January 15, 1997

Tennessee Valley Authority
ATTN: Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: MEETING SUMMARY - BROWNS FERRY NUCLEAR PLANT

Dear Mr. Kingsley:

This refers to the information meeting between the Nuclear Regulatory Commission and Browns Ferry Nuclear Plant. The meeting was conducted at your request in the NRC Region II office on December 16, 1996. The purpose of the meeting was to inform the Nuclear Regulatory Commission of various aspects of the Radiological and Chemistry programs at the Browns Ferry Nuclear Plant.

It is our opinion that the meeting was beneficial and provided a better understanding of the issues and status at Browns Ferry.

In accordance with 10 CFR 2.790, of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please contact us.

Sincerely,

(Original signed by M. S. Lesser)

Mark S. Lesser, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos. 50-259, 50-260, 50-296
License Nos. DPR-33, DPR-52, DPR-68

Enclosures: 1. List of Attendees
2. Browns Ferry Handout Material

cc w/encls: (See page 2)

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LIST OF ATTENDEES

Tennessee Valley Authority

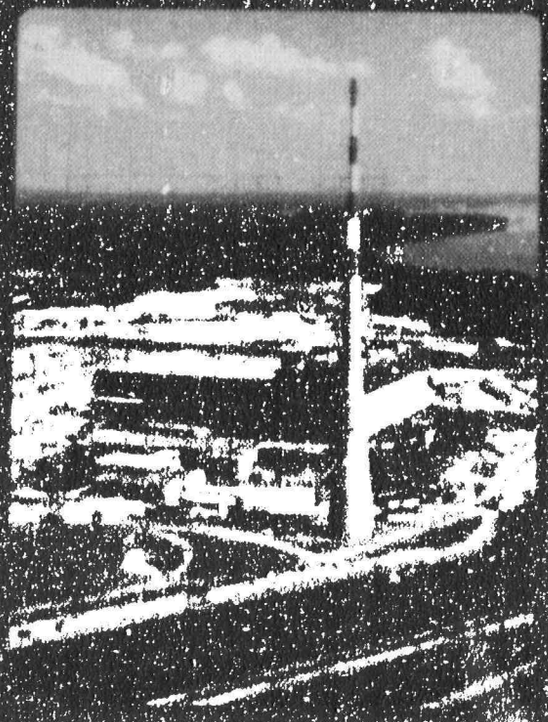
S. Bugg, Manager, RadChem
R. Coleman, Manager, Radcon, Browns Ferry Nuclear Plant
W. McArthur, Manager, Corporate RadChem
J. McCarthy, Manager, Industry Affairs, Browns Ferry Nuclear Plant
B. Pierce Jr., Manager Enviromental/Waste Control
J. Sabados, Manager, Chemistry, Browns Ferry Nuclear Plant
F. Spivey, Supervisor, ALARA, Browns Ferry Nuclear Plant

Nuclear Regulatory Commission

K. Barr, Chief, Plant Support Branch (PSB), Division of Reactor Safety (DRS)
D. Forbes, Radiation Specialist, PSB/DRS
J. Kreh, Radiation Specialist, PSB/DRS
G. Salyers, Radiation Specialist, PSB/DRS

