis personnel (including sample transport devices) (285/81-35-26);
- Evaluate capabilities for meeting the three hour sample and analysis time frame if the radio-chem lab becomes uninhabitable due to elevated radiation levels (285/81-35-27);
- Evaluate high level sample counting limitations of both GeLi systems under present counting geometries (285/81-35-28); and
- Develop and implement procedures for maintaining routine efficiency and calibration checks of the NaI back-up counting system at the North Omaha Station (285/81-35-29).

4.1.2 Protective Facilities

4.1.2.1 Assembly/Reassembly Areas

The auditors reviewed the Radiological Emergency Plan Section J-1-1.0 and the Emergency Implementing Procedure EPIP-EOF-1-1.

The auditors toured the assembly/reassembly areas located outside of the protected area (interim Emergency Operations Facility, Storeroom, and the North Omaha Station) where station personnel will assemble upon notification from the Shift Supervisor. Emergency Plan Implementing Procedure EPIP-EOF-1 indicated that, "The EOF must be surveyed for habitability. If not habitable the alternate EOF must be activated." Station personnel (usually on day shift) will assemble at the storeroom if they do not have emergency duties, other personnel (e.g., emergency team members) will report to the EOF. If the interim EOF is not habitable then personnel will be instructed to relocate to the North Omaha Station.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

4.1.2.2 Medical Treatment Facilities

The auditors reviewed the Radiological Emergency Plan Section L-1.0; Emergency Plan Implementing Procedures EPIP-OSC-8; Standing Order G-14, "Personal Injuries"; and toured the First-Aid Room located in the Northwest corner of the Service Building.

The auditors noted that the first-aid equipment consisted of: several stretchers, an examination table, a first-aid supply cabinet, and several manuals of first aid. The auditors also noted that there were no radiation monitoring instruments available in or near the first-aid room. The auditors determined that the FCS policy was that, if the person were seriously injured, then they would be sent to the hospital with a Health Physics Technician (monitored but not necessarily decontaminated) but, if not seriously injured, then the person would be decontaminated prior to going to the First-Aid Room.

The auditors noted that there were nine first-aid kits distributed on station, and that there was a procedure (A-G-43) for checking all first-aid kits once a week and replacing missing supplies.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

4.1.2.3 Decontamination Facilities

The auditors reviewed Radiation Protection Manual Section 2.9 and Emergency Plan Implementing Procedure EPIP-E0F-10.

The auditors toured the two decontamination facilities, one facility located on-site adjacent to the station laundry and the other being the off-site facility located in the near-site Emergency Operations Facility. The station decontamination facility consisted of a small lavatory and two showers. The auditors noted that there were no signs reminding contaminated personnel to contact Health Physics and no immediate method of notifying Health Physics (e.g., no telephone in the area). The auditors also noted that the facility design would require clean personnel and contaminated personnel to intermix due to the absence of space (e.g., enter the room contaminated, take a shower, and step out into another room which is clean).

The decontamination facility located in the near-site Emergency Operations Facility had a small lavatory and one shower stall. The auditors noted that the facility was being used by plant personnel and that housekeeping was very poor. Supplies for decontamination were locked up in two metal cabinets. The auditors noted that there were no decontamination procedures in the cabinets, and additional decontamination supplies were to be obtained from the storehouse.

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Install in the station decontamination area adequate communications for contacting Health Physics personnel (285/81-35-30);
- Provide in both decontamination facilities adequate and necessary supplies for personnel decontamination (285/81-35-31); and
- Provide permanent instructions in both decontamination facilities to contact Health Physics upon determining that the individual(s) are contaminated and provide a communication system to accomplish the notification (285/81-35-32).

4.1.3 Expanded Support Facilities

The auditors reviewed the Radiological Emergency Response Plan and Implementing Procedures series EPIP-RR.

The auditors toured the Emergency Operations Facility and the Technical Support Center and noted that the near-site Emergency Operations Facility was quite small and would not be sufficient in size for large scale operations (e.g., if the Technical Support Center were not available). The auditors also noted that whole body counting, respiratory protection qualifications, SCBA bottle refilling and training was presently being conducted in the Emergency Operation Facility. Further, the auditors determined that those activities would be increased during an emergency thus creating an overcrowded condition.

The auditors noted that the licensee had under construction a new Technical Support Facility and plans to construct an off-site Emergency Operations Facility. The auditors determined that the existing facilities were too small and the auditors do not know the size of the proposed facility; therefore, this will be an Open Item for future resolution.

The adequacy of the Expanded Support Facilities, Emergency Appraisal Section 4.1.3 will remain an Open Item for future resolution until final plans are prepared and construction authorized by OPPD for those facilities (285/81-35-33).

4.1.4 News Center

The auditors reviewed the contents of Section G, Pages 1-4 of the licensee's Emergency Plan and associated EPIP's.

The auditors interviewed the Manager of Media Relations and toured the Media Release Center (MRC) located in the Omaha Civic Center. The auditors noted that the MRC loading capacity should be capable of handling approximately 300 news media representatives in addition to the licensee's emergency staff. The auditors noted that MRC had 96 dedicated telephone lines and that telephones presently being used in the Civic Center offices were to be plugged

into the dedicated telephone jacks in the event of an emergency at Fort Calhoun Station and the MRC was activated.

The auditors also noted that electrical outlets in the News Media work area appeared inadequate. Only eight 110-volt electrical outlets were noted in the News Media work area. News media representatives would have recording equipment, typewriters, and facsimile equipment, all requiring an electrical supply. Further, broadcast representatives and television stations would require electrical power for recording equipment and lights. This would appear to overload the present electrical outlets. The auditors noted one additional News Media Center located at the intersection of Nebraska Highway No. 73 and the licensee's access road. This News Media Center's activation was dependent on the severity of the licensee's emergency.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Perform an evaluation to determine what additional electrical service would be needed by news media representatives during an emergency and provide such a capability in the MRC (285/81-35-34).

4.2 Emergency Equipment

4.2.1 Assessment Equipment

4.2.1.1 Emergency Kits and Emergency Survey Instrumentation

The auditors reviewed the Radiological Emergency Response Plan, Section H and Surveillance Test ST-RM-3.

The auditors toured the Control Room, Technical Support Center, Emergency Operations Facility, and the Health Physics work area. The auditors noted the equipment list on Table H-1 and inspected the emergency kits, emergency lockers, and reserve instrument area. The auditors noted that all equipment was calibrated, operable, and in place (except the EOF, see Section 4.1.1.4 of this report).

The auditors noted a small hand-held high range survey instrument in the Control Room emergency locker. The auditors recommend that the small hand-held high radiation instrument be replaced with an extendable probe high range instrument to reduce personnel exposure.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Replace the small hand-held high range instrument in the Control Room locker with an extendable probe high range instrument (285/81-35-35).

