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SAFETY SURVEY REPORT
EBR-II SAFETY SURVEY, ANL-WEST
HEALTH PROTECTION, INDUSTRIAL SAFETY AND FIRE PROTECTION SURVEY

Idaho Falls, Idaho
January 10-18, 1972

DISCLAIMER

Conducted by:
Safety Division
Chicago Operations Office

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ABSTRACT

A safety survey covering the disciplines of Reactor Safety, Nuclear Criticality Safety, Health Protection and Industrial Safety and Fire Protection was conducted at the ANL-West EBR-II FEF Complex during the period January 10-18, 1972. In addition, the entire ANL-West site was surveyed for Health Protection and Industrial Safety and Fire Protection. The survey was conducted by members of the AEC Chicago Operations Office, a member of RDT-HQ and a member of the RDT-ID site office. Eighteen recommendations resulted from the survey, eleven in the area of Industrial Safety and Fire Protection, five in the area of Reactor Safety and two in the area of Nuclear Criticality Safety.

Kenneth A. Dunbar, Manager
Chicago Operations Office
U. S. Atomic Energy Commission

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I. INTRODUCTION

A safety survey covering the disciplines of Reactor Safety, Nuclear Criticality Safety, Health Protection, and Industrial Safety and Fire Protection was conducted at the ANL-West EBR-II FEF Complex on January 10-18, 1972. In addition, all ANL-West facilities were surveyed in the disciplines of Health Protection and Industrial Safety and Fire Protection.

Members of the survey team were: Mr. R. M. Moser, Director, Safety Division (SD), Chicago Operations Office (CH); Messrs. R. D. Morley and Dale A. Herbst, Reactor Safeguards Engineers, SD, CH; Mr. J. H. Pingel, Health Physicist, SD, CH; and, Mr. L. E. Oldendorf, Fire Protection Engineer, SD, CH. RDT participants in the survey were Mr. J. T. O'Connor, Site Representative, RDT-ANL-West, and Mr. James F. Smith, Jr., Chief, Operations Support Branch, RDT, HQ. Messrs. D. E. Ericson and D. E. Beaderstadt, CH Site Representatives, NRTS; and, Mr. W. J. Tupper, Nuclear Engineer, Operational Safety Division, ID, also participated in portions of the survey.

The survey was performed following the agenda given in Appendix 1 which was transmitted by a December 29, 1971, letter, McSwain to Duffield.

In Section II, Survey Findings, the agenda activities of Appendix 1 are identified by number and grouped by discipline. In addition, the relevant documents and participants are identified for each activity. This is done to assist the reader in identifying the specific criteria against which contractor performance was measured for each activity.

A close-out session which resulted in the Agreements and Commitments of Appendix 2 was attended by the following individuals.

ANL

R. Laney, Associate Director for Engineering Research and Development

M. Levenson, Project Director, EBR-II

D. O'Neil, Director, Industrial Hygiene and Safety Division

F. Pancner, Superintendent, Fire Protection Department

W. Barney, Associate Director, Materials, EBR-II Project

H. Lawroski, Superintendent of Operations, EBR-II

E. Graham, Manager, Health and Safety, ANL-West

W. Wilson, Fire Protection Engineer

AEC

C. C. McSwain, Director, Argonne Contract Management Office, CH

R. M. Moser, Director, Safety Division, CH

J. H. Pingel, Health Physicist, SD-CH

L. E. Oldendorf, Fire Protection Engineer, SD-CH

R. D. Morley, Reactor Safeguards Engineer, SD-CH

Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

D. E. Ericson, CH Site Representative, NRTS

D. E. Beaderstadt, CH Site Representative, NRTS

R. F. Sweek, EBR-II Program Director, RDT-HQ

M. E. Jackson, Senior Site Representative, RDT-ANL-East

D. A. Moss, Senior Site Representative, RDT-ANL-West

J. T. O'Connor, Site Representative, RDT-ANL-West

J. F. Smith, Jr., Chief, Operations Support Branch, RDT-HQ

W. J. Tupper, Nuclear Engineer, Operational Safety Division, ID

E. I. Nowstrup, Reactor Safety Specialist, Division of Operational Safety, HQ

R. E. Tiller, Director, Operational Safety Division, ID

Members of the survey team would like to express their gratitude to the ANL staff for the cooperation given them during the survey, which was performed under extremely adverse weather conditions. Without ANL's assistance in making key personnel available, the activity schedule of Appendix 1 could not have been met.

II. SURVEY FINDINGS

A. EBR-II-FEF Complex - Nuclear Criticality Safety

1. Discuss Any Future Plans for Revision to CHCS for FEF-EBR-II Complex (Agenda Activity 35)

a. Relevant ANL Documents

(1) ANL Policy and Practice Guide - Nuclear Safety Chapter, Part I, Nuclear Criticality Safety, July 1971

(2) ANL Criticality Hazards Control Statement (CHCS) Desiderata, November 1968

(3) ID-CHCS-A06, CHCS EBR-II L & O Building Vaults and Cage Area

(4) ID-CHCS-A05, CHCS EBR-II Flow Test Area

(5) ID-CHCS-A10, CHCS EBR-II Reactor Building

(6) ID-CHCS-G01, CHCS General

(7) ID-CHCS-G02, CHCS Inter-Area Transfers

(8) ID-CHCS-A09, Interim Exemption, CHCS Heat Treatment of Fuel Elements

(9) ID-CHCS-A09, CHCS FCF Cold Line and ITF

(10) ID-CHCS-A13, CHCS FEF Argon Cell

(11) ID-CHCS-A14, CHCS FEF Air Cell

(12) ID-CHCS-A15, CHCS FEF Out-of-Cell Areas

(13) Hot Fuel Examination Facility, Title I Design Report and Cost Estimates, April 1969

b. Relevant AEC Documents

(1) Report on EBR-II Fuel Management Audit, July 26-28, 1971; August 13, 1971

(2) AECM-0530 - Nuclear Criticality Safety

(3) IAD-0530-27 - Contractor Internal Review System Requirements for NCS, October 21, 1971

(4) CH-CA-050B - Special Requirements for Users of Special Nuclear Materials

(5) AECM-0545 - Nuclear Accident Dosimetry Program

c. Miscellaneous Relevant Documents

(1) TID-7016, Nuclear Safety Guide

(2) TID-7028, Critical Dimensions of Systems Containing U-235, Pu-239 and U-233

(3) Nuclear Criticality Safety Standard for Operations with Fissionable Materials Outside Reactors - (Prepared by Subcommittee ANS-8)

(4) KENO - A Multigroup Monte Carlo Criticality Program by G. E. Whitesides and N. F. Cross, September 10, 1969

(5) TID-4500, pp. 26-27, The Development of KENO - A Multigroup Monte Carlo Criticality Program by G. E. Whitesides

d. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) W. Barney, Associate Director, Materials, EBR-II Project

(c) M. Feldman, Project Manager, FEF

(d) D. Hampson, Operations Manager, Procedures, FEF

(e) J. Long, Criticality Safety Representative, EBR-II Project

(2) AEC

(a) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

e. Survey Findings

The Reference a.(4) and a.(5) documents for the EBR-II facility have been revised and are presently under review by the Office of the Director, ANL. The procedures contained in these documents will not be utilized until the appropriate reviews and approvals have been completed. Subsequently, completion of actions in response to many of the recommendations made in the Reference b.(1) document will not be affected until that time.

The Reference a.(3) document (A06) was discussed with Messrs. Staker and Curl of ANL during the survey. Although the A06 document meets the requirements of AECM-0530, it is the opinion of the survey team that the Nuclear Criticality Safety Analysis Section could be expanded to better identify the bases for the nuclear criticality safety of the storage arrays utilized. Mr. Curl indicated that efforts have already been undertaken to generate a new A06 document utilizing the KENO computer code (References c.(4) and c.(5)). Mr. Staker agreed to take the matter under consideration.

The Reference a.(6) and a.(7) documents are under review by ANL with changes expected in the near future. In addition, the Reference a.(6) document has been updated to include the General Plan for ANL-West. This document is under review by the Office of Operational Safety (OOS). The Reference a.(9) document which was submitted to CH on December 16, 1971, for review and approval, has been updated to include Building 786 activities. Subsequent to the survey, a January 26, 1972, letter from Kenneth A. Dunbar to Robert B. Duffield approved the Reference a.(9) document subject to minor revisions. The Reference a.(10) and a.(11) documents are not anticipated to receive revision in the near future.

The Reference a.(12) document is presently under review by CH. Approval awaits submittal of revised pages by ANL as agreed to in a telecon on December 13, 1971, between Messrs. J. Long and H. Bryant, ANL; and Messrs. R. I. Elder and Dale A. Herbst, SD-CH.

ANL indicated that there will be three criticality hazards control documents written to cover fissile material activities within HFEF. These documents will be similar in structure to those used in the FEF A13, A14, and A15 documents. It is anticipated that these three documents will be submitted to CH before July 1972.

The survey team concluded that all fissile material operations at the EBR-II FEF Complex are described in Criticality Hazards Control Statements which are in conformance to AECM-0530 requirements. In addition, all fissile material activities are being performed using procedures which have received review and approval by the appropriate authorities.

2. Discuss Responsibilities, Authority and Communications with All Individuals Interviewed (Agenda Activity 28)

a. Relevant ANL Documents

(1) ANL Policy and Practice Guide - Nuclear Safety Chapter, Part I, Nuclear Criticality Safety, July 1971

(2) EBR-II Project Policy and Procedures Manual

(3) EBR-II Operating Manual, Volume III, Section VIII

(4) Fuel Cycle Facility Operations Manual

(5) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. Koch et al.

(6) ANL-5719, (Addendum) Addendum to Hazards Summary Report Experimental Breeder Reactor II (EBR-II), June 1962, L. J. Koch, W. B. Loewenstein, H. O. Monson

(7) ID-CHCS-A05, CHCS EBR-II Flow Test Area

(8) ID-CHCS-A06, CHCS EBR-II L & O Building Vaults and Cage Area

(9) ID-CHCS-A09, Interim Exemption, CHCS Heat Treatment of Fuel Elements

(10) ID-CHCS-A10, CHCS EBR-II Reactor Building

(11) ID-CHCS-A13, CHCS FEF Argon Cell

(12) ID-CHCS-A14, CHCS FEF Air Cell

(13) ID-CHCS-A15, CHCS FEF Out-of-Cell Areas

(14) ID-CHCS-G01, CHCS General

(15) ID-CHCS-G02, CHCS Inter-Area Transfers

b. Relevant AEC Documents

(1) AECM-0530 - Nuclear Criticality Safety

(2) AECM-0530-27 - Contractor Internal Review System Requirements for Nuclear Criticality Safety, dated October 21, 1971

c. Participants

(1) ANL

The subject of this activity was discussed with all individuals interviewed during the survey

(2) AEC

(a) R. M. Moser, Director, SD-CH

(b) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

d. Survey Findings

As with all other safety activities, the primary responsibility and authority for NCS rests with the Laboratory Director (LD), ANL. He is accountable to the AEC for assuring that all NCS activities are carried out in a safe manner and in compliance with the Nuclear Safety Clause of the University of Chicago contract and applicable AEC Manual Chapter requirements.

A Policy and Practice Guide on Nuclear Criticality Safety (PPG) has been issued which outlines the ANL mechanisms utilized in meeting NCS requirements. The Laboratory wide system consists of two independent organizations who report to the LD and have the responsibility to assure that all fissile material operations are:

1. Described and analyzed in documents called Criticality Hazards Control Statements (CHCS)

2. Carried out in compliance with approved written procedures.

One of these organizations is called the Criticality Hazards Control Committee (CHCC). It is made up of individuals from various scientific disciplines throughout the Laboratory. Their primary responsibility is to review CHCSs submitted to the LD and advise him as to the adequacy and acceptability of the statement and the safety of the proposed operations. In addition, the CHCC performs annual on site audits of all fissile material operations. The other organization with NCS responsibility is the Office of Operational Safety (OOS). As can be seen from its title, OOS has responsibility for all aspects of safety, NCS included. One of the primary NCS functions of OOS is to perform independent audits of fissile material operations to assure compliance with approved CHCS. Both the CHCC and OOS organizations have the authority to stop any operations which they deem unsafe.

The PPG charges each Division or Project Director with the responsibility and authority to assure NCS within his organization. To assist him in this function the Project Director appoints one or more Criticality Safety Representative (CSR). The CSR is responsible for day-to-day surveillance of fissile material activities to assure they are being performed in compliance with approved CHCS. If in his opinion any operation is unsafe, he has the authority to order that operation ceased. In addition, the CSR may assist division personnel in the preparation of the Nuclear Analysis Section of the CHCS. Mr. J. Long is the CSR for the EBR-II Project and was appointed to that position by Mr. M. Levenson, the Project Director. Messrs. Brunson and Matlock were appointed alternate CSRs by the Project Director. One of these individuals may assume the responsibility and authority of Mr. Long in his absence.

CHCS writing is the responsibility of the individual who intends to conduct an operation utilizing fissile material. The CHCS which he generates must describe the proposed operation, analyze it for NCS and identify parameters or mechanisms which assure the NCS of the operation. After a CHCS has been approved, the individual who is performing the operation under that document has the authority to stop operations if he feels an unsafe situation exists. He does not have the authority to alter the procedures without proper review and approval.

In summary, the PPG defines NCS as a line responsibility. The authority for NCS is also passed down this line of responsibility. Any individual who feels an NCS problem exists has the option of bringing it to the attention of the CSR or the Project Director.

Briefly the following is the paper flow involved before a fissile material operation can begin:

The individual who intends to conduct an operation generates a written CHCS. This is usually done with the assistance of the CSR. This document is then submitted to the CSR and the Project Director for their review. When the CHCS meets with their satisfaction, it is then submitted by the Project Director to the Laboratory Director for review and approval. The Laboratory Director forwards the CHCS to OOS for coordination with the CHCC. The CHCC then reviews, recommends changes and/or approval of the statement to OOS. OOS then informs the Laboratory Director of the results of the review. The Laboratory Director makes a decision using the criteria outlined in AECM-0530, whether or not the CHCS must be sent to CH for review and approval. If CH approval is required, no further action is taken until this approval is obtained. Approval for the CHCS goes from the Laboratory

Director to the Project Director. This information is then forwarded to the responsible operational individual.

The results of the annual CHCC inspections of fissile material operations are reported in memorandum form to the Laboratory Director. The results of the OOS audits are supposed to be reported in memorandum form from the OOS organization to the Laboratory Director. For reasons explained in other parts of this report (Agenda Activity 27), an OOS audit had not been performed to date. Mr. Long has been charged with the responsibility of performing an annual audit of all EBR-II Project fissile material activities. He is required to submit to the Project Director a memorandum specifying his findings. Mr. Long informed the survey team that he has performed his annual audit, however, did not complete the required memorandum. Mr. Long was urged to complete his action at the earliest possible date.

It is the opinion of the survey team that the above described distribution of the responsibilities and authorities for NCS meet the requirement of AECM-0530 and the October 1971 IAD-0530-27. The communications mechanisms described are also responsive to the Manual Chapter requirements.

3. Discuss and Check on 0530-27 Implementation at All Levels (Agenda Activity 27)

a. Relevant ANL Documents

(1) ANL Policy and Practice Guide - Nuclear Safety Chapter, Part I, Nuclear Criticality Safety, July 1971

(2) Ltr., Duffield to Dunbar, December 6, 1971, Immediate Action Directive 0530-27, Contractor Internal Review System Requirements for Nuclear Criticality Safety

(3) Ltr., M. Novick to C. C. McSwain, November 8, 1971, Nuclear Criticality Safety Survey, ANL, August 2-13, 1971

(4) Memo., Dillow to Duffield, Report of CHCC Inspection of Idaho Site Facilities on May 25-26, 1971; July 14, 1971

b. Relevant AEC Documents

(1) AECM-0530 - Nuclear Criticality Safety

(2) IAD-0530-27 - Contractor Internal Review System Requirements for Nuclear Criticality Safety, October 21, 1971

(3) Ltr., Dunbar to Duffield, November 1, 1971, Imeediate Action Directive, 0530-27, Contractor Internal Review System Requirements for Nuclear Criticality Safety

(4) Ltr., C. C. McSwain to R. B. Duffield, October 23, 1971, Transmittal of Nuclear Criticality Safety Survey Report, Argonne National Laboratory, Argonne, Illinois, August 2-13, 1971

(5) AECM-0545 - Nuclear Accident Dosimetry Program

(6) CH-CA-050B - Special Requirements for Users of Special Nuclear Materials

c. Participants

(1) ANL

(a) M. Levenson, Project Director, EBR-II

(b) H. Lawroski, Superintendent of Operations, EBR-II

(c) R. Staker, Associate Director, ANL; ANL-West Site Manager

(d) W. Barney, Associate Director, Materials, EBR-II Project

(e) M. Feldman, Project Manager, FEF

(f) D. Hampson, Operations Manager, Procedures, FEF

(g) M. Novick, Director, Office of Operational Safety, ANL-East

(2) AEC

(a) R. M. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

d. Survey Findings

Results of a Nuclear Criticality Safety Survey (Reference b.(4)) performed at ANL-East in August 1971 disclosed that some of the functions assigned to the Office of Operational Safety (OOS), ANL, by Reference a.(1) were not being implemented. Recommendations contained in Reference b.(4), requested a schedule for full implementation of the Reference a.(1) document's requirements. Reference a.(3) transmitted that schedule to CH.

In October 1971, Reference b.(2) was issued. In response to Reference b.(3), ANL supplied a point-by-point comparison of its Nuclear Criticality Safety internal review system to the IAD requirements (Reference a.(2)). Review of both the Reference a.(1) and a.(2) documents indicates that OOS is a key link in the ANL Nuclear Criticality Safety organization which is designed to assure compliance with Manual Chapter requirements (References b.(1), b.(2), b.(5), b.(10)). One of the primary mechanisms to be utilized by OOS is the performance of periodic audits of all ANL facilities. Questioning of cognizant ANL management personnel failed to disclose that OOS had performed any audits at the EBR-II FEF Complex. Mr. M. Novick, Director, OOS, confirmed this finding when asked if OOS audits had been performed.

Thus a concern was raised as to whether ANL is meeting the requirements set down in the References a.(1), b.(1), b.(2), b.(5) and b.(6) documents. Reference a.(3), however, did indicate the following proposed action:

"Upon approval of the General Plan, reviews will be held to assess compliance with the PPG as proposed by the Plans. Initial reviews for this purpose will begin in January and are expected to be completed in June 1972. Additional periodic audits will thereafter be performed on a schedule which reflects the complexity of operations and associated degrees of hazard in the division and organizations involved."

The above indicated schedule and action was accepted as adequate by CH in November 1971.

Discussions with individuals interviewed indicated that the CHCC had reviewed the EBR-II FEF Complex on May 25-26, 1971. Reference a.(4) transmitted results of that review to the Laboratory Director.

It is the opinion of the survey team that the audit performed by the CHCC is adequate to meet AECM-0530 requirements for an independent review of operations. However, this should not alter ANL's resolve to meet the schedule outlined above for implementation of the OOS audit function.

4. Discuss and Review Status of ANL Responses to Recommendations of July 1971 Fuel Management Audit (Agenda Activities 26 and 34)

a. Relevant ANL Documents

(1) ANL Policy and Practice Guide - Nuclear Safety Chapter, Part I, Nuclear Criticality Safety, July 1971

(2) ANL Criticality Hazards Control Statement (CHCS) Desiderata, November 1968

(3) ID-CHCS-A06, CHCS EBR-II L & O Building Vaults and Cage Areas

(4) ID-CHCS-A05, CHCS EBR-II Flow Test Area

(5) ID-CHCS-A10, CHCS EBR-II Reactor Building

(6) ID-CHCS-G01, CHCS General

(7) ID-CHCS-G02, CHCS Inter-Area Transfers

(8) ID-CHCS-A09, Interim Exemption - CHCS Heat Treatment of Fuel Elements

(9) ID-CHCS-A09, CHCS FCF Cold Line and ITF

(10) ID-CHCS-A13, CHCS FEF Argon Cell

(11) ID-CHCS-A14, CHCS FEF Air Cell

(12) ID-CHCS-A15, CHCS FEF Out-of-Cell Areas

(13) Ltr., R. V. Laney to M. Shaw, October 5, 1971, ANL Responses to Recommendations of July 1971 Audit

b. Relevant AEC Documents

(1) Report on EBR-II Fuel Management Audit, July 26-28, 1971; August 13, 1971

(2) AECM-0530 - Nuclear Criticality Safety

(3) IAD-0530-27 - Contractor Internal Review System Requirements for Nuclear Criticality Safety, October 21, 1971

(4) CH-CA-050B - Special Requirements for Users of Special Nuclear Materials

(5) AECM-0545 - Nuclear Accident Dosimetry Program

c. Miscellaneous Relevant Documents

(1) TID-7016, Nuclear Safety Guide

(2) TID-7028, Critical Dimensions of Systems Containing U-235, Pu-239 and U-233

(3) Nuclear Criticality Safety Standard for Operations with Fissionable Materials Outside Reactors (Prepared by Subcommittee ANS-8)

d. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, EBR-II Operations Manager

(c) W. Barney, Associate Director, Materials, EBR-II Project

(d) M. Feldman, Project Manager, FEF

(e) D. Hampson, Operations Manager, Procedures, FEF

(f) J. Long, Criticality Safety Representative, EBR-II Project

(g) J. Davis, Assistant Operations Manager, EBR-II

(2) AEC

(a) R. M. Moser, Director, SD-CH

(b) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(d) J. T. O'Connor, Site Representative, RDT-ANL-West

(e) J. H. Pingel, Health Physicist, SD-CH

e. Survey Findings

The following lists the recommendations of Reference b.(1), ANL's responses (Reference a.(13)) and the conclusions of the survey team from the nuclear criticality safety viewpoint on each recommendation.

Recommendation A

Detailed plans for the surveillance and maintenance of the Criticality Detection and Alarm System should be formulated, agreed to and implemented by the various affected Idaho Site facilities consistent with the installation schedule for this system.

Response

The Criticality Detection and Alarm System is operational. Plans for surveillance and maintenance of the system are completed.

Comment

It is the survey team's understanding that the Maintenance and Calibration Procedure (MCP) No. 1, Revision 1, dated 12-22-71, for the criticality monitors is in draft form undergoing a review procedure by ANL-West. The document is presently being used on an interim basis by Mr. Moriarity's group (EBR-II organization), which services and calibrates the criticality monitors. Mr. Moriarity stressed that the EBR-II Project does not have responsibility for the system. Total responsibility for the system rests with the ANL-West Site Manager. The instrument and calibration group of EBR-II acts as a service group to Mr. Staker to maintain and calibrate the monitors as required. This is done because the ANL-West organization does not have an instrument maintenance group. The survey team considers this arrangement as satisfactory from a safety standpoint.

In addition to reviewing the calibration procedure, the survey team reviewed the records for several of the monitors in the system. The records showed that the monitors are given gamma sensitivity checks and quarterly calibrations. They also showed the history for an individual monitor, the results of the calibration, who performed the calibration and the date of the calibration. It is the opinion of the survey team that the maintenance and calibration procedures and records are adequate. However, the survey team is of the opinion that the MCP draft document should be approved and issued in final form as soon as possible.

Present plans call for the addition of two new criticality monitors to the site wide system, one in the FAS Building and another in the HFEF Building. Efforts are presently underway to purchase new detectors which would give better service than those presently in use. This project is presently in the bidding stage. No date was given for anticipated completion of the changeover.

While inspecting the EBR-II Power Plant Building the survey team noted that a criticality monitor was not located in the EBR-II Flow Test Area. The requirements of Reference b.(4) would indicate that a monitor is needed. However, review of the material in Reference a.(4) shows the low probability of a criticality accident. The survey team feels that justification exists for not having a monitor in the flow test area; however, under the requirements of Reference b.(4), ANL should request a waiver.

The following agreement and commitment resulted:

ANL should request from CH a waiver of CH-CA-050B requirements for criticality monitors in the EBR-II Flow Test Area along with proper justification for same. ANL action will be performed by February 18, 1972.

Recommendation B

Results of the annual Criticality Hazards Control Committee and periodic Criticality Safety Representative surveys should be transmitted to "on-site" management.

Response

Results of the annual Criticality Hazards Control Committee were transmitted to Messrs. Staker and Levenson on July 21, 1971.

Comment

The ANL action is considered adequate. Mr. John Long, who is the Criticality Safety Representative for the EBR-II Project and reports to the Project Director, indicated that he is required to report in writing annually the results of his inspection of all the facilities under his purview. Mr. Long considers his inspection to be a continuing day-to-day activity.

Mr. Long participated in the May 1971 CHCC inspection of the EBR-II Project facilities and also considered this part of his audit function. However, as of the date of this survey, he had not written the report of his findings. It was urged that he complete his action at the earliest date possible.

Recommendation C

The requirements included in the revised chapter on Nuclear Safety of the ANL Policy and Practice Guide dated July 1971 should be fully implemented by all affected Idaho Site organizations. Attention is drawn to the requirement for a General Plan. Also, the specific requirements pertinent to EBR-II . . . should be met.

Response

The requirements of the Laboratory Policy and Practice Guide on Criticality Hazards Control, issued in July 1971, will be implemented. A General Plan will be prepared and in use by February 1, 1972.

Comment

The General Plan for the EBR-II Project has been given in Criticality Hazards Control Document No. G04. This document was supplied to the Laboratory Director in mid-December 1971. It is presently undergoing Laboratory Director's Office review. Approval is expected such that the February 1, 1972, implementation date will be met.

Recommendation D

The criticality procedures and practices, including records, identification tags, and transfer forms, used by the various organizations should be evaluated collectively to determine the need and desirability for more standardization and necessary changes recommended. The use of verbal instructions, approvals, etc., in lieu of written communications, should be examined. Where necessary, more formal means of communications should be implemented.

Response

Recommendation D, . . . will be given consideration in the development of a General Plan.

Comment

Revisions to the A05 and A10 document as well as the writing of the G04 document have given consideration to this recommendation. Neither of the three mentioned documents have received final approval from the Laboratory Director's Office, therefore, they have not been implemented. No evaluation as to adequacy of ANL action can be made until these documents are issued.

Recommendation E

Designated alternates for each Criticality Safety Representative should be appointed.

Response

Alternates will be selected and identified in each activity.

Comment

The Project Director has appointed two CSR alternates for Mr. Long. The first alternate is Mr. Brunson, the second is Mr. Matlock. The survey team questioned the advisability of having Mr. Brunson as a CSR, since he is also a member of the CHCC. Our concern dealt with the possible conflict of interest which would arise if Mr. Brunson were discharging his duties as a CSR by assisting individuals in writing CHCSs. These statements would then be submitted to the CHCC for review and approval and Mr. Brunson would then be reviewing his own work. Mr. Levenson indicated that the same practices used by the RSRC are used by the CHCC. Whenever a committee member is asked to review something which would result in a possible conflict of interest, he abstains from participation in the committee activities. He does, however, assist the committee in that he will make himself available to answer any questions which may arise. The survey team felt that this was an acceptable approach. Both Mr. Brunson and Mr. Matlock are eminently qualified by education and background to function in the capacity of CSR.

Recommendation F

Standards and dummies used within ITF criticality hazards control areas or zones should be permanently marked in a uniform manner.

Response

Each fissile and nonfissile subassembly will be marked with identifying tags.

Comment

The FEF Project has initiated a procedure whereby white or yellow tags are attached to indicate whether the subassembly is fueled or nonfueled. The original recommendation asked that the standards and dummies be permanently marked in a uniform manner. The system used by ANL is not permanent in nature in that the tags are just attached to the subassemblies. However, the absence of a tag from any one of the standards would be obvious. It is the opinion of the survey team that the intent of marking has been met although the marking is not permanent in nature.

Recommendation G

The number of alternates who are authorized to move fuel into and out of the FEF Criticality Control Areas should be reexamined. The alternates should then be designated in writing.

Response

FEF management has examined, as requested in Recommendation G, the number of alternates who are authorized to move fuel into and out of the FEF Criticality Control Area. We believe the current number is appropriate.