Enclosure 1

Tennessee Valley Authority
Browns Ferry Nuclear Plant



RadChem Information For Nuclear Regulatory Commission

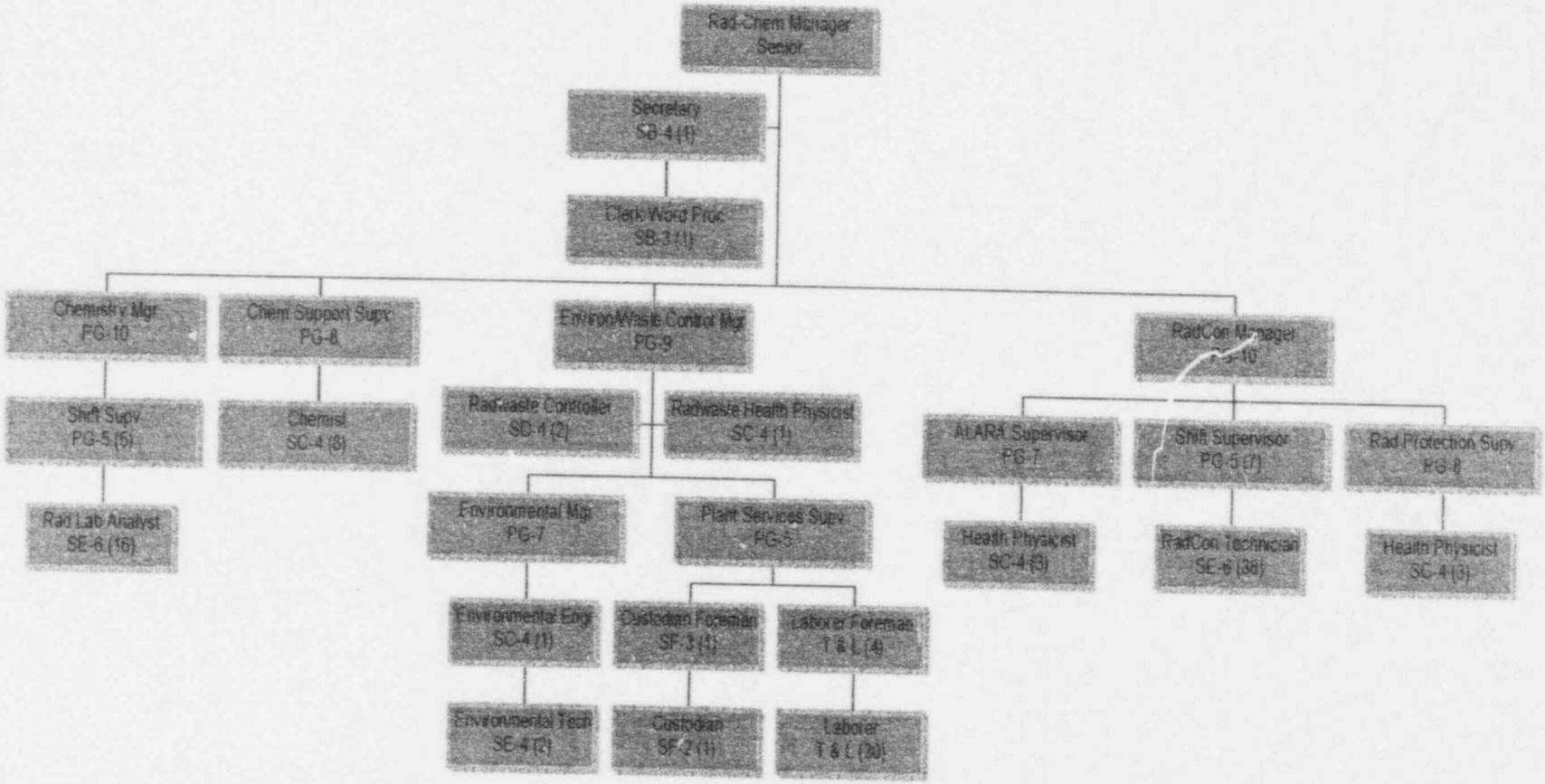
Prepared by:
Site RadChem Organization

Tennessee Valley Authority
Browns Ferry Nuclear Plant

RadChem Information For Nuclear Regulatory Commission

Prepared by :
Site RadChem Organization

Tennessee Valley Authority
Browns Ferry Nuclear Plant
Radiological/Chemistry (Rad-Chem) Organization



Summary of Plant Performance

- Five consecutive SALP 1 ratings and no INPO findings during last E & A visit.