4.2.1.2 Area and Process Radiation Monitors

The auditors reviewed the licensee's Emergency Response Plan and toured the licensee's facility to verify the type and locations of the various monitors. The auditors noted that all area and process radiation monitors described in the OPPD emergency plan Sections H-5, I-1, I-6 and I-7 were in the specified locations and were operable. All radiation monitor read outs were located in the Control Room. Sensors associated with radiation process monitors were lead shielded to prevent interference by elevated background levels of radiation. The auditors determined that routine calibration of all monitors across all instrument ranges were performed for all monitors and that conversion factor charts and graphs were available in the Control Room. The auditors also noted that daily operability and calibration checks were performed utilizing internal check sources. Inoperable instruments were promptly repaired or replaced. Written calibration procedures were available for all monitors, and all area and process radiation monitoring instruments were on the emergency power buss.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

4.2.1.3 Non-Radiation Process Monitors

The auditors reviewed the licensee's non-radiation process monitors identified on pages I-2, 3, and 4 of the licensee's Emergency Response Plan. All

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REGION IV
Emergency Preparedness Appraisal

Report No. 50-285/81-35

Docket No. 50-285

License No. DPR-40

Category C

Licensee: Omaha Public Power District
1623 Harney Street
Omaha, Nebraska 68102

Facility Name: Fort Calhoun Station

Appraisal At: FCS, Fort Calhoun, Nebraska

Appraisal Conducted: December 7 - 16, 1981

Team Members:

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Laboratories Date

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non-radiation process monitors described in the emergency plan were in place and operable. Meteorological, river level detection, seismic, reactor core (RC) temperature, containment pressure, emergency core coolant system (ECCS) actuation, pressurizer pressure, steam generator pressure, pressurizer level, and steam generator level all had read outs located in the Control Room. All read outs were readily observable.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

4.2.1.4 Meteorological Instrumentation

The basis for the review of the meteorological measurements program included material in Regulatory Guides 1.23 and 1.97, and criteria in NUREGs 0654, 0696 and 0737.

The licensee's meteorological measurement program was described in Section I-2.2.4 of the Fort Calhoun Radiological Emergency Response Plan, dated October 15, 1981. The wind speed, wind direction and stability measurements were available in the control room and the alternative to milestone 3 of Annex 1 to Appendix 2 of NUREG 0654 was presently being used. The plant was included on the NAWAS system for notification of severe weather phenomena, and provisions were made to use the Omaha National Weather Service office for back up meteorological data when the onsite system was inoperable. The meteorological equipment was checked daily for operability in the Control Room and if needed, maintenance was promptly performed. Calibration of the equipment was performed every 6 months rather than quarterly and no strip chart readers were in the meteorological tower instrument shelter or in the Control Room. However, data was recorded directly on magnetic tape and available to the plant computer for relative radionuclide concentration calculations for use in dose assessment. No automated system for dose calculation using real time meteorology information was presently in use. Overlays and hand calculator methods were the principal dose calculation tools. Remote interrogation of the meteorology system was not possible.

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Develop and implement procedures to calibrate all meteorological instruments and equipment on a quarterly basis (285/81-35-36);
- Develop the capability for remote interrogation of the meteorological system by off-site agencies in accordance with Regulatory Guide 1.23, Revision 1 (285/81-35-37);
- Provide a detailed description of the dose assessment methodology and how meteorological information is used in that model (285/81-35-38); and
- Perform an analysis to determine how a release plume from FCS may be modified by terrain induced effects and provide the results of the study in the emergency plan (285/81-35-39).

4.2.2 Protective Equipment

4.2.2.1 Respiratory Protection

The auditors toured the Technical Support Center, and the Control Room for emergency respiratory equipment. The auditors noted the absence of emergency respiratory equipment in the Technical Support Center and only three SCBA's available in the Control Room. The auditors noted in their tour of the station that there were lockers stationed strategically on-site which contained SCBAs for the fire brigade.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Provide adequate respiratory equipment for all emergency personnel that remain on-site during an emergency (285/81-35-40).

4.2.2.2 Protective Clothing

The auditors toured the licensee's storeroom and protective clothing storage area and noted that adequate supplies were available (see Section 4.2.5 of this report).

Based on the above findings, this portion of the licensee's program appeared to be adequate.

4.2.3 Emergency Communications Equipment

The auditors reviewed the Radiological Emergency Response Plan Sections H and F, and toured the near-site Emergency Operations Facility; Technical Support Center; Control Room; Security Building; Resident Inspectors Office; Operations Support Center; and Plant Operations Managers Office.

The auditors determined that the NRC Emergency Notification System Telephones and the NRC Health Physics Network Telephones were operable by calling NRC Headquarters in Washington, D.C., and the NRC Region IV office in Arlington, Texas. The auditors noted that there were dedicated telephones for Federal, State and local agencies as well as redundant or back-up communications. The auditors also noted that the communication system distribution was such that someone could make initiating calls of emergency response on a 24-hour-per-day basis. The auditors noted that a system having several telephones on one system was only checked at two instruments (e.g., NRC Emergency Notification System was normally checked only in the Control Room and Station Managers office). The auditors also noted the communications capabilities between each emergency facility and noted that there appeared to be adequate communication equipment available.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

4.2.4 Repair/Corrective Action Equipment

The auditors toured the Storeroom, Machine Shop, and Welding Shop and noted that chain falls, hoists, tools, a variety of nuts and bolts, hydraulic jacks, and lubricants were available. The auditors determined that upon discovering that the three areas were not accessible during recovery, the licensee also had two operating power plants within 25 miles and that the licensee could gather enough equipment to fill their needs from those two additional plants.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

4.2.5 Reserve Emergency Supplies and Equipment

The auditors toured the Health Physics office area and instrument storage area. The auditors noted that ample instrumentation was available for high and low level monitoring. The auditors also noted that there were extra dosimeters in reserve that could be used during incident response and recovery actions and that there were reserve supplies of: lead bricks (800 each), sheet lead (900 lbs.), lead wool (900 lbs.), disposable coveralls (40K), rubber gloves (6K pair), respirators, lab coats, decontamination soap, extra pipe, valves, sheet plastic and additional SCBA masks.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

4.2.6 Transportation

The auditors noted that the licensee had recently procured two, four-wheel drive vehicles for off-site monitoring during an emergency. The auditors further noted that both vehicles had radios for communicating with the Emergency Operations Facility, a SAM-2 counting system, and that they were equipped with a DC to AC converter.

The auditors noted that the licensee did not have an ambulance on station, but had access to an ambulance service located in Blair, Nebraska.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

5.0 PROCEDURES

5.1 General Content and Format

The auditors reviewed the content and format of the FCS Emergency Plan Implementation Procedures and the methods used to move the Control Room Operators from the Standard Operating Procedures (SOPs), thru the Emergency Operations Procedures (EOPs), and into the EIPs.

The auditors noted that many persons were assigned duties and responsibilities in single procedures and thus, there was no specific delegation of responsibility for the completion of the entire procedure. The auditors also noted that the procedures did not specify the individuals who had responsibility, authority, and qualifications necessary to perform the tasks governed by the procedure. Further, the EIPs did not contain sign-off sheets or checklists to ensure that each step of the procedure was completed, even though the procedures did generally follow a step-by-step format.

The auditors also noted that the EIPs did reference other EIPs in the text of the procedure, however, numerous references were made to values or requirements of the FCS Technical Specifications, as they applied to the Emergency Action Levels (EALs), but the actual parameter value was not in the EIP. This required the operator to leave the procedure to verify the Technical Specification requirement. The auditor noted that the Protective Action Guides (PAGs) were consistent with the guidance of the U.S. Environmental Protection Agency and were clearly specified.