As requested in Recommendation G, . . . we will designate who the alternates are in the FEF Operating Manual.

Comment

The FEF organization has designated three individuals besides the FEF Manager who can authorize the movement of fuel into and out of FEF Criticality Control Areas. A listing of these individuals will be placed in the FEF Operations Manual which is presently undergoing a major revision. The revisions to the Operations Manual are expected to be completed by July of 1972. A letter, which has been issued by the project, indicates who the three alternate individuals are and describes the responsibilities which they have. The project explained that these three individuals may act even though the Facility Manager is present. This is done because it could be a major operational inconvenience to require the Manager's approval for each and every fuel movement. The action taken is considered acceptable by the survey team.

Recommendation H

Forced spacing should be provided around all sides of storage rack No. 15C in the FEF Argon Cell.

Response

The Criticality Hazards Control Committee (CHCC) reviewed and approved the configuration and use of this storage rack. We cannot find any technical basis for this recommendation. Please provide the basis for this recommendation.

Comment

The ANL response indicates an adequate review of the need for forced spacing.

Recommendation I

The use of piece control versus mass control for criticality hazards control in the FEF cells should be evaluated.

Response

We have evaluated and reaffirm the criticality control methods in the FEF. It should be noted that remote in-cell conditions are quite different, and safer, than out-of-cell conditions.

Comment

The ANL response is considered acceptable.

Recommendation J

EBR-II management review and approval of the new "out-of-cell" CHCS for FEF should be completed without further delay.

Response

EBR-II management has approved the new "out-of-cell" CHCS for FEF. It is currently under review by the ANL Office of Operational Safety.

Comment

The ANL review of the new out-of-cell A15 document has been completed and the document was submitted to CH for review and approval on December 13, 1971. CH is presently awaiting revised pages to that document which were results of telephone discussions between ANL and CH Safety Division personnel in December of 1971. CH should be in a position to approve this document when the revised pages are received if they conform to the agreements reached during the informal telephone discussions.

Recommendation K

The FEF Criticality Hazards Control Training Program, including requalification, should be upgraded to include testing of individuals.

Response

The new Laboratory Policy and Practice Guide on Criticality Hazards Control, issued in July 1971, covers training and indoctrination on page 6. We are currently implementing this guide.

Comment

The ANL action on this recommendation is still pending final approval of the General Plan document by the OOS organization. The survey team feels that the Project's action has been adequate to this point. A final decision as to adequacy of the ANL action will require an indepth review of the General Plan after it has been approved by Laboratory management.

Recommendation L

The personnel who are qualified and authorized to move fuel in each criticality hazards control area, including EBR-II and the L & O Building, should be identified in writing. A list of authorized personnel should be posted in each criticality hazards control area.

Response

A list of authorized personnel who are to be present and supervise the movement of fuel in Criticality Hazards Control Areas of EBR-II FEF Complex and L & O Building will be posted.

Comment

ANL's final action on posting will be completed when the new revised A05 and A10 documents are approved by the CHCC. ANL explained that they do not initiate procedures covered by a revised CHCS until that document has been completely reviewed and approved by the appropriate groups. The survey team concurs with the ANL approach as such a position is in accord with AECM-0530 requirements.

Recommendation M

The individuals responsible for criticality hazards control in the EBR-II and their alternates should be identified in writing. A list of the responsible individual and the alternate(s) should be posted in each EBR-II Criticality Hazards Control Area.

Response

The line supervisor for a given area is responsible for criticality hazards control for his area. This is in addition to his other line responsibilities related to his supervisory function. Unlike the personnel referred to in the preceding Item L, this is not appropriate for posting.

Comment

The ANL response is considered acceptable. However, it is suggested that posting the fact that the line supervisor has criticality hazards control responsibility be given consideration.

Recommendation N

The procedures for authorizing transfer of fissile material on and off site should be streamlined to afford better efficiency.

Response

Effective October 1, 1971, the signature authority for AEC-741 was delegated to Mr. R. U. Curl at Argonne-West. This authorization change should expedite the document flow on transfers of fissile material.

Comment

The ANL response is considered acceptable.

Recommendation O

The advisability of not always transferring accountability to Test Area North (TAN) in the shipment of fueled sub-assemblies should be evaluated.

Response

The advisability of not always transferring accountability to TAN in the shipment of test irradiation capsules was evaluated prior to initiating the practice. There are instances when irradiated test irradiation capsules are sent to TAN for loading into an off-site shipping cask for shipment to the experimenter (GE, LASL, WADCO, BMI, etc.). In these cases, the casks and loading instructions are provided to TAN by the experimenter and our only function is to deliver to TAN. If TAN is only transferring from our cask to the experimenter's cask and not altering the material, we make the AEC-741 transfer form directly to the experimenter. This is a matter of expedience and has been agreed upon by SPM, TAN and the experimenter. If TAN alters the material or does not plan to make the reloading on a timely basis, the AEC-741 is sent to TAN. Our current review does not indicate the procedure should be changed at this time.

Comment

The ANL response is considered acceptable.

Recommendation P

ID-CHCS-A05 and ID-CHCS-A10 are outdated and should be revised . . . ..

Response

Recommendation P, . . . addresses comments listed under paragraph II.D.3, pages 7, 8 and 9 of reference (1).

Pages 7 and 8, Ref. (1) (ID-CHCS-A10

3a, 3b, 3c,3d, 3f, and 3h -- We will endeavor to clear up the wording as recommended in the statements identified.

3e - Logging of fuel transfers between storage areas will be done.

3g - Ref. item F.

3i - Safety considerations are not involved in the storage of nonfueled subassemblies in the storage rack in the reactor building. To prohibit storage of nonfueled subassemblies in the rack, as stated in recommendation P, would unnecessarily limit EBR-II operations.

Pages 8 and 9, Ref. (1) (ID-CHCS-A05)

3a, 3b, 3c and 3d -- We will review the wording and revise as is appropriate.

3e - With a limit of only three subassemblies in the area, we do not believe that it is necessary for safety reasons to log within the area.

Comment

Criticality Hazards Control Statements A05 and A10 were supplied to the Laboratory Director for review and approval on December 15, 1971. Utilization of the revised procedures will not occur until the required approvals are received from the Laboratory Director.

The timeliness of ANL's response to this recommendation was questioned since the documents were not supplied to the CHCC until December of 1971, and the audit was done in July of 1971. ANL explained that the writing, reviewing and approving of a CHCS requires a considerable period of time. This coupled with the splitting of criticality hazards control responsibility at ANL-West, the issuance of ANL's Policy and Practice Guide on Nuclear Criticality Safety and the work involved in assuring coordination between the EBR-II Projects, CHCS and other ANL-West CHCS, particularly in the area of transfers, contributed to the delay. The survey team accepts the ANL explanation but urges ANL to make every effort to speed resolution of AEC recommendations in the future.

Recommendation Q

The use of tags and transfer forms associated with the EBR-II Criticality Control Areas should be included in formal procedures or as part of the appropriate Criticality Hazards Control Statements.

Response

Recommendation Q . . . will be implemented.

Comment

The ANL response is considered acceptable. Completion of action requires issuance of the revised A05 and A10 documents.

Recommendation R

The EBR-II training and requalification program should be revised to insure that (1) alternate shift personnel are kept knowledgeable on current criticality hazards control rules and procedures and (2) the EBR-II Flow Test Area is adequately covered. As part of the latter effort, the video tape, "Criticality and Subassembly Handling," should be revised to cover the Flow Test Area and transfer of fueled subassemblies from the ITF or L & O Building to the EBR-II Criticality Hazards Control Areas. It is understood this effort is being planned by EBR-II.

Response

This item will be reviewed as part of implementation of the ANL new Policy and Practice Guide statement on criticality safety, comment C.

Comment

Final resolution of this recommendation will require an indepth review of the Project's General Plan after it has received ANL internal review and approval.

Recommendation S

The identification numbers on the storage holes in the EBR-II Reactor Building should be repainted.

Response

Recommendation S, . . . will be implemented.

Comment

The requested action was completed in October 1971.

Recommendation T

The location of the subassembly storage racks in the EBR-II Reactor Building should be permanently marked on the floor.

Response

We do not agree with recommendation T, ... Permanently marking the floor as stated under recommendation T would not improve the safety of EBR-II operations. Recommendation T would potentially limit operation in the EBR-II Reactor Building and does not have criticality safety connotations.

Comment

The ANL response is considered acceptable.

Recommendation U

The tagging system should be instituted to identify when a fueled Instrumented Subassembly is stored in the storage pit of the EBR-II Reactor Building.

Response

Recommendation U, . . . recommends a tagging system be instituted. A handling procedure which includes tagging is in operation.

Comment

The ANL response was reviewed and is considered acceptable.

Recommendation V

The same key control procedures should be used for the storage racks and storage holes in the EBR-II Reactor Building. The affected procedures should be revised accordingly.

Response

Procedures and systems are devised for multiple reasons and we believe there is no criticality safety reason for having the two systems mentioned be identical.

Comment

The ANL response is considered acceptable.

Recommendation W

The rules for criticality hazards control in the EBR-II Flow Test Area should be posted in a more visible location.

Response

Recommendation W, . . . requests that the posted rules be moved to a more visible location. We will change the location of this posting.

Comment

The survey team noted the posting of the EBR-II Flow Test Area Rules at the entrance to that area. The ANL action is considered acceptable.

Recommendation X

The storage rack for fueled subassemblies located in the EBR-II Flow Test Area should be modified to include locking provisions and more physical protection against damage to a stored subassembly.

Response

Recommendation X, . . . will be implemented.

Comment

ANL response to this recommendation is contained in the revision to the A05 CHCS document. Action will be completed after issuance of the required A05 document.

Recommendation Y

A tagging system should be instituted to identify when a fueled subassembly is mounted in the test fixtures of the EBR-II Flow Test Area.

Response

Recommendation Y, . . . will be implemented.

Comment

ANL response to this recommendation is contained in the revision to the A05 CHCS document. Action will be completed after issuance of the revised A05 document.

Recommendation Z

Non-fueled subassemblies and components used in the EBR-II Flow Test Area should be permanently marked as such.

Response

See Recommendation F above.

Comment

All components in the Flow Test Area have been identified with black marking pencil. The marking system used is not permanent in nature, however, it is the opinion of the survey team that the spirit of the recommendation has been met.

5. Summary

The EBR-II FEF Complex Nuclear Criticality Safety Program is adequate and meets the requirements of AECM-0530, AECM-0545, IAD-0530-27 and Supplement CH-CA-050B.

B. EBR-II Reactor Safety

1. Discuss and Review Status of ANL Responses to Recommendations of June 8-10, 1971, Reactor Safety Survey (Agenda Activities 29 and 36)

a. Relevant ANL Documents

(1) EBR-II Operating Manual

(2) EBR-II Operating Limits

(3) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. Koch, et al.

(4) ANL-5719 (Addendum) Addendum to Hazards Summary Report Experimental Breeder Reactor-II (EBR-II), L. J. Koch, W. B. Lowenstein, H. O. Monson, June 1962

(5) EBR-II Project Policy and Procedures Manual, November 1970

(6) Ltr., Novick to McSwain, November 9, 1971, Reactor Safety Survey Report, EBR-II Survey of June 8-10, 1971

(7) Review of the Reactor Operator and Supervisor Training, Qualification, Certification and Recertification Program for EBR-II, December 8, 1971

(8) Ltr., Levenson to Shaw, December 6, 1971, EBR-II Operator Training Program

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

(2) IAD-8401-6 - Retraining and Requalification of Reactor Operators

(3) IAD-8401-7 - Contractor Internal Review System Requirements for Safety of Reactors and Critical Facilities: Operating Phase, September 16, 1970

(4) Reactor Safety Survey Report, EBR-II Survey of June 8-10, 1971

c. Participants

(1) ANL

(a) M. Levenson, Project Director, EBR-II

(b) H. Lawroski, Superintendent of Operations, EBR-II

(c) G. Deegan, Operations Manager, EBR-II

(d) J. Davis, Assistant Operations Manager, EBR-II

(e) R. Cooley, Training Coordinator, EBR-II

(2) AEC

(a) R. M. Moser, Director, Safety Division, CH

(b) R. M. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

d. Survey Findings

The last Reactor Safety Survey of EBR-II (Reference b.(4)) resulted in twelve recommendations. The following lists these recommendations, ANL's response to these recommendations (Reference a.(6)) and the survey team's conclusion on the status of ANL's actions in response to these recommendations.

Recommendation 1

It is recommended that means be explored by which training and testing on emergency procedures and equipment be performed as emphasized by IAD-8401-6.

Response

"Dry run" training and testing as suggested in the comments in the report will be incorporated into the revised training program which is being organized to satisfy the Laboratory's Policy and Practice Guide and IAD-8401-6. Because of other high priority programmatic commitments, the Project had not been in a position to specify a date for compliance. However, the Office of Operational Safety has scheduled a field review and survey of the EBR-II training program early in December. At that time we will attempt to resolve this matter. In our report to CH, as required in recommendation No. 2, we expect to provide this schedule for compliance.

Comment

A "dry run" approach has been utilized for personnel training on emergency procedures and equipment. A simulated emergency is conducted on each shift. The shift is asked to tag out the equipment, i.e., valves position, breaker position, controller operation, etc., to handle the emergency, and to write down the actions which need to be taken. This information is then reviewed by the training coordinator to see if the proper actions were taken. Any discrepancies noted are discussed with the operating crew. The tags used in the simulation are a different color than those used in normal operation to prevent confusion if a tag is not removed after the simulation.

In addition to the dry run activities, the operations staff reviews the emergency procedures annually. All simulations are recorded to show the training status of all operations personnel for all types of emergency situations (e.g., nuclear criticality safety, reactor safety).

The survey team considers the ANL action adequate to satisfy the recommendation if followed through on a continuing program.

The following describes some of the salient features of the EBR-II training program.

All individuals will not be completely requalified or qualified under the EBR-II training program until July 1972. This is acceptable to the survey team as a two year cycle is required for completion of the entire training program.

Mr. Cooley and his group are responsible for administering the written examinations to the various operations personnel. After successful completion of the written portions of the training program an individual is required to take an oral examination before a board consisting of the Operations Manager, the Training Coordinator, and an individual expert in a field related to reactor operation. Before an individual may take the oral examination he has to be recommended by a shift supervisor. The training program also requires that an individual have a walk through test on the system for which he is seeking qualification.

There are five areas of qualification. They are reactor control console operator, coolant systems operator, fuel

handling equipment operator, electrical equipment operator and power plant operator. Operators must qualify on coolant systems before qualifying on the reactor console.

The Training Coordinator reports to the Operations Manager, who in turn reports to the Superintendent of Operations. The Superintendent of Operations reports to the Project Director. An operator of EBR-II is certified as a reactor console operator by the Laboratory Director. The certification request is from the Training Coordinator to the Operations Manager to the Superintendent of Operations to the Project Director and finally to the Laboratory Director. Official certification returns through this chain.

The subject of increased staffing was discussed. The Project feels a need exists to increase the operations staff by 14 people. The additional group would consist of two Shift Supervisors, four on-shift technicians, two procedures group personnel, four assistants to the Shift Supervisors, one training group technician and one training staff secretary. The additional staff is needed to allow requalification of the operations staff and to maintain the various procedures in an up-to-date status. This would also allow more flexibility for shift coverage in all qualification areas for absences due to illness, leave, and vacations. The survey team supports the Project's efforts to maintain the operation staff's high standard of qualification and the maintenance of current procedures.

Recommendation 2

It is recommended that an independent ANL review of the EBR-II training program be performed as required by IAD-8401-7. Any discrepancies disclosed by this review should be eliminated. CH should be informed of corrective actions taken and the estimated date of complete compliance with IAD-8401-6. The review results and schedule of corrective actions should be submitted to CH by November 30, 1971.

Response

An independent review of the EBR-II training program will be performed early in December. Therefore, review results will not be available by November 30 as requested. A report to the Commission should be prepared early in January 1972, however.

Comment

The training program documentation was approved by the OOS. A review of the EBR-II training program for compliance to the documentation was performed on December 8, 1971, by OOS. Four recommendations were made as a result of the review.

1. Medical Certificates should be filed in each reactor operator's, foreman's, and supervisor's training folder. The certificates are currently in the Operations Manager's files; these -- or copies of same -- should be transferred to the training file.

2. Examination papers are to be dated and clearly titled to indicate whether it is a qualification or requalification test.

3. Files of all operating personnel, including foremen and supervisors, should include qualification and requalification certificates. The certification should specify the area in which a man is qualified and the duration for which the certification is effective.

4. Inactive personnel reactor training folders should be removed from active files.

Final resolution of this recommendation requires submittal of the requested information to CH.

Recommendation 3

It is recommended that a safety committee be formed to periodically audit the functions and performance of the EBR-II operations and staff. To assure the proper degree of independence the Committee should not report directly to Dr. Lawroski. CH should be provided with the scope, makeup and functions of the Committee by October 15, 1971.

Response

A Project Safety Review Group (SRG) has been established to advise the Project Director on safety matters relating to experiments and plant changes. The SRG consists of three subgroups: the In-core Experiment Subgroup (IES); the Ex-core Experiment Subgroup (EES); and the Plant Changes Subgroup (PCS). The Experiment Safety Review

Group (ESRG) and all other safety review groups and ad hoc safety committees have been abolished. The "EBR-II Project Policy and Procedure Manual" and "Guide for Irradiation Experiments in EBR-II" will be revised to reflect this new activity.

Comment

In a memorandum M. Levenson to EBR-II Project Staff Personnel, dated September 13, 1971, subject: EBR-II Project Safety Reviews, the following actions are described:

1. The Experiment Safety Review Group (ESRG) is abolished.

2. The ad hoc RSCL review group is abolished.

3. The Project Committee on Reactor Safety is abolished.

4. The Safety Review Group (SRG) is established and consists of the following:

   a. In-core Experiment Subgroup (IES)

   b. Ex-core Experiment Subgroup (EES)

   c. Plant Changes Subgroup (PCS)

In addition, it is stated that the SRG will act as an advisory group to the Project Director.

The IES is chartered to review all in-core experiments for safety, including those in In-core Test Facility (INCOT) and Instrumented Subassembly (INSAT). The safety review of all new irradiations vehicles is also the responsibility of the IES.

The EES is chartered to review all out-of-core irradiation experiments, including those in the Radioactive Sodium Chemistry Loop (RSCL) and Nuclear Instrument Test Facility (NITF) for safety.

The PCS is chartered to review all changes to the reactor plant for safety. The existing Reactor Plant Modification Committee (RPMC) will continue to function. The RPMC will review all plant changes for technical feasibility, operability, etc., and act as an advisory committee to the Superintendent of Reactor Operations. The changeover to SRG operation is being formulated and was not fully implemented at the time of the survey.

Changes to existing ANL documents which will need revisions due the above actions were assigned to the Experiment Manager and the Project QAR.

It is the opinion of the survey team that the actions taken are responsive to the recommendation. The EBR-II Project should implement the SRG operation changeover and revise procedures, as necessary, in a timely manner.

Recommendation 4

It is recommended that the EBR-II Operating Limits be rewritten in Technical Specification format as required by Shaw's letter to Dunbar dated September 25, 1970; McSwain's letter to Duffield dated October 6, 1970; and the May 24, 1971, letter from Dunbar to Duffield. The schedule for completing this task should be carefully evaluated to determine if the preparation time cannot be shortened to less than the estimated one year. The results of the evaluation and schedule should be reported to CH by October 29, 1971.

Response

An evaluation of its program by the EBR-II Project has indicated that the schedule for the preparation of its Technical Specifications may not be shortened under current conditions. As previously stated, the draft of the Technical Specifications will be completed June 30, 1972. This date and the method of funding and necessary effort to prepare the document were agreed upon between RDT and the EBR-II Project Director.

Comment

Dr. Lawroski stated that the Technical Specifications submission time could not be shortened from that given in Reference a.(6). The proposed schedule is considered acceptable by the survey team.

During the discussion of Recommendation 4, Dr. Lawroski was asked to state his interpretation of Operating Limit (O.L.) No. 1, since this O.L. was originally included in all O.L.s and it could be interpreted in different ways.

He interpreted O.L. No. 1 to mean that all operations at EBR-II should be conducted in accordance with written operating procedures and that deviations from these procedures that had significant safety or potential safety implications would be treated as an O.L. violation.

The survey team concurs that this interpretation is proper and was the intent of the Safety Division when it was incorporated in the O.L. However, to assure no future misinterpretations are made, it was recommended that ANL revise the O.L. to assure only one interpretation can be made. No restrictions were imposed on the means by which this is accomplished. The following recommendation and commitment was made during the closeout.

Recommendation 5

It is recommended that ANL submit a revision to Basic Operating Limit No. 5 by August 10, 1971.

Response

The revision to Basic Operating Limit No. 5 was submitted to the AEC on July 30, 1971.

Comment

The action taken satisfied the recommendation. The revision to Basic Operating Limit No. 5 was approved by CH October 7, 1971.

Recommendation 6

It is recommended that arrangements be made to have all operators read the Incident Reports.

Response

Arrangements have been made for the operators to read the Incident Reports.

Comment

This recommendation has been satisfied by routing Incident Report files to all operators. Sign-off of the routing slip is required.

Recommendation 7

It is recommended that AP 42 "Plant Modification Committee" be revised and issued by August 16, 1971.

Response

Final issuance of the document is dependent upon its success in trial use currently under way. Issuance is currently scheduled by December 30, 1971.

Comment

AP-42 "Plant Modification Committee" has been revised and reissued. The scheduled December 30, 1971, issuance date was not met because the reorganization of the Safety Review Groups necessitated additional revisions to AP-42. The final issue of AP-42 is expected by February 1, 1972. The survey team considers the ANL action acceptable.

Recommendation 8

It is recommended that the procedure that details the method for preparing procedures be completed and issued as soon as possible.

Response

The procedures will be affected by other procedural changes being made in the Project. Final issuance is scheduled by November 30, 1971.

Comment

The procedure requested has been issued and is entitled, "Departmental Procedure No. DP-1-71 EBR-II Procedures Manual." The recommendation is therefore considered satisfied.

Recommendation 9

It is recommended that the review of Incident Reports by engineering support be detailed in the appropriate procedure. It is also recommended that future Incident Reports be more comprehensive and the followup actions more timely.

Response

Timely followup actions will be emphasized as much as practical in the future.

Comment

Personnel from the ANL Quality Assurance Organization were conducting an internal audit of the entire incident reporting system at the time of this survey. The next survey of EBR-II will include followup on this audit as well as future performance.

Recent Incident Reports have been more comprehensive and issuance of Bulletin No. 166 provided the requested procedure, therefore, we consider the recommendation satisfied. Continuing efforts should be directed to timeliness of reports.

Recommendation 10

It is recommended that the guidance in the letter from Dunbar to Duffield, dated May 24, 1971, concerning noncompliance of Operating Limits be incorporated into the appropriate procedure for use by the reactor operating personnel by September 5, 1971.

Response

Instructions for reactor operating personnel will be formalized by September 30, 1971.

Comment

The guidance given in the May 24, 1971, Dunbar to Duffield, letter detailing required actions when not in compliance with Operating Limits has been incorporated into the Operating Limits document for EBR-II. The action taken is considered satisfactory, however, we suggest the EBR-II Project issue an EBR-II Operating Limits document, dated as of this revision or that revision required on February 18, 1972, No. 13, of the Agreements and Commitments.

Recommendation 11

It is recommended that the procedural system be reviewed and, if possible, made less cumbersome. Nonstandard terminology should be eliminated and the lag time in issuing procedures should be reduced as much as possible, but not to exceed 30 days.

Response

Considerations which go into a procedure from the time it is proposed and until it is issued do not lend themselves necessarily to a fixed time schedule. Procedural changes of safety concern obviously require a number of levels of review and approval and require more time than those which do not. A revised guide is now being used to shorten issuance time for reactor operating procedure changes, however. When a procedure is approved, this is indicated in special revised pages which are inserted into the control room copy of the Operating Instructions Manual, called to the attention of operators and supervisors, and issued to all necessary cognizant personnel and groups. By this method it will be possible to initiate operations with revised procedures within 30 days of their approval.

Comment

A system has been in use which utilizes pink colored pages in the Operating Manual for those sections which have been revised, approved and issued for trial use. The pink pages have significance for the operators to point out they are not the final issue and do contain recent changes. When final issue is made, the only changes in the content of the manual are the substitution of white paper for the pink paper in the printing process.

During the inspection, a great preponderence of pink pages was noted in the control room copy of the Operating Manual. This was due to the many revisions which were made during the December 1971 extended reactor shutdown for operator training and procedures updating.

The terms Special Operating Procedure (SOP) and Administrative Procedure (AP) have been retired along with their use as a means of communication between the Operations Manager and the operating shifts. They have been replaced by shift instructions. The shift instructions are memorandums issued to specifically cover the off shifts daily, and weekend shifts. They are issued as required by the Operations Manager and are inserted in a notebook in the control room.

The procedure utilized and the action taken is considered adequate and constitutes a satisfactory response to the recommendation.

Recommendation 12

It is recommended that the Quality Assurance procedure for shop work be corrected so that the option for no inspection be removed and also that a record be made of all inspections. It is also recommended that a check list of all QA activities be developed for sign-off as a prerequisite for plant modification acceptance.

Response

The degree of inspection for shop work must be commensurate with the particular work. Appropriate QA activities are already factored into the plant modification procedures.

Comment

The Project's position is that the depth of QA activities undertaken should be specified by the responsible engineer. Good engineering judgment is the basis for the criteria used for this decision. The decision made by the responsible engineer is subject to review by the Project's QA organization as well as the Laboratory's QA organization.

2. Discuss Adequacy of Safeguards to Prevent Loading Error and Inspect Fuel Handling Mechanisms (Agenda Activity 30)

a. Relevant ANL Documents

(1) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. Koch, et al.

(2) ANL-5719 (Addendum), Addendum to Hazards Summary Report Experimental Breeder Reactor II (EBR-II), June 1962, L. J. Koch, W. B. Loewenstein, H. O. Monson

(3) EBR-II Operating Manual, Volume III, Section VIII

(4) Fuel Cycle Facility Operations Manual

(5) Incident Report #98 for EBR-II Reactor

(6) FEF Process Work Sheet, "Experimental Subassembly Hardware Preparation," FCF-OM-820.5, pages 5-7, October 11, 1971

(7) FEF Inspection Sheet, FCF-OM-820.5, pages 8-13, October 11, 1971

(8) EBR-II Reactor Operating Limits

(9) ID-CHCS-A06, CHCS EBR-II L & O Building Vaults and Cage Area

(10) ID-CHCS-A13, CHCS FEF Argon Cell

(11) ID-CHCS-A14, CHCS FEF Air Cell

b. Relevant AEC Documents

(1) AEC-8401 - Safety of AEC-Owned Reactors

(2) AECM-0530 - Nuclear Criticality Safety

c. Miscellaneous Relevant Documents

(1) TID-7016, Nuclear Safety Guide

(2) TID-7028, Critical Dimensions of Systems Containing U-235, Pu-239, and U-233, June 1964

d. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) R. Cooley, Training Coordinator, EBR-II

(d) J. Davis, Assistant Operations Manager, EBR-II

(e) J. Long, Criticality Safety Representative, EBR-II Project

(f) M. Feldman, Project Manager, FEF

(g) W. Barney, Associate Director, Materials, EBR-II Project

(h) D. Hampson, Operations Manager, Procedures, FEF

(i) R. Curl, Special Materials Representative, ANL-West

(j) R. Staker, Associate Director, ANL; ANL-West Site Manager

(k) G. Hocker, Fuel Management Supervisor

(2) AEC

(a) R. M. Moser, Director, Safety Division, CH

(b) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(d) J. Pingel, Health Physicist, SD-CH

(e) J. T. O'Connor, Site Representative, RDT-ANL-West

e. Survey Findings

The process by which subassemblies are constituted or reconstituted was traced from subassembly origin to final removal from the reactor at the conclusion of irradiation. While doing this, areas and equipment were inspected in the FEF facility, the EBR-II Reactor Building, and the L & O Building. This led to discussions of several recent incidents related to fuel manufacturing which have occurred at the EBR-II FEF Complex.