- Environmental/Waste Control
  - Performance in the past year has been satisfactory. Aggressive goals were set and achieved during fiscal year 1996.
    - The contaminated area square footage goal of <1% was achieved during FY'96.
    - Shipped 262 cubic meters of radwaste vs. a goal of 320 cubic meters
    - The goal of 5 reportable Environmental Non-Compliance events was maintained

- Radiological Control
  - BFN goals for external radiation were met during FY'96.
    - Accrued 432 man-rem versus a goal of 510
  - Personnel Contamination Events (PCE) decreased by approximately 40% during FY '96.
    - 124 PCEs in FY'96 vs. 210 PCEs in FY'95

- Chemistry
  - Unit 3 was returned to operation in November 1995 and has operated with reactor coolant conductivity approximately 0.08 µS/cm and chloride and sulfate less than 1.0 ppb.
  - Unit 2 has continued to operate with reactor coolant conductivity approximately 0.08 µS/cm and chloride, and sulfate less than 1.0 ppb.
  - Unit 3 Depleted Zinc Oxide (DZO) injection has been effective in controlling drywell BRAC dose rates

Major Events

- RadChem has successfully transitioned from a recovery/operation to a two unit operation mentality.
- Startup of U-3 was successful with no significant radiological events and excellent water chemistry.
- Accreditation renewal of RadChem Training Program

- **Environmental/Waste Control**
  - The disposal site operator has changed the disposal site pricing from a volume based system to a weight/hazard based pricing structure. The entire methodology to determine the effectiveness of a radwaste program is being changed. No longer will volume generation/disposal be an indicator of the program. More emphasis must be placed on reduction in front end generation and recycling.
  - Approval of the Thermex water treatment system will benefit the plant by:
    - Decreased discharges to the environment and improved recycle times
    - Reduce liquid radwaste system spent resin from 1000 to 100 cubic feet per year
    - Allow CST's to be filled with floor drain water instead of demin water.

Radiological Control

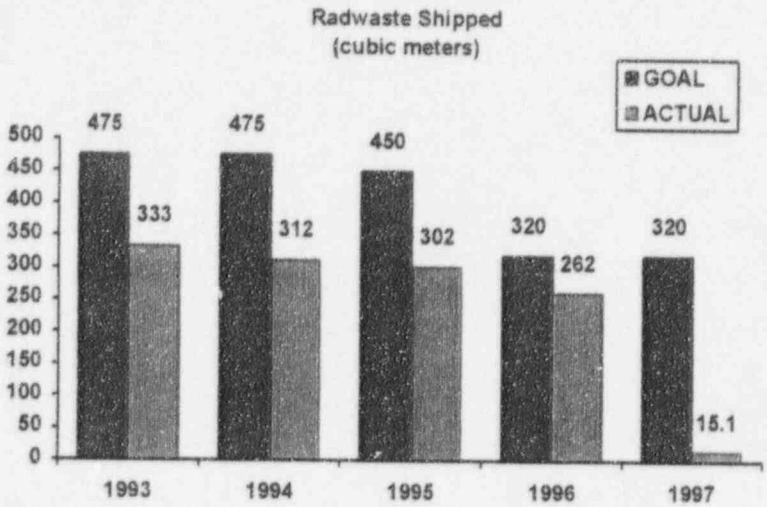
- U2C8 Outage
  - Short Duration - 32 days
  - Exposure Goal Met - Actual 241 vs. Goal of 350 man-rem
- All RadCon procedures were transferred to an electronic media and are now revised via computer.
- Smooth transition to a re-engineered organization
  - RadCon made a smooth transition from one unit in Recovery and one unit operational to a 2 unit operational mode
- BFN installed the GE DZO injection process on Unit 3 for cycle 7 operation. The DZO injection combined with a recirc system chemical decon and CRB pin and roller replacement during the recovery outage have resulted in contact dose rates on recirc piping at levels expected to be approximately 30% of those experienced during the first Unit 2 outage following restart. Dose rate projections are based upon radiation measurements conducted during a Unit 3 outage during September 1996 (10 months post start-up.) Substantial reductions in Co-60 levels in Unit 3 reactor water have been achieved when compared to the levels in Unit 2 as well.