The EIPs did contain prerequisites, precautions, and guidelines for the exercise of judgment in the implementation of specific actions especially in the area of development of recommendations for off-site protective actions. The auditors noted, however, that the procedures did not identify specific limits of action to the user of the procedure. Further, the references in the EOPs only stated that the user of the procedure was to "initiate the site emergency plan," and did not guide the user to the specific procedure to do that. During walk-throughs of the Shift Supervisors of their emergency plan

initiation steps, the auditors noted that time was lost in looking for specific procedures as they were not individually tabbed.

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Correct the Emergency Procedures (EOPs) to provide specific guidance to the operator as to when Emergency Action Levels may be approached or exceeded and provide specific reference as to the exact EIPs which should be initiated (285/81-35-41);
- Correct the EIPs to identify the individuals by title who have the authority, responsibilities, and qualifications necessary to perform the tasks governed by the procedure (285/81-35-42);
- Correct the EIPs to allow only a single individual to perform the procedure or separate all steps to be performed by an individual from the steps to be performed by other individuals (285/81-35-43); and
- Correct the EIPs to provide checklists or other methods to ensure that all necessary procedure steps are completed at the proper time (285/81-35-44).

5.2 Emergency, Alarm and Abnormal Occurrence Procedures

The auditors reviewed the contents of the OPPD Emergency Plan Implementing Procedure (EIP) OSC-1, which provided descriptions and examples which would have initiated conditions leading to evaluation of an abnormal occurrence into one of the four emergency classes. The auditors also reviewed the contents of the licensee's SOPs, EOPs, and AOPs.

The auditors noted that in EIPs OSC-1 through OSC-11, Emergency Action Levels (EALs) were listed which would have indicated that an abnormal condition existed. The auditors also noted that the EALs were categorized as to the emergency class and that once an EAL criterion had been met or exceeded the procedure (OSC-1) referenced the proper procedure for that specific class.

The auditors noted that OSC-1 listed EAL parameters which included: 1) absolute values (e.g., in counts per minute which would have been taken from the Control Room readouts of the Radiation Monitoring System); 2) calculated dose levels at the site boundary; 3) natural phenomenon; and 4) other possible hazards such as plane crashes, train derailment or explosions which could have impacted the safe operation of the Fort Calhoun Station.

The auditors also noted that not all of the appropriate AOPs and EOPs referenced the EIPs and that those that did only referenced the operator to "initiate the site emergency plan." Thus the operator was not provided with specific guidance as to which of the various EIPs he was to use to initiate the Emergency Plan.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Correct the appropriate EOPs and AOPs, where necessary to identify when Emergency Action Levels may be approached or exceeded and insure that the station operators can effectively and expeditiously move from normal operations, to abnormal operations, through emergency operations and into the appropriate EIPs (285/81-35-45).

5.3 Emergency Plan Implementing Instructions

The auditors reviewed the contents of the Fort Calhoun Emergency Plan Implementing Procedures OSC-3, OSC-4, OSC-5, and OSC-6 and noted that these procedures addressed the emergency actions which would be taken for each specific class of emergency.

The auditors noted that the implementing instructions were written for use by the interim Emergency Duty Officer (EDO) (e.g., the Shift Supervisor until relieved) and contained the associated responsibilities being transferred eventually to the person relieving the Shift Supervisor as EDO. The auditors further noted that the EIPs did not specifically identify those duties and responsibilities which shall not be delegated by the EDO. The Emergency Plan specified the responsibilities of each of the Emergency Team members, however,

there was no specific indication that all emergency response personnel had been given the authorities necessary to perform the assigned tasks associated with those responsibilities (with the exception of the Recovery Manager and the EDO).

The auditors also noted that EALs listed in EPIP OSC-1 were keyed to each class of emergency and a procedure for each emergency class was in place which specified prerequisites for augmentation of additional Emergency Team members and facilities. Further, the EALs were based on monitoring instrumentation readouts. Those readouts were located in the Control Room and were readily observable to Control Room personnel and included both radiological and non-radiological process monitoring instrumentation. The auditors further noted that EIPs OSC-5 and OSC-6 addressed the use of Emergency Procedures EP-1 through EP-37-B, indicating that they should be used as needed, depending on the severity of the accident. These procedures provided more detailed emergency instructions.

Based upon the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Correct the EIPs to specifically identify those duties and responsibilities which may not be delegated by the EDO (285/81-35-46).

5.4 Emergency Plan Implementing Procedures

5.4.1 Notifications

The auditors reviewed the Emergency Plan Implementing Procedures (EIPs) EOF-7, OSC-2, and RR-1, 3, and 6 for emergency action level recognition, emergency action level classification, and instruments used for determining accident classification. The auditors determined that the operations personnel would rely on area radiation monitors and the radiological stack monitor for predicting or assessing off-site releases. The auditors noted that the Abnormal Operating Procedures for the operations personnel did not have integrated into their plan a scheme where their emergency action level recognition would lead them from their Abnormal Procedures to the Emergency Plan.

The auditors noted that there were procedures for alerting and instructing on-site personnel, alerting and notifying State(s) and local agencies, Corporate personnel, and Federal Agencies. The auditors also reviewed the licensee's public information program and while traveling the immediate area surrounding FCS, determined information for emergency response had been distributed to the public.

The auditors also noted that there were preplanned messages and alarms for initial notification and followup messages resulting from degradation of plant status. The auditors did note, however, the absence of a complete list of all persons and agencies to be contacted. The auditors determined that the licensee has a revision to their EPIP-OSC-2 procedure, which, when approved and implemented, will contain a list of all persons and agencies to be contacted, along with the phone numbers.

The auditors verified that notification of State Agencies required a code identification number to prevent unauthorized reporting of accidents.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

5.4.2 Assessment Actions

The auditors reviewed the licensee's commitment to accident assessment actions as specified in Section I (pages I-1 to I-47) of the licensee's Emergency Response Plan. The operational assessment actions program was contained in pages I-1 to I-12 and assessments of Radiological Releases were contained in pages I-12 to I-26. Assessment action tables, charts, maps, etc., were listed on pages I-27 to I-47.

The licensee's Emergency Response Plan identified the Shift Supervisor as the initial Emergency Duty Officer (EDO) and the individual responsible to make immediate assessments, to classify the event, and to initiate notifications. The priority system and information available from the plant instrumentation readouts located in the Control Room and the alternate meteorological data sources located at Eppley Field in Omaha were identified on page I-8 Section I

of the ERP. Action levels and protective action guides were contained in EPIP-OSC-10 and EPIP-OSC-11. Those EPIP's had been written but not distributed at the time of this appraisal.

Means of initially projecting exposures on-site, at the site boundary, and in the plume exposure emergency planning zone were located on pages I-9 to I-26 of the ERP. The containment source term would be obtained from the new high range containment monitors (RM-091A and RM-091B).

If the licensee's Control Room instruments were off-scale or inoperable, initial dose projections would be made from information gathered by the licensee's emergency radiological survey teams in the field. Procedures for emergency radiological surveys were contained in EPIP-EOF-4, 5, 6, 7, and EPIP-RR-6. Provisions for immediate notification of State and local agencies were contained in pages F-1 to F-6 of the licensee's emergency plan.