Some areas were given more indepth review than others so the following description may not be complete. However, it does point out the many checks which exist in the process to assure that loading errors are made improbable. The survey team concluded that the procedures used are adequate. The following briefly describes the subassembly life process.

Subassemblies can be divided into two large groups on the basis of the region in which they will be placed in the reactor. These are the core or blanket region. The core region subassemblies can be further subdivided into driver subassemblies and experimental subassemblies. These again can be subdivided into new and preirradiated subassemblies. For the purpose of this narrative, a typical core region new experimental subassembly is followed from origin to removal from the reactor. Any deviations from this process for other types of subassemblies will be noted.

A new subassembly can have its origin in the ITF Building. It is fabricated using a loading diagram supplied by the Irradiations Office for the EBR-II Project. The diagram contains specifications for the fuel pins as well as the hardware associated with the irradiation vehicle. FEF Process Work Sheet (Reference a.(6)) requires twelve sign offs by various FEF personnel as the subassembly is constituted. This sign-off procedure was instituted after the occurrence of an incident in which an incorrect lower pole piece was fitted to subassembly X068A. The FEF organization explained that the X068A incident was caused by the use of an incorrect loading diagram. This happened because the subassembly hardware had been "pulled" together in anticipation of assembly. Then the Irradiations Office requested a hold. The hardware was placed in bonded storage. Some time later, after several revised loading diagrams were generated, the word came to assemble the subassembly. The FEF group assembled the subassembly using an incorrect pole piece. The new process work sheet procedure should help preclude a reoccurrence of this type of incident because of the sign-offs required and the information contained therein.

After completion of fabrication, the subassembly along with its as loaded paper work is delivered to the EBR-II Reactor Section through the Irradiations Office. All subassemblies are then flow tested and either placed in the vault or taken to the Reactor Building for use in the reactor. Flow testing is performed to assure that the specified coolant flow rate is available. Reflector and driver subassemblies are deviations from this process in that only random numbers of assemblies are flow tested. This is considered adequate in that each subassembly, core or blanket, is orificed for a given flow rate.

Before the subassembly is released for use in the reactor by the SPM group, which is responsible for accountability, the complete paper work packet must be in the SPM office. Releasing of a subassembly from the SPM vault in the L & O Building requires a telephone request to SPM by Mr. Hocker of the EBR-II project. At the time of release, the SPM vault custodian and Mr. Hocker's representative, who transport the subassembly to the Reactor Building, are to visually compare the subassembly number with that on the paper work requesting transfer. A recent incident occurred in which an incorrect subassembly was transferred from the vault to the Reactor Building. Discussions with cognizant ANL personnel disclosed that these visual checks were not performed. The following briefly describes the incident.

Mr. Hocker, EBR-II Fuel Management Supervisor, called the Special Materials people and requested three subassemblies. The Special Materials people withdrew the proper paper work for all of these subassemblies and transferred it to the vault custodian. The vault custodian removed one wrong subassembly and delivered it with the paper work to Mr. Hocker's associate who is responsible for transferring the subassembly to the EBR-II Reactor Building. The subassembly was transferred into the Reactor Building where subsequently it was found its identification number differed from that on the paper work. Mr. Curl explained that both the vault custodian and the EBR-II individual responsible for transferring the subassembly failed to visually compare the subassembly number to that on the paper work. Mr. Curl further explained that at the time Mr. Hocker requested the three subassemblies the vault custodian noted the three subassemblies were aligned in a row in the vault. The first subassembly requested was transferred correctly. The one which was involved in the incident was the second to be transferred. The vault custodian apparently thought that the subassemblies to be transferred were in a row going towards the wall rather than across the front of the storage rack. He felt he had the right subassembly and therefore did not check the identification number.

The following agreement and commitment resulted from the survey team's review.

ANL should initiate actions that will assure that all required checks are made prior to a subassembly transfer. ANL will comply and advise CH of actions by February 1, 1972.

I.R. Report # 100 (dated 1/17/72) covers this commitment

The next step in the subassembly flow process involves its transfer into the Reactor Building and placement in the storage rack. Its identification number is checked and recorded in the reactor console log. Before being loaded into the Fuel Unloading Machine (FUM) for insertion into the reactor, a Polaroid picture is taken of its identification number. This becomes a part of the permanent record for the subassembly. This picture taking procedure is only used with experimental subassemblies.

All fuel loading for the reactor takes place through the FUM. After insertion into the FUM, the movement actions of the fuel handling system are electrically controlled through the use of sequence buttons on the Operating Panel of the Fuel Handling Console. A device called the Numerical Position Control (NPC) which uses prepunched IBM cards, positions and supervises the angular position of the large rotating plug, the small rotating plug, and gripper as well as the angular position and elevation of the storage basket. The NPC consists of a card reader, card reader storage, plug and gripper position encoders, translators, digital subtractors, drive motor units and an output card punch. Color coded punch cards are used for the four separate transfer actions which can occur. They are:

1. Blue for FUM to Basket

2. Green for Basket to Core

3. Red for Core to Basket

4. Yellow for Basket to FUM

Briefly, the NPC is loaded with the prepunched cards. The control then drives the mechanism to obtain proper position. The subtractor's function is to direct this positioning activity. When the proper position is obtained as indicated by a lessening of the error noted by the subtractor, a card is punched which indicates the actual final position. These cards are visually compared to the input cards. In addition, a digital position indicator is available to show the position to which the subassembly has been placed. This procedure occurs for each of the four transfer actions listed above.

A discussion was held on the possibility of loading a subassembly in the wrong core or blanket position. The lower pole piece of the blanket subassemblies is sufficiently different in design to prevent loading a blanket subassembly into the core region. From this point the discussion led to the question of the intent of the EBR-II in-house rule of two-open-holes in the core or blanket.

This discussion did not fully explain the intent of the rule. The survey team recommends that the EBR-II "Two Open-hole" rule should be clarified to assure its intent is clear. No. 14 of the Agreements and Commitments was reached at the closeout of the survey.

After completion of irradiation, the subassembly is unloaded into the FUM using the NPC. From there it is placed in the interbuilding coffin where it is moved to the FEF for disposition. If the subassembly is an experimental type, it may undergo an interim examination. If so, it is disassembled in the FEF and tests are performed. Reconstitution is performed incell with the accompanying paper work identical to that applied to a new subassembly. Normal blanket and driver subassemblies are not reconstituted; they are "cut up" for disposal.

While inspecting the FEF facility, a technician and responsible engineer were observed assembling a preirradiated subassembly in the argon cell. The technician was using a loading diagram as required. He was checking each fuel pin as it was assembled by noting the number of the pin as well as its location in the subassembly. The responsible engineer was visually checking the technician's activity and comparing it to the loading diagram.

After reconstitution the subassembly is transferred back to the reactor via the interbuilding coffin to the FUM. Thus several of the visual checks applied to a new subassembly in the Reactor Building and the water flow test are not given to a reconstituted subassembly.

Presently, ANL is attempting to devise a process by which argon gas flow tests can be given to a reconstituted subassembly to check correct orificing. After insertion in the FUM, the reconstituted subassembly is subjected to identical checks and balances described above for the new subassembly.

The prepunched IBM cards used are a product of calculations and checks performed by three different individuals in the EBR-II project. One of these is located at ANL-West while the other two are stationed at ANL-East. Some factors entering into their activities are subassembly history, anticipated reactor position, anticipated run length and required reactor parameters and restrictions. Individual subassembly loading plans as well as the overall reactor loading plans are generated to comply with HSR and Operating Limits restrictions.

The operation crew on duty is responsible for bringing the reactor to a critical condition after completion of a reloading. Inverse count rate experiments are run and measured values are compared to calculated values. A discrepancy of $\pm$100 inhours between measured and calculated values requires termination of critical activities and notification of Physic section personnel through the Operations Manager.

The survey team feels the many checks and balances outlined above should be adequate to assure the safety of the loading of the EBR-II core.

3. Discuss Adequacy, Accuracy and Frequency of Control and Safety Rod Calibration and Inspect Control Rod Drive Mechanisms (Agenda Activity 31)

a. Relevant ANL Documents

(1) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. J. Koch, et al.

(2) ANL-5719 (Addendum) Addendum to Hazards Summary Report Experimental Breeder Reactor-II (EBR-II), June 1962, L. J. Koch, W. B. Loewenstein, H. O. Monson

(3) EBR-II Operating Limits

(4) EBR-II Operating Manual

(5) ANL/EBR-029, Functional Description of the EBR-II Digital Data Acquisition System, J. M. Allen, et al.

(6) EBR-II, A Status Report, July 1971, ANL-7743

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) J. Davis, Assistant Operations Manager, EBR-II

(d) F. Kirn, Operations Physicist, EBR-II Project

(2) AEC

(a) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

d. Survey Findings

The required frequency of control and safety rod calibrations is given in Assurance Limit Nos. 3 and 4 of the EBR-II Operating Limits. The frequencies listed in Reference a.(3) resulted from agreement between the AEC and ANL at the time of issuance using the information of Reference a.(1). Since that time (1966) experience has indicated the required frequency is adequate.

A calibration of the EBR-II safety rods cannot be done using the positive period or rod drop methods as these require a critical configuration. The safety rods operate in a full "IN" (most reactive) or full "OUT" (least reactive) position. The term "safety rods" must be understood to be a misnomer in the EBR-II Reactor as their primary function is to remove reactivity in the unrestricted fuel handling mode of operation. They do not drop out of the core on an automatic reactor scram. They can be used as back-up to the control rods and can be driven or dropped "OUT" manually at the discretion of the operator.

Subcritical count rates and solutions to the inverse kinetics equations are utilized to calibrate the safety rods. This method is used because of the operation mode of the safety rods described above. The reactor is subcritical in both conditions, rods "IN" and "OUT", and the count rates are relatively low, therefore, the accuracy of the measurement is only $\pm$10%.

The actual safety rod calibration is performed by recording the count rate with the safety rods in their full "IN" and full "OUT" position. The change in count rate is then reproduced by inserting a selected control rod the amount required to duplicate the change in count rate due to inserting the safety rods. The control rods are calibrated using a more accurate method, $\pm$ 1%, and a value is then assigned to the safety rod worth from the control rod calibration curve. This method is very sensitive to the flux tilting due to inserting a fueled control rod into the core, therefore, care must be exercised in the choice of the intercalibrating control rod. The position of the two safety rods in Row 3, the 12 control rod positions in Row 5 and the source and detector locations also contribute to the error in the calibration. The source locations were changed in relation to the detectors to ascertain any effects on the safety rod worth. An effect was noted but the magnitude could not be determined.

Prior to installation of the Digital Data Acquisition System (DDAS), control rod calibrations were performed using the positive period method. This consists of moving a control rod an incremental amount and recording the asymptotic period generated. From this the reactivity worth of the incremental rod movement can be deduced. The DDAS system is presently being used for calibration of the control rods. The DDAS performs rod calibrations using the inverse kinetics equations and the neutron population data which is automatically supplied to the DDAS where it is processed yielding control rod worth data. The positive period method is still being used to check on the DDAS results. Mr. F. Kirn estimated the accuracy of both the DDAS and positive period calibrations to be $\pm$1%.

In addition to the comparison of calibration data from the two methods, results are also compared to predicted worths from preloading physics calculations. Any discrepancies in excess of $\pm$100 inhours are brought to the attention of the calculational group through Mr. Deegan. Reactor operation is not allowed until satisfactory resolution of discrepancies is obtained. The survey team concluded that the methods of calibration used are adequate and result in acceptable accuracy for rod worths.

4. Review ANL Records Identified by the Survey Team and Discuss Items Noted in Review (Agenda Activities 33 and 38)

a. Relevant ANL Documents

(1) EBR-II Operating Limits

(2) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. J. Koch, et al.

(3) ANL-5719 (Addendum) Addendum to Hazards Summary Report Experimental Breeder Reactor-II (EBR-II), June 1962, L. J. Koch, W. B. Loewenstein, H. O. Monson

(4) EBR-II, A Status Report, July 1971, ANL-7743

(5) EBR-II Operating Manual

b. Relevant AEC Documents

(1) AECM-0510 - Prevention, Control and Abatement of Air and Water Pollution

(2) AECM-0524 - Standards for Radiation Protection

(3) AECM-0525 - Occupational Radiation Exposure Information

(4) AECM-0530-27 - Contractor Internal Review System Requirements for NCS, October 21, 1971

(5) AECM-0544 - Planning for Emergencies in AEC Operations

(6) AECM-0545 - Nuclear Accident Dosimetry Program

(7) CH-CA-050B - Special Requirements for Users of Special Nuclear Materials

c. Participants

(1) ANL

G. Deegan, Operations Manager, EBR-II

(2) AEC

(a) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(c) J. T. O'Connor, Site Representative, RDT-ANL-West

d. Survey Findings

The following logs were spot checked at the time of the survey.

(1) Reactor Control Console Logs

(2) Primary System Log

(3) Fuel Handling Log

(4) Sodium Boiler Log

(5) Power Plant Log

(6) Scram Log

(7) Trip Log (Startup)

(8) Fuel Handling Trip Log

(9) Control Room Interlock Checklists

(10) Functional Startup Checklist

(11) Master Fuel Handling Checklist

(12) Master Plant and Reactor Startup Checksheets

(13) Auxilliary Systems Reactor Startup Checksheets

(14) Reactor Control Checksheets

(15) Power Plant Systems Checksheet

(16) Secondary System Checksheet

(17) Primary System Checksheet

(18) Reactor Restart Checksheet

(19) Radiation Monitoring System Reactor Startup

(20) Past Fuel Handling Checklist

(21) Argon Cooling System Checklist

(22) Electrical System

(23) Failed Fuel Element Detectors

(24) Unrestricted Fuel Handling Checksheet

(25) Reactor Run Plan and Authorization

(26) Scram Reports

(27) Work Request Log

The Reactor Control Console Log kept by the reactor console operator, is the primary source of shift activity and occurrence information and as such does not provide a complete summary of activities at the facility. It must be signed off by all shift operators and the shift supervisors. The Reactor Control Console Log uses a two page system. One is removable and is circulated for information within the Operations Section. The instrument technician on shift also lists a summary of his activities in this log at the end of the shift for the information of the Instrument and Control Section Manager.

Logbooks are located at designated stations within the facility in which the operators pass on information to the incoming shift. EBR-II Operations Section does not utilize a shift supervisor's log.

The review of the logbooks revealed the following areas which required further discussion.

The safety rod drop time was out of specification. The subsequent logbook entries are detailed and contained enough information to trace the location and repair of the problem. The safety rod clutch was found to be out of alignment.

The seal between the Fuel Unloading Machine (FUM) and the Fuel Transport Port (FTP) malfunctioned on numerous occasions, on one occasion cover gas was released to the building. The problem appeared to be a combination of improper design and operator error. The problem was traced to the FTP locking pin not being in its detent. The port position is indicated, open or closed, but not the locking pin position. The cause of the pin being in the wrong position was due to the fact the previous fuel handling crew did not fully close the transfer port, although it was indicated closed. In the logbook review there was a late entry describing the incident. This incident is reported in Incident Report No. 98. The incident was not reported to the AEC Site Representatives, RDT or CH within the agreed upon time limit. The survey team feels this is not in compliance with the ANL incident reporting procedure.

The survey team, therefore, recommend that ANL should comply with the ANL procedure for reporting incidents. No. 15 of the Agreements and Commitments covers this recommendation.

Observation of the FUM operation during the survey, which is complex in nature and requires many steps committed to memory, led the survey team to make the following recommendation.

It is recommended that:

Checklists incorporating the significant steps for various FUM operations should be prepared, used, and kept on file for a reasonable period of time. No. 12 of the Agreements and Commitments covers this recommendation.

The survey team concurs with the design change in FTP interlock system and believes that the checklist agreed to in No. 12 of the Agreements and Commitments will preclude a recurrence of the problem.

The 100 pin connector on control rods No. 9 and No. 2 were not made up. During a reactor shutdown, it was found the rods could neither be run "IN" or "OUT". The problem was reported in Incident Report No. 97. The No. 9 and No. 2 control rods share the same 100 pin connector. The lower horizontal connector clamp had pulled loose from its support, with the result that the loose connector did not make good connections for mating pins. The repair was made and all other connectors were checked. The scram function of the two rods was never impaired and was available.

The control rod No. 9 sticking in the reactor vessel cover was reported in Incident Report No. 101. The incident was being investigated at the time of the survey. The survey team discussed the possibility of the 1964 oscillator balls being the cause of the sticking. It was not being ruled out during the investigation.

The logs and records reviewed appeared to be satisfactory. The information reviewed indicated the reactor is being operated in accordance with the approved Operating Limits.

5. Discuss Placing a Burnup Limit on Oxide Subassemblies (Agenda Activity 44)

a. Relevant ANL Documents

(1) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. J. Koch, et al.

(2) ANL-5719 (Addendum) Addendum to Hazards Summary Report Experimental Breeder Reactor II (EBR-II), June 1962, L. J. Koch, W. B. Loewenstein, H. O. Monson

(3) EBR-II, A Status Report, July 1971, ANL-7743

(4) Prospectus, Routine Operation of EBR-II at 62.5 Mwt, July 1970

(5) EBR-II Operating Limits

(6) Guide for Irradiation Experiments in EBR-II, February 1971

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

(2) AECM-0524 - Standards for Radiation Protection

(3) AECM-0525 - Occupational Radiation Exposure Information

c. Participants

(1) ANL

(a) M. Levenson, Project Director, EBR-II

(b) H. Lawroski, Superintendent of Operations, EBR-II

(2) AEC

(a) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

d. Survey Findings

The following summarizes the EBR-II Project's philosophy on placing a fuel burnup limit on mixed oxide subassemblies in the reactor as outlined by Messrs. Levenson and Lawroski.

All the experimental mixed oxide subassemblies which are presently used in the EBR-II core are essentially one of a kind. This means that each is unique in the irradiation or reactor environment to which it is exposed (e.g., flux, temperature, heating rate). Before such a subassembly is placed in the reactor, it is required to receive the analysis and reviews as outlined in Reference a.(6) to assure it will be in compliance with the restrictions of References a.(1), and a.(5). In essence, the most meaningful criteria which can be applied to these experimental subassemblies is the linear heating rate. As noted in Reference a.(6) this is one of the criteria applied in the required reviews. In addition to this critical review some experiments undergo interim examinations and reconstitution as their reactor residence time increases. This additional check assures the safety of continued irradiation to higher burnups to characterize the fuel material. Therfore, the project feels that because of the uniqueness of these subassemblies, use of an overall burnup limit for oxide subassemblies would be prohibitive and meaningless at this time.

If mixed oxide subassemblies were to be used as driver fuel in the reactor core, the concept of a burnup limit would become meaningful. In all likelihood, the placing of a value on this burnup limit would be based on information gained in the on-going experimental irradiation program. The usefulness of a burnup limit would be obvious at that time because the irradiation or reactor environment to which all subassemblies would be exposed would be similar.

The ANL explanation is considered acceptable based on presently available information. However, this position should be periodically reviewed as more irradiation experience information becomes available from TREAT, EBR-II and Fuel Element Failure Propagation Loop (FEFPL).

6. Discuss Safety Implications of the X068A Occurrence (Agenda Activity 39)

a. Relevant ANL Documents

(1) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. Koch, et al.

(2) ANL-5719, (Addendum) Addendum to Hazards Summary Report Experimental Breeder Reactor II (EBR-II) June 1962, L. J. Koch, W. B. Loewenstein, H. O. Monson

(3) EBR-II Operating Manual

(4) EBR-II Operating Limits

(5) ANL-7743, The EBR-II: A Status Report by R. R. Smith, W. B. Loewenstein, C. M. Walter

(6) Fuel Cycle Facility Operations Manual

(7) FEF Process Work Sheet, Experimental Subassembly Hardware Preparation FCF-OM-820.5, pages 5-7, October 11, 1971

(8) Incident Report FEF-14, dated October 14, 1971

b. Relevant AEC Documents

AECM-8401 - Safety of AEC-Owned Reactors

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) D. Hampson, Operations Manager, Procedures, FEF

(d) F. Kirn, Operations Physicist

(2) AEC

(a) R. D. Morley, Reactor Safeguards Engineer, CH-SD

(b) Dale A. Herbst, Reactor Safeguards Engineer, CH-SD

d. Survey Findings

The EBR-II Reactor is designed such that the lower pole piece used for each of the three reactor regions is different. This was done to assure proper region positioning and proper coolant flow to the subassemblies. The three reactor regions are identified as the core, the inner blanket, and the blanket. The blanket region receives coolant flow from the low pressure plenum while the inner blanket and core coolant flow comes from the high pressure plenum.

Reference a.(8) reported an incident in which an incorrect pole piece was fitted to the experimental subassembly X068A. (See Agenda Activity 30). Because of the uniqueness of the reactor environment specified for each subassembly, the X068A error raised a question about the possible effects of the use of incorrect subassembly hardware on the safe operation of the reactor. X068A was a reconstituted subassembly which called for the use of a blanket lower pole piece. In reality, it was assembled using an inner blanket lower pole piece. This error resulted in a 12% increase in coolant flow through X068A. The error was discovered after removal of X068A from the reactor.

No specific statements can be made concerning incorrect hardware use unless a specific subassembly and reactor grid position are discussed. The following general conclusions can be stated, however. If an improperly orificed subassembly were to be placed in the reactor, it would either receive less than or more than its design flow. With the reduced flow situation, the subassembly would tend to operate at higher than designed temperatures. This could eventually result in damage to the subassembly clad and/or fuel. If the subassembly receives too much flow, it is possible that adjacent subassemblies would be flow starved. This could lead to results similar to those described above for the reduced flow situation. The survey team reviewed the procedures which are presently being used at the FEF to assure that correct hardware is utilized in the fabrication of subassemblies (Agenda Activity 30). The Reference a.(7) material shows the checks and balances employed to avoid errors similar to those of X068A in the future. It is the opinion of the survey team that these procedures will assist in precluding similar occurrences in the future.

7. Discuss Status of Upgrading of Shutdown Protective System (Agenda Activity 37)

a. Relevant ANL Documents

(1) EBR-II Operating Limits

(2) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. Koch, et al.

(3) EBR-II, A Status Report, July 1971, ANL-7743

(4) EBR-II Operating Manual

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

(2) RDT Standard C16-1T - Supplementary Criteria and Requirements for RDT Reactor Plant Protection Systems

(3) Ltr., Kosiba to Project Director, dtd. August 31, 1971

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) R. Curran, Instrumentation and Electrical Section Manager, EBR-II

(d) R. Matlock, Associate Manager, Analysis and Test Section, EBR-II

(e) K. Moriarity, Instrumentation and Control Section Manager, EBR-II

(2) AEC

(a) R. M. Moser, Director, Safety Division, CH

(b) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(d) J. T. O'Connor, Site Representative, RDT-ANL-West

d. Survey Findings

The schedule currently projected by ANL is as follows:

(1) Plant and Reactor Damage Thresholds - 1/31/72

(2) Design Basis Analysis of Whole-Core Loss of Flow Faults - 1/31/72

(3) Design Basis Analysis of Reactivity Faults - 4/1/72

(4) Design Basis Analysis for Containment Isolation Faults - 7/25/72

(5) Rationale for removal from the shutdown system of as many as possible of the functions considered non-essential or anticipatory - 1/30/72

The preliminary proposal for the upgrading is scheduled for January 31, 1972. Before it is submitted the above design basis analyses are required. The RSRC will review the necessary plant modifications when they are submitted as Engineering Proposals.

The Snake River Plain which includes the NRTS was recently redesignated as an earthquake Zone 3 area. A Zone 3 area is defined as one which would expect major damage to man-made structures in case of an earthquake.

Shutdown of EBR-II will require a one second warning before the earthquake strikes the facility. Best present estimates are that an earthquake travels at a mile a second. On this basis, Mr. Curran anticipates three earthquake detectors will be required. These will be placed about a mile in distance from the reactor, three detectors will be placed in three different directions. An additional detector will be placed in the Reactor Building.

Very little is known of the geology of the Snake River Plain. In addition, the state of the art for earthquake detection is not fully developed. For these reasons any activities undertaken for earthquake detection will be based on the best engineering judgment available at the time of decision.

The schedule as outlined in the Agreements and Commitments of the August 2, 1971, RDT/ANL meeting on EBR-II Plant Protection System (PPS) Upgrading has not been met.

8. Discuss Criteria for Submittal of Plant Modifications for Review (Agenda Activity 40)

a. Relevant ANL Documents

(1) ANL Policy and Practice Guide, Nuclear Safety Chapter, Part I, Nuclear Criticality Safety, July 1971

(2) EBR-II Operating Manual, Division I

(3) EBR-II Project Policy and Procedures Manual

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

(2) IAD-8401-7 - Contractor Internal Review System Requirements for Safety of Reactors and Critical Facilities: Operating Phase, September 16, 1970

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(2) AEC

(a) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

d. Survey Findings

A document describing the plant modification is prepared by the cognizant or responsible engineer. He then supplies this document to Mr. B. Cerutti, who is Chairman of the Plant Modification Committee (PMC). Mr. Cerutti then distributes this document to the PMC membership for their review, for technical feasibility and operability. In addition, he supplies copies to the Safety Review Group (SRG), the newly formed safety review organization for the EBR-II Project. The Chairman of the SRG is responsible for determining whether the modification involves safety considerations or not. If the SRG decides that a plant modification does not have safety

significance, the Superintendent of Operations may affect the change. If the document does involve safety considerations, it is reviewed by the SRG. Mr. Lawroski cannot act until the modification has been reviewed and approved. If the document involves safety considerations which deal with the Reactor Plant Protection System, it is submitted to the RSRC for review and approval. Other than that mentioned above, there are no specific criteria for required submittal of the documents to the RSRC for review. In addition, all activities of the SRG, the PMC and the EBR-II Project are reviewed twice a year by either the full RSRC or members of the subcommittee assigned to that reactor for conformance to the described criteria.

It was determined that any individual within the EBR-II Project can recommend that a plant modification be submitted to the RSRC. Mr. Lawroski indicated that every time he has suggested to Mr. Levenson that a document required RSRC review, Mr. Levenson has accepted his opinion. It appears that the procedures utilized for the review of plant modifications are adequate. The appropriate safety groups exist and are utilized to review plant modification documents. However the criteria which are used are not specifically set down. The criteria many times constitute a value judgment based on the experience of the reviewer.

9. Compare the EBR-II Organization to the IAD-8401-6 and 7 Requirements (Agenda Activity 42)

a. Relevant ANL Documents

(1) ANL Policy and Practice Guide - Nuclear Safety Chapter, Part I, Nuclear Criticality Safety, July 1971

(2) EBR-II Project Policy and Procedures Manual

(3) Ltr., Levenson to Shaw, dated December 6, 1971

(4) EBR-II Operating Manual, Division I

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

(2) IAD-8401-6 - Retraining and Requalification of Reactor Operators and Supervisors

(3) IAD-8401-7 - Contractor Internal Review System Requirement for Safety of Reactors and Critical Facilities: Operating Phase

(4) Ltr., McSwain to Levenson, dated December 16, 1971

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) R. Cooley, Training Coordinator, EBR-II

(2) AEC

(a) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(c) R. M. Moser, Director, Safety Division, CH

d. Survey Findings

The EBR-II Operations retraining program was reviewed in detail for compliance to IAD-8401-6. The retraining of operators and supervisors includes:

(1) Training on a continuing basis.

(2) Refresher training prior to examination.

(3) Sufficient company time for training.

(4) Re-examination at least annually in all procedures for handling abnormal plant conditions and emergencies and biennial re-examination on all other subjects.

(5) Retraining and re-examination in weak areas discovered.

It is the survey team's opinion the contractor is providing assurance that operators and supervisors are capable of continuing to operate safely. The assurance is obtained through appropriate retraining and formal examinations (written, oral and operating) formally administered and recorded.

The EBR-II Project has interpreted the IAD-8401-6 as discussed in Reference a.(3). Reference b.(4) is a partial concurrence by CH of the Project's interpretation, it also states that DOS is to rewrite the IAD. The rewritten IAD is to permit the contractor to conduct retraining as needed (per contractor requirements) during the first year of his absence from reactor operations.

