HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT
ELECTRIC GENERATING STATION
PLANT PROCEDURES MANUAL

SAFETY-RELATED

FOR INFORMATION ONLY Internal Dosimetry Program

PRP2-ZB-01
Rev. 0

APPROVED: W. A. Kinsel / PLANT MANAGER — 3-2-84 / DATE APPROVED — 3-9-84 / DATE EFFECTIVE

This procedure is not described in the FSAR.

1.0 Purpose and Scope

1.1 This procedure describes the internal dosimetry program and specifies required frequencies for performing routine bioassays and body burden analyses (whole body counts).

1.2 An internal dosimetry program is required by federal and state regulations to detect and measure personnel internal burdens of radioactive material and to provide the data necessary to demonstrate compliance with the associated regulations. In addition, the program provides a basis for monitoring the effectiveness of the respiratory protection and contamination control programs.

2.0 Definitions

2.1 BODY BURDEN: The amount of a radioisotope present in the body at the time of measurement or analysis.

2.2 CRITICAL ORGAN: Body organ particularly sensitive to ionizing radiation and/or body organ in which damage is particularly injurious to the health of the individual; organ of interest.

2.3 MAXIMUM PERMISSIBLE BODY BURDEN (MPBB): The amount of a radioisotope which, if deposited in the body, will deliver a dose a) not greater than 100 mRem/week when the critical organ is the total body, gonads, or blood forming organs, or b) not greater than 300 mRem/week for any other critical organ.

2.4 IN VIVO ANALYSIS: The measurement of radioactivity in the human body utilizing instrumentation which detects radiation emitted from the radionuclides in the body.

2.5 IN VITRO ANALYSIS: The estimation of radioactivity in the human body based on (1) measurements of radioactivity in excreta or other materials taken from the body and (2) on a biological model for the radionuclide movement in body tissues and organs.

2.6 BIOASSAY: Any measurement of internal deposition of radionuclides using in vivo and/or in vitro analysis.

3.0 Precautions

3.1 Measures should be taken to ensure that contamination on clothing and external items is excluded from whole body counts. Clean robes and provisions for showers should be available.

3.2 Urine samples for routine analysis should be 24 hour voidings collected while not in the work environment.

4.0 Equipment Required

4.1 Body Scanning Device (bed or chair)

4.2 Sample collection containers

5.0 Procedure

5.1 Whole Body Counting

5.1.1 Specific instructions for operating body counting equipment are given in PRP5-ZO-45 (Spectra Acquisition Using The WBC-6000).

5.1.2 Permanent HL&P employees, contract personnel, visitors, and other temporary personnel assigned work in areas where contamination control measures are used shall have whole body counting performed at the following times:

5.1.2.1 Prior to initial assignment to work in contaminated and/or airborne radioactivity areas.

5.1.2.2 When an individual has been exposed to airborne radioactivity in excess of 2 MPC-hours in one day or 10 MPC-hours in any 7 consecutive days.

5.1.2.3 At the discretion of supervision when there is reason to suspect that an individual may have inhaled, ingested, or absorbed radioactive material.

5.1.2.4 Upon termination of employment or end of assignment.

5.1.3 HL&P employees shall have whole body counting performed at intervals not exceeding once annually while performing permanent assignments at nuclear facilities.

5.2 Excreta Collection and Analysis

5.2.1 Specific instructions for sample processing are given in PRP2-ZB-02 (Biological Sample Collection) and PRP2-ZB-03 (Body Burden Analysis).

5.2.2 Samples of excreta (urine and/or feces) shall be collected as specified by Radiological Services Supervision when there is reason to believe that an individual has inhaled, ingested, or absorbed any of the following radioactive materials:

5.2.2.1 A pure beta or low energy X-ray emitter such as H-3, Fe-55, or Sr-90.

5.2.2.2 An alpha emitter such as Am-241, enriched U, or PU-239.

5.2.3 Radiological Services Supervision shall determine the method of analysis for excreta samples on a case basis. (Excreta analysis may be performed by an approved vendor).

5.3 Actions Based on Bioassay Results (See Addendum 1)

5.3.1 If the baseline BBA indicates results of $\geq$ 10% of the MPBB the Radiological Protection Supervisor shall be notified, and he will specify the conditions under which the individual is to be allowed to work in areas where there is a potential for internal contamination.

5.3.2 If routine bioassay results indicate a body burden for an individual of less than 5% of the Maximum Permissible Body Burden (MPBB) above the baseline Body Burden Analysis (BBA), special action is not required.

5.3.3 During a routine bioassay, if results indicate a body burden for an individual greater than 5% but less than 10% of MPBB above baseline BBA, the following actions shall be taken:

5.3.3.1 Repeat bioassays shall be performed to confirm the results found on the routine bioassay.

5.3.3.2 The Radiological Protection Supervisor shall determine possible cause and determine work assignment limitations (Addendum 1).

5.3.4 During a routine bioassay, if results indicate a body burden increase for an individual of greater than 10% of the MPBB, the following actions shall be taken:

5.3.4.1 The individual shall be barred from work in the Controlled Area pending further evaluation and estimates of internal radiation exposure.

5.3.4.2 Repeat bioassays shall be performed to confirm the results found on the routine bioassay.

5.3.4.3 The Radiological Services Manager shall initiate an investigation to determine, if possible, the location, time, and cause of the uptake.

5.3.4.4 Based on the data available, Radiological Services Supervision shall calculate, or have calculated, the whole body and/or organ dose to the individual resulting from the uptake.