A description of the data available from the environmental monitoring program was contained on pages I-18 and I-19 of the ERP. On-site and off-site radiological environmental monitoring assessment equipment and facilities were described on pages H-15 to H-20. Locations for on-site and off-site radiological monitoring stations for TLD's, air particulate, and charcoal cartridges were identified on pages J-49, 50, and 51 of the ERP. Procedures for operation of radiological monitoring equipment and air samplers were contained in EPIP-EOF-3, 4, and 8.

Radiological dose assessment procedures provided for the use of data from area and process radiation monitors and in-plant surveys. Interim methods were developed for estimating high-level radiological releases. These methods were discussed on page I-19 of the ERP. Installation of high-level radiation process monitors were in process at the time of this appraisal.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

5.4.2.1 Radiological Surveys

The auditors reviewed the contents of the licensee's Emergency Plan and Emergency Plan Implementing Procedures to determine the readiness of plant forces to perform off-site, on-site (out of plant), and in-plant radiological surveys during emergencies. Operational assessment actions were specified in pages I-9, I-10, I-11, and I-12 of the licensee's Emergency Plan. Radiological monitoring equipment to be used in the event of an accident at the licensee's facility was listed on Table H-1, page H-15.

The auditors noted that OPPD personnel assigned to the Radiological Emergency Monitoring teams would be notified in accordance with the Station Emergency call list for the emergency team as per instructions in EPIP-OSC-2. Further, the licensee's Radiological Emergency Monitoring teams were augmented by in-plant groups. Radiological monitoring training was conducted per instructions found in EPIP-EOF-3, 4, 5, 6, and 8. The auditors noted that prepositioned radiological survey sites were identified on maps (pages J-49, 50 & 51) and on charts detailing the type of environmental sampling and distance from licensee site (pages J-19 to 21).

Letters of agreement between the licensee and the states of Nebraska and Iowa concerning off-site monitoring requirements were located in Appendix A of the licensee's Emergency Plan. The auditors noted that at the time of the appraisal no formal document had been developed for off-site and on-site (out-of-plant) radiological emergency survey teams to record sampling data. The auditors reviewed a draft copy of EPIP-EOF-18 and determined that it was an adequate form for documenting collection data. The aforementioned EPIP was being reviewed by OPPD Health Physics staff prior to its implementation.

The auditors noted that methods and equipment to perform in-plant radiological surveys were specified on pages B-7, H-14, and table H-1 on page H-15 of the Emergency Plan, and in EPIP-RR-22 "Health Physics/Chemistry Supervisor." Procedures written from the viewpoint of the persons performing the surveys were located on pages M-25 and M-26 of the Emergency Plan. The H.P./Chemistry Supervisor directed in-plant, as well as the off-site, radiological survey teams as directed by EPIP-RR-22. The auditors also noted that in-plant

Emergency Radiological Survey teams would use the licensee's normal radiation zone survey form which identified radiation areas within the licensee's facility by use of facility floor plans. The form also required the surveyors to list time, date of the survey, as well as their signature.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Develop and implement procedures to provide adequate forms for the documentation of emergency radiological survey results (285/81-35-47).

5.4.2.2 Post-Accident Sampling and Analysis

The auditors reviewed the contents of the Fort Calhoun Emergency Plan and noted that "Operating Instructions Post-Accident Procedures" (OI-PAPs) were referenced as the applicable procedures for post-accident sampling. The auditors reviewed the OI-PAPs (which were not a part of the EIPs) and noted that these procedures provided instructions and guidelines for the collection of samples from the primary reactor coolant, containment atmosphere, gas decay tanks, and gaseous effluent released to the atmosphere under accident conditions. The auditors noted that only two controlled copies of these procedures existed at the site and those copies were kept in the Central Office area and the Control Room. There was not a controlled copy available for use in the RAD-CHEM Office by the personnel who would actually be involved in the post-accident sampling and analysis work.

The auditors noted that sample analysis procedures were contained in the "Chemical Manual Procedures" (CMPs) and that those procedures covered steps to be taken in determining specific activities of isotopes which may be present in both liquid and gaseous samples. The auditors also noted that CMPs 1 and 2 provided information for liquid effluent sampling and analysis.

The auditors noted that the OI-PAPs listed prerequisites and dose limiting actions to be followed for obtaining samples (e.g., portable lead shielding, lead aprons, and supplied air breathing apparatus). The auditors determined that ALARA considerations had not been specifically addressed in the

procedures and that the shielded sample transport cart as specified in OI-PAP-1 had not been built and thus was not actually available for use.

The auditors noted that standard forms were available in the CMPs for the documentation of pertinent sample data, but that the procedures did not specifically provide for labeling, storage, nor disposition of the samples. The auditors conducted interviews and walk-throughs of sample collection and analysis (see Section 7.2 of this report) with RAD-CHEM personnel and determined that each of the samples could be obtained within one hour and analyzed in two additional hours, assuming habitability of the Radio-Chem lab. However, habitability of the sample collection areas and the Radio-Chem lab during severe accident conditions was not satisfactorily verified.

The auditors noted that the CMPs described the methodology for diluting and reducing samples to allow for counting high-level samples on the GeLi detection systems. The auditors noted that each of the two available GeLi systems was calibrated daily. The auditors further noted that the procedures listed a maximum "dead time" of 50 per cent for the GeLi systems, which may be difficult to achieve even when counting diluted high-level samples. The auditors noted that the procedures did not specifically address radioactive contamination control within the counting systems, but interviews with chemists indicated that such safeguards were being taken.

The auditors noted that the Emergency Plan contained letters of agreement for back-up sample analysis with Eberline (Chicago) and the Cooper Nuclear Power Station. The auditors were also shown a dated Sodium-iodide counting system at the OPPD North Omaha Station and noted that the relative distances to the back-up facilities did not enhance the capability of analyzing the Fort Calhoun samples within a two hour time frame.

Based upon the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Provide a controlled copy of the OI-PAPs for use in the RAD-CHEM Office (285/81-35-48);

- Incorporate specific ALARA measures and considerations into the OI-PAPs and CMPs (285-81-35-49);
- Correct the OI-PAPs and CMPs to include provisions for labeling, storage, and disposition of samples (285/81-35-50);
- Provide the shielded sample transport cart for use as stated in OI-PAP-1 (285/81-35-51);
- Take measures to assure habitability of an adequate sample analysis facility under severe accident situations (285/81-35-52); and
- Evaluate present counting systems for high-level sample counting abilities and limitations (285/81-35-53).

5.4.2.3 Radiological Environmental Monitoring Program (REMP)

The auditors noted that provisions for a Radiological and Environmental Monitoring Program (REMP) had been established by the licensee for collecting and evaluating data relative to environmental TLD's, soil samples, water samples, etc. The auditors further noted that duty assignments for the Emergency Radiological Monitoring survey teams were conducted using a tag numbering system. Each tag specified the duty of that specific radiological monitoring team.