The program is considered to be in compliance with IAD-8401-6. Total requalification of all operations personnel will not be completed until July 1972. The survey team is of the opinion this does not detract from the compliance of the EBR-II program.

The new Safety Review Group, discussed in Agenda Activities 29 and 36, the Plant Modification Committee, and the Reactor Safety Review Committee constitute the main effort for safety reviews in the EBR-II Project. It is the opinion of the survey team that the review functions within the EBR-II Project are in compliance with IAD-8401-7.

10. Discuss Status of EBR-II Project's Response to Safety Recommendations Made in the "QAM Audit of EBR-II Project," Report dated September 13, 1971 (Agenda Activity 43)

a. Relevant ANL Documents

(1) QAM Audit of EBR-II Project, dated September 13, 1971

(2) EBR-II Project Policy and Procedures Manual

(3) ANL Quality Assurance Management Policy and Procedures Manual

b. Relevant AEC Documents

(1) AECM-8401-6 - Retraining and Requalification of Reactor Operators and Supervisors

(2) AECM-8401-7 - Contractor Internal Review System Requirements for Safety of Reactor and Critical Facilities: Operating Phase

(3) AECM-8401 - Safety of AEC-Owned Reactors

c. Participants

(1) ANL

(a) M. Levenson, Project Director, EBR-II

(b) H. Lawroski, Superintendent of Operations, EBR-II

(c) R. Lykken, EBR-II Project Quality Assurance Representative

(2) AEC

(a) C. C. McSwain, Director, Argonne Contract Management Office, CH

(b) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

d. Survey Findings

The survey team discussed those areas they considered to be related to reactor safety. The areas of concern were the outdated EBR-II Operating Procedures and the instrument calibration and maintenance activities.

The Operating Manual was updated during the December extended reactor shutdown for operator training and manual updating. Around the clock review and revision was utilized to shorten the time required. Mr. Lawroski stated during the survey that the Operating Manual is up to date.

The computerized calibration and maintenance program is to be implemented to clear up the backlog of calibration work that exists. An additional discussion with Mr. Lawroski disclosed the mechanical maintenance will also be computerized.

Discussions with Mr. Lykken disclosed that the Departmental QARs now report to the Project QAR. He is currently in the process of revising the EBR-II PPM.

The survey team is of the opinion the audit recommendations on the Operating Manual are being carried out in a timely fashion. However, the EBR-II Project should take steps to be sure the review and revision of the Operating Manual is kept current.

The calibration and maintenance recommendation, in the opinion of the survey team, is not getting the attention it properly deserves. EBR-II Project should take the necessary steps to acquire the personnel needed to complete the job.

11. Discuss Adequacy of Staffing for All Aspects of Reactor Operation (Agenda Activity 41)

a. Relevant ANL Documents

(1) EBR-II Operating Manual, Division I

(2) EBR-II Operating Limits

(3) EBR-II Project Policy and Procedures Manual

(4) ANL Quality Assurance Management Policy and Practice Manual

(5) ANL Policy and Practice Guide, Nuclear Safety Chapter, Part I, Nuclear Criticality Safety, July 1971

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

(2) IAD-8401-6 - Retraining and Requalification of Operators and Supervisors

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) R. Cooley, Training Coordinator, EBR-II

(2) AEC

(a) R. M. Moser, Director, Safety Division, CH

(b) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(d) J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

The crew size requirements are as listed in Division I, Section I.F.3., in the Operating Manual.

The requirements are as follows:

	Minimum Crew Size	Minimum In Control Room
(1) Reactor Operating No Fuel Handling	6	3
(2) Reactor Operating Restricted Fuel Handling	7	3
(3) Plant Standby No Fuel Handling	5	1
(4) Plant Standby Restricted Fuel Handling	6	1
(5) Plant Standby Unrestricted Fuel Handling	6	2
(6) Plant Shutdown, Secondary System Drained, No Fuel Handling	4	1
(7) Plant Shutdown Restricted Fuel Handling	5	1
(8) Plant Shutdown Unrestricted Fuel Handling	6	1

The five areas of qualification required for the above plant conditions are listed below:

Qualification	Plant Conditions
Shift Supervisor	1, 2, 3, 4, 5, 6, 7, 8
Control Console Operator	1, 2, 5, 8
Coolant Systems Operator	1, 2, 3, 4, 5, 6, 7, 8
Fuel Handling Operator	2, 4, 5, 7, 8
Power Plant Operator	1, 2, 3, 4, 5
Electrical Operator	1, 2, 3, 4, 5, 6, 7, 8
Other Operator (Trainee)	1, 2, 3, 4, 6, 7, 8

The qualification areas required vary with the plant conditions. The list shows a Shift Supervisor, Coolant Systems Operator, and an Electrical Systems Operator are required for all plant conditions. When no fuel is being handled, the Fuel Handling Operator is not required for condition 1, 3 and 6.

The Control Console Operator is not required for conditions 3, 4, 6 and 7.

The Power Plant Operator is not required for conditions 6, 7 and 8.

The trainee is not required for condition 5.

The number of people in the five qualification areas available per shift are as follows:

	Crew			
	A	B	C	D
Control Console Operator	7	7	6	6
Coolant System Operator	8	7	6	7
Fuel Handling Operator	4	5	5	6
Power Plant Operator	6	5	5	5
Electrical Systems Operator	5	7	5	6
Other (Trainees) Qualified in One Area or Less	1	2	1	2

The number of operators who are qualified in all five areas (RPO) are:

	Crew			
	A	B	C	D
Reactor Plant Operator	3	5	4	5

The crew size presently is eight operators or trainees, a shift foreman and a shift supervisor. The shift foreman and the shift supervisor are not accounted for in the above last two lists.

A comparison of the list of operators available per shift versus the requirements indicates there is an excess of qualifications in all areas with the exception of fuel handling. There are operators in training, two on Crew A, one on Crew B, and two on Crew C which will eliminate the exception. Crew D has six qualifications in fuel handling.

Dr. Lawroski stated that the weak area of the staff is the lack of training people on shift for retraining. The Operations Engineers are currently serving in this capacity, their engineering duties thereby suffer because of the time devoted to retraining. The backlog of Operating Procedures which need revision can be attributed to their split duties.

The EBR-II Project feels this problem can be alleviated by the addition of 14 people to the Operations Section, as discussed in Agenda Activities 29 and 36 of this report.

It is the opinion of the survey team the staffing of the operating crews is adequate for safe reactor operation.

12. Inspect INSAT Equipment and Discuss XX04 Incident (Agenda Activity 16)

a. Relevant ANL Documents

(1) Procedure SE 11-71, Instrumented Subassembly Removal and Installation of the Shield Plug

(2) Ltr., Laney to Shaw, dated December 13, 1971

b. Survey Findings

It was the intent of the survey team to review the release of gaseous fission products from XX04, described in EBR-II Incident Report No. 91. The Laney to Shaw letter transmitted the report of the ad hoc committee selected to investigate that incident. The investigation report provided the required information, cause, effect, and the method to resolve the problem. For this reason the XX04 incident was not discussed during the survey.

In the opinion of the survey team a recurrence of the incident will be precluded by the revisions to procedures and equipment described in the letter.

13. Radioactive Sodium Chemistry Loop (RSCL)

a. Relevant ANL Documents

(1) Departmental Procedure No. DP 1-71, EBR-II Procedures Manual

(2) Memo., Levenson to Distribution, Method of Doing Business re Special Experimental Facilities, dated August 18, 1970

(3) SE 9-71, RSCL Cell C

(4) EBR-II Operating Manual, Section IV, p.3, RSCL Cell B

(5) EBR-II Operating Manual, Section IV, p.1, Radioactive Sodium Chemistry Loop

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

(2) AECM-0524 - Standards for Radiation Protection

(3) AECM-0525 - Occupational Radiation Exposure Information.

c. Participants

(1) ANL

(a) D. Cissel, Manager, Coolant Technology

(b) J. Holmes, Chemical Engineer, ANL-East

(c) G. Haroldson, Responsible Engineering, RSCL

(d) L. McKesson, Shift Foreman

(e) H. Lawroski, Superintendent of Operations, EBR-II

(f) G. Deegan, Operations Manager, EBR-II

(2) AEC

(a) D. E. Beaderstadt, CH Site Representative, NRTS

(b) J. F. Smith, Jr., Chief, Operations Support Branch, RDT-HQ

d. General Description

The Radioactive Sodium Chemistry Loop (RSCL), is a facility designed to provide for experimental testing of prototype online coolant quality monitoring devices under operating conditions typical of those expected in future LMFBRs. The loop circulates primary EBR-II sodium obtained from the previously installed primary purification system.

The main RSCL loop provides for connecting as many as five sub-loops. The actual devices under test would be incorporated into these sub-loops. The main loop is used simply to deliver sodium to the sub-loops and return it from them to the primary purification system.

As of the date of the survey, equipment was installed in two of the sub-loops. Cell B contained oxygen and hydrogen monitoring meters. This cell was in operation. Cell C contained a wire equilibration module. It had been shut down and was not operating at the time of the survey.

e. Survey Method

Pertinent documents were examined, primarily to become familiar with the system. These included the operating instructions for the main loop as well as those for Cells B and C, the only two cells to have been placed into service as of the time of the survey. In addition to these document reviews, several physical inspections of the loop (as much as was not behind shielding) and its ancillary equipment were performed. Some loop operation was observed and several operating personnel were interviewed.

f. Findings

It was found that procedures for operation of the RSCL main loop and Cells B and C have been prepared. As far as could be determined these procedures are being followed in operation of the loop. Incidentally, none of these procedures are in final form. The procedures for operation of the RSCL main loop and RSCL Cell B are, in fact, a part of the EBR-II Operating Instructions. However, they are preliminary procedures which have not yet received final approval. As such they are found, printed on colored paper, in the control room copies of the EBR-II Operating Instructions. The operating instructions for RSCL Cell C are contained in a set of Special Equipment Procedures, SE 9-71. Special Equipment Procedures are not formally a part of the EBR-II Operating Instructions but, nonetheless, are common vehicles for the provision of operating instructions for test equipment.

No evidence of failure to adhere to pertinent instructions was found. On the other hand, virtually no check sheets are used to control various important operations of the loop such as startup and shutdown. Hence, virtually no evidence is available upon which to base a judgment that operation is being conducted in accordance with approved instructions. Agreement No. 11, calling for startup and shutdown check lists should correct this situation. During routine operation, control room personnel are required to record periodically certain meter readings. Inspection of control room records revealed that these readings are, in fact, being taken and recorded.

Certain inconsistencies and examples of poor practice were discovered during the procedure review. These discrepancies are listed below in no particular order of importance:

(1) RSCL Main Loop Instruction. The fourth step of the startup procedure calls for verifying that the loop outlet valve is open. The instruction goes on to say that on a normal system shutdown, this valve is left open. However, the fifth step of the shutdown procedure calls for the loop outlet valve to be closed.

(2) RSCL Main Loop Instruction. The sixth step of the startup procedure calls for adjusting a certain meter to read zero. It then goes on to say that the adjustment procedure is the same as that for adjusting a comparable meter on another loop but does not describe that procedure.

(3) Action to be taken on receipt of a "Vent Fan Abnormal" annunciator light is described somewhat vaguely. The rationale for action to be taken in this case was described by the operating personnel but does not appear in the instruction.

(4) RSCL Main Loop Instruction. Figure 6 is incorrect. It shows seven selector switches on the RSCL Fire Protection Panel while the actual panel only has six.

During the several physical inspections, it was noted that the general areas were clean and orderly. As far as could be determined the loop was being operated in accordance with accepted practice. However, certain discrepancies were noted. These are listed below, once again in no particular order of importance:

(1) On the main RSCL control panel, leak lights 11-20 and 21-30 were not identified yet some of these lights are connected to active leak probes. The corresponding lights on the board in the corridor outside the airlock were identified.

(2) The Met-L-X control panel in the corridor provides for remote operation of one or two of seven spray heads. The control panel in the containment building provides for six. Actually only five are installed, but there is no way of telling this on the control panels.

(3) In the experiment data readout room a silicone control rectifier (temperature controller) had been removed. Over the hole left in the panel, a sheet of paper was taped with the following printed thereon: "SCR-1 Removed for repair 12/8/71. System OK without it until restart is required." The paper was unsigned.

(4) A technician was observed in a room requiring eye protection. He was not wearing any.

g. Comment

The RSCL loop is a somewhat complex piece of equipment containing radioactive sodium. As such it represents a particular hazard. Consequently, it appears that operating instructions should be clarified, inconsistencies both in instructions and installations should be removed, and the temporary nature of these instructions should be changed to permanent. Casual operations such as the operator ignoring a warning sign and informal tagging out of control equipment are hazardous acts which should not be allowed.

14. Discuss Responsibilities, Authority and Communication with All Individuals Interviewed (Agenda Activity 28)

a. Relevant ANL Documents

(1) ANL Policy and Practice Guide - Nuclear Safety Chapter, Part I, Nuclear Criticality Safety, July 1971

(2) EBR-II Project Policy and Procedures Manual

(3) EBR-II Operating Manual

(4) ANL 5719 (Addendum) Addendum to Hazards Summary Report Experimental Breeder Reactor II (EBR-II), June 1962, L. J. Koch, W. B. Lowenstein, H. O. Monson

b. Relevant AEC Documents

(1) AECM-8401 - Safety of AEC-Owned Reactors

(2) IAD-8401-6 - Retraining and Requalification of Reactor Operators

c. Participants

(1) ANL

All personnel interviewed

(2) AEC

(a) R. M. Moser, Director, Safety Division, CH

(b) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(d) J. T. O'Connor, Site Representative, RDT-ANL-West

d. Survey Findings

The primary responsibility and authority rests with the Laboratory Director (LD), R. Duffield, of ANL. He is accountable to the AEC for assuring that all ANL reactor activities are carried out safely and in compliance with the nuclear safety clause in the University of Chicago contract, and the requirements of the AEC manual chapters. A Policy and Practice Guide (PPG) has been issued which outlines the ANL mechanisms which are used in meeting AECM 8401 requirements.

The administration of the facility is by the Project Director, M. Levenson. He reports to the Associate Laboratory Director for Engineering Research and Development, R. Laney. He reports to the LD. The departments are administered by Associate Director for Analysis, W. Loewenstein, Associate Director for Materials, W. Barney, Associate Director for Engineering, R. Winkleblack, and the Superintendent of Operations, H. Lawroski. The three Associate Directors and the Operations Superintendent report to the Project Director.

The management, administration and coordination of the operations department is the responsibility of the Superintendent of Operations.

The Operations Manager, G. Deegan, is responsible for the direct supervision and administration of the Operations Section. He reports to the Superintendent of Operations.

The Operations Section is organized as required by the Hazards Summary Report, ANL-5719. Each shift is supervised by a Shift Supervisor. A shift crew, specified in Division I, Section I.F.3 of the operating manual, is composed of qualified technicians who have had specialized training in reactor operation, plant systems operation, instrumentation, and radiation safety.

Technical support for the Operations Section is provided by Operations Physicist, R. N. Smith; the Training Coordinator, R. Cooley; the Fuel Management Supervisor, G. Hocker; and the Procedures Supervisor, F. Tebeau. They report to the Operations Manager.

Additional technical support within the Operations Section is provided by the Operations Engineers, Electrical - D. Hinckley, Reactor Plant Systems - W. Perry, and Power Plant Systems - C. Nelson.

The Superintendent of Operations obtains additional support from the Planning and Scheduling Office, J. Antiveros and R. Schmid, Chief Operations Physicist, F. Kirn, the Irradiations Office, R. Niedner, and for Reactor Safety, J. Sackett. They report to the Superintendent of Operations.

Other support sections reporting to the Superintendent of Operations include Systems Engineering, B. Cerrutti, and the Instrumentation and Control Section, K. Moriarity.

Support services such as Health and Safety, Shops, Drafting, Special Materials, Plant Services, Materials Handling, and Computer Services are provided to the Project by the ANL-West organization.

The communications between the Superintendent of Operations and the Operations Manager is by memoranda and published schedules. The Operations Manager communicates routinely with the Shift Supervisors via Shift Instructions, Loading Instructions, published schedules and memoranda.

The Shift Supervisor is responsible for the safe operation of the facility for the shift to which he is assigned. A Shift Foreman assists the Shift Supervisor in carrying out his duties. The foreman is responsible to the Shift Supervisor and cannot assume that responsibility. If it is necessary for the Shift Supervisor to leave the site, the reactor must be shut down unless another qualified Shift Supervisor is available.

The technicians are classified as operators or trainees. They can perform only those operations in which they are qualified unless it is under the direction of a qualified operator.

The Operations Manager is responsible for the training function of the Operations Section. The Training Coordinator has been delegated the responsibility by the Operations Manager for administering the training of shift supervisors, foremen, and operators in accordance with the approved EBR-II Training Program.

Maintenance is the responsibility of the Operations Maintenance Supervisor, J. Leman, who also reports to the Operations Manager. His responsibilities include routine maintenance, equipment repairs, system modifications, component procurement, spare parts control, and experimental installation for the EBR-II reactor and auxiliary systems.

The Procedures Supervisor is responsible for all EBR-II procedures. This includes new procedures and the reissuing of existing procedures. He is responsible for Operating Instructions, Departmental Procedures, Maintenance Procedures, Test and Experimental Procedures, Plant Modification Procedures, Special Equipment Procedures and Posted Operating Instructions. He reports to the Operations Manager.

The Fuel Management Supervisor is responsible for the preparation, review and coordination of approval of Reactor Loading Instructions, loading charts, and IBM cards required for fuel handling. He programs subassembly transfers and reactor fuel requirements to be consistent with the operating schedule, and maintains records of burnup so that subassembly removal can be programmed at the appropriate time. The additional checks and balances for fuel handling operations are discussed in Agenda Activity #30.

In the opinion of the survey team, Operations Department is organized as the documents describe. The responsibilities and authorities for themselves and those up and down the organization appeared to be understood by all participants interviewed.

15. Inspect Control Room and Discuss Ability to Shutdown Reactor Outside of Control Room in Event of Fire in Control Room (Agenda Activity 1)

a. Relevant ANL Documents

(1) EBR-II Project Policy and Procedures Manual

(2) EBR-II Operating Limits

(3) EBR-II Operating Manual, Volume V

(4) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. Koch, et al.

b. Relevant AEC Documents

(1) AECM-0504 - Operational Safety Program Appraisals

(2) AECM-0524 - Standards for Radiation Protection

(3) AECM-0544 - Planning for Emergencies in AEC Operations

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) E. Graham, Manager, Health and Safety, ANL-West

(d) R. Matlock, Associate Manager, Analysis and Test Section, EBR-II

(2) AEC

(a) R. M. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(c) J. T. O'Connor, Site Representative, RDT-ANL-West

(d) J. F. Smith, Jr., Chief, Operations Support Branch, RDT-HQ

d. Survey Findings

Many methods exist to shutdown the reactor from outside of the reactor control room in the event that it should be inaccessible due to a fire. This would be done by pulling breakers, i.e., nuclear instrument constant power supply, process instrument constant power supply, main breaker, etc., on various subsystems of the scram system. The nuclear status of the reactor can be checked in the control room, in the cable routing room or at the fuel handling console. Information as to the nuclear status of the reactor is continuously recorded at the fuel handling console and in the control room. The instrumentation available in the cable routing room is an indicator, not a recorder, on all nuclear instrument channels. Evacuation in the event of a fire is left to the discretion of the shift supervisor, although action levels exist for evacuations due to radiation levels. The ANL criteria used in our evaluation of this activity were Emergency Procedures 1-2, 1-3 and 1-4; CH criteria used were radiation level criteria as specified in 0524. The appropriate ANL procedures were reviewed to assure their adequacy.

Remote scram capability is also located on the fuel handling console. Rod position can be observed at the rod drive mechanism on the reactor top. Reactor temperature outlet and fuel outlet temperature thermocouples have readout in the cable routing room. Also the DDAS information may be available if required.

16. Summary

The EBR-II Reactor is being operated in a safe manner. The only areas of concern noted were:

(a) Procedures

(b) Possibility of misinterpretation of Operating Limits

(c) Compliance with internal rules.

Recommendations were made in these areas and implementation of these recommendations will remove the concern.

C. ANL-West-Health Protection

1. Inspect Waste Treatment Plant (Agenda Activity 18)

a. Relevant AEC Documents

AECM 0510 and Supplements - Prevention, Control and Abatement of Air and Water Pollution

b. Miscellaneous Relevant Documents

State of Idaho Water Pollution Control Regulations and Sanitary System Regulations

c. Participants

(1) ANL

(a) J. Auer, Manager, Plant Services

(b) W. Persky, Supervisor, Plant Services

(c) P. Stoddard, Waste Management Representative, Health and Safety Section

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

The overall liquid waste system is presently being overhauled which eventually will assure that no radioactive or laboratory waste will go to the sanitary system or to the environment except thru ID burial sites or landfills. Presently some of such wastes go to the sanitary system, the industrial waste lagoon and the leaching pit.

Sanitary waste is treated in a primary and secondary lagoon each constructed with a diatomaceous earth waterproofing base. The system operates anaerobically during the winter (mid-October to mid-March) and aerobically during the rest of the year. Average input to the 800,000 gallon lagoon is 58,000 gallon/day. Overflow goes to a 300,000 gallon lagoon. The lagoons operate satisfactorily except during the spring changeover from anaerobic to aerobic operation when odor is noticeable. Measurements are made for pH, BOD, dissolved oxygen, and

gross alpha and beta activity. These parameters vary with seasonal conditions. There is essentially no overflow during the warmer ice free season. Percolation to ground occurs at other times. The system has been acceptable under past Idaho sanitary water treatment regulations. Since State laws, rules and regulations are in a state of flux, ANL was advised to keep aware of the State requirements and to comply with them as directed by AECM 0510.

2. Review Records of Measurements of Nonradioactive Air and Water Pollutants (Agenda Activities 19 and 20)

a. Relevant ANL Documents

ANL Internal Records and Reports

b. Relevant AEC Documents

AECM 0510 and Supplements - Prevention, Control and Abatement of Air and Water Pollution

c. Participants

(1) ANL

(a) P. Stoddard, Waste Management Representative, Health and Safety Section

(b) J. Auer, Manager, Plant Services

(c) W. Persky, Supervisor, Plant Services

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

As required by ID 0510 Supplement, ANL prepares a monthly report of liquid gaseous and solid radioactive and nonradioactive wastes and emissions. These records of nonradioactive pollutants are of recent origin and are based on estimates made from observations of usage. This along with occasional checks should be adequate. The coverage is thorough and all possible emission sources have been examined.

The major air pollution source is the boiler plant for process steam. Records have been kept on steam generated and oil used on an annual basis since the plants construction. No. 5 oil (No. 6 with S content adjusted by addition of No. 1 oil) at 1.0 to 1.2% S is burned. The quantity of oil used has gradually increased from 180,000 gallons/year in 1961 to 720,000 in recent years. The TREAT reactor building is heated separately with small boilers using No. 2 oil.

Water is discharged to the sanitary lagoons, an industrial waste lagoon and a 200,000 gallon leaching pit. The latter receives water with radioactivity levels below the concentrations specified in AECM 0524. There is measurable but low level accumulation of radioactivity in the leaching pit. Nonradioactive contributions to the three water disposal areas are not routinely measured. Blowdown waters are treated to reduce hexavalent chromium to the trivalent hydroxy state. Recent measurements show 0.3 ppm trivalent Cr in the industrial waste pond after 10 years of operation.

In general the records have been adequate and have satisfied the operational needs and regulatory requirements in the past. It is necessary to routinely assess the need for records relating to environmental discharges in the light of changing regulations. ANL-West is presently aware of and actively abreast of these developments. Appendix 3 (from ANL records) indicates tests and measurements required by Idaho State regulations. ANL is as yet evaluating these rules and regulations to determine what equipment, skills and records will be necessary. ANL-West is making a satisfactory effort in this direction.

3. Inspect Cover Gas Monitoring Equipment and Discuss the Signal-to-Noise Ratio Data (Agenda Activity 32)

a. Relevant ANL Documents

(1) ANL-5719, Summary Report of the Hazards of the EBR-II, May 1957, L. Koch, et al.

(2) ANL-5719 (Addendum) Addendum to Hazards Summary Report Experimental Breeder Reactor II (EBR II), June 1962, L. J. Koch, W. B. Loewenstein, H. O. Monson

(3) EBR-II, A Status Report, July 1971, ANL-7743

(4) EBR-II Operating Manual, Volume V, EP-2-9

(5) EBR-II Operating Limits

(6) Monthly Reports of the Health and Safety Section

b. Relevant AEC Documents

(1) AECM 0510 - Prevention, Control and Abatement of Air and Water Pollution

(2) AECM 0524 - Standards for Radiation Protection

(3) AECM 0525 - Occupational Radiation Exposure Information

(4) AECM 050D and Appendix - Radioactive and Waste Management Data and Practices

(5) AECM 8401 - Safety of AEC-Owned Reactors

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) R. Smith, Manager, Analysis and Testing Section, EBR-II

(d) M. R. Tomblison, Chief Health Physics Technician, EBR-II

(2) AEC

(a) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(b) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(c) J. H. Pingel, Health Physicist, SD-CH

(d) J. T. O'Connor, Site Representative, RD-ANL-West

d. Survey Findings

The present cover gas monitoring system consists of a Reactor Cover Gas Monitor (RCGM), Failed Element Rupture Detector (FERD), Fission Gas Monitor (FGM), and a developmental Germanium-Lithium Argonne Scanning System (GLASS). The functions of the monitors are to cover the various gaseous fission products and delayed neutrons, given off after a failure of fuel element cladding.

The ranges of the instruments vary due to the type of product being detected. The RCGM has been the most sensitive of the monitoring systems for the clad failures. The sensitivity of the monitor is such that a small gas leak can be detected but at a S/N of 250 the instrument would be off scale. It is at this level the reactor must be shutdown. To get better and more sensitive data, grab samples of the cover gas are taken and run on laboratory equipment in the Laboratory and Office Building. These data are plotted on a curve in the control room.

The ANL definition of "diagnostic operation" is "that operation required to find a suspect leaker in the EBR-II core." EP-9 is the limiting document for EBR-II operation when a suspect leaker resides in the core.

The fuel handling operation does purge the cover gas system but the effect is very small and does not alter the S/N appreciably. The grab sample curve in the control room was reviewed to get insight into the purge effect on the S/N ratio. It is indeed not significant.

Cover gas sampling was looked at from a health and safety viewpoint. A 10 cc sample is taken using chemical type glass stopcock and connector system involving 1/8 inch inner diameter tubing. The total sample reads 0.8 to 1 mr/hr for normal running conditions. An insignificant amount of gas escapes in the disconnect procedure. The approximately 650 cubic feet of argon cover gas is remote from neutron flux, hence, contains only minor

activation products. Since it is at atmospheric pressure there is little or no likelihood for a significant release of cover gas from this operation. The operation is done by a single individual with no protective clothing. Normally a health physics technician performs the sampling and gamma analysis. When a health physics technician is not available it is done by a reactor operator. The question was posed as to whether or not this was an operation which should be carried out solely by reactor operators. The response was that more consistent and accurate results were obtained by health physics technicians who were more familiar with counting techniques. The health physics technicians prefer to take the samples since information is valuable to the HP assessment of exposure potential and data on effluent releases is obtained routinely.

The question was posed as to whether or not a single individual alone should perform this operation. A conclusion was reached that this is an acceptable practice since the radioactivity of the cover gas is principally rare gases (A 41 and fission gases principally Xe 133) whose exposure limits are based on immersion in an atmosphere of the gas. The quantities that can be released are very small relative to an immersion exposure.

4. Examine and Discuss Copies of Federal and State Regulations on Hand for Updatedness and the Application to ANL (Agenda Activity 17)

a. Relevant AEC Documents

AEC Manual Chapters and Supplements

b. Miscellaneous Relevant Documents

State and Local Regulations

c. Participants

(1) ANL

(a) D. O'Neil, Director, Industrial Hygiene and Safety Division

(b) E. Graham, Manager, Health and Safety, ANL-West

(c) P. Stoddard, Waste Management Representative, Health and Safety Section

(2) AEC

(a) J. H. Pingel, Health Physicist, SD-CH

(b) George Wehmann, Chief, Waste Management Branch, Production and Technical Support Division, ID

d. Survey Findings

A check was made of the 0500 AEC Manual Chapters in the H & S Section files. Most of the basic chapters were on hand and up-to-date; 0505, IAD 0510-25, 0552 and 0555 were missing and 0504 and the table of contents were old issuances. Nine CH Supplements were missing and several were outdated. CH will provide up-to-date issues to H & S.