Chemistry

- Hideout return (Sulfate, Calcium, Silica) from the old fuel to reactor coolant is experienced during Unit 3 Scrams.
- Unit 3 has experienced a single fuel leaker during U3C7.
- Transition to a new Raw Water Treatment Program and a new Makeup Water Treatment System continues.

Environmental/Waste Control

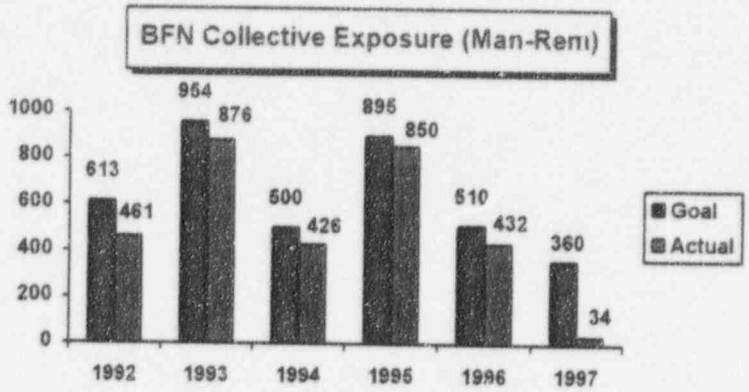
- Approximately 262 cubic meters of radioactive waste was shipped for disposal during fiscal year 1996. The goal for the year was 320 cubic meters. The graph below shows a comparison of the shipment of radwaste versus the goal for the past four years.



- C-zone minimization continues to be a strength of the organization. A goal of less than 1.0 percent c-zone area versus total plant radiologically controlled areas has been established (excluding outages.) The c-zone area is tracked on a daily basis and reported in the plan-of -the-day (POD) package for management. The goal was met consistently throughout the year. The FY'97 goal is also <1% and is at or near that goal daily.
- A goal of five (5) non-radiological environmental noncompliances was established and met. The FY'97 goal is also 5. To date there has been 1 non-radiological noncompliance recorded.
- Shipments of Non-Radioactive Hazardous Waste
  - FY'96 Goal 12,000 pounds - Actual 6,500 pounds
  - FY'97 Goal 12,000 pounds - Actual To Date 3,500 pounds

Radiological Control

- BFN goals for external radiation were met during FY'96. The site accrued 432 man-rem versus a goal of 510. As seen by the graph below, BFN has been consistent in meeting its exposure goals:



- Personnel Contamination Events (PCE) were reduced by approximately 40% during FY '96. At total of 124 PCEs were recorded for FY'96 vs. 210 for FY'95. There are 14 PCEs to date (12/12/96) for FY'97.

Chemistry

- Unit 2 and Unit 3 operate at Chemistry Performance Indicators (CPI) of approximately 1.00 (and less than 0.20 using the old CPI).
- Unit 2 Fuel Reliability Indicator (FRI) is approximately 10 µCi/sec.
  - FY 97 FRI Goal for Unit 2 - 300 µCi/sec
- Unit 3 Fuel Reliability Indicator (FRI) is approximately 4000 µCi/sec.
  - FY 97 FRI Goal for Unit 3 - 8000 µCi/sec
- Liquid Radwaste volume discharged and curies released are high
  - (See Chemistry Challenges)

Program Strengths

- Plant Management review of RadChem goals and status
  - Daily POD Review
- Commitment to Training

- **Chemistry**

- Feedwater Iron/Radioactive Resin Reduction Plan
  - MEMTEC condensate demineralizer filter elements
    - Install four sets in Unit 3 (U3) by January 1997
    - Install four additional sets in Unit 2 (U2) by June 1997
  - Lower feedwater iron to 0.75 - 1.25 ppb
  - Reduce radioactive resin generated

- Use of DZO to lower U3 drywell dose rates
  - After ten months of operation, U3 BRAC dose rates were approximately 50 milli-rem/hr versus approximately 220 milli-rem/hr for U2 (after the same period of operation).