The auditors determined that, with the established methods of collecting and evaluating data, trained radiological emergency teams, and the capabilities to analyze samples at the licensee's site or back-up analytical facilities at the North Omaha Station, the licensee demonstrated necessary capabilities to perform the emergency monitoring program.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

5.4.3 Protective Actions

5.4.3.1 Radiation Protection During Emergencies

The auditors noted that an overall procedure governing the implementation of the radiation protection program during emergencies had been written (EPIP-OSC-2). The auditors further noted that routine radiation protection procedures are referenced and were applicable during emergencies. The procedures were discussed on pages K-1 to K-10 of the licensee's ERP and addressed the following areas: Life Saving; Public Health and Safety; Protection of Property; Personnel Dosimetry; Area Access; Personnel; Water and Food Supply; etc. The auditors also noted that emergency radiation protection procedures, as well as normal radiation protection procedures, were referenced and that special controls for emergency conditions were addressed.

The auditors further noted that procedures were addressed in the licensee's ERP dealing with expanding the respiratory protection program and providing additional protective clothing when needed for emergency response. The auditors also noted that procedures existed which described both what actions were to be taken and the specific personnel to perform Health Physics functions during emergency situations.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

5.4.3.2 Evacuation of Owner-Controlled Areas

The auditors reviewed Section J-1 of the Radiological Emergency Response Plan, EPIP-EOF-9, and Security Procedure SCP-19.

The auditors reviewed those sections pertaining to evacuation of owner-controlled property and noted that the ERP described the Nuclear Emergency Alarm as an intermittent howl and was distinguished from the fire alarm which was a continuous howl. Further, the actuation of the alarms would be followed by a message over the station public address system instructing personnel what course of action to take. Personnel instructed to evacuate the protected area

(site) would proceed through two gates; the main vehicle gate and a railroad gate West of the plant. The auditors noted that there were no procedures describing what gates to use for exiting the plant although the ERP did contain maps in figures J-1 and J-2 on how to get to the interim EOF and the Alternate EOF (both are assembly areas) at the North Omaha Station. The auditors also noted that there were no markings at the assembly areas to identify them as such, nor were there any markings in or around the plant to direct personnel to the assembly areas.

The auditors also determined that the licensee had made no specific provisions to notify and evacuate private citizens (farmers) who rented field space from the licensee or for those persons living across the river from FCS but still within the licensee controlled areas.

Based on the findings in the above area, improvements in the following area should be considered in order to achieve an adequate program:

- Develop and implement methods to adequately mark assembly areas and the routes to be taken to get to the assembly areas (285/81-35-54); and
- Develop and implement procedures to ensure that all persons in the licensee controlled areas, including areas across the river from FCS, are notified of any need to evacuate those areas and that adequate provisions are available to ensure the evacuation and accountability of those persons (285/81-35-55).

5.4.3.3 Personnel Accountability

The auditors reviewed the Emergency Plan Implementing Procedures EOF-9, EOF-13, OSC-7, and Security Procedure SCP-19.

The auditors noted that personnel, upon exiting the protected area, would turn in their security badge and TLD to the security guard at the gate(s) and that the badges were then taken to the main security post and individually fed into the computer thus removing these individuals from the computer file as being

on-site. The auditors determined that the Control Room and Technical Support Center gathered a list of their personnel and upon request there is a computer print-out made of all on-site personnel. Any person on the computer list and not in the Control Room or the Technical Support Center was assumed to still be on-site, and a search and rescue team would be activated to find the missing personnel. The auditors noted that the computer could be interrogated to determine where the missing person entered the last "key card" station, however, the computer could not determine if that person had left that area.

The auditors reviewed the appropriate Security and Accountability Procedures and noted that Section J-1.3.2 of the ERP indicated that "The Emergency Duty Officer will be immediately notified of all unaccounted personnel." However, EPIP-EOF-9.2.IV.8 states, "Inform the Shift Supervisor or Monitor Team Coordinator of all personnel whose safe condition has not been verified." The auditors noted that there was no clear method for keeping track of the accountability information nor to whom it went. Further, the auditors noted that there was no method to track personnel dispatched into the plant for corrective actions (e.g., fire brigade, retrieve injured personnel, etc.).

The auditors noted that there were no plans or procedures for determining the status of off-site personnel in the exclusion area/owner controlled area for accountability purposes.

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Correct the EPIP's to reflect the single individual that will receive and account for personnel immediately following the incident and maintain continuous accountability thereafter (285/81-35-56); and
- Correct the EPIPs related to personnel accountability to provide for accountability of all persons in the owner controlled areas, including those persons across the river from FCS but still within the owner controlled area (285/81-35-57).

5.4.3.4 Personnel Monitoring and Decontamination

The auditors reviewed the Radiation Protection Manual, Section RPP-7 and the Emergency Plan Implementing Procedures and noted that no special section was devoted to personnel decontamination in the EIPs.

The auditors also noted, in the decontamination procedure (RPP 7-1-A) that contaminated personnel were to notify HP, however, if no HP was in the area, the person was to put on covershoes and go to the sample room and call for an HP. The auditors noted that there were no instructions as to where the sample room was located and there were no areas conspicuously marked as being the "Sample Room." Further, there were no forms to be filled out describing contamination levels, where contamination occurred, who to report the incident to, or whether nasal smears and/or a whole body count was required.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Develop and implement specific personnel monitoring and decontamination procedures in the EIPs which will provide for thorough investigation of contamination incident and documentation of the results of any decontamination procedure and subsequent bioassay. (285/81-35-58).

5.4.3.5 On-Site First Aid/Search and Rescue

The auditors reviewed the Emergency Plan Implementing Procedure OSC-8 and the Standing Order G-14 and noted that the licensee did not intend to treat injuries, on station, greater than minor cuts or immediate first-aid. The auditors noted that severely injured and contaminated personnel were not to be detained on-site. Further, the University of Nebraska Medical Center in Omaha was designated as the primary hospital for contaminated persons and that the hospital had facilities for treatment, and decontamination of personnel and retention of contaminated wastes. Search and Rescue procedures were discussed in Section 5.4.3.3 of this report.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

5.4.4 Security During Emergencies

The auditors reviewed the Emergency Plan Implementing Procedures, OSC-7-2; the Radiological Emergency Response Plan, Section J-2; and the Security Procedure SCP-19. The auditors noted that the procedures which would involve security during an incident were written in the station security procedures. The auditors also noted that the security plan discussed emergency vehicles and accountability, however, no procedures existed to identify what actions would be taken by security upon a declaration of a General Emergency (e.g., all personnel outside of the Control Room and Technical Support Center having to evacuate the area).

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Develop and implement specific procedures governing the duties, authorities, and responsibilities of Security Personnel during an emergency (285/81-35-59).

5.4.5 Repair/Corrective Actions

The auditors reviewed the Emergency Plan Implementing Procedures and noted that the licensee enters the recovery mode once corrective action has been initiated to circumvent an abnormal condition. Further, the level of response from the recovery team would depend on the degree of severity of the incident (e.g., minor leak versus radioactive release off-site). The procedures addressed recovery team briefing and assigns responsibility for approval of personnel emergency doses. The auditors noted that an emergency response pool of various licensee personnel will be maintained at the assembly area and that those persons would be selected to form the recovery teams or corrective action teams.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

5.4.6 Recovery

The auditors reviewed Sections G and M of the FCS Radiological Emergency Response Plan and the EPIP-RR, EPIP-EOF, and EPIP-PI series of the EIPs.