Recent copies of State of Idaho Air and Water Pollution regulations (1968 and 1971) were on hand as well as such other AEC Manual Chapters as apply (0601,0701, 6101, 6301, 7450, 8401 and DOT regulations).

Awareness of the provisions of Federal, State and Local regulations among H & S personnel is very good.

5. Stack Effluent Control; Inspect Control and Monitoring Equipment, Discuss Control Procedures, Monitor Set Points and Bases, Discuss Plant Modification for Increased Purge Rate (Agenda Activity 15)

a. Relevant ANL Documents

ANL Air Sampling and Survey Data

b. Relevant AEC Documents

(1) AECM 0524 and Supplements - Standards for Radiation Protection

(2) ID Appendix 0510 - Prevention, Control and Abatement of Air and Water Pollution

(3) Health Physics Survey Reports for EBR-II and FEF

c. Participants

(1) ANL

(a) G. Deegan, Operations Manager, EBR-II

(b) E. Graham, Manager, Health and Safety, ANL-West

(c) M. R. Tomblison, Chief Health Physics Technician, EBR-II

(d) F. Lee, Chief Technician, FEF

(e) P. Stoddard, Waste Management Representative, Health and Safety Section

(f) D. O'Neil, Director, Industrial Hygiene and Safety Division

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

Radioactive discharges:

There are four stacks on site at TREAT, Sodium Chemistry Laboratory, ZPPR and the main 300 ft. stack located near EBR-II. The TREAT and ZPPR facilities were surveyed in October 1971 and were not reviewed during this survey. The main stack serves the

reactor, FEF and the junior cave facility in the L&O Building. Air discharge rates are respectively about 10,000 cfm, 46,000 cfm and 20,000 cfm with a total of about 76,000 cfm.

The radioactivity likely to be discharged from the reactor are fission gases and a very small amount of A 41 activation in the cover gas. The approximate 650 cu. ft. of Argon cover gas is shielded from the core by over 20 feet of sodium. In addition some air is irradiated in the instrument thimbles which are air cooled. Cover gas is discharged at low rates through a gas holdup system providing a holdup of three days (somewhat variable depending on discharge rate).

The source of radioactivity from the FEF facility is normally irradiated fuel and occasionally sodium, hence beta-gamma and alpha radioactivities are possible. Airborne radioactivity can be rare gases, other fission products, activated sodium and alpha activity of the fuel. The source is the material being worked on and the general contamination in the air and argon cells. The general contamination in the air cell is about one alpha to 10 beta disintegrations. About 40% of the alpha is Pu.

Radioactivity from the L&O facilities can have broader range of radioisotopes but in general are similar to those in FEF.

Air monitoring is provided though not in the degree that all emissions are directly measured. Like most stack monitors key elements are measured. The main stack monitor is a commercial five channel moving tape and filtered air monitor. Air at 10 cfm passes through the tape to filter out particulates and passes through two series holdup tanks. The tape is counted for gamma activity, and scintillation counters look for A 41 and I 131 in the holdup tanks. One cfm passes through activated charcoal which can be analyzed immediately and is counted once per month.

A separate beta particulate monitor samples the reactor effluent. It will detect serious filter leaks. Both read out on location and in the reactor control room. The combination allows differentiating between reactor building and other facility emissions. In addition, ionization chambers continuously look at the filter banks in FEF and the L&O Building. These monitors will detect serious releases but not leakage through filters except under certain conditions (no retention). They are set to alarm at twice the background level. Normal readings are 15-40 mr/hr at L&O filters and 60-100 mr/hr at FEF filters. The alarm points on the main stack monitor are set at 10^4 cpm for

general particulates and 400 cpm for I 131. Normal count rate is 200 cpm for particulates. The upper instrument limit is to 10^6 cpm. Allowable stack discharge as calculated to meet requirements of ID 0510 Appendix is 10^8 dpm.

In conclusion, stack monitoring is provided to give key information on radioisotopes of highest significance excepting alpha activity for control of operation. It does not give a detailed measurement of emissions but does give reasonable inference as to what the releases are. Since the ratio of alpha to beta-gamma activity is known in FEF this gives information for making a rough estimate as to what alpha emitter discharges are. It was suggested that a study be made relative to AECM 0513 reporting requirements to assure that existing monitoring provides sufficient information to fulfill all requirements. The stack monitors should detect significant filter breaches. Filters are DOP tested for leakage by Aerojet Nuclear Company semiannually.

Nonradioactive discharges:

Stacks are not routinely monitored or sampled for nonradioactive discharges. In lieu of this a thorough survey of usage of possible pollutants was made and discharges are reported to ID based on a materials use and loss analysis. The monthly reports to ID includes the amount of fuel oil used in the three 17 x 10^6 Btu boilers and the per cent of sulfur. A work order has been issued requesting Aerojet Nuclear Company to make direct measurements of pollutant concentrations in the boiler plant stack.

Administrative Relationships:

Phil Stoddard, Administrative Assistant, has been assigned full time responsibility for waste management including AECM 0510 and AECM 0524 responsibilities as these relate to effluents and effluent control. He reports to Earl Graham but also has direct contact on routine (not policy) matters with corresponding CH and ID personnel (Waste Management and Environmental) and with ANL personnel including supervisors as needed in discharging his responsibilities. He and fire and safety representatives work with the OH nurse on a daily contact basis.

Conclusions:

ANL has recently increased emphasis on assessment of environmental releases. Since the planned program is not yet fully implemented comments in this report have been limited to two suggestions for strengthening planned actions: (1) consider

added emphasis in assessing the need for environmental monitoring and (2) assess stack monitoring of alpha emitters for adequacy as regards having positive knowledge of the amounts or concentrations released.

6. Inspect Heating Plant (Agenda Activity 21)

a. Participants

(1) ANL

(a) J. Auer, Manager, Plant Services

(b) P. Yost, Mechanic, Plant Services

(c) P. Stoddard, Waste Management Representative, Health and Safety Section

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

b. Survey Findings

The steam plant (3 boilers at 18,000 lb./hr.) was clean, uncluttered and well run. The oil used is specified by AEC-ID. ANL-West has arranged for Aerojet Nuclear Inc. to make measurements of stack emissions. Emissions have not been measured to date. State and Federal standards for gaseous and particulate emissions can be met by careful regulation of fuel, excess air, and soot blowing. With care in operating the plant ANL-West should have no emission problem unless regulations change drastically. There was no visible plume observed from the boiler stack during the survey period.

7. Inspect and Discuss the General Occupational Health Program; Adequacy of Staffing, Adequacy of Equipment, Scheduling of Physical Exams, Examine Monthly Reports, Examine and Discuss Injury-Exposure Experience, Emergency Preparations (Agenda Activity 22)

a. Relevant AEC Documents

(1) AECM-0528 - Occupational Health Program

(2) IDO Annual Reports of the Health Services Laboratory

b. Participants

(1) ANL

Adele S. Seward, Nurse, ANL-West

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

c. Survey Findings

Some aspects of the Occupational Health (OH) program were covered in the October 12-21, 1971, survey. Repetition was avoided except for a check on progress with recommendations made in that survey.

(1) Staffing is somewhat inadequate by 0528 standards (one nurse per 300 employees). ANL-West employs approximately 600 persons, has one nurse and relies on Idaho Central for service by medical doctors. The question, "Should another nurse be hired" was examined and a conclusion was reached that one nurse is adequate with support approximately as follows:

(a) Clerical aid to be available fulltime to aid when the nurse needs to spend uninterrupted time with patients, to aid in emergencies and to carry part of the clerical load associated with the OH program. It is probable that some of the cleric's time would be available for non-OH work but she should be physically present on a full-time basis.

(b) Private space for listening to and talking with patients. Additionally the space could be used for diathermy equipment which would be a useful addition to the OH apparatus.

(c) A substitute nurse for all absences of the regular nurse (vacation, illness, travel, etc.). ANL should write an administrative procedure for obtaining a substitute when the regular nurse cannot make such arrangements herself.

(d) Emergency aid in the form of trained employees specifically instructed to make themselves available during emergencies. Preferably these should be nearby individuals who are readily available and have no other significant emergency duties and whose work can be neglected during an emergency. A nurse is on duty continuously at central. Guards, firemen, ambulance drivers and health physics shift technicians are given Red Cross multimedia first aid training plus additional in-house training.

(2) Equipment appears to be adequate except that a diathermy unit could be added if space is available.

(3) Other questions were asked and the existing practices were deemed adequate. Medical doctors from Idaho Central have not visited the site. It would be desirable to invite them for a familiarization visit in case it is necessary for them to answer emergency calls. Md's from ANL-East have visited to review the health program.

The only physicals given at Central are complete ones at a rate of about 150 per year. About a 50-minute travel time is involved. Al employees receive an annual laboratory examination via a mobile unit from Central.

8. Inspect Records Relating to Radioactive and Industrial Waste Management (Agenda Activity 23)

a. Relevant ANL Documents

(1) Internal ANL records

(2) Health and Safety Section's Monthly Reports and Survey Records

b. Relevant AEC Documents

(1) AECM 050D and Appendix - Radioactive and Waste Management Data and Practices

(2) ID Supplement 0510 - Prevention, Control and Abatement of Air and Water Pollution

(3) AECM 0513 - Proposed

c. Participants

(1) ANL

(a) E. Graham, Manager, Health and Safety, ANL-West

(b) P. Stoddard, Waste Management Representative, Health and Safety Section

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

Records for effluents are discussed under Activity Nos. 19, 20 and 24.

Records for solid wastes consist of file copies of ANL radioactive waste work sheets, the ID Form 135 data sheets and computer printouts. Copies of the ANL Forms are retained by the originator, Special Materials, and Waste Management (Phil Stoddard). Shops receive one copy to inform them when a storage pipe is full and is to be welded shut. The Id 135's are made up from data on the ANL Form both for radioactive wastes stored at ANL-West and for wastes picked up by Aerojet Nuclear. Monthly Aerojet Nuclear summarizes the ID 135's and sends them to ANL (Stoddard) for verification before computerizing them.

All solid wastes, active or nonactive are removed by Aerojet Nuclear except for those placed in the high level storage pipes. Since ID has responsibility for all wastes moved off the ANL site, a check was made with AEC ID (G. Wehman) as to adequacy of ANL effort and cooperation. It is satisfactory. The handling of the wastes on site is adequate.

9. Inspect and Discuss Adequacy of Records of Measurement of Radioactive Emissions to Air and Water (Agenda Activity 24)

a. Relevant ANL Documents

(1) ANL Internal Records

(2) Recording Charts for Air Monitors

b. Relevant AEC Documents

(1) AECM 0524 - Standards for Radiation Protection

(2) AECM 0513 - Proposed

(3) ID 0510 Supplement - Prevention, Control and Abatement of Air and Water Pollution

c. Participants

(1) ANL

(a) E. Graham, Manager, Health and Safety, ANL-West

(b) P. Stoddard, Waste Management Representative, Health and Safety Section

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

The primary records of emissions to air and water are those sent monthly to ID on computer data sheets. These and summary computer readouts for 1971 were examined and found to have occasional omissions but in general were reasonably complete. Although the emission concentrations and amounts are estimates, air samples and the recording charts for the stack monitors in ZPPR, TREAT and the main stack monitor are used to arrive at values given. The recorder charts are kept indefinitely. One continuous monitor housed in the power plant building records ambient air particulate radioactivity. Its primary purpose is to permit differentiating between ambient air radioactivity and that in effluent air. Results of sampling and spot checks appear in the survey records of the various facilities.

The question was raised as to the need for plutonium monitoring for the effluent of FEF and the L&O Building. Such monitoring has not been considered necessary by ANL since occasional alpha counts are made on the filter papers from the stack monitor. It was stated that Pu has never been detected on these samplings. Since measurements for Pu in soil and vegetation are not made in the NRTS environmental monitoring program these occasional samplings constitute the only measurement of possible plutonium releases. ANL does not do environmental monitoring. It is advised that ANL examine (for adequacy) its overall program for assessing environmental releases of Pu. Proposed AECM 0513 requires effluent monitoring unless an exemption is secured.

Stack monitors are calibrated with known radioactivity standards placed in the filter paper position. Co 60 is used to calibrate the analysers of the gamma monitors (I 131, A 41 and the TREAT stack monitor). Pu is used to calibrate the ZPPR alpha monitor.

Water monitoring records consist of the laboratory analyses of retention tanks before release. AECM 0524 standards for unknown emitters are used for retention tank discharges. In the past retention tanks were discharged to the leaching pit if concentration levels were below those of AECM 0524. In the past year few tanks have been discharged, most go to the evaporator. Evaporator residues are encased in concrete inside 55 gallon drums and sent to ID burial grounds after the concrete is set and aged. Distillate is condensed and returned for a second distillation before release to the leaching pit. In addition occasional sampling is done of the sanitary and industrial waste lagoons. Such samples are counted for gross alpha and beta activity.

Environmental monitoring is not done by ANL since they rely on the AEC ID environmental program.

It is concluded that the effluent monitoring program will need reexamination for compliance with AECM 0513.

10. Inspect and Discuss Program for Assessment of Radioactivity in Environmental Air, Water and Soil Particularly at Points of Discharge to Ground Water (Agenda Activity 25)

a. Relevant AEC Documents

(1) AECM 0524 - Standards for Radiation Protection

(2) AECM 0513 - Proposed

b. Participants

(1) ANL

(a) P. Stoddard, Waste Management Representative, Health and Safety Section

(b) E. Graham, Manager, Health and Safety, ANL-West

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

c. Survey Findings

ANL has not done environmental monitoring. Occasional checks of lagoons and leaching pit are made. Otherwise reliance is placed on the ID environmental monitoring program. Measurable but low level buildup of radioactivity has been noted in the leaching pit.

It is concluded that ANL in its consideration of the requirements of AECM 0513 should review the possible need for some assessment of environmental radioactivity.

11. Discuss Responsibility for Radioactive Waste Management Reports (AECM-CH-050D, Form 298) (Agenda Activity 59)

a. Relevant AEC Documents

(1) AECM-050D and Appendix - Radioactive and Waste Management Data and Practices

(2) AEC-CH Form 298

b. Participants

(1) ANL

(a) D. O'Neil, Director, Industrial Hygiene and Safety Division

(b) E. Graham, Manager, Health and Safety, ANL-West

(c) P. Stoddard, Waste Management Representative, Health and Safety Section

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

c. Survey Findings

CH Supplement 050D requires quarterly reporting of liquid, gaseous and solid wastes to CH. ID requires reporting of similar data but at monthly periods and on a working basis for solid wastes (ID Form 135). Both ID and CH have a need to know this data. ANL-East has not included such data for ANL-West in its AEC-CH Form 298 reports to CH. Verbal requests for such data have not resulted in a change of practice. Agreement was reached that ANL-West (Earl Graham) would supply to ANL-East (D. P. O'Neil, IHS Division Director) copies of reports sent to ID and ANL-East would transmit these to CH either on a monthly basis or as an Appendix to the quarterly 050D-298 reports which are prepared jointly by IHS (J. Novak) and P.O. (W. Kline, Reclamation Section) for ANL-East. This type of omission points to weakness in the overall ANL management system in which an overall coordinating effort appears weak.

12. Discuss Basic Question: Does ANL Know Its Environmental Effects? The Question is in the Framework of Cooperative and Supportive Effort in Relation to the ID Environmental Monitoring Program - ANL Should Know On-Site Effects. Determine Authority and Responsibilities Related (Agenda Activities 60, 65 and 67)

a. Relevant AEC Documents

(1) AECM 0524 - Standards for Radiation Protection

(2) AECM 0513 - Proposed

(3) Related ID and CH Supplements

b. Participants

(1) ANL

(a) D. O'Neil, Director, Industrial Hygiene and Safety Division

(b) E. Graham, Manager, Health and Safety, ANL-West

(c) P. Stoddard, Waste Management Representative, Health and Safety Section

(d) W. Persky, Supervisor, Plant Services

(e) J. Auer, Manager, Plant Services

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

c. Survey Findings

Measurement of effluent releases and environmental effects was posed on the basis that ANL be able to state with complete confidence what its pollution emissions and environmental effects are or are not. In inspections and discussions under other related activity numbers in this survey, it is apparent that there are occasional weaknesses. Examples are the inferred calibration of stack monitors especially as relates to nonmeasured emissions and quantitative values of steam plant stack emissions. There is no doubt that ANL-West is now moving strongly to effect a positive attitude toward minimal releases. There is need for continuing effort in this direction. Clear documented statements of actual and potential releases from normal

operations should be developed and orderly, systematic documentation of all operations and measurements should be made. In addition there is need for positive statements as to what is not discharged and why this conclusion is reached. (What is meant here is that the negative results of sampling type measurements which have been made should be emphasized. As an example, continuous stack monitoring for plutonium in the FEF and L&O facility effluents is not done although ANL has occasionally sampled and analyzed the continuous monitor filters for plutonium always with negative results.)

Personnel are knowledgeable and capable, but since the manpower is spread thinly in these areas, there is need for documentation of these things as backup and for continuity. In implementing the impending Chapter 0513, ANL should document this kind of information in a brief environmental report either independently or as a part of the environmental monitoring reports presently covering only ANL-East.

13. Discuss ANL-East to ANL-West to ID Occupational Health Relationships - Divisions of Labor, Responsibilities, Authorities Agenda Activity 61

a. Participants

(1) ANL

A. Seward, Nurse, ANL-West

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

b. Survey Findings

The relationships between the ANL-West Branch of the Health Division, the ID Health Services Laboratory, and Health Division (at ANL-East) are satisfactory. The cooperative effort and communications are good. The nurse routinely spends several hours per week (Fridays) at ID Health Services Laboratory in a management-informational type meeting. Dr. Francis W. Strehl, Director, ANL Health Division, encourages this cooperative effort and maintains good continuity of HD policy and practices between the two ANL sites.

It is concluded that the occupational health program is satisfactorily managed.

14. Discuss the Basic Question: What are the Applicable Air and Water Quality Rules and Regulations? Who has Related Authority for Enforcement? Who the Responsibilities (Agenda Activity 62)

a. Relevant AEC Documents

(1) AECM 0524 - Standards for Radiation Protection

(2) AECM 0510 - Prevention, Control and Abatement of Air and Water Pollution

b. Miscellaneous Relevant Documents

State Air and Water Pollution Control Rules and Regulations

c. Participants

(1) ANL

(a) E. Graham, Manager, Health and Safety, ANL-West

(b) P. Stoddard, Waste Management Representative, Health and Safety Section

(c) D. O'Neil, Director, Industrial Hygiene and Safety Division

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

Basic authority and responsibility for implementing the air and water pollution control regulations for the site resides in the Site Manager, R. G. Staker, and project leaders. Responsibility for policy and administrative practices is retained by Mr. Staker and project leaders. Responsibility for reporting requirements and certain coordination-management functions for radioactive wastes and discharges is delegated to the H&S Section. Coordination and management control of nonradioactive wastes and discharges is shared between Plant Services (J. Auer) and H&S (E. Graham). Responsibility for management and control of wastes and discharges rests in project leaders in the degree that it relates to project budgets and operations. There is some documentation of H&S responsibilities in the new H&S manual presently in draft. There are plans for additions to this manual. "Waste Management" (Phil Stoddard) has direct responsibility for field

implementation and application in the areas of radioactive waste management, effluent control and environmental monitoring. He coordinates reporting on both radioactive and nonactive wastes and effluents. J. Auer, P.S. Supervisor, has responsibility for operation and control of nonradioactive effluents as related to operation of heating, power, air handling and water handling systems in the various facilities. Responsibility for implementation of air and water pollution controls appears to be centering in "Waste Management" within the H&S Section. Development of operations and procedures for air and water pollution control is developing satisfactorily.

15. Are There Any Proposed Regulations Which Will Require ANL Action? (Agenda Activity 63)

a. Relevant AEC Documents

AECM 0513 - Proposed

b. Miscellaneous Relevant Documents

State of Idaho Air Pollution Control Regulations, Appendix 4

c. Participants

(1) ANL

P. Stoddard, Waste Management Representative, Health and Safety Section

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

This item, as regards State regulations, is discussed in Activity Numbers 19 and 20, and portions of the State of Idaho's Air Pollution Control Regulations that may affect ANL-West are stated in the appendix referenced above (from ANL-Waste Management work sheets).

The proposed AECM 0513 on environmental monitoring and reporting was also discussed and a suggestion made for implementation in Activity Numbers 60 and 65.

16. Discuss Sources of Emissions, Quantity of Emissions, Controls, Measurements (Activity 66)

a. Relevant ANL Documents

(1) ANL Reports to ID

(2) ANL Waste Management Files

b. Relevant AEC Documents

(1) ID Appendix 0510 - Prevention, Control and Abatement of Air and Water Pollution

(2) AECM 0510 - Prevention, Control and Abatement of Air and Water Pollution

c. Participants

(1) ANL

(a) E. Graham, Manager, Health and Safety, ANL-West

(b) P. Stoddard, Waste Management Representative, Health and Safety Section

(c) J. Auer, Manager, Plant Services

(d) W. Persky, Supervisor, Plant Services

(e) D. O'Neil, Director, Industrial Hygiene and Safety Division

(2) AEC

J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

ANL has made studies of emission sources. Waste Management has done a fairly complete summarization of all emission sources as a basis for estimating effluent releases - even including things like the amount of soap and detergents routinely used. ANL-West has also begun heating plant stack effluent analysis. This should be continued in great enough degree to assure that furnaces are controlled and operated for minimum particulate, CO and NOx emissions. ANL has provided that routine attention be paid to effluent controls by assigning responsibility for

this area to a specific office, Waste Management, for what is estimated to be approximately one-half man year of effort. This is an excellent management move and shows promise for increasingly good control as knowledge and experience is gained.

17. Miscellaneous Items

a. Relevant ANL Documents

(1) "Safety Survey Report, ZPPR, AFSR, TREAT and Laboratory and Office Building", dated October 12-21, 1971

(2) Monthly Reports of the Health and Safety Section, January through November 1971

(3) Computer Printout of ANL-West Personnel Exposures

b. Survey Findings

(1) Organization Changes

The organization of the Health and Safety Section is discussed in the referenced survey report. Changes since that report have been made. Jesse A. Pagliaro has assumed the Radiation Safety Supervisor position under Earl Graham and Earl M. Cook now has responsibilities in the Argonne-West Model Site Program emphasizing environmental control systems. The Model Site Program is most worth-while and a fitting development to accompany breeder reactor development.

Phillip G. Stoddard as Waste Management Representative also assumes responsibility for effluent monitoring and reporting (AECM 0513) and some responsibility for air and water pollution control (AECM 0510). He prepares effluent monitoring and waste reports required by ID.

(2) Review and Analysis of H&S Monthly Reports

As an indicator of the sort of radioactivity work being done in which personnel exposures could take place, the January-November 1971 H&S monthly reports were reviewed and a trend seeking analysis was made on items summarized in numbers of events in the report. The following statistics resulted: (a number enclosed in parenthesis is used to indicate the number of reports in which such statistical summaries were mentioned. If the statistical number is large, the parenthetical number usually indicates the number of months represented by that statistical number since reporting was not always consistent).

EBR-II cover gas analyses - 1780 (11), item or special surveys (nonroutine) - 481 (11), radiographs - 6 (1), sodium samples - 136 (9), out of reactor fuel handling - 189 (10), RSCL operations - 4 (4), thimble liner transfers - 13 (3), control rod changes - 2 (1), FUM operations - 7 (4), sodium pump cleaning operation - 1 (6 week duration).

Transfers out of FEF air cell to basement, main floor or roof - 327 (11 months), surveys of items removed from controlled areas - 798 (11), cask surveys - 518 (11), manipulator changes from both argon and air cells - 104 (11), cask inserts surveyed - 12 (3), cell entries - 5 (3), personnel contamination incidents - 6 (2).

Additions to high level waste storage - 22 (6), whole body counts - 337 (7) (averages about one per year for the approximately 600 employees). One out of the ordinary notation was the finding Po 210 on a sodium pump from EBR-II. It was traced to activation of a seal containing bismuth.

Examination was made of reports of special or unusual incidents for inferences relating to adequacy of operating methods and procedures. One entry described a continuous air monitor which sounded the "evacuation" alarm. The cause was an improper procedure (correction made) in sweeping the floor in a red (toe rubber) area in the basement of FEF. Dry sweeping is occasionally done prior to wet mopping (to remove debris too large to be picked up with a wet mop). It is suggested that dry sweeping be eliminated entirely (except for operations under direct H.P. observation) and that the frequency of cleaning the red areas be increased to keep down background levels of contamination (see results of smear surveys of floors).

The review of the survey report files indicated a health physics program in good balance among air sampling, routine surveys with instruments, routine smear surveys and the nonroutine activities.

(3) Review and Analysis of Exposure Records

As an indicator of general exposure control, the personnel exposure records were also reviewed. This was prompted partly by noting an 800 mrem exposure from one FEF operation. The following data is hard evidence that such exposures are infrequent. Lifetime exposures over 10 rem - 8, lifetime exposures over 5 rem - 21, maximum lifetime exposure 21.8 rem, persons with measured lifetime neutron exposure 61.

18. Summary

The Health Protection Program at Argonne-West is a good program when compared to other similar facilities. However, there are areas that need particular attention. These areas have been pointed out through the health protection section and no recommendations have been made since the areas not conforming to present day standards have arisen for the most part from changing standards.

With the addition of personnel to the Health and Safety Group, it is expected that these areas of concern will be corrected in the near future.

D. ANL-West Industrial Safety and Fire Protection

1. Inspect Control Room and Discuss Control Room Evacuation Criteria (Agenda Activity 1)

a. Relevant ANL Documents

EBR-II Emergency Procedures and Plans

b. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

(3) AECM 0544 - Planning for Emergencies in AEC Operations

c. Participants

(1) ANL

(a) H. Lawroski, Superintendent of Operations, EBR-II

(b) G. Deegan, Operations Manager, EBR-II

(c) E. Graham, Manager, Health and Safety, ANL-West

(d) W. Wilson, Fire Protection Engineer

(e) R. Matlock, Associate Manager, Analysis and Test Section, EBR-II

(f) F. Pancner, Superintendent, Fire Protection Department

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(c) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(d) J. T. O'Connor, Site Representative, RDT-ANL-West

(e) J. F. Smith, Jr., Chief, Operations Support Branch, RDT-HQ

d. Survey Findings

The EBR-II Emergency Director is responsible for training and evacuation procedures. The procedures are updated at three months intervals, and operating crews are trained in these procedures at that time. The evacuation plan is posted in the control room. All reactor operating personnel are trained in scramming the reactor from locations outside the control room.

The NRTS fire department carries portable smoke ejectors on its fire truck which would be used to remove smoke from the control room. A ventilation system can also be used to minimize smoke damage to monitoring equipment. The methods of operating the air exhaust system for venting smoke will be evaluated by the EBR-II Group and incorporated into the emergency plans if feasible.

The control room is not separated by a standard one-hour fire partition from the turbine area and office area to eliminate fire spread into the control room. The UBC and AECM 0552 require a one-hour separation to minimize interruption to EBR-II operations in the event of an exposing fire. This includes sealing floor openings, installing one-hour fire doors, protecting the exposed steel columns with a one-hour fire resistive coating, reducing window openings and installing one-hour fire shutters, and installing one-hour fire dampers in ducts where they penetrate the room enclosure. This protection is recommended, and will be evaluated and provided as part of Agreement and Commitment No. 1. The evaluation will be completed by March 18, 1972.

been provided on the RSCL fire control panels to pinpoint the location of a sodium leak and permit activating the Met-L-X system into the specific location of the leak. Two of the leak lights on the main RSCL control panel were not yet identified. (Reference Agenda Activity 13)

Recent smoke abatement tests have indicated the graded media filter is effective in filtering sodium smoke. This type of filter is installed on the RSCL exhaust system and is considered adequate. The overall evaluation of EBR-II will include consideration of upgrading the PPC and ICC exhaust systems accordingly unless the PPC and ICC are inerted instead.