5.3.4.5 The calculated whole body dose delivered in each calendar quarter shall be entered on the individual's NRC Form-5 or equivalent and shall be added to any other whole body exposure incurred during the same quarter. Exposure from organ uptakes shall be maintained on a separate NRC Form-5 or equivalent for the individual with applicable whole body exposure contributions added to the NRC Form-5 equivalent on which whole body exposures are recorded.

5.3.4.6 Following investigation of the uptake, the Radiological Services Manager shall specify the conditions under which the exposed individual may resume normal duties.

5.3.5 Actions taken as a result of bioassay results shall be documented and be retained in the individual's permanent dosimetry file.

5.3.6 Results of whole body counts and in vitro bioassay results shall be retained as are personnel exposure records.

5.3.7 Any calculations used to estimate dose from internally deposited radionuclides will be retained in the individual's personal dosimetry record.

6.0 References

6.1 10CFR20, Standards for Protection Against Radiation

6.2 Regulatory Guide 8.9 Acceptable Concepts, Models, Equations, and Assumptions for Bioassay Program

6.3 ICRP Publication 2, Report of ICRP Committee II on Permissible Dose for Internal Radiation (1959)

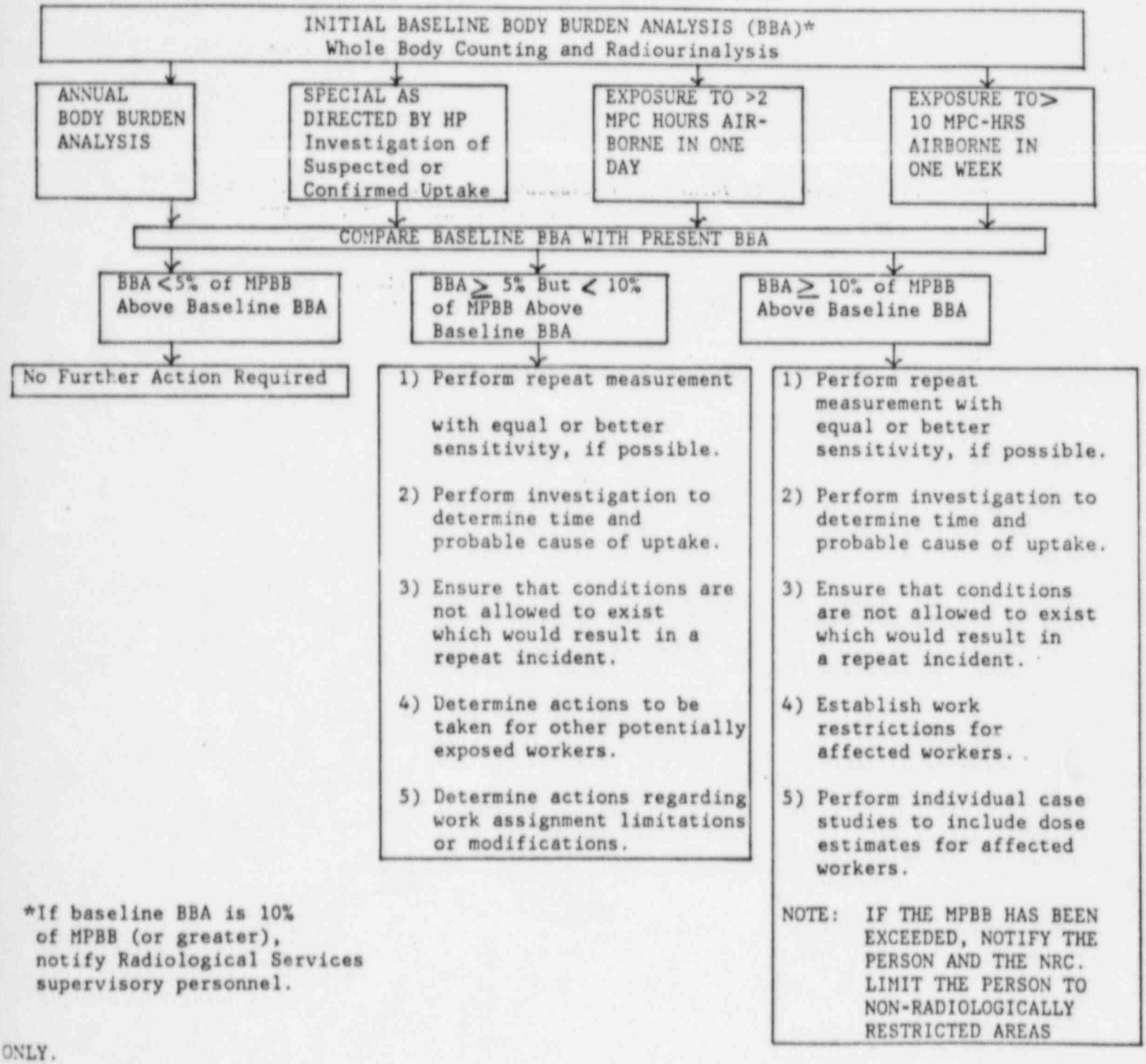
6.4 ICRP Publication 10, Evaluation of Radiation Doses to Body Tissues from Internal Contamination Due to Occupational Exposure, A Report by Committee 4 (1968)

6.5 ICRP Publication 10A, An Assessment of Internal Contamination Resulting from Recurrent or Prolonged Uptakes, A Report by Committee 4 (1971)

7.0 Support Documents

7.1 Addendum 1 - Bioassay Program Flow Diagram

ADDENDUM 1
BIOASSAY PROGRAM FLOW DIAGRAM



*If baseline BBA is 10% of MPBB (or greater), notify Radiological Services supervisory personnel.

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