The auditors noted that a complete Recovery Organization had been defined and described in the licensee's Emergency Plan and EIPs, including the identification, by title, of both a primary and a secondary person to fill each position in the Recovery Management. However, as described in Section 2 of this report, the actual approval of the Radiological Emergency Response Plan, its EIPs, and the specific provisions for the delegation of authority from the OPPD Board of Directors to the individual members of the Emergency Response Organization and Recovery Organization had not been completed at the time of the appraisal.

The auditors noted that there were provisions in the Emergency Plan and Procedures to evaluate plant operating conditions as well as in-plant and out-of-plant radiological conditions in the decision to activate the Recovery Organization.

It should be noted, that the licensee's concept of the Recovery Organization was that it would be fully operational and the center for overall management and control of the licensee's response to a radiological emergency at FCS during the active part of an emergency and not just activated after the immediate emergency events have stopped. With this in mind, the auditors noted that there were no provisions in either the Emergency Plan or its EIPs which required the notification of any outside agency or individual prior to the activation of the Recovery Organization.

The auditors also noted that the licensee's Emergency Plan did identify that decisions to relax or curtail duties of the Recovery Organization personnel would be with the concurrence of the Recovery Manager, Plant Operations Manager, and the Emergency Coordinator. Further, general criteria were listed

in the Emergency Plan on which to base such decisions. The auditors determined, however, that no procedure existed by which such a decision would be arrived at or implemented. Further, there were no direct provisions for the licensee to confer with, notify, or gain concurrence from any Federal, State, or local officials prior to entering a downgraded mode of emergency response operations.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Develop and implement procedures with specific criteria upon which the emergency class may be downgraded and provisions for notification of Federal, State and local officials prior to entering a downgraded mode of emergency response operation (285/81-35-60).

5.4.7 Public Information

The auditors reviewed Sections B, G, and M of the licensee's Emergency Plan and EPIP-PI-1 thru 7 "Crisis Communication Plan for Nuclear Plant Emergency." The auditors noted that the EIPs identified OPPD and State organizations involved in news dissemination in the event of a nuclear emergency. The auditors also noted during a review of Figure B-4, of the licensee's emergency plan that, while the NRC and FEMA Public Affairs representatives will be available at the Media Release Center (MRC), it was not so indicated on the chart.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Include the NRC and FEMA on the list of interfacing organizations in the MRC in Section B, Figure B-4 of the Emergency Response Plan (285/81-35-61).

5.5 Supplementary Procedures

5.5.1 Inventory, Operational Check and Calibration of Emergency Equipment, Facilities, and Supplies

The auditors reviewed the Emergency Plan Implementing Procedure EOF-3, "Emergency Instruments and Equipment," held discussions with plant staff personnel, reviewed calibration dates for equipment, and toured the Instrumentation and Calibration Laboratory.

The auditors noted that there were lists for emergency equipment and calibration logs maintained for those instruments used during emergencies. Also there were charts listing all radiation monitoring equipment. The auditors noted the absence of formal procedure that lists all instruments, detailing: calibration frequencies; responsibilities for performing and maintaining instruments; and accountability of instruments (e.g., when the calibration date is due and the instrument can't be found, who is responsible for finding the instrument?).

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Develop and implement formal procedures for radiation monitoring equipment inventory, including acquiring new instruments, retiring old or lost instruments, and instrument calibration due dates (285/81-35-62).

5.5.2 Drills and Exercises

The auditors noted that the licensee's Emergency Plan addressed drills and exercises in Section N, on pages N-1 to N-4. The auditors further noted that the licensee conducts a radiation emergency exercise annually and that drills are conducted by the licensee at various times for different functions (i.e., Fire Drills for plant personnel are conducted quarterly). The auditors noted that there were three types of Health Physics and Radiological Monitoring drills, one conducted semi-annually to monitor response to and analysis of

simulated elevated airborne releases, liquid samples, and direct radiation measurements in the environment. The second Health Physics and Radiological Monitoring drill is conducted annually to analyze in-plant liquid samples with actual elevated radiation levels. The third drill is also annually and requires radiological monitoring of the plant environs. The auditors noted that scenarios for drills were developed by the group or agency responsible for conducting the specific drill. The auditors also noted that critiques were conducted for drills and exercises and were filed at the Fort Calhoun Station. The auditors further noted that Emergency Preparedness Tests (EPT) were prepared for guidance and development of drills and exercises.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

5.5.3 Review, Revision and Distribution of Emergency Plans and Procedures and Audits of Emergency Preparedness

The auditors reviewed the Fort Calhoun Emergency Plan and noted that the responsibility and authority for Radiological Emergency Response Planning at the site was intended to be vested in the Supervisor-Chemistry and Radiation Protection. The auditors also noted that the responsibility and overall authority for development, review, updating and distribution of the Emergency Plan rested with the Emergency Coordinator and that the Emergency Plan specified the Radiological Health and Emergency Preparedness Manager as the Emergency Coordinator.

The auditors noted that the Emergency Plan required an annual review of that plan by the Plant Review Committee (PRC); that the results must be documented; and that a summary of recommended corrective actions was required from the PRC. The auditors also noted that the Safety Audit and Review Committee (SARC) was to biannually audit: the Emergency Plan; implementing procedures and practices; training; readiness testing; and equipment availability and operability. The results of this audit were to be documented per Tech. Spec. 5.5.2.10.c.

The auditors noted that, in addition to the above audits and reviews, the Emergency Plan would be reviewed annually by an independent organization and that the Emergency Coordinator was responsible for assuring that the review was performed. This independent review was to include all audit items which the SARC group reviewed plus interfaces with State and local governments. The auditors further noted that the results of this independent audit would be documented, reported to appropriate plant and corporate management, as well as involved Federal, State, and local organizations. Emergency telephone numbers were to be updated on a quarterly basis.

Based upon the above findings, this portion of the licensee's program appeared to be adequate.

5.6 Human Factors Engineering

The auditors observed several areas where impediments to the effective operations of the various emergency workers existed and where greater consideration of human factors engineering could assure quicker and more accurate emergency response. Impediments in the areas of classifying emergency conditions and making appropriate recommendations were identified. The licensee's EIPs were not tabbed for quick location of critical EIP sections or attachments such as: (1) emergency classification; (2) notification; and (3) the Emergency Director emergency procedures. When reviewed, the auditors noted that the licensee's EIPs were only tabbed by the emergency facility where the procedure would be performed (e.g., OSC, TSC, EOF, etc.). The auditors further observed that the use of color coding tabs or other similar means would greatly enhance the retrievability of the immediately necessary documents.

Upon review of the various instruments, meters, and other assessment tools used during an emergency, the auditors noted that, again human factors engineering could enhance the timeliness and accuracy of decisionmaking. For example, color coding or other techniques could be used on those specific instruments used for the identification and proper classification of emergencies.

Based on the above findings, improvement in the following area should be considered in order to achieve an adequate program:

- Review and evaluate the usability of existing procedures and instruments, used during emergencies, for human factors engineering corrections (285/81-35-63).