The exits from the Reactor Building are not visible from all areas of the main floor. Exit signs should be provided in accordance with the new Occupational Safety and Health Act (OSHA) standards. Rotating parts on machinery are only partially guarded. Total guarding is also required by OSHA standards. These improvements are recommended and a progress report for compliance will be furnished by March 18, 1972, as part of Agreement and Commitment No. 9.

2. Inspection of EBR-II Reactor Building (Agenda Activity 2)

a. Relevant ANL Documents

(1) EBR-II Emergency Procedures and Plans

(2) Ltr. H. V. Ross to C. C. McSwain, dated January 5, 1972, Evaluation of Fire Protection at EBR-II

(3) Ltr. L. R. Monson to Distribution, dated November 29, 1971, Smoke Detector Tests with Copy of Report on Sodium Fire Smoke Abatement Tests at EBR-II, dated November 1972

b. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

c. Participants

(1) ANL

(a) W. Perry, Operations Engineer, EBR-II

(b) W. Wilson, Fire Protection Engineer

(c) F. Pancner, Superintendent, Fire Protection Department

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(e) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

d. Survey Findings

The Met-L-X fire extinguishing system has been upgraded in the Primary Purification Cell (PPC), and extended into the Instrument Control Center No. 3 (ICC). A similar system is installed in the newly built Radioactive Sodium Chemistry Loop (RSCL). Smoke detectors and sodium leak detectors are monitored, and the Met-L-X systems are controlled from the Reactor Building and the Power Plant. Alarm indicators have

3. Inspection of EBR-II Power Plant (Agenda Activity 3)

a. Relevant ANL Documents

(1) EBR-II Emergency Procedures and Plans

(2) Ltr. H. V. Ross to C. C. McSwain, dated January 5, 1972, Evaluation of Fire Protection at EBR-II

b. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

c. Participants

(1) ANL

(a) W. Perry, Operations Engineer, EBR-II

(b) W. Wilson, Fire Protection Engineer

(c) F. Pancner, Superintendent, Fire Protection Department

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(e) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

d. Survey Findings

The Data Acquisition System (DAS) computer room is enclosed by a one-hour fire wall except for unprotected steel columns on the turbine area side and two ordinary metal doors. Underwriters' Laboratories (UL) labeled one-hour fire doors and fire resistive coating on exposed steel are required. In addition, the cable routing room should be enclosed by a one-hour fire wall and cable penetration openings in walls, floor, and ceiling should be sealed with smoke-tight noncombustible materials. This protection will be evaluated and provided as part of Agreement and Commitment No. 1. The evaluation will be completed by March 18, 1972.

There are three manholes covered by steel grate covers for the cable tunnel which would permit smoke spread into the first floor area of the Power Plant. There should be solid covers available at each of the man-holes for emergency use.

A non-standard method was being used to hold open the boiler room fire door. Fire doors should be maintained automatic closing at all times. An excessive quantity of combustibles was being stored in the Maintenance Materials Holding Area on the first floor of the Power Plant. By Agreement and Commitment No. 16, ANL will comply by improving housekeeping and assure combustibles are maintained at a minimum.

A number of partially guarded belt and pulley systems will require total guarding in accordance with OSHA standards. By Agreement and Commitment No. 9, ANL will furnish a progress report for compliance by March 18, 1972.

4. Inspection of EBR-II Sodium Boiler Building (Agenda Activity 4)

a. Relevant ANL Documents

(1) EBR-II Emergency Procedures and Plans

(2) Ltr. H. V. Ross to C. C. McSwain, dated January 5, 1972, Evaluation of Fire Protection at EBR-II

(3) Ltr. L. R. Monson to Distribution, dated November 29, 1971, Smoke Detector Tests with Copy of Report on Sodium Fire Smoke Abatement Tests at EBR-II, dated November 1972

b. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

c. Participants

(1) ANL

(a) W. Perry, Operations Engineer, EBR-II

(b) W. Wilson, Fire Protection Engineer

(c) F. Pancner, Superintendent, Fire Protection Department

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(e) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

d. Survey Findings

Emergency exits are being planned for the upper levels of the Sodium Boiler Building. Additional smoke detectors will also be installed in the building to provide more complete coverage. Plans to upgrade the Met-L-X system in the building have been deferred pending results of current tests being performed by HEDL. Since the existing supply is located in

the building and subject to fire damage, plans are to move the supply into a separate shelter outside the building.

An open air duct in the Sodium Boiler Building Control Room floor would permit smoke spread in the event of a fire in the sodium storage tank located in the area below. A standard smoke damper would minimize the damage. This should be evaluated as part of Agreement and Commitment No. 1. The evaluation with recommendations will be provided by March 18, 1972.

A tractor-backhoe was parked outside the Sodium Boiler Building without roll-over protection. This protection is recommended to comply with EM 385-1-1 Corps of Engineers Safety Manual, and will be completed by March 1, 1972, in accordance with Agreement and Commitment No. 7.

5. Inspection of FEF (Agenda Activity 5)

a. Relevant ANL Documents

FEF Emergency Procedures and Plans

b. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

c. Participants

(1) ANL

(a) D. Hampson, Operations Manager, Procedures, FEF

(b) W. Wilson, Fire Protection Engineer

(c) F. Pancner, Superintendent, Fire Protection Department

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(e) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

d. Survey Findings

Only one room in the FEF is protected by a fire protection system. The importance and loss potential of this facility warrants built-in fire protection in accordance with AECM 0552. By Agreement and Commitment No. 2, ANL will evaluate the fire protection needs of the FEF and provide a report with recommendations by March 18, 1972.

Housekeeping in the basement of the FEF needs improvement by providing metal cabinets for necessary health physics supplies and using metal secondary containers for dry active waste. By Agreement and Commitment No. 16, housekeeping will be improved and metal cabinets and containers will be used for combustibles.

Total guards on rotating parts of machinery and standard air nozzles are recommended in accordance with OSHA standards. By Agreement and Commitment No. 9, a progress report will be furnished by March 18, 1972, on plans to comply.

6. Inspection of Fuel Assembly and Storage Building (FAS) (Agenda Activity 6)

a. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

(3) AEC Plutonium Storage Criteria

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Pancner, Superintendent, Fire Protection Department

(c) D. O'Neil, Director, Industrial Hygiene and Safety Division

(d) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

This building is a new fire resistive structure protected by a smoke detection system. The building contains a nuclear materials storage vault and assembly work areas. Equipment is in the process of being installed in the work areas. Rotating parts on ventilation equipment are partially guarded. The slope of the stairs to the fan room is excessive. These need to be brought into conformance with OSHA standards. By Agreement and Commitment No. 9, a progress report will be furnished by March 18, 1972, on plans to comply.

The storage vault is not yet equipped for storage of fuel. ANL is in the process of evaluating improvements needed for all its plutonium storage vaults. The status of this evaluation is reported in Section D24 (Agenda Activity 54) of this report.

7. Inspection of HFEF (Agenda Activity 7)

a. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

b. Participants

(1) ANL

(a) N. Swanson, Supervisor, HFEF Construction

(b) W. Wilson, Fire Protection Engineer

(c) F. Pancner, Superintendent, Fire Protection Department

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(e) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

Construction of the hot cells in the HFEF is nearing completion. Fire protection consists of heat and smoke detectors throughout the building, Halon-1301 in hot cells, and an automatic sprinkler system in the argon cooling and emergency generator room. The exit sign over the east stair door in the high bay area is partially blocked by an adjacent structural column. This should be made visible from the center of the building. Sharp corners were noted on duct work in the exhaust equipment room on the second floor and need to be removed or guarded to eliminate the personnel hazard. Kickplates are needed around guard rail posts at hatchway openings and guard rails or gates are needed at entrances to pit areas in the basement. Fire doors were temporarily blocked open and should be kept free to close automatically. Fire equipment was blocked by temporary storage on the first floor. Recommendations are made to correct these deficiencies in accordance with OSHA standards. By Agreement and Commitment No. 9, a progress report will be furnished by March 18, 1972, on plans to comply.

8. Inspection of ITF and RHTF (Agenda Activity 8)

a. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Pancner, Superintendent, Fire Protection Department

(c) D. O'Neil, Director, Industrial Hygiene and Safety Division

(d) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

Housekeeping was good in both of these facilities. Fire protection systems are well maintained. There was an air compressor with only a partial guard in the RHTF. Complete guarding is required by OSHA standards. By Agreement and Commitment No. 9, a progress report will be furnished by March 18, 1972, on plans to comply.

9. Inspection of Laboratory and Service Building (Agenda Activity 9)

a. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

(3) AEC Plutonium Storage Criteria

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Pancner, Superintendent, Fire Protection Department

(c) D. O'Neil, Director, Industrial Hygiene and Safety Division

(d) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

A sprinkler system has been installed throughout the basement of this building. A serious loss potential exists in the computer room located in the basement since only a smoke detection system is now installed in this room. A recommendation is made in this report to install an automatic extinguishing system as required by NFPA Standard 75 and provide metal storage cabinets for cards now stored in the open area. By Agreement and Commitment No. 3, ANL will request funds and approval for installation by February 1, 1972.

Only partial guarding is provided on rotating parts of most machinery. Total guarding is required by OSHA standards. By Agreement and Commitment No. 9, a progress report will be furnished by March 18, 1972, on plans to comply.

The nuclear materials storage vaults on the first floor are not equipped with built-in fire protection. An overall evaluation of Plutonium Storage Criteria is in process by the Laboratory. A recommendation is made in this report to complete the evaluation and to move materials stored in the temporary vault in the basement to a standard vault as soon as possible. By Agreement and Commitment No. 8, ANL will furnish date on completing the evaluation by February 1, 1972.

10. Inspection of Warehouse and Plant Services (Agenda Activity 10)

a. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Pancner, Superintendent, Fire Protection Department

(c) D. O'Neil, Director, Industrial Hygiene and Safety Division

(d) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

Housekeeping was good in these areas. Exit signs are installed in most areas of the Warehouse. An additional exit sign is needed on the mezzanine exit. Exit signs are also needed throughout the Plant Services Building in accordance with OSHA standards. Guards and non-kickback devices are needed on two rip saws in the carpenter shop in accordance with OSHA standards. A recommendation is made to meet OSHA requirements. By Agreement and Commitment No. 9, a progress report will be furnished by March 18, 1972, on plans to comply.

11. Inspection of Machine Shop (Agenda Activity 11)

a. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

b. Participants

(1) ANL

(a) D. Wall, Shop Foreman, ANL-West

(b) W. Wilson, Fire Protection Engineer

(c) F. Pancner, Superintendent, Fire Protection Department

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(e) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

Housekeeping was good. Standard guards are installed on all metal-working machines. OSHA approved air nozzles have been installed on all air lines used for cleaning parts. Ventilation for welding operations appears adequate. The eye protection program in the area is effective.

12. Inspection of ZPPR (Agenda Activity 12)

a. Relevant ANL Documents

ZPPR Emergency Procedures and Plans

b. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

(3) AEC Plutonium Storage Criteria

c. Participants

(1) ANL

(a) F. Thalgott, Deputy Director, Applied Physics Division

(b) J. Young, Reactor Manager, ZPPR

(c) F. Pancner, Superintendent, Fire Protection Department

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(e) W. Wilson, Fire Protection Engineer

(f) F. Sommers, Safety Inspector

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) J. H. Pingel, Health Physicist, SD-CH

d. Survey Findings

Housekeeping was good throughout the building. Plans are to install a Halon-1301 extinguishing system in the computer area.

The basement storage area has been used for assembling equipment and other work. Since there is only one exit from the area, an additional exit would be required if

this work was continued. By Agreement and Commitment No. 4, the area will not be used as a workshop. By Agreement and Commitment No. 9, a progress report will be furnished by March 18, 1972, on plans to complete total guarding of rotating parts on machinery in accordance with OSHA standards.

The plutonium storage vault appears adequately designed and protected to meet AEC's Plutonium Storage Criteria. By Agreement and Commitment No. 8, ANL will furnish a date by February 1, 1972, to complete the evaluation to assure compliance with this criteria.

13. Inspection of TREAT (Agenda Activity 13)

a. Relevant ANL Documents

TREAT Emergency Procedures and Plans

b. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

c. Participants

(1) ANL

(a) J. Boland, Manager, TREAT Facility

(b) W. Wilson, Fire Protection Engineer

(c) F. Pancner, Superintendent, Fire Protection Department

(d) D. O'Neil, Director, Industrial Hygiene and Safety Division

(e) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

d. Survey Findings

There is insufficient water for fire fighting at the TREAT Reactor Building and no fire hydrant at the TREAT Control Building. A minimum of 500 gpm is required by "improved risk" standards. The existing four-inch water main can only provide 170 gpm flowing at 14 psi residual pressure. New Recommendation No. 5 is amended to include an improved water supply for TREAT to meet "improved risk" standards.

The metal clad wood frame instrument maintenance trailer attached to the TREAT Reactor Building creates a serious fire exposure to the Reactor Building. The trailer should be relocated a minimum of twenty-five feet away from the Reactor Building or a one hour fire wall installed between the trailer and the Reactor Building, or an automatic sprinkler system installed in the trailer and above the trailer for exposure protection. A smoke detection system

14. Inspection of Site Water System and Fire Pump (Agenda Activity 14)

a. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) AECM Appendix 0550 - Operational Safety Standards

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Pancner, Superintendent, Fire Protection Department

(c) D. O'Neil, Director, Industrial Hygiene and Safety Division

(d) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

The fire pumps, fire hydrants, and control valves are well maintained. Fire pumps are tested weekly. Water supplies are reliable, and water flow tests indicate a minimum of 1,500 gpm is available for fire fighting at any hydrant in the EBR-II area. There is only 170 gpm at 14 psi residual pressure available from the hydrant at the TREAT Reactor Building and there is no hydrant at the TREAT Control Room. New Recommendation No. 5 is amended to include an improved water supply for TREAT to meet "improved risk" standards and a standard fire hydrant at the TREAT Control Building. Details on the site water system are covered in Section D21 (Agenda Activity 50).

15. Discuss Responsibilities, Authorities, and Communication With All Individuals Interviewed and Discuss Safety Organization and Responsibilities (Agenda Activities 28 and 53)

a. Relevant ANL Documents

Idaho Emergency Handbook

b. Relevant AEC Documents

(1) AECM-0504 - Operational Safety Program Appraisals

(2) AECM-0505 - Construction Safety Program

(3) AECM Appendix 0550 - Operational Safety Standards

(4) AECM Appendix 0552 - Industrial Fire Protection

(5) AECM-0544 - Planning for Emergencies in AEC Operations

c. Participants

(1) ANL

(a) R. Staker, Associate Director, ANL; ANL-West Site Manager

(b) E. Graham, Manager, Health and Safety, ANL-West

(c) F. Sommers, Safety Inspector

(d) W. Wilson, Fire Protection Engineer

(e) D. O'Neil, Director, Industrial Hygiene and Safety

(f) F. Pancner, Superintendent, Fire Protection Department

(g) G. Deegan, Operations Manager, EBR-II

(h) F. Thalgott, Deputy Director, Applied Physics Division

(i) R. Curl, Special Materials Representative, ANL-West

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) T. Asbury, Fire Protection Engineer, ID

d. Survey Findings

Section I of the ANL Idaho Emergency Handbook and the Organization Chart in Appendix 3 of this report provide a complete flow chart of safety responsibilities and authority. The Associate Laboratory Director of Engineering, Research, and Development is responsible for the EBR-II and ZPPR-AFSR, and the Assistant Laboratory Director, Idaho Site Manager is responsible for TREAT and other areas.

The Health and Safety Manager is directly responsible to the Assistant Laboratory Director. ANL-West personnel responsible at the scene of emergencies are listed in the Emergency Handbook. The Health and Safety Section covers industrial safety, fire protection, industrial hygiene, and radiation safety. The safety inspector is responsible for advising on matters of industrial accident prevention, conducting surveys and initiating recommendations for the elimination of hazards, analyzing accident causes, testing and licensing operators of lift trucks and cranes, maintaining and issuing safety statistics, conducting safety training, assisting in the activities of various safety committees, and reviewing plans, specifications, work permits, hazardous operations, etc., to insure that operational safety requirements are met. Industrial Safety assistance is obtained from the Industrial Safety Engineering Section at the Illinois Site and AEC when needed.

The Fire Protection Engineer reports to the Health and Safety Manager. Fire protection assistance is obtained from the Fire Protection Department at the Illinois Site and AEC when appropriate.

The Fire Protection Engineer is responsible for fire control training for emergency personnel, investigating fires, coordinating fire equipment inspections and tests, recommending fire safety improvements where needed, reviewing work permits and plans for new facilities and modifications to existing facilities, and assuring AEC fire protection requirements are followed.

Communications between the ANL-West safety staff and ANL-East safety staff has generally been good. Communications between operating groups and the ANL-West safety staff is considered effective based on discussions during the survey.

16. Review of ANL Records Identified at Time of Survey (Agenda Activity 33)

a. Relevant ANL Documents

(1) Fire Equipment Inspection Records

(2) Accident Reports Including Fire and Property Damage Reports

(3) Safety Training Records

b. Relevant AEC Documents

(1) AECM Appendix 0550 - Operational Safety Standards

(2) AECM-0502 and CH Supplement, Notification, Investigation and Reporting of Occurrences

c. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Sommers, Safety Inspector

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) Lt. S. Henicksman, AEC Fire Department

d. Survey Findings

The fire equipment inspection records and safety training records were found properly documented. The information contained in the documents is useful in evaluating the efforts and adequacies of these programs. Additional effort is needed to complete hydrostatic tests of pressurized fire extinguishers. By agreement and commitment no. 9, a progress report and plan for compliance with OSHA Standards will be furnished by March 18, 1972. Continued effort is also needed to assure all employees are included in safety training program periodically. Future plans appear adequate to assure these efforts will be made.

17. Discuss Safety Training and Fire Control Training (Agenda Activity 45)

a. Relevant AEC Documents

(1) AECM-0504 - Operational Safety Program Appraisals

(2) AECM Appendix 0552 - Industrial Fire Protection

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

Training of employees in safety is as follows:

1. New employees receive about an hour indoctrination covering the Laboratory's industrial safety and fire protection programs and about one and one-half hours lecture on industrial hygiene and radiation safety. They also receive indoctrination in the use of fire protection equipment and in fire prevention techniques. Good training aids are used. They receive six weeks of work orientation from their supervisors which includes safety briefings on hazards associated with their specific work.

2. Supervisors have studied the National Safety Council's "Supervisors Safety Manual" and have been tested on the material. They are provided with safety literature and posters for their areas.

3. Drivers of government vehicles must pass a written examination on the rules of the road before receiving a government drivers license. Drivers of evacuation buses and heavy equipment must also pass an operational road test. Vehicle safety is discussed at general safety meetings.

4. Machinery operators are checked on their performance by their supervisor. Permits are issued for operating special equipment such as cranes and lift trucks following certification that they are qualified by their supervisor.

5. Special service representatives and industrial safety, radiation safety, and fire department personnel receive first aid training as part of the NRTS training program. Training of employees in fire prevention and control and emergency procedures varies according to the needs of each operating group. The EBR-II Training Group under the direction of the Emergency Director provides emergency training to operating crews at least every three months.

6. General training is received by all employees in emergency evacuation during periodic drills and in the use of fire extinguishers at least annually. Films on special hazards are shown to various groups routinely. Emergency personnel receive special training in assisting the Fire Department in fire control and the proper use of self-contained breathing apparatus.

Overall safety training has been effective and should be continued on a regular basis.

18. Discuss Program to Meet OSHA Standards (Agenda Activity 46)

a. Relevant AEC Documents

OSHA Standards

b. Participants

(1) ANL

(a) R. Staker, Associate Director, ANL; ANL-West

(b) E. Graham, Manager, Health and Safety, ANL-West

(c) F. Sommers, Safety Inspector

(d) W. Wilson, Fire Protection Engineer

(e) F. Pancner, Superintendent, Fire Protection Department

(f) D. O'Neil, Director, Industrial Hygiene and Safety

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

The Supervisor of the Safety Engineering Section, ANL-East, has conducted presentations on the applicability of OSHA standards to its facilities for all management personnel at ANL-West. Work orders have been prepared for correcting most deficiencies, and good progress has been made in installing OSHA approved air cleaning nozzles in shops and complete guards on rotating parts of machinery in some areas. A recommendation is made in the report to take immediate steps to bring all areas into compliance with the OSHA standards. By agreement and commitment no. 9, ANL will furnish a progress report and plan for future compliance.

19. Discuss Fire, Injury, and Vehicle Accident Experience (Agenda Activity 47)

a. Relevant ANL Documents

Accident Reports Including Fire and Property Damage Reports

b. Relevant AEC Documents

AECM 0502 and CH Supplement - Notification, Investigation and Reporting of Occurrences

c. Participants

(1) ANL

(a) F. Sommers, Safety Inspector

(b) W. Wilson, Fire Protection Engineer

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

d. Survey Findings

The Laboratory participates in the AEC, Idaho State, and National Safety Council safety award programs and have earned many awards for its performance. The experience at ANL-West has been exceptionally good. The Laboratory consolidates its experience at both of its sites into a single report submitted to the AEC. The injury experience and vehicle accident experience for ANL-West compares favorably with AEC's overall experience.

20. Review Fire Department Services and Fire Fighting Capability at the EBR-II and Discuss Emergency Procedures to Control Fires, Provide Medical Treatment, Including Adequacy of Communications, Alarms, Manpower, and Equipment (Agenda Activities 48 and 49)

a. Relevant ANL Documents

(1) Idaho Emergency Handbook

(2) Ltr., Staker to D. E. Ericson, dtd. January 10, 1972

(3) Ltr., Staker to AEC Fire Department, dtd. November 5, 1971

b. Relevant AEC Documents

(1) Ltr., Ginkel to Staker, dtd. August 2, 1971, Fire Department Operating Philosophy

(2) AECM Appendix 0552 - Industrial Fire Protection

(3) NFPA Standards Nos. 4, 4A, 7, and 8, Fire Department Organization

c. Participants

(1) ANL

(a) R. Staker, Associate Director, ANL; ANL-West Site Manager

(b) W. Wilson, Fire Protection Engineer

(c) E. Graham, Manager, Health and Safety, ANL-West

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) R. M. Moser, Director, Safety Division, CH

(c) Lt. S. Henicksman, AEC Fire Department

(d) T. Asbury, Fire Protection Engineer, ID

d. Survey Findings

The AEC NRTS Fire Department has a good paid organization with one of three stations located at ANL-West. Four men are normally on duty at all times at the ANL-West station. The equipment in the station consists of a 750 gpm triple combination pumper and an ambulance. The pumper will soon be replaced by a more reliable 750 gpm triple combination pumper with a 400 gallon water supply. Response time to fires is less than a minute, except it would take about two minutes for travel to the TREAT Facility. Fires are reported by telephones, manual alarm boxes, and/or automatic fire detection or water flow alarms. The Central Facility fire station also receives a simultaneous alarm from the ANL-West station and responds automatically with a 750 gpm combination pumper-ladder truck and a high expansion foam truck. Running time of the central facility apparatus is about 20 minutes during favorable weather. Fire Department vehicles are equipped with two-way radios and, in the event more equipment is needed, the Officer in charge of the ANL-West station could radio the other drivers.

The Fire Department utilizes the ANL Idaho Emergency Handbook as a reference for emergency procedures, plans, special fire protection features, responsible personnel, and special hazards for specific areas. In addition to the Handbook, written instructions have been given to the Fire Department restricting immediate access to the nuclear materials storage vaults and the EBR-II Reactor Building, and restricting the use of water in sodium and nuclear material areas. Signs have recently been posted on the storage vaults in the Laboratory and Service Building permitting the use of water if dry extinguishing agents are not effective. Although the Fire Department has never been prevented from taking appropriate measures to control a fire, recent instructions may cause an unnecessary delay to obtain permission from the "authorizing official" to enter a facility. These instructions will be revised to permit responsible personnel on site to act as "authorizing official" for all facilities as described in the ANL Idaho Emergency Handbook. A recommendation was made accordingly, and by Agreement and Commitment No. 10, ANL will revise these instructions before February 1, 1972, to remove any misunderstanding created by the recent instructions.

The Idaho Operations Office has recently clarified its "total commitment" philosophy in the event of a serious emergency at the NRTS. Although there are approximately 100 fire alarms each year at the NRTS, there has never been an emergency outside of ANL-West requiring the participation of the firemen and equipment stationed at ANL-West. It is understood that the ANL-West station would not be dispatched to other areas except in the event of a major crisis, based on the expert judgment of the Fire Chief or his designated officer. This understanding was resolved in discussions with W. Asbury, Fire Protection Engineer, Idaho Operations Office, and the officer in charge of the ANL-West station.

There are approximately 36 emergency personnel who have received training in combatting fires pending the arrival of the on-site Fire Department. Special service representatives and maintenance men assist during fire emergencies as needed.

An automatic (pre-action) deluge sprinkler system is installed throughout the cooling tower. Automatic sprinklers are installed in the Plant Services Building, the Warehouse, Fuel Examination Facility (FEF) truck lock and temporary lunchroom, most of the Laboratory and Service Building, the ZPPR support wing basement, and part of HFEF. A manually-operated water spray system is installed in the turbine-generator lubricating oil areas of the Power Plant. The operating valves are located outside the building. Manually operated Met-L-X fire extinguishing systems for sodium fires are installed in parts of the Sodium Boiler Building and EBR-II Reactor Building. There is a convenient means of applying conventional foam into the large above-ground fuel oil tank as a fire control measure.

Automatic heat and smoke detectors are installed in most buildings where needed. Recommendations are made to install appropriate fire protection systems in computer rooms, the FEF, and the TREAT Control Building and equipment trailer.

Manual fire alarm boxes are well distributed in buildings. All alarms register in the fire station and transmit a coded signal throughout the facility. The Central Fire Department alarm office receives all fire alarms for ANL-West. A separate evacuation alarm system is provided. An "Auto-Call" paging system is provided in all buildings. Independent evacuation alarms are provided in the Reactor

Facilities, the Fuel Cycle Facility, and the Laboratory and Service Building. Alarms are tested monthly by Fire Department personnel.

Progress has been made in standardizing fire protection equipment, alarms, and maintenance procedures. Plans are to utilize a standard fire alarm monitoring system at the fire station for all fire protection systems. NFPA standards are followed in the installation of all fire protection equipment.

The ANL-Idaho Emergency Handbook contains emergency procedures and plans of each major area. The Handbook is updated periodically. It covers specific actions to be taken by emergency groups and building emergency supervisors. Individual building and site alarms and a public address system are used for evacuating buildings in the event of a Site-wide emergency. A Site-wide emergency drill is staged periodically.

A nurse is on duty at ANL-West, and two doctors and a nurse are on duty at the NRTS Central Facilities to assist in medical treatment during normal working hours. In the event of a serious injury after normal working hours, the injured person would be taken to a hospital in Idaho Falls by a Fire Department ambulance where previous arrangements for admittance have been made. If the injury involved radiation, an NRTS doctor would also go to the hospital to assist in treatment of the injured. The Safety Inspector receives reports of all first-aid cases. Workman's Compensation is administered by the Personnel Department.