- Use of the stator cooling water oxygen injection system to estimate hydrogen leakage from the stator bars into the cooling water system
  - During the Unit 2 Cycle 8 (U2C8) outage, the actual hydrogen leakage through the stator bars matched the calculated hydrogen leakage using the oxygen injection system. This verified method allows BFN to determine stator bar leakage with the unit on-line.
- Use of RWCU Anion Overlay
  - Control of reactor water sulfate and silica concentrations are enhanced by increasing the amount of anion resin used to coat the reactor water cleanup filter demineralizers. Run lengths are also increased.
- Western Area Regional Laboratory Analyses
  - TVA has established in-house analyses of radioactive samples for 10CFR50 and 10CFR61 compliance. This has improved the quality and timeliness of analytical results.

♦ Environmental/Waste Control

- Active Radwaste Minimization Program
  - * The quantity of waste shipped to disposal in Fiscal Year (FY) 1996 was approximately 262 cubic meters.
  - * Aggressive minimization program utilizing incinerable material when practical.
  - * Extensive use of contaminated tools and "hot toolroom" minimizing waste generation.
  - * Use of warehouse to store specialty items for reuse, thus reducing waste generation.
  - * Active leak identification and minimization program.
  - * Listed in Plan of the Day (POD) package for management attention
  - * Aggressive leakage goal
  - * Dedicated radwaste Operations personnel
  - * Recyclable material, such as mops and bags, used extensively..

- Aggressive C-Zone Minimization Program
  - * Site goal of less than 1.0 percent total contaminated plant area.
  - * Dedicated decontamination crew.
  - * Decontamination priorities listed in POD for management attention.

- Installation of New State-Of-The-Art Liquid Waste Processing System
  - * In final phase of project to install system.
    Will replace existing outdated liquid radwaste processing systems (floor drain and equipment drain)
  - * All radwaste effluent water will be processed to reactor grade
  - * Radionuclide releases from the radwaste system to the environment will decrease
  - * Radwaste resin usage will be greatly reduced
  - * Reactor chemistry intrusions from radwaste sources will be reduced

Radiological Control

- All FY 1996 Goals Met

Goal Description	Goal	Actual
FY 1996 Man-Rem	510.00	431.74
U2C8 Man-Rem	350.00	241.25
C-Zone Area	<1%	0.97%
Radwaste Shipped (cubic meters)	320	262

- Temporary Shielding Program
  The temporary shielding program continued its effectiveness in reducing radiation exposure to plant workers.
  - Tonnage of Shielding In Place
    - A total of 126.8 tons of lead shielding was used during FY 1996
      –78.3 tons of shielding remained in place from previously installed shielding packages
      – 5.5 tons were installed in support of various maintenance activities
      – 43 tons were installed in support of U2C8 outage
  - Man-Rem Savings
    - Total estimated savings of 25.7 man-rem during FY'96
    - 6 man-rem from previously installed packages
    - U2C8 Outage - 17.7 man-rem
    - Support of various maintenance activities: 2 man-rem
  - Strong Focus On ALARA Items
    - Closed Circuit Television Program (CCTV)
      –The CCTV program is used for monitoring work activities in the Radiologically Controlled Area (RCA) as well as plant equipment in high radiation areas while the plant is operating. An estimated 12 man- rem is saved annually by utilizing CCTV in operating areas of the plant.

Program Strengths - Continued

* Robotics

  -BFN uses the ANDROS Mark VI robot to monitor workers, perform surveys, provide lighting to workers, as well as locate and detect leaks in the operating areas of the plant. ANDROS saved an estimated 3 man-rem during the past year.

* Surrogate Tour System

  -The Surrogate Tour System is a video tour system that can instantly access and display any of over 100,000 photographs stored in a laser disk database using simple computer controls and video displays of plant floor plans. The Surrogate Tour System is used by planners, engineers, and in ALARA briefings.