6.0 COORDINATION WITH OFF-SITE GROUPS

6.1 Off-site Agencies

The auditors contacted responsible individuals within the following organizations to verify that: 1) they understood their responsibilities and procedures in responding to an emergency at the licensee's facility; 2) their understandings were consistent with the agreements made between themselves and the licensee and the licensee's procedures; and 3) their expectations as to the interfaces and cooperative relationship with the licensee were adequate.

- Nebraska State Patrol
- Nebraska State Civil Defense
- Nebraska State Department of Health
- Harrison County Sheriff Department
- Washington County Sheriff Department
- Blair Fire Department and Rescue Squad
- UNMC Regional Radiation Health Center
- Blair Memorial Community Hospital
- Cooper Nuclear Station
- Missouri State Highway Patrol
- Missouri Disaster Planning and Operations Office
- U.S. Coast Guard
- U.S. Department of Energy, Chicago Operations Office (DOE)
- U.S. Environmental Protection Agency (EPA)
- U.S. National Weather Service
- Institute for Nuclear Power Operations (INPO)
- Gibbs & Hill, Inc.

These contacts verified that the licensee had contacted the responsible agencies for the purpose of conducting drills, exercises, and where applicable, training. The auditors determined that the licensee's concept of training for off-site response personnel was to invite those personnel to participate in drills and exercises and to participate in formal classroom type training. Each representative contacted expressed satisfaction with the licensee's

coordination efforts in relation to notification during an emergency and the exchange of routine planning information.

The licensee's protective action guides and related recommendations appeared to be consistent with those of the States of Nebraska and Missouri. However, the auditors were unable to verify that the off-site agencies had formally reviewed and approved the emergency actions, protective action guides and associated protective action recommendations for each emergency class, except that these items had been incorporated into the State and local plans without change from the items in the licensee's Emergency Response Plan.

The auditors determined that the letters of agreement between the licensee and off-site response groups were not all current and that letters of agreement did not exist for some response groups or were so ambiguous as to be meaningless. The auditors also determined that the States of Nebraska and Missouri could not activate and provide off-site radiological monitoring teams and equipment for approximately 3 hours after that need was identified to the States. The licensee would have to perform this task until the States could respond and accept responsibility for this function.

Based on the above findings, improvements in the following areas should be considered in order to achieve an adequate program:

- Review all letters of agreement with off-site support organizations to ensure that all are still acceptable and will be honored, and ensure that adequately detailed letters of agreement exist for all organizations the licensee will depend on for aid during an emergency (285/81-35-64); and

- Ensure that the EALs and their associated response actions are discussed with and agreed on by the licensee, State and local governmental authorities and develop and implement a method to review the continued acceptability of the EALs and their associated response actions with the State and local governmental authorities on an annual basis (285/81-35-65).

6.2 General Public and News Media

The auditors reviewed Section G of the licensee's Emergency Plan and EPIP-Pi-1 thru 7. The auditors interviewed the OPPD Manager of Media Relations; citizens and business people in Blair and Fort Calhoun, Nebraska; and citizens and business people in Missouri Valley, Iowa. The auditors also toured the DeSoto Wildlife Reserve and interviewed the Refuge Manager.

The auditors determined that the licensee had developed and distributed an Emergency Planning (EP) brochure to residents of the 10-mile EPZ and had also placed EP brochures in businesses to inform transient individuals of emergency protective actions while in the 10-mile EPZ.

The auditors also determined that the licensee had an active program of familiarizing the news media with emergency plans, establishing points of contact for release of public information, providing space for media use and providing information about radiation, normal plant operations versus accident operation and accident sequences.

The auditors further noted that the licensee had briefed the news media about the EP brochure and had provided a media information kit during a luncheon for media representatives in July 1981. The auditors noted that the licensee had instituted and planned to continue annually a media seminar as well as an annual distribution of emergency preparedness information to the general public.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

7.0 DRILLS, EXERCISES, AND WALK-THROUGHS

7.1 Drill and Exercise Program Implementation

The auditors verified by reviewing documented emergency exercises and drills in the licensee's files, that emergency exercises and drills were being conducted in accordance with the licensee's emergency plan. The auditors also noted that the emergency exercises and drills were being performed by those individuals identified in the licensee's Emergency Plan and at the time periods specified in the licensee's Emergency Plan.

The auditors further verified, by randomly selecting several emergency exercises and drill critiques, that deficiencies noted during exercises and drills were being corrected and that off-site agencies were being invited to attend (documentation in files verified attendance) and participate in the licensee's emergency exercises and drills.

Based on the above findings, this portion of the licensee's program appeared to be adequate.

7.2 Walk-Through Observations

The auditors observed walk-throughs of many of the various emergency detection, assessment, and response functions of the FCS Emergency Response Plan and its associated implementation procedures. The results of those observations were used in the development of findings in the other sections of this report.

7.2.1 Emergency Detection (EAL Recognition) and Emergency Classification

The auditors reviewed the contents of the licensee's Radiological Emergency Response Plan Sections A, B, C, D, I, and the Emergency Plan Implementing Procedures OSC-1, 5, 6, and 7. The auditors also held discussions with several of the station operation personnel who are normally assigned as Shift Supervisors for the Reactor Operations shift and performed a walk-through of the EAL recognition and emergency classification responsibilities of those Shift Supervisors. The auditors supplied the individuals questioned with

specific instrument conditions as a starting point and requested that the individual take that information and classify the emergency based upon the EAL's as defined in the EPIP-OSC-1. The auditors noted that the initiating conditions for off-site response were primarily based on a radiological release from the plant stack and subsequent readings taken from the gas, particulate, and radioiodine monitors. The auditors also noted that a chart had been posted near the radiological effluent monitors giving Emergency Action Levels for different radiological releases or meter readings.

The auditors interviewed several Shift Supervisors and noted that most of the Supervisors would not hesitate to make off-site recommendations to the State(s) in the event of an instantaneous release which would impact the health and safety of the public.

The auditors noted that one Shift Supervisor would make recommendations only to the Station Manager or Duty Supervisor, after assessing the accident.

7.2.2 Dose Assessment Calculations

The auditors, while having Control Room Operators discuss the area process monitors, asked how they would determine a stack release rate in Ci/sec from an increased or alarming process monitor in containment. The Control Room Operators, with the aid of some graphs and the dose assessment equation located in Section I of the FCS Emergency Plan, demonstrated proficiency in answering the question and an awareness of the dose calculation methods of the ERP.

7.2.3 Post-Accident Coolant Sampling and Analysis

The auditors requested that the back-shift chemist walk-through the steps of obtaining and analyzing a reactor primary coolant liquid sample. It should be noted that the chemist had been on duty since 11:30 PM and the walk-through request was made at 9:30 AM after the chemist's regular shift had ended. The auditors noted no hesitation or obvious uncertainties on the part of the chemist as each phase of the task was demonstrated.

The auditors also noted that the sample collection point in Room 60 and the sample line which the chemist would have used (Reactor Coolant Loop, 1 hot leg) were consistent with those listed in OI-PAP-1 "Post-Accident Sampling of Primary Coolant." The auditors determined that transport of the sample to the radio-chem lab would have been by hand carrying it in the shielded sample vessel, which did not satisfy ALARA nor OI-PAP-1 criteria.