21. Discuss Evaluations on Water Supplies; Review Safety and Fire Equipment Inspection Practices and Records; Construction and Modification Reveiw Practices; Work Permit System (Agenda Activity 50)

a. Relevant ANL Documents

Fire Equipment Inspection Records

b. Relevant AEC Documents

AECM Appendix 0550 - Operational Safety Standards

c. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Sommers, Safety Inspector

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) Lt. S. Henicksman, AEC Fire Department

d. Survey Findings

Water for domestic, process, and fire protection uses is from two 900 gpm electric-driven deep well pumps. Normally one pump operates automatically and the other is on standby. Water is pumped into a 200,000 gallon above-ground steel storage tank which is filled automatically by float control when the level drops to about 113,000 gallons. The storage tank is heated to prevent freezing. The pump house at the storage tank contains three 500 gpm, 100 psi, electric-driven centrifugal pumps for normal use, and a 1,000 gpm, 100 psi, automatic diesel-driven centrifugal fire pump for emergency use. Normally one of the 500 gpm pumps is operating at 115 psi. If the pressure drops to 87 psi, the second pump kicks in automatically and if it drops to 72 psi, the 1,000 gpm fire pump operates automatically. The third 500 gpm pump is on manual control and would be started if needed. Total pumping capacity to the water main system is, therefore, 2,500 gpm at 100 psi. Fire mains are on a looped system of 8 to 12-inch mains with a single 4-inch main serving the TREAT Facility. Sectional control is good, and standard fire hydrants are

well distributed. The water supply from the deep wells is reliable, and the water system is considered good, except for TREAT. Water flow tests are made annually. The last flow test in the main area indicated a minimum flow of 1,502 gpm at 100 psi residual pressure. Static pressure was 134 psi in the main area and 116 psi at TREAT. Two 500 gpm and the 1,000 gpm pumps were operating, and domestic and process demands on the water supply system were normal.

There is an additional 197,000 gallons of water available from the basin of the EBR-II cooling tower. Fire apparatus can be connected to the dry hydrant and suction line to draft water from the basin.

The alarms on fire protection systems are tested monthly by the Fire Department. Portable fire extinguishers are inspected monthly by firemen and are serviced in accordance with NFPA requirements. Records are well maintained on these services. Additional effort is needed to complete hydrostatic tests of pressurized extinguishers. By Agreement and Commitment No. 9, a progress report will be furnished by March 18, 1972, on plans to complete these tests.

Fire Department personnel check all buildings at the end of the normal work day for fire prevention purposes and to assure familiarity with changes on a day-to-day basis. The Fire Protection Engineer makes weekly inspections of all areas and takes appropriate action to correct any deficiencies that are noted during his inspection.

The Laboratory has published guidelines for its operations which include special safety requirements in its "Laboratory Policy and Practice Guide." Modifications to these guidelines are sometimes made to insure maximum usefulness to the organization at ANL-West.

The Health and Safety Section recommends safety appliances, protective equipment, and work clothing meeting AEC standards for use at ANL-West. The type of equipment used is based on evaluations and comparisons and advice of other safety engineers at ANL-East.

The Safety Inspector assists scientific, technical, and service personnel in safety problems relating to processes, equipment, and materials. He also assists scientific personnel in developing safety standards and operating procedures, and in analyzing special problems peculiar to research work.

The safety inspector inspects and approves all new personnel safety equipment before it is permitted to be used. Breathing apparatus is inspected monthly by the Health and Safety Section. Emergency showers are tested annually. Electrical grounding, lighting, and exits are maintained by maintenance groups and are checked weekly. Safety inspections are conducted in all areas at least weekly and in important areas almost daily by the Safety Inspector. The EBR-II Safety Committee inspects different parts of their facility weekly.

Work permits are required for non-routine repairs and work considered hazardous in nature. The supervisor of the operation and appropriate safety personnel must review and approve the proposed activity.

All employees receive pre-employment and periodic medical examinations. Their supervisor and the Safety Inspector are informed of any physical and/or work restrictions that apply for each individual.

22. Discuss Overall Fire Protection at EBR-II Facility and Compliance with AECM-0552, Improved Risk Criteria (Agenda Activities 51 and 68)

a. Relevant ANL Documents

Ltr. H. V. Ross to C. C. McSwain, dated January 5, 1972, Evaluation of Fire Protection at EBR-II

b. Relevant AEC Documents

(1) Ltr., Kosiba to EBR-II Project Director, dated May 27, 1971, containing agreements and commitments at April 28, 1971, review meeting

(2) AECM Appendix 0552 - Industrial Fire Protection

(3) AECM Appendix 0550 - Operational Safety Standards

c. Participants

(1) ANL

(a) R. Laney, Associate Director for Engineering Research and Development

(b) H. Lawroski, Superintendent of Operations, EBR-II

(c) M. Levenson, Project Director, EBR-II

(d) W. Wilson, Fire Protection Engineer

(e) F. Pancner, Superintendent, Fire Protection Department

(2) AEC

(a) R. M. Moser, Director, Safety Division, CH

(b) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(c) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(d) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

d. Survey Findings

As a result of the EBR-II fire safety review meeting held on April 28, 1971, ANL agreed to consider the overall EBR-II Plant for fire safety improvements and the best methods of controlling the potential loss by fire. Mr. McSwain's letter to Dr. Duffield, dated November 16, 1971, provided additional guidance on what the evaluation should consist of and requesting recommendations for installing the best available fire protection systems. ANL responded with a letter on January 5, 1972, indicating an ad hoc committee made up of well qualified members of different parts of the Laboratory will be appointed to perform the evaluation. Expert consultants from outside the Laboratory will be considered if needed. By agreement and commitment no. 1, the above evaluation will be completed by March 18, 1972. Following completion of the evaluation, all requirements of AECM Appendix 0552 and Appendix 6301, Part I-H will be met or funds or exceptions requested.

23. Discuss Vehicle Licensing Requirements and Crane Operating (Agenda Activity 52)

a. Relevant AEC Documents

(1) AECM-0553 - Operators of Federal Motor Vehicles

(2) American National Standards Institute Standard B 30.2

b. Participants

(1) ANL

F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

About 12 Government vehicles are assigned to the ANL-West Facilities. They are maintained by another NRTS contractor, and operators are licensed and tested by representatives of the Idaho Operations Office. Maintenance and vehicle licensing practices conform with AEC requirements.

Maintenance personnel conduct scheduled preventive maintenance inspections of all plant equipment including hoisting equipment. Cranes, hoists, boilers, and pressure vessels are inspected annually by an outside professional specialist in accordance with ANSI and ASME Standards. The safety inspector accompanies him and receives a copy of the inspection report and follows up the inspection findings to assure corrective action.

24. Discuss Nuclear Materials Storage Fire Protection (Agenda Activity 54)

a. Relevant AEC Documents

(1) AEC Plutonium Storage Criteria

(2) AECM Appendix 0552 - Industrial Fire Protection

b. Participants

(1) ANL

(a) F. Thalgott, Deputy Director, Applied Physics Division

(b) R. Curl, Special Materials Representative, ANL-West

(c) W. Wilson, Fire Protection Engineer

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) J. H. Pingel, Health Physicist, SD-CH

c. Survey Findings

A Laboratory-wide evaluation of plutonium storage facilities is in progress. A. Shuck, ANL Coordinator for this evaluation, is well experienced in the design of plutonium fabrication facilities and is utilizing the ANL-East fire protection staff in assuring compliance with fire protection requirements of the Plutonium Storage Criteria. The fire protection systems in the ZPPR and FAS storage vaults appear adequate to meet the fire protection requirements, but improvements are needed in early fire detection for the storage vaults on the first floor in the Laboratory and Service Building. A recommendation is made in the report to complete the evaluation and installation of fire protection as required by the 1971 Plutonium Storage Criteria. By agreement and commitment no. 8, ANL will furnish a date by February 1, 1972, when the evaluation will be completed.

25. Discuss Laboratory Safety Policies and Publications (Agenda Activity 55)

a. Relevant AEC Documents

(1) AECM-0504 and Appendix - Operational Safety Program Appraisals

(2) AECM 0550 and Appendix - Operational Safety Standards

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

AEC safety and accident prevention policies as contained in the AEC Manuals are properly implemented at ANL-West. NRTS health and safety policies are also followed as a guide. The Laboratory cooperates with the Idaho Operations Office in special accident reporting, vehicle licensing, health services, and Site-wide emergency planning programs at NRTS. Operational safety standards contained in AECM Appendix 0550 are followed.

It is the policy of the Laboratory that the least hazardous solvents be used and only minimal quantities be stored within laboratories. Approved safety containers are used for flammable liquids. Bulk storage of flammables, compressed gases, and other hazardous materials are kept in a detached building of fire resistive construction.

Hard hats are required in certain locations such as construction sites, and safety glasses are required for work involving eye hazards. Personnel working with liquid metals are required to wear special protective equipment.

Escorts and supervisors are responsible for visitor safety, and protective equipment is provided to those authorized to enter hazardous areas. Supervisors are responsible for the Laboratory's safety program as it applies to them. The

safety engineer assists them as needed. A new Safety Manual has been written and will be distributed to all employees in February 1972.

Employees are encouraged to bring safety matters to the attention of their supervisor or the Safety Department, and they are resolved by the supervisor or the Safety Department.

All accidents are reported to the safety inspector who investigates in accordance with Laboratory policy and AECM 0502 requirements. Supervisors investigate and submit reports required by the AEC.

The Industrial Hygiene and Safety Division publishes a "Topic of the Month" covering a specific fire or safety problem area. It is distributed to each section head at ANL-West. The safety inspector prepares safety memos on current safety subject and distributes copies to each employee. Safety pamphlets obtained from the National Safety Council are also distributed to all employees periodically as reminders to seasonal hazards.

26. Discuss Watchman Service and Recording Methods for Patrols (Agenda Activity 56)

a. Relevant AEC Documents

(1) AECM Appendix 0552 - Industrial Fire Protection

(2) Proposed AEC Guide on Watchman Service

b. Miscellaneous Documents

NFPA Standard No. 601

c. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

d. Survey Findings

Watchman Service and Fire Inspections

Special service representatives make recorded rounds of major buildings every two hours during evenings, weekends, and holidays. They prepare written reports on fire, safety, and security deficiencies noted during their rounds, and copies are sent to the responsible department for action. The frequency of rounds meet the minimum requirements of a proposed AEC Guide on Watchman Service. There is a total of 22 clock stations throughout the buildings.

27. Discuss Status of Fire Brigade (Agenda Activity 57)

a. Relevant AEC Documents

AECM Appendix 0552 - Industrial Fire Protection

b. Miscellaneous Documents

NFPA Standard No. 27, Private Fire Brigade

c. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) T. Asbury, Fire Protection Engineer, ID

d. Survey Findings

The EBR-II Site does not have an organized fire brigade. There are approximately 36 emergency personnel who have received training in the use of self-contained breathing units and in combatting fires pending the arrival of the on-site Fire Department. They receive regular training in controlling emergencies for their responsible areas, especially where sodium and special materials are used. Since there is generally only five emergency personnel available during off-shifts, ANL-West is especially dependent on the Fire Department after normal working hours. Special service reporesentatives and maintenance men assist during fire emergencies as needed. Additional training is planned to assure adequate support is provided to the Fire Department where needed. This training will be coordinated with the Fire Department.

28. Discuss Use of Consultants for Special Hazards (Agenda Activity 58)

a. Relevant AEC Documents

AECM Appendix 0552 - Industrial Fire Protection

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) F. Sommers, Safety Inspector

(2) AEC

L. E. Oldendorf, Fire Protection Engineer, SD-CH

c. Survey Findings

ANL-West utilizes consultants for annual inspections of pressure vessels, elevators, and cranes. Fire protection equipment representatives are used for Met-L-X extinguishing systems, smoke detectors, and Halon-1301 extinguishing systems. Other AEC contractors at the NRTS have made fire protection and industrial hygiene specialists available on a consulting basis. Specialists from ANL-East have frequently assisted ANL-West on special hazard problems. The Laboratory utilizes consultants whenever such expertise is needed.

29. Discuss Sodium and NaK Disposal Procedures (Agenda Activity 64)

a. Relevant AEC Documents

(1) AECM Appendix 0550 - Operational Safety Standards

(2) AECM-0510 - Prevention, Control and Abatement of Air and Water Pollution

b. Participants

(1) ANL

(a) W. Wilson, Fire Protection Engineer

(b) E. Graham, Manager, Health and Safety, ANL-West

(2) AEC

(a) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(b) J. H. Pingel, Health Physicist, SD-CH

c. Survey Findings

The procedures for disposal of sodium and NaK are based on past experience and contamination potential. The Health and Safety Section utilizes steam or water spray for reacting non-contaminated sodium at a safe distance from the facilities. Smaller quantities are reacted in gloveboxes and the oxides handled as dry active waste. Quantities of contaminated sodium and NaK too large to react safely in gloveboxes are stored pending the development of safe methods for disposal. Evaluations are being made to dispose of the contaminated NaK stored at the EBR-I Facility

30. EBR-II Safety Mods (Agenda Activity 69)

a. Relevant ANL Documents

(1) Preliminary Proposal for Modifications to Reactor, EBR-II

(2) Ltr. L. R. Monson to Distribution, dated November 29, 1971, Smoke Detector Tests with Copy of Report on Sodium Fire Smoke Abatement Tests at EBR-II, dated November 1972

(3) ANL-7691, Guidelines for Sodium Fire Prevention, Detection, and Control, June 1970

b. Relevant AEC Documents

AECM Appendix 0552 - Industrial Fire Protection

c. Participants

(1) ANL

(a) M. Levenson, Project Director, EBR-II

(b) R. K. Winkleblack, Associate Director, Engineering, EBR-II

(c) H. Lawroski, Superintendent of Operations, EBR-II

(d) W. Wilson, Fire Protection Engineer

(e) F. Pancner, Superintendent, Fire Protection Department

(2) AEC

(a) R. M. Moser, Director, Safety Division, CH

(b) L. E. Oldendorf, Fire Protection Engineer, SD-CH

(c) R. D. Morley, Reactor Safeguards Engineer, SD-CH

(d) Dale A. Herbst, Reactor Safeguards Engineer, SD-CH

(e) D. E. Beaderstadt, CH Site Representative, NRTS

(f) J. F. Smith, Jr., Chief, Operations Support Branch, RDT-HQ

d. Survey Findings

(1) Status of Fire Safety System - I Projects

Subsystems II, III, IV, V, VII, and VIII have been installed and are complete. Smoke abatement tests provided assurance that the graded-media/HEPA filter assembly similar to that installed on the RSCL was effective. The electrostatic precipitator did not perform satisfactorily in the tests. The photoelectric and ionization type smoke detectors responded satisfactorily to sodium smoke in these tests.

Subsystem IX and X cannot be completed until pump and valve designs are selected from those bidders responsive to requests for proposals.

Subsystem XI involves the relocation of the Met-L-X extinguishing units outside the Sodium Boiler Building. A suitable building is being designed by the ANL-West Engineering Section.

(2) Status of Fire Safety Systems for the Sodium Boiler Building Only part of these items have been funded.

(a) Subsystem I - The proposal for emergency exits from the Sodium Boiler Building upper levels went out for bids; however, no bids were received. The ANL-West Engineering Section is now designing the exit features and will include this work with the project for relocating the Met-L-X units from this building.

(b) Subsystem II - Photoelectric smoke detectors have been purchased and will be installed to complement the existing ionization type detectors throughout the building.

(c) Subsystem III - Work has not been started on eliminating cooling water from the sodium wing or installing the steel hold basin and leak detectors for the secondary purification system. The EBR-II group is evaluating other E.M. pumps.

(d) Subsystem IV - CH has recommended deferring the expansion of the Met-L-X system for the building pending further evaluation of the effectiveness of Met-L-X for fire control of large sodium fires by HEDL.

(e) Subsystem V - A contract has been awarded for the installation of a Halon-1301 fire suppression system in the DAS room.

(3) Documentation of Proof Tests

There has been good documentation of proof tests on sodium-smoke abatement and smoke detector tests by the EBR-II group with the assistance of the ANL-West Fire Protection Engineer. The tests provided evidence that the electrostatic precipitator added little, if any, to the sodium smoke filtration capability of the system installed in the PPC. The HEPA filter provided very efficient sodium smoke filtration but became plugged fairly rapidly. The large volume graded media filter installed in the RSCL area, in conjunction with HEPA filters, provided very efficient sodium smoke filtration and could adequately filter smoke products generated by fires involving more than 30-pounds of sodium. Additional tests are needed to determine the maximum amount it would filter.

Smoke detector tests at ANL-East and ANL-West indicate both the photoelectric and the ionization smoke detectors respond rapidly to sodium smoke when the units are installed properly. Since there was only a minimum of ionization detectors previously installed in sodium system areas, additional photo-electric detectors are being installed to provide more complete coverage.

Met-L-X systems are to be proof tested by HEDL since the EBR-II Project was not staffed to conduct the necessary tests. Since usual testing methods cannot be performed with Met-L-X because of the clean-up problem that would result, mock-ups of the systems will be set up by HEDL to evaluate the effectiveness of the systems. Air flow tests will be performed on the EBR-II Met-L-X systems in place to assure piping is not obstructed. A small scale test was performed by the EBR-II group utilizing a 30-pound Met-L-X portable extinguisher to extinguish a one-pound sodium fire. The application was double the quantity of Met-L-X recommended by Underwriter's Laboratories and after 15 minutes, smoke began to evolve from areas where the sodium burned through the Met-L-X powder. This produced smoke which was more irritating than sodium smoke by itself.

Various nozzles for Met-L-X systems have been tested, and certain types have proven more effective for equal distribution than those presently installed. Further investigations and tests will be made before existing nozzles are changed.

(4) Although there are considerations for inerting the PPC and possibly the ICC, the EBR-II group is awaiting the completion of the overall evaluation being performed by the Laboratory's ad hoc committee assigned this task. A preliminary report from the committee is expected by March 1972.

31. Summary

Five of the previous recommendations have been accomplished and eight are repeated or transferred to the new recommendations section of the report. Accident experience has been good. ANL-West is making good progress in upgrading most buildings to comply with AEC's "improved risk" criteria and in meeting OSHA standards. Completion of the recommendations will bring facilities at ANL-West in compliance with AECM 0550 and 0552.

III. STATUS OF PREVIOUS RECOMMENDATIONS

A. EBR-II-FEF Complex Nuclear Criticality Safety

The two recommendations made in the August 17-18, 1971, Nuclear Criticality Safety Survey of ANL-West were satisfactorily responded to in an October 29, 1971, letter from Dr. Duffield to C. C. McSwain. Intended actions indicated in that letter have been completed.

B. EBR-II Reactor Safety

The status of ANL actions on previous recommendations is given in Section II.B.1.

C. ANL-West - Health Protection

Recommendation (October 12-21, 1971 Survey)

Assignment of neutron exposure to personnel retroactively.

Action Taken

Action indicated by ANL in December 1, 1971 summary is that the program to assign exposure started November 9, 1971.

Further Action Required

Estimated correction for neutron exposure had been made on the 1971 exposure records. Work continues.

Recommendation (October 12-21, 1971 Survey)

Distribute final approved ANL-West Health and Safety Manual to ANL and CH.

Action Taken

Action indicated in ANL December 1, 1971 summary is that the manual is in revised draft form as of December 1, 1971.

Further Action Required

Comments on the revised draft due January 10, 1972, had not been received (including CH comments) as of the survey dates. Hence, the February 1, 1972, deadline date for final printing cannot be met. Action continues.

Recommendation (October 12-21, 1971 Survey)

1. Preplanning for handling seriously injured, contaminated personnel.

   Action Taken

   Discussions by ANL-West were held with the AEC-Central physician and a written response received. Specific locations for decontamination were chosen and service orders initiated for providing hot and cold water and drainage to retention tanks. Areas are to be restricted to decontamination use.

   Further Action Required

   Complete the actions initiated.

2. Reevaluate need for slit-lamp eye examination.

   Action Taken

   Reevaluation was made and a decision made to continue use of slit-eye examinations.

   Further Action Required

   None

3. Provide nurse with timely notification of new hazardous materials being used.

   Action Taken

   Safety has been assigned the responsibility for routinely providing such information to the nurse.

   Further Action Required

   None

Recommendation (October 12-21, 1971 Survey)

Compile and emphasize health and safety radiation monitoring equipment maintenance schedule.

Action Taken

Action was completed but subsequent experience is that manpower is not available to maintain the schedules at the levels set as goals.

Further Action Required

ANL-West should reevaluate the radiation protection equipment maintenance schedule, come up with a realistic schedule which will assure that equipment is properly calibrated, checked and maintained.

Recommendation (September 14-17, 1970 Survey)

ANL should develop a short form radiation survey report format for reporting small monitoring jobs. H&S should document visitations, special projects and assignments.

Action Taken

A short form was developed and is in use. Radiation Safety building representatives have been instructed to keep daily logs which adequately

document visitations, special projects and assignments. Additionally special projects such as dose calculations and procedure reviews will be separately documented.

Further Action Required

Routine supervision. Recommendation satisfactorily completed.

Recommendation (April 16-18, 1968 Survey)

FEF exposures not as low as practicable.

Action Taken

ANL had made reductions in exposure by installing in-cave traps which greatly reduced radiation levels from filter banks (from 10-15 r to 100 mr levels) shortly after the survey report was issued. Action is satisfactorily complete relative to observations made in 1968. ANL has voluntarily continued efforts to reduce exposures.

Further Action Required

None.

D. ANL-West Industrial Safety and Fire Protection

69-1. EBR-II Reactor Building

b. The containment and ventilation design for sodium systems should be evaluated to minimize the spread of smoke in the event of a sodium leak.

Action Taken

An effective smoke abatement system utilizing a large graded media filter and HEPA filters is installed in the RSCL area. The smoke abatement system for the PPC and ICC has proven to be ineffective. Improved fire protection for these areas is being evaluated by a Laboratory ad hoc committee, and their report will be used in upgrading the ventilation and smoke abatement system for the Reactor Building.

Further Action Required

This recommendation is transferred to Part IV, Recommendation D.1.

70-1. EBR-II Power Plant

a. A one-hour fire cutoff should be provided between the EBR-II control room and the rest of the building.

Action Taken

A 3/4 rated enclosure was proposed by the EBR-II group but did not meet UBC and NFPA requirements. The Laboratory ad hoc committee will evaluate measures needed to meet the one-hour requirement.

Further Action Required

This recommendation is transferred to Part IV, Recommendation D.1.

b. An automatic extinguishing system such as Halon-1301 should be installed in the DAS room.

Action Taken

A contract has been awarded for the installation of a Halon-1301 system.

Further Action Required

To complete the installation.

70-2. Inspection and Testing Facility

d. The chain and lock arrangement on the emergency hatch on the fuel pin storage bin in the ITF should be removed to comply with the NFPA Life Safety Code.

Action Taken

Administrative procedures have been instituted and posted on the elevator requiring the hatch to be opened when personnel are in the pit.

Further Action Required

None.

70-3. Sodium Boiler Building

a. Re-evaluate the Met-L-X systems and proof test them.

Action Taken

Mock-ups of the Met-L-X systems are to be proof tested by HEDL.

Further Action Required

This recommendation is transferred to Part IV, Recommendation D.1.

b. Relocate the supply tanks and controls for the Met-L-X systems to an unexposed place outside the building.

Action Taken

The shelter for this equipment has been designed and the work is out for bid.

Further Action Required

To complete the relocation.

c. Supplement existing smoke detectors with the new photoelectric types that are more effective for sodium fire detection.

Action Taken

The detectors have been procured and are ready for installation.

Further Action Required

To complete the installation.

e. Install emergency exits directly to the outside for the upper levels of the Sodium Boiler Building.

Action Taken

The proposal for emergency exits did not receive any bids. The ANL-West Engineering Section is now designing the exit features and will go out for bids again.

Further Action Required

To complete the installation.

70-4. Laboratory and Service Building

a. A smoke detection system should be installed in the special materials "vault" in the basement, pending transfer of the materials to a new fire resistive vault.

Action Taken

A smoke detection system has been installed in the special materials "vault" in the basement, and the materials will be moved to a new fire resistive "vault."

Further Action Required

To complete transfer of materials to a standard "vault."

b. Consideration should also be given to installing smoke detectors in existing special materials vaults and adjoining storage areas on the first floor of the same building to provide an early warning in the event of fire.

Action Taken

The fire protection systems have been engineered and are ready to be installed.

Further Action Required

To complete the installation.

70-8. General Items

The following minor corrective actions should be taken:

a. Engineering drawings should be stored in metal cabinets if they must be kept available in the turbine generator area of the Power Plant.

Action Taken

Cabinets are being used to store all drawings.

Further Action Required

None.

e. The smoke detectors in TREAT should be replaced with the new photoelectric type which are more sensitive to sodium fires.

Action Taken

Recent proof tests at ANL-West indicate the photoelectric detector is no more sensitive than the existing detectors. Since the existing smoke detection system is adequate, the recommendation is dropped.

Further Action Required

None.

71-2. TREAT

a. The exposure created to the TREAT Reactor Building by the addition of a combustible trailer should be adequately protected to minimize a serious programmatic loss of the Reactor.

c. Laboratory and Office Area Computer Room - The fire alarm fire panel should be provided with a lockout, and consideration should be given to installing a safety pull pin arrangement in the computer power shutoff to prevent inadvertent shutoff.

Action Taken

A safety pull pin has been installed on the computer power shutoff, and a lock has been installed on the fire alarm panel.

Further Action Required

None.

d. The door to the DAS room should be replaced with a one-hour rated fire assembly.

Action Taken

The one-hour enclosure will be evaluated by the ad hoc committee assigned the overall fire protection evaluation of EBR-II.

Further Action Required

This recommendation is transferred to Part IV, Recommendation D.1.

71-6. The following safety items should be completed:

Carpenter's Shop

a. Anti-kick-back devices should be installed on the rip saws and all guards returned to the cross cut saws.

Action Taken

A standard guard has been installed on the table saw, and the rip saws have been modified to operate as cross cut saws only.

Further Action Required

Standard guards and anti-kick-back devices should be installed on the two cross cut saws.

Laboratory and Office Building

b. The light levels in the shops should be surveyed and improved if necessary when compared to IES Standards.

Action Taken

The light levels have been checked and found adequate.

Further Action Required

None.

Warehouse 781

d. An overhead guard should be provided on the fork lift truck operating in this warehouse.

Action Taken

A guard has been installed on the fork lift.

Further Action Required

None.

71-7. Construction Safety

d. Improve the usage of hard hats throughout the construction site.

Action Taken

Hard hats were being used throughout construction areas.

Further Action Required

None.

e. Provide roll-over protection for the ANL tractor equipped with a backhoe.

Note: This recommendation is transferred to Part IV, Recommendation D.7.

71-8. The dangerous Material Storage Building No. 769 should be improved as follows:

b. Gravity feed of flammable liquids should be eliminated.

Action Taken

Overall improvements have been made in grounding flammable liquid containers and installing approved vent caps. Automatic shutoff valves on drums of oils and solvents reduces the possibility of serious spills, therefore, current dispensing methods are acceptable.

Further Action Required

None.

c. The gasoline fuel pump should be provided with an electrical ground.

Action Taken

The electrical ground was inspected and found adequate.

Further Action Required

None.

IV. RECOMMENDATIONS

The following recommendations resulted from this survey. Action and schedules were formally agreed upon by Messrs. McSwain and Laney on January 18, 1972 (see Attachment 2).

A. EBR-II FEF Complex - Nuclear Criticality Safety

1. (Agreement and Commitment No. 17) - ANL should request from CH a waiver of CH-CA-050B requirements for criticality monitors in the EBR-II Flow Test area along with proper justification for same. Will request by February 18, 1972.

2. (Agreement and Commitment No. 18) - ANL should initiate actions that will assure that all required checks are made prior to a subassembly transfer. Will comply and will advise CH of actions by February 1, 1972.

B. EBR-II Reactor Safety

1. (Agreement and Commitment No. 11) - Checklists for startup and shutdown of the RSCL main loop and each cell subloop should be prepared, used, and kept on file for a reasonable period of time, say, one year. Will comply by February 18, 1972.

2. (Agreement and Commitment No. 12) - Checklists incorporating the significant steps for various FUM operations should be prepared, used, and kept on file for a reasonable period of time. ANL will review fuel handling operations to determine need for additional checklists by February 18, 1972.

3. (Agreement and Commitment No. 13) - Revise Operating Limit No. 1 to clarify the intent of the operating limit. Will provide change requested by March 18, 1972.

4. (Agreement and Commitment No. 14) - The EBR-II "TWO OPEN-HOLE" rule should be clarified to assure it's intent is clear. Complete by February 18, 1972.