Challenges

- **Chemistry**
  - The volume and curie content of radioactive liquid effluents are high
    - Radwaste inleakage reduction program goal for inleakage is less than or equal to 10 gallons per minute each for both the equipment drains and floor drains.
    - Drywell leakage repairs during the September 4, 1996 U3 shutdown have reduced liquid effluents (curies).
    - Thermex is to be installed in February 1997. This will reduce the volume and curie content of the effluents.
  - Management of Chemistry Data is not optimum
    - Need to improve efficiency and effectiveness of data generation, handling, and review.
    - Contract with Beckman was approved in November 1996. The system has an estimated 45-week implementation schedule
- **Environmental/Waste Control**
  - New Disposal Site Pricing
    - Less volume may not be the best business
    - We are evaluating changing our radwaste goal from a "volume to disposal" goal to an "unprocessed waste generation" goal.
    - With today's new disposal site pricing, it may be more cost effective to compact the waste instead of incineration.
    - Front end generation is becoming more important
    - Innovative waste minimization ideas may become practical
  - Managing Resin Biogasing
    - Continue to operate under the guidance of "placing a barrier" between a gasing liner and the disposal site
    - Participation in EPRI's biogas study
    - New liquid waste processing system may eliminate food source for microbes, thus minimizing biogas potential

Radiological Control

- REXS Replacement
  - It has been recommended by Corporate Information Services that the REXS application be replaced with new design and technology by October 1998, due to the requirement of extensive program modifications to accommodate the new century date format. Rad-Chem is currently reviewing options for meeting this challenge. A committee has been defined and commissioned to produce a conversion plan.

- Rad-Chem Process Redesign
  - A Rad-Chem Process Redesign Committee is currently in the process of reviewing all Rad-Chem processes with the intent to improve, streamline, and/or eliminate time-consuming and inefficient processes. This team is being assisted by the Methods Group.

- Unit 2 Chemical Decon/DZO
  - The challenge is to get Unit 2 operating on DZO like Unit 3 as soon as possible. Optimum conditions include the performance of a chemical decontamination. Challenges to be addressed include:
  - Chemical Decon cost estimate ($1.5M)
  - Five days critical path
  - Core offload, RPV partial drain
  - DZO cost estimate ($1.037M initial load)
  - $366K/YR operating cost for zinc

- RADCON is coordinating with Outage Management to evaluate the feasibility of chemical decontamination during the U2C9 outage. A vendor has given a presentation on methods of achieving the decontamination with minimal impact upon outage duration. This effort is ongoing.

- The overall plan to be submitted for approval includes:
  - Optimize recirculation and RHR piping surfaces by performing a chemical decontamination at the onset of U2C9 outage
  - Install DZO components preoutage (U2C9)
  - Make final zinc injection connections during U2C9 outage
  - Implement zinc injection starting U2C10
  - Potential 95 man-rem savings during U2C9 outage
  - $212k man-rem dollar savings

Procedure Overview

TVAN RadChem organization is currently undergoing a standardization of procedures across the organization. When complete the current Nuclear Power Standards and the Site Standard Practices will be replaced by Standard Procedures and Processes (SPPs) and Site Departmental Procedures (SDPs). These procedures will be implemented at each TVAN site. This should allow for fewer and more streamlined procedures. This project is approximately 50% complete with all procedures currently drafted and in the review/comment phase.

- RadCon
  - RadCon has recently implemented a self-assessment program to ensure regulatory compliance and that high standards of performance are maintained. The program consists of two processes. The first is a compliance based review of RadCon procedures, documents and records using compliance matrix checklists. The checklists list the regulatory requirements, commitments and industry good practices. The second process consists of assessing performance using quality indicators and performance observation checklists. These checklists detail management expectations for job and program performance in key areas.
- Chemistry
  - Chemistry has recently established a self-critical process by which activities, programs and processes are evaluated to improve performance and ensure high standards are met and maintained. This process is based on INPO and NRC guidelines and regulations and industry experience.
- Environmental/Waste Control
  - The self-assessment program developed for the Environmental/Waste Control organization mirrors the program described above for RadCon. A Self-Assessment Compliance Matrix for Solid Radioactive Waste Procedures and a Solid Radioactive Waste Observation Checklist have been developed to implement the process.