The auditors did not specify the analysis to be performed but rather inquired into methods and equipment which would have been used to accomplish various analyses. The auditors were shown sample receptacles, analysis systems, and special equipment required for the respective analysis. The auditors were also shown chemical procedures (CMPs) and forms provided for recording data. The auditors further noted that all equipment was operable and it appeared that total sample and analysis time would have been less than 3 hours assuming that the radio-chem lab could be inhabited and that the GeLi "dead time" stayed within limits for sample counting.

7.2.4 Post-Accident Containment Atmosphere Sampling and Analysis

The auditors requested that a Rad-Chem technician walk-through the steps of obtaining and analyzing a sample of the containment atmosphere. The auditors noted that in Room 69, RM-051 and RM-052 (which are the sample system identities) were in operation and appeared to be functioning properly. These systems contained a charcoal cartridge and millipore-type pre-filter which made up the sample deposit media. The auditors also noted that flow-rates and sample times would be documented on standard forms. The auditors noted that the samples would have been hand carried to the radio-chem lab for analysis, which did not satisfy ALARA or OI-PAP-1 criteria.

The auditors noted that the samples would be counted on one of the two available GeLi systems. The auditors asked what would be done if the GeLi system were "swamped" because the sample activity level was too high and the technician indicated that a re-sample of a shorter time duration would be taken. The auditors also noticed that the GeLi systems were the only counting systems available except for tritium (3H) analysis. Further, the auditors

were not satisfactorily shown that the GeLi systems could accomplish high-level sample counting without "swamping" using present counting geometries.

The auditors determined that sampling and analysis could have been accomplished within a 3 hour time frame assuming habitability of the Radio-Chem lab and availability of the sample counting by the GeLi systems.

7.2.5 Protective Action Decision Making

The auditors walked the Shift Supervisors through the dose projection and protective action decisionmaking process. Each Shift Supervisor readily identified the stack monitor release rate and emergency action levels. The auditors noted that each Shift Supervisor would immediately, upon receiving an alarm on the stack monitor, proceed to calculate off-site dose and be prepared to make off-site recommendations. The auditors noted that most Shift Supervisors would make recommendations to the State agencies if necessary.

8.0 EXIT MEETING

On December 16, 1981, at the conclusion of the on-site portion of the appraisal, the Appraisal Team, along with a representative from the NRC Office of Inspection and Enforcement Headquarters and a representative from the NRC Region IV offices, met with licensee representatives denoted in Annex A to this report. At that meeting, the Team Leader summarized the scope of the appraisal and the significant appraisal findings.

Licensee management acknowledged the appraisal findings and indicated that, prior to the NRC appraisal, they were aware that there were many areas which needed to be improved. Limited resources in conjunction with the short time frame permitted by the regulations from the Emergency Plan submittal to Plan implementation, however, made it difficult to accomplish all that was required.

Immediately following the exit meeting, the NRC staff met with the licensee's management and emergency preparedness staff and reviewed the specifics of the significant appraisal deficiencies to ensure mutual understanding. At the meeting, problems needing immediate attention were identified and mutually agreed-upon dates for corrective actions were established.

ANNEX A

INDIVIDUALS CONTACTED

1. Selected Licensee Contacts

- **R. L. Andrews - Section Manager, Operations
- M. M. Baye - STA
- J. A. Bra1 - Storekeeper
- J. Branch - STA
- D. Bruening - Dosimetry Coordinator (Corp)
- C. L. Carlson - Machinist
- J. Carlson - Clerk
- A. R. Chandler - Security Force
- T. Christenson - Shift Technician
- M. R. Core - I&C Maintenance Supervisor
- C. R. Crawford - Rad-Chem Technician
- R. C. DeMeulmeester - Shift Supervisor, EDO
- J. J. Fisicaro - Supervisor, Administrative Services
- J. J. Fluehr - Reactor Engineer
- **F. F. Franco - Manager, Radiation Health & Emergency Planning
- J. F. Gasz - Training Supervisor
- W. G. Gates - Supervisor, Operations
- **M. O. Gautier - Manager, Media Relations
- J. C. Hansen - Security Force
- L. Harrow - Environmental Sample & Analysis Coordinator (Corp)
- B. J. Hickie - Supervisor, Chemistry & Radiation Protection
- R. Hyde - Supervisor, Field Maintenance
- K. Irwin - Plant Chemist
- T. W. Jamieson - Chemistry & Radiation Protection
- **R. L. Jaworski - Section Manager, Technical Services
- G. D. Jones - Institute of Resource Management

**Denotes those individuals attended the Exit Meeting on December 16, 1981.

1. Selected Licensee Contacts (continued)

- **W. C. Jones - Division Manager, Production Operations
 - E. Kemp - Communication Technician
 - S. Khan - Alternate Emergency Coordinator (Corp)
 - M. Klanderud - Alternate Dosimetry Coordinator (Corp)
 - R. C. Kreis - Security Force
 - R. L. Kuhmann - I&C Technician
 - L. T. Kusek - Supervisor, Technical
 - G. D. Mamoran - Reactor Operator
 - J. M. Mattice - H. P. Technician
 - J. A. Mixan - I&C Technician
- **K. J. Morris - Manager, Administrative Services
 - R. J. Mueller - I&C Engineer
 - C. Norris - Dose Assessment Coordinator (Corp)
- **C. H. Ostler - Manager, Communications
- **T. L. Patterson - Licensing Administrator
 - G. J. Pelnar - Shift Supervisor, EDO
 - G. R. Peterson - Supervisor, Maintenance
 - J. L. Peterson - Security Force
- **D. R. Pettit - Acting Division Manager, P.R.
 - A. W. Richard - Plant Engineer
 - G. Roach - Rad-Chem Supervisor (acting)
 - C. A. Smith - Security Force
- **S. C. Stevens - Manager, Fort Calhoun Station
 - R. K. Stultz - Chemistry
 - T. Swift III - Rad-Chem Technician
 - M. Tesar - Alternate Environmental Sample & Analysis Coordinator (Corp)
- **F. A. Thurtell - Division Manager, E&RA
- **D. D. Witthe - Division Manager, Engineering Division
 - E. Zyblut - I&C Technician

**Denotes those individuals attended the Exit Meeting on December 16, 1981.

2. Selected Non-licensee Contacts

- A. C. Baker - Project Manager, Gibbs & Hill
- M. S. Blair - Vice President, Gibbs & Hill
- R. R. Farquharson - Medical Director, Radiation Health Center, UNMC
- L. E. Hanus - Lt. Nebraska State Patrol
- W. P. Hawkins - Gas Station Customer
- B. Jensen - Trustee, Blair Fire Department
- R. R. Kastanek - Patrolman, Nebraska State Patrol
- T. Mayo - Mini-Market Clerk
- M. A. Quaife - Director, Radiation Health Center, UNMC
- J. H. Rives, Jr. - Manager of Engineering, Gibbs & Hill
- J. Swanson - Gas Station Attendant, Fort Calhoun
- **L. A. Yandell, NRC Senior Resident Inspector, FCS

**Denotes those individuals attended the Exit Meeting on December 16, 1981.