5. (Agreement and Commitment No. 15) - ANL should comply with the ANL procedure for reporting incidents. Will give date January 24, 1972, for response to AEC incident and audit letter. ANL will comply with ANL procedures.

C. ANL-West - Industrial Safety and Fire Protection

1. (Agreement and Commitment No. 1) - Complete the fire safety evaluation that was requested in letter, McSwain to Duffield dated November 16, 1971. Following completion of the evaluation, all requirements of AECM 0552 and Appendix 6301, Part I-H should be met or funds or exceptions requested. The evaluation will be completed by March 18, 1972.

2. (Agreement and Commitment No. 2) - Evaluate the fire protection system throughout the FEF Facility as required by AECM 0552 and take appropriate action. The evaluation with recommendations will be provided by March 18, 1972.

3. (Agreement and Commitment No. 3) - Install automatic extinguishing system in the Laboratory and Office Building basement computer room as required by NFPA-75. ANL will request funds and approval for installation by February 1, 1972.

4. (Agreement and Commitment No. 4) - Discontinue using the ZPPR storage area in the basement as a workshop until an emergency exit is installed per NFPA-101. Completed.

5. (Agreement and Commitment No. 5 only covers part of the required fire protection for TREAT. Therefore, this item has been amended to include total fire protection to meet the "improved risk" standards.)

   a. The TREAT water supply should be improved to provide a minimum of 500 gpm at sufficient pressure to assure a minimum of 15 psi residual pressure at the highest sprinkler head and/or at the end of 150 feet of 1½ inch fire hose. A standard fire hydrant should be installed near the TREAT Control Building on this new supply.

   b. The instrument maintenance trailer attached to the TREAT Reactor Building would be relocated a minimum of 25 feet away from the Reactor Building, or a one hour fire wall should be installed between the trailer and the Reactor Building, or an automatic sprinkler system should be installed in the trailer and above the trailer for exposure protection.

   c. A smoke detection system should also be installed in the above trailer if it remains attached to the Reactor Building.

6. (Agreement and Commitment No. 6) - Install a smoke detection system in the TREAT Control Building per AECM 0552. Complete by April 18, 1972.

7. (Agreement and Commitment No. 7) - Provide with roll-over protection the existing tractor-backhoe as required by EM 385-1-1, Corps of Engineers Safety Manual. Complete by March 1, 1972.

8. (Agreement and Commitment No. 8) - Complete the evaluation of fire protection as required by the 1971 Plutonium Storage Criteria. ANL will furnish date by February 1, 1972.

9. (Agreement and Commitment No. 9) - Additional steps should be taken to bring all areas into compliance with the OSHA Standards. Furnish progress report and plan for future compliance by March 18, 1972.

10. (Agreement and Commitment No. 10) - Argonne-West should improve the capability to respond to fire emergencies. ANL will provide clarification to the AEC Fire Department and remove any misunderstanding within ANL by February 1, 1972.

11. (Agreement and Commitment No. 16) - Improve housekeeping to assure combustibles are maintained at a minimum. ANL will comply.

V. CONCLUSIONS

It is the opinion of the survey team that the EBR-II-FEF Complex is being operated in a safe manner and in compliance with the requirements of the ANL and AEC documents in the areas of Reactor and Criticality Safety.

In the areas of Industrial Safety and Fire Protection and Health Protection ANL-West is being operated in a safe manner.

The recommendations are made to further strengthen the safety programs of the EBR-II and ANL-West.

Dale A. Herbst
Reactor Safeguards Engineer
Safety Division

Russell D. Morley
Reactor Safeguards Engineer
Safety Division

Lawrence E. Oldendorf
Fire Protection Engineer
Safety Division

John H. Pingel
Health Physicist
Safety Division

James F. Smith, Jr., Chief
Operations Support Branch
Division of Reactor Development
and Technology

R. M. Moser, Director
Safety Division

APPENDIX 1

December 29, 1971

Dr. Robert B. Duffield, Director
Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439

Dear Dr. Duffield:

COMBINED SAFETY SURVEY, EBR-II - FEF COMPLEX, FIRE PROTECTION AND HEALTH PROTECTION SURVEY - ARGONNE-WEST

This will confirm discussions between members of my Safety Division and Mr. M. Novick, regarding the subject survey which will be performed January 11-18, 1972. The draft of the Combined Safety Survey Agenda, EBR-II Complex, has been revised. The revision includes the comments generated from the review by all parties involved. The time required for the survey has been lengthened by one day to allow more discussion time during the inspection phase of the survey. Although the schedule is longer, ANL should allow for a possible schedule slippage which may extend the survey for an additional day.

An area of special interest to the survey team will be the assignment of authority and responsibility throughout the EBR-II organization. The team will be looking for traceability, clarity of communication and the functioning of the organization.

EBR-II operations will be compared against good operational practices, accepted standards, AEC Manual Chapters and procedures and ANL's internal procedures.

This will be a combined reactor safety, nuclear criticality safety, health protection and industrial and fire safety survey performed by:

R. Moser, Director, Safety Division (SD)
J. Pingel, Health Physicist, SD
D. Herbst, Reactor Safeguards Engineer, SD
R. Morley, Reactor Safeguards Engineer, SD
L. Oldendorf, Safety and Fire Protection Engineer, SD
D. Ericson, CH Site Representative, Idaho
J. O'Connor, RDT Site Representative, Idaho
G. McGovern, RDT Site Representative, Idaho
D. Beaderstadt, CH Site Representative, Idaho
J. Smith, RDT, Headquarters

C O P Y

In addition to the EBR-II - FEF Complex, we intend to conduct fire protection and health protection surveys of a major portion of the Argonne-West Site. The last safety and fire protection survey was conducted in July 1971. These surveys were discussed with Mr. Staker on December 29, 1971.

Your cooperation is requested to assure that the personnel listed in the survey agenda are available for the AEC-ANL meeting on January 11, 1972. The primary purpose of this meeting is to alert the ANL management of our purpose so that other cognizant personnel will be available as the survey progresses. The inspecting group will start together but as they progress they will split up into smaller groups as indicated in the attached agenda.

The following data should be available for the survey:

A. Records and logs covering the time period from the previous survey date to the current one. These should include reactor, health protection, industrial and fire safety, and criticality safety records.

B. Dates and results of reviews by ANL internal safety groups.

C. Current organization charts for the EBR-II Project, ANL-West Fire Safety and Health Protection, and ANL-West Criticality Safety organizations.

The following procedures and charters should be available at the January 11, 1972, meeting; a copy of each should be available for each member of the survey team:

1. Revised AP-42 Plant Modification Committee (Recommendation 7 of June 8-10, 1971, survey)

2. Procedure for Writing Procedures, (Recommendation 8)

3. Incident Report Procedures (Recommendation 9)

4. Operating Limit Violation Report Procedure (Recommendation 10)

5. Instrumented Subassembly Removal Procedures

6. Charters for the Newly Formed Safety Committees (Recommendation 3)

Sincerely,

C. C. McSwain
Director, Argonne Contract
Management Office

Enclosures:
1. Safety Survey Agenda
2. Attachment 1
3. Flow Diagram

cc: See Attachment

C O P Y

MULTI-DISCIPLINED EBR-II COMPLEX SAFETY SURVEY AGENDA

Date	Time	Activity
January 11, 1972	9:00 a.m.	Discussions with ANL Management The following personnel will be required:

AEC	ANL
All survey team members	R. Staker W. Barney H. Lawroski J. Long D. Smith D. Graham OOS representative

The function of this meeting will be to inform ANL management personnel of the purpose of the survey, its scope the method by which it will be conducted and other ANL personnel who will be required during the course of the survey. Reference to the attached detailed inspection and discussion agenda should give insight into the above subjects. Any ANL questions on this agenda will be answered at this time.

a.m. Inspection of EBR-II complex as per detailed agenda of attachment 1.

The inspection activities will commence immediately after the conclusion of the meeting with ANL management. Initially the inspection will start with participation of all four survey disciplines. Subjects of interest to all four disciplines will be covered first as detailed in

C O P Y

January 11, 1972	a.m.	attachment 1. The order of these topics need not be as listed in attachment 1 for the four discipline inspections. As the inspection proceeds, the inspection teams will break off into subgroups of multiple discipline or single discipline groups to cover subjects of interest. Details of these discipline subgroupings and subject material are given in attachment 1. It is anticipated that the inspection activities will require approximately 2½ days. The agenda of attachment 1 shall be followed until all inspection items are covered. During the course of inspection activities, various ANL personnel will be required. These people who are specifically identified by name or responsibility in attachment 1 should be available on a timely basis to facilitate efficient use of the time available. At the conclusion of the attachment 1 inspection activities, discussion activities listed in attachment 1 should commence. The above remarks regarding the attachment 1 inspection activities apply to the discussion items also. It is anticipated that the discussion items will require approximately 3 days to complete.
	Lunch	
January 11	p.m.	Continuation of attachment 1 agenda.
January 12, 1972	a.m.	Continuation of attachment 1 agenda.
	Lunch	
	p.m.	Continuation of attachment 1 agenda.

January 13, 1972	a.m.	Continuation of attachment 1 agenda.
	Lunch	
	p.m.	Continuation of attachment 1 agenda.
January 14, 1972	a.m.	Continuation of attachment 1 agenda.
	Lunch	
	p.m.	Continuation of attachment 1 agenda.
January 15, 16, 1972		Records review as detailed in attachment 1 agenda.
January 17, 1972	a.m.	Continuation of attachment 1 agenda.
	Lunch	
	p.m.	Continuation of attachment 1 agenda.
January 18, 1972	a.m.	Continuation of attachment 1 agenda.
	Lunch	
	p.m.	Agreements and commitment meeting Required attendees:

AEC	ANL
C. C. McSwain	R. Laney
R. Sweek	M. Levenson
Survey Team members	R. Staker
	K. Winkelblack
	OOS representative

ATTACHMENT 1

INSPECTION AND DISCUSSION AGENDA

The following activities are schematically diagramed on the attached survey flow chart. The order of these activities may be altered as indicated on the flow chart.

Activity Number	Activity Description	Interested Disciplines	Required ANL Attendees
1	Inspect control room and discuss control room evacuation criteria and ability to shutdown reactor outside of control room in event of fire in control room.	HP, FP, NCS RS	G. Deegan K. Moriarity E. Graham

NOTE: Items 2-14 will involve the following activities:

Inspect for adequacy of exits, housekeeping conditions, fire extinguishing units and systems, fire detection systems and alarms, fire cut-offs, personnel safety equipment, emergency lighting, lightning protection, machine guarding, flammable liquid and gas handling practices, electrical equipment, ventilation systems, compliance with AECM-0550 and 0552 standards.

2	Inspection of EBR-II Reactor Building	FP	B. Wilson, F. Summers, Building Representatives as required
3	Inspection of EBR-II Power Plant	FP	B. Wilson, F. Summers, Building Representatives as required
4	Inspection of EBR-II Sodium Boiler Building	FP	B. Wilson, F. Summers, Building Representatives as required
5	Inspection of FEF	FP	B. Wilson, F. Summers, Building Representatives as required

Activity Number	Activity Description	Interested Disciplines	Required ANL Attendees
6	Inspection of Fuel Assembly and Storage Building	FP	B. Wilson, F. Summers, Building Representatives as required
7	Inspection of HFEF	FP	B. Wilson, F. Summers, Building Representatives as required
8	Inspection of ITF, RHTF	FP	B. Wilson, F. Summers, Building Representatives as required
9	Inspection of Laboratory and Office Building	FP	B. Wilson, F. Summers, Building Representatives as required
10	Inspection of Warehouse	FP	B. Wilson, F. Summers, Building Representatives as required
11	Inspection of Machine Shop	FP	B. Wilson, F. Summers, Building Representatives as required
12	Inspection of ZPPR	FP	B. Wilson, F. Summers, Building Representatives as required
13	Inspection of TREAT	FP	B. Wilson, F. Summers, Building Representatives as required
14	Inspection of Site Water System and Fire Pump	FP	B. Wilson, F. Summers, Building Representatives as required

Activity Number	Activity Description	Interested Disciplines	Required ANL Attendees
15	Stack Effluent Control a. Inspect control and monitoring equipment b. Discuss control procedures c. Monitor set points and bases d. Discuss plant modification for increased purge rate	HP, RS, NCS	R. Rice G. Deegan M. Feldman H. Greening E. Graham
16	Inspect INSAT equipment discuss handling techniques, inspect general radiation monitoring equipment, discuss XX04 incident	HP, RS, NCS	J. Long G. Deegan E. Graham
17	Examine and discuss copies of Federal and State regulations on hand for updatedness and the application to ANL operations	HP	E. Graham and/or Summers, Bassett, H. Greening or Representative, ID Representative
18	Inspect sanitary waste treatment plant. Does it meet State and County requirements?	HP	H. Greening or Representative, F. Summers
19	Inspect records of measurements made for nonradioactive air and water pollutants	HP	E. Graham or E. Cook F. Summers Plant Services Engr.
20	Inspect any quantitative and qualitative records of nonradioactive releases	HP	E. Graham or E. Cook F. Summers Plant Services Engr.
21	Inspect heating plant	HP	H. Greening or Plant Engineer
22	Inspect and discuss the general OH program a. Adequacy of staffing b. Adequacy of equipment c. Scheduling of physical exams d. Examine monthly reports e. Examine and discuss injury-exposure experience f. Emergency preparations	HP	A. Seward

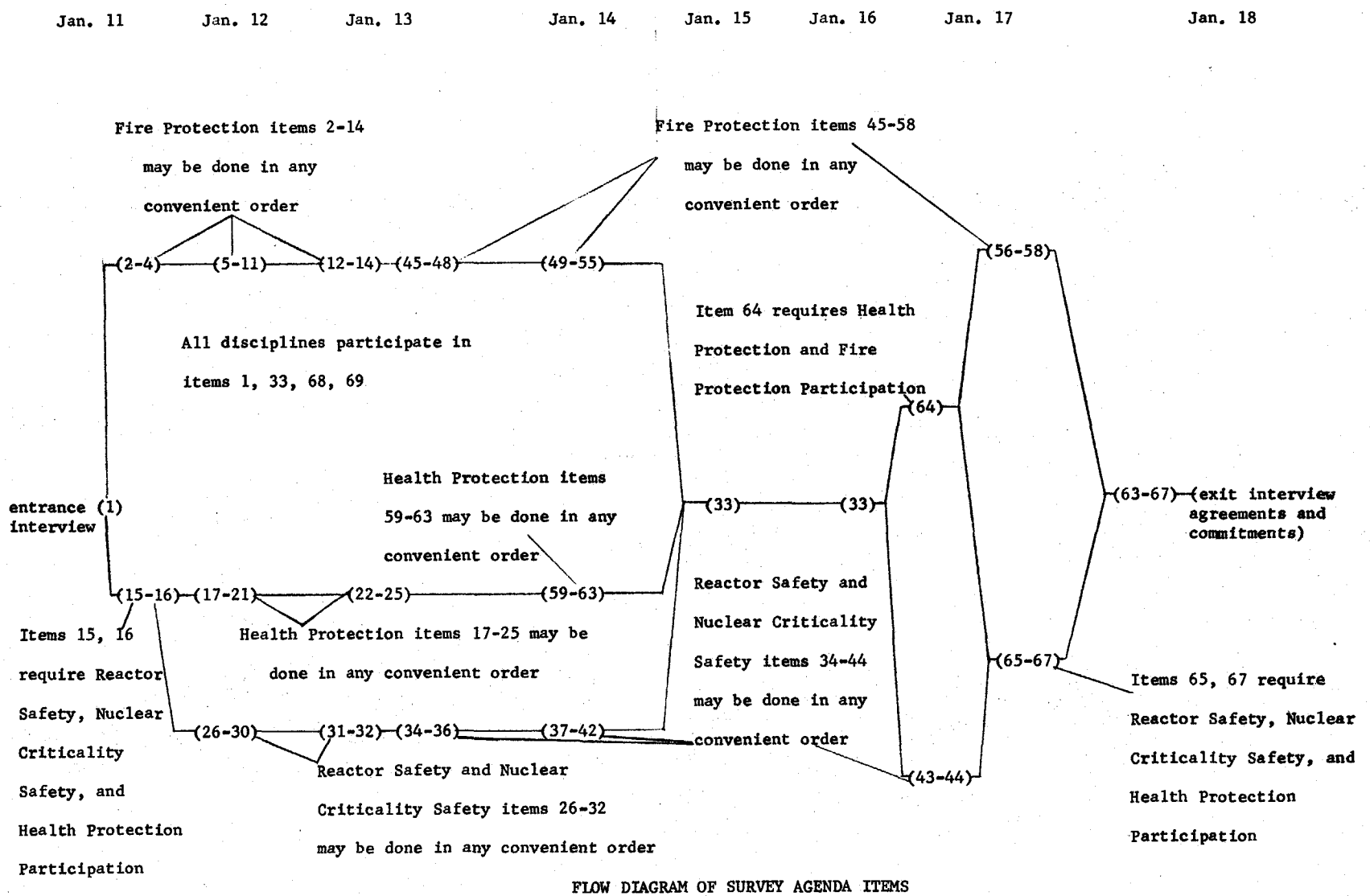
Activity Number	Activity Description	Interested Disciplines	Required ANL Attendees
23	Inspect records relating to radioactive and industrial waste management	HP	E. Graham, Bassett
24	Inspect and discuss adequacy of records of measurement of radioactive emissions to air and water	HP	E. Graham, ID Representative
25	Inspect and discuss program for assessment of radio-activity in environmental air, water and soil particularly at points of discharge to ground water	HP	E. Graham
26	Inspect and discuss status of required ANL actions to Recommendations A, B, F, J, L, P, S, U, W, X, Y, Z, of July 1971 fuel management audit	NCS, RS	J. Long G. Deegan FEF Representative
27	Discuss and check on 0530-27 implementation at all levels	NCS, RS	J. Long
28	Discuss responsibilities, authority and communication with all individuals interviewed	NCS, RS	
29	Discuss and inspect status of ANL responses to Recommendations 1, 2, 6, 12, from the June 8-10, 1971, Reactor Safety Survey	NCS, RS	G. Deegan H. Lawroski
30	Discuss adequacy of safeguards to prevent loading error and inspect fuel handling mechanisms	NCS, RS	G. Deegan
31	Discuss adequacy, accuracy and frequency of control and safety rod calibration and inspect control rod drive mechanisms	NCS, RS	F. Kern G. Deegan H. Lawroski
32	Inspect cover gas monitoring equipment and discuss the signal to noise ratio data	NCS, RS	D. Smith G. Deegan
33	Review ANL records identified by survey team at time of survey	NCS, RS, HP, FP	

Activity Number	Activity Description	Interested Disciplines	Required ANL Attendees
34	Review status of required ANL actions to Recommendations E, G, K, N and Q, of July 1971 fuel management audit	RS, NCS	J. Long G. Deegan FEF Representative
35	Discuss any future plans for revision to CHCS for FEF-EBR-II complex	RS, NCS	J. Long G. Deegan FEF Representative
36	Discuss status of ANL responses to Recommendations 3, 4, 5, 7, 8, 9, 10, 11, from the June 8-10, 1971, survey	RS, NCS	G. Deegan H. Lawroski
37	Discuss status of upgrading of shutdown protective system	RS, NCS	K. Moriarity R. Curran
38	Discussion of items uncovered in records review	RS, NCS	H. Lawroski G. Deegan
39	Discuss safety implication of the X068A incident	RS, NCS	F. Kirn
40	Discuss criteria for submittal of plant modifications to the RSRC for review	RS, NCS	H. Lawroski
41	Discuss adequacy of staffing for all aspects of reactor operations	RS, NCS	H. Lawroski G. Deegan
42	Compare the EBR-II organization to the IAD-8401-6 and 7 requirements	RS, NCS	H. Lawroski G. Deegan Training Coordinator
43	Discuss status of EBR-II projects response to recommendations made in the "QAM Audit of EBR-II Project" Report dated September 13, 1971	RS, NCS	M. Levenson H. Lawroski W. Barney
44	Discuss placing a burnup limit on oxide subassemblies	RS, NCS	M. Levenson
45	Discuss Safety Training and Fire Control Training	FP	F. Summers

Activity Number	Activity Description	Interested Disciplines	Required ANL Attendees
46	Discuss Program to meet OSHA Standards	FP	E. Graham and F. Summers
47	Discuss Fire, Injury and Vehicle Accident Experience	FP	F. Summers
48	Review Fire Department Services and Fire Fighting Capability at EBR-II	FP	B. Wilson B. Asbury, ID
49	Discuss emergency procedures to control fires, provide medical treatment, including adequacy of communications, alarms, manpower and equipment	FP	B. Wilson E. Graham
50	Discuss evaluations on water supplies; review safety and fire equipment inspection practices and records; construction and modification review practices; work permit system	FP	B. Wilson F. Summers
51	Discuss overall fire protection at EBR-II Facility	FP	Coor. Engr. EBR-II
52	Discuss Vehicle Licensing Requirements and Crane Operating	FP	F. Summers
53	Discuss Safety Organization and Responsibilities	FP	All
54	Discuss Nuclear Materials Storage Fire Protection	FP	B. Wilson
55	Discuss Laboratory Safety Policies and Publications	FP	E. Graham and F. Summers
56	Discuss Watchman Service and recording methods for patrols	FP	Security and B. Wilson
57	Discuss status of fire brigade program	FP	B. Wilson
58	Discuss use of consultants for special hazards	FP	E. Graham B. Wilson

Activity Number	Activity Description	Interested Disciplines	Required ANL Attendees
59	Discuss responsibility for radioactive waste management reports (AECM-CH-050D, Form 298)	HP	
60	Discuss basic question: Does ANL know its environmental effects? The question is in the framework of cooperative and supportive effort in relation to the ID environmental monitoring program - ANL should know on-site effects. Determine authority and responsibilities related	HP	R. Staker E. Graham ID Representative
61	Discuss ANL-East to ANL-West to ID Occupational Health relationships - divisions of labor, responsibilities, authorities	HP	A. Seward (Possibly Bassett) ID Representative
62	Discuss the basic question: What are the applicable air and water quality rules and regulations? Who has related authority for enforcement? Who the responsibilities?	HP	E. Graham H. Greening ID Representative
63	Are there any proposed regulations which will require ANL action?	HP	
64	Discuss sodium and NaK disposal procedures	HP, FP	B. Wilson and E. Graham
65	Does ANL know what its releases are? Quantitatively and qualitatively?	HP, NCS, RS	E. Graham R. Staker
66	Discuss sources of emissions quantity of emissions, controls, measurements	HP, NCS, RS	E. Graham ID Representative P.S. Representative (Greening)

Activity Number	Activity Description	Interested Disciplines	Required ANL Attendees
67	Discuss basic question: "How well does ANL know what its radioactive effluent releases are?"	HP, RS, NCS	E. Graham
68	Compliance with AECM-0552, Improved Risk Criteria	FP, RS, NCS, HP	B. Wilson M. Levenson
69	EBR-II Safety Mods A. Status of work B. Documentation of Proof tests 1. Met-1-X Systems 2. Smoke Abatement Systems 3. Smoke Detectors C. Future Work Planned	FP, RS, NCS, HP	Coor. Engineer - EBR-II B. Wilson M. Levenson K. Winkelblack



FLOW DIAGRAM OF SURVEY AGENDA ITEMS

C O P Y

ATTACHMENT

cc: Director, RDT, HQ
Special Assistant to Director, RDT, HQ
Assistant Director for Project Management, RDT, HQ
Assistant Director for Engineering Standards, RDT, HQ
Assistant Director for Plant Engineering, RDT, HQ
Assistant Director for Reactor Engineering, RDT, HQ
Assistant Director for Reactor Technology, RDT, HQ
Assistant Director for Nuclear Safety, RDT, HQ
EBR-II Program Manager, RDT, HQ
LMFBR Program Manager, RDT, HQ
Director, ANL
EBR-II Project Director, ANL
Director, LMFBR Program Office, ANL
RDT Senior Site Representative, ANL, CH
RDT Senior Site Representative, ID
CH Site Representative, ID
CH Project Engineer, ID
Director, DOS, HQ (2)

C O P Y

C O P Y

APPENDIX 2

AGREEMENTS AND COMMITMENTS FROM SAFETY SURVEY - JANUARY 10-18, 1972

1. Complete the fire safety evaluation that was requested in letter, McSwain to Duffield, dated November 16, 1971. Following completion of the evaluation, all requirements of AECM 0552 and Appendix 6301, Part I-H should be met or funds or exceptions requested. The evaluation will be completed by March 18, 1972.
2. Evaluate the fire protection system throughout the FEF facility as required by AECM 0552 and take appropriate action. The evaluation with recommendations will be provided by March 18, 1972.
3. Install automatic extinguishing system in the laboratory and Office Building basement computer room as required by NFPA-75. ANL will request funds and approval for installation by February 1, 1972.
4. Discontinue using the ZPPR storage area in the basement as a workshop until an emergency exit is installed per NFPA-101. Completed.
5. Install automatic sprinklers in the trailer connected to the TREAT Reactor Building per AECM 0552. Complete by April 18, 1972.
6. Install a smoke detection system in the TREAT Control Building per AECM 0552. Complete by April 18, 1972.
7. Provide with roll-over protection the existing tractor-backhoe as required by EM 385-1-1, Corps of Engineers Safety Manual. Complete by March 1, 1972.
8. Complete the evaluation of fire protection as required by the 1971 Plutonium Storage Criteria. ANL will furnish date by February 1, 1972.
9. Additional steps should be taken to bring all areas into compliance with the OSHA Standards. Furnish progress report and plan for future compliance by March 18, 1972.
10. Argonne-West should improve the capability to respond to fire emergencies.

C O P Y

ANL will provide clarification to the AEC Fire Department and remove any misunderstanding within ANL by February 1, 1972.

11. Checklists for startup and shutdown of the RSCL main loop and each cell subloop should be prepared, used, and kept on file for a reasonable period of time, say, one year. Will comply by February 18, 1972.

12. Checklists incorporating the significant steps for various FUM operations should be prepared, used, and kept on file for a reasonable period of time. ANL will review fuel handling operations to determine need for additional checklists by February 18, 1972.

13. Revise Operating Limit No. 1 to clarify the intent of the operating limit. Will provide change requested by March 18, 1972.

14. The EBR-II "TWO OPEN-HOLE" rule should be clarified to assure it's intent is clear. Complete by February 18, 1972.

15. ANL should comply with the ANL procedure for reporting incidents. Will give date January 24, 1972, for response to AEC incident audit letter. ANL will comply with ANL procedures.

16. Improve housekeeping to assure combustibles are maintained at a minimum. ANL will comply.

17. ANL should request from CH a waiver of CH-CA-05B requirements for criticality monitors in the EBR-II Flow Test area along with proper justification for same. Will request by February 18, 1972.

18. ANL should initiate actions that will assure that all required checks are made prior to a subassembly transfer. Will comply and will advise CH of actions by February 1, 1972.

EXCERPTS FROM "RULES AND REGULATIONS FOR THE CONTROL OF AIR POLLUTION IN IDAHO"

The following tests are required to determine conformance with Idaho Air Pollution Control Commission regulations:

Particle Fall

The ambient air quality for an area shall be determined on the basis of not less than four sets of 30-day samples taken within a six-month period of time. Each set shall be comprised of a sufficient number of samples to adequately characterize the area being evaluated.

Suspended Particulates

The ambient air quality for an area shall be determined on the basis of not less than ten sets of 24-hour samples taken within a 30-day period. For operations which do not run continuously for 30 days, the "ten sets of 24-hour samples taken within a 30-day period" requirement is waived. In such instances, the Air Pollution Control Section shall secure samples as they can.

Sulfur Dioxide

Such person shall provide at least three recording sulfur dioxide monitoring stations located in the area surrounding the source. These monitoring stations shall be operated in accordance with specifications outlined by the Air Pollution Control Commission.

Such person shall provide at least one recording meteorological station equipped to record wind speed and wind direction.

Such person shall provide the necessary care and maintenance services to insure that instruments will function properly and adequately record sulfur dioxide data which can be converted into sulfur dioxide concentration levels in the area.

Such person shall keep for a period not less than six months all records gathered as a result of this paragraph B, and shall make these available to the Air Pollution Control Section upon request.