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## Calhoun Operations

### Radiation Protection Program

#### I. Introduction

Employees of and visitors to Bowater Incorporated (Bowater) face few potential radiation hazards at the Calhoun facility. While these hazards may not be eliminated entirely, they can be minimized through the development and implementation of prudent radiation safety practices.

It is the responsibility of Bowater to provide a workplace environment in which all employees, visitors, contractors, and subcontractors are adequately protected from exposure to ionizing radiation and radioactive material.

The primary purpose of this Radiation Protection Program (RPP) is to minimize the total potential risk of harm or injury incurred by employees, contractors, or visitors as a result of work-related activities involving radiation and/or radioactive sources. However, this goal is only achievable if each Bowater employee, visitor, and contractor assumes some responsibility for ensuring radiological safety at the Calhoun facility by integrating the following three principles into all aspects of routine company operations. These principles are designed to govern all work activities with the potential for exposure to radioactive materials:

- No activity or operation involving exposure to radiation shall be conducted unless its performance is necessary for the completion of the assigned task and will produce a net positive benefit.
- All radiation exposure shall be kept as low as reasonably achievable (ALARA) considering economic and social costs.
- No individual shall receive radiation doses in excess of federal or administrative limits.

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1.0	Definitions

Background Radiation - Background radiation is radiation from natural and man-made sources that is not directly associated with Bowater activities and is not considered work-related radiation.

Radiation Area - A radiation area is any area accessible to personnel, where radiation levels exist such that a major portion of the body could receive a dose equivalent in excess of five (5) millirem in any one hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

Radiation Safety Officer (RSO) - The RSO is the individual specified in the Radioactive Materials License issued by the Tennessee Department of Radiological Health who is responsible for the adherence to that license, this RPP, and other supporting elements. This individual is also responsible to insure workers are provided with training, instruments, and protective equipment needed to perform their work in accordance with this RPP and other supporting elements.

Radiation Source - A radiation source is any material capable of producing ionizing radiation.

## 2.0 Control of Work with/near Radioactive Materials

Prior to initiating any work involving radioactive materials, a task- or location-specific hazard review will be performed (Attachment I). Such a review shall be generated by the supervisor and signed by the RSO or comparably qualified designee. The review will include the following:

- Review date
- Expected date(s) of task performance
- Name(s) and ID numbers of employee(s) or contractor(s) to perform work
- Location(s) of radioactive source
- Task description
- Expected task duration
- Expected dose (millirem) to each worker.

Note: When the review indicates any worker(s) would receive more than 5 millirem during the performance of the task, the worker(s) must wear personnel monitors (i.e., must be badged) such as thermoluminescent detectors (TLDs). Use of such monitors would be accomplished according to the appropriate procedure.

This review shall be signed and dated by the worker(s) prior to performing the work. Leak tests performed by the employees of or subcontractors to the radiation source manufacturer(s) are exempt from this review.

If the task duration or dose to any worker exceeds the information recorded in the review, a post-task review must be performed and must be attached to or included on the original review. The post-task review must include the reason for the extended duration or the greater dose. An estimated/calculated dose to each unbadged worker must be included.

## 3.0 Training in Radiation Protection

Personnel who will be part of a task that requires a hazard review, as described in Section 2.0, and other personnel designated by the RSO shall be trained

in radiation protection in accordance with the Basic Radiation Awareness Training approved by Bowater. The RSO has the authority to accept as a substitute training provided outside of Bowater that meets or exceeds Bowaters Basic Radiation Awareness Training.

The Basic Radiation Awareness Training is designed to provide an awareness of Bowater radiation protection practices to workers who meet the above criteria, but who are not considered radiation workers. This training consists of 2-4 hours of classroom training in the following topics:

- Basic radiation protection concepts
- Applicable federal, state, and Bowater radiation protection procedures and other supporting elements
- Worker and management responsibilities for radiation safety
- Identification of radiological postings, barriers, labels, boundaries, and monitors
- The risk of low-level occupational radiation exposure
- The risk of pre-natal radiation exposure
- Emergency procedures.

Basic Radiation Awareness Training will be updated annually. Training records shall be maintained by the RSO. These records shall include: attendance sheets, results of examinations, copies of examinations, course lesson plans, and a copy of the certificate of completion.

#### 4.0 Radiation Exposure Control

**External Exposure Limits:** External exposure limits for Bowater employees, visitors, and contractors shall be consistent with those established by the State of Tennessee in the State Regulations for Protection Against Radiation (SRPAR) 1200-2-5-.50, Occupational Dose Limits for Adults. In developing the radiation protection requirements for a task, the RSO or comparably qualified designee shall specify the appropriate requirements. The administrative goals for exposure of Bowater employees, visitors, and contractors shall be ten percent or less of the regulatory limits.

**Exposure of the Unborn:** Exposure limits for the unborn child shall not exceed those established by the NRC in 10 CFR 20.1208 for the entire gestation period. Employees working with radioactive material shall be informed of the potential effects that may result to an embryo-fetus at low exposure levels. Employees shall be encouraged to notify the RSO regarding suspected or confirmed pregnancies. When pregnancy is declared in writing, evaluation shall be performed by the RSO to determine the potential for the employee to exceed the regulatory exposure limit during the nine-month gestation period. If the potential exists or if an employees request for transfer is approved, the employee will be transferred in accordance with the Bowater Labor Agreement to a different job assignment during the pregnancy, as appropriate and feasible.

External Dose Assessment: External dose assessment is to be performed by the RSO or comparably qualified designee. Such an assessment can be performed by work station, work area, or individual, as appropriate. If the assessment reveals a potential for any work station, work area, or individual to receive in normal work shifts more than one percent of regulatory dose limits, either the area will be changed to reduce the dose or a personnel dosimetry program will be established by Bowater.

## 5.0 ALARA

Although the occupational radiation exposures incurred by employees, visitors, or contractors of Bowater are historically low, all exposures are assumed to entail some risk. Therefore, the following three principles designed to govern work activities with the potential for exposure to radiation or radioactive materials shall be adopted:

- No activity or operation involving exposure to radiation shall be conducted unless its performance is necessary for the completion of the assigned task and will produce a net positive benefit.
- All radiation exposure shall be kept as low as reasonably achievable (ALARA) considering economic and social costs.
- No individual shall receive radiation doses in excess of federal or administrative limits.

An ALARA review shall be conducted by the RSO or comparably qualified designee at least annually. This review shall include external dose assessments as they are described in Section 4.0 of this RPP. Also to be included in the review is a description (list, graphic, etc.) of sources new to Bowater since the last ALARA review.

The results of the ALARA reviews shall be maintained by the RSO.

## 6.0 Instrumentation

Instrumentation used by Bowater employees or contractors to assess radiation exposure levels shall be of sufficient sensitivity and accuracy to assess radiation exposure levels appropriate for Bowater. Instrumentation shall be tested and calibrated as recommended in ANSI N323. Radiation protection instruments shall be calibrated at the frequency specified in the licensing documents and/or at least annually. The RSO is responsible for providing calibrated instruments for use. Calibration and repair records shall be maintained by the RSO. An instrument inventory list will also be maintained by the RSO.

## 7.0 Radiological Postings

Radiological area definitions and postings/labeling requirements throughout Bowater shall be as described in 10 CFR 20, Subpart J. Recognition of the postings/labelings used at Bowater and their meanings shall be included in the Basic Radiation Awareness Training described in Section 3.0 of this RPP.

The trefoil (three-blade) symbol in magenta and yellow or black and yellow will be displayed on the radioactive source housing such that a worker in the

vicinity of the source would be aware of the presence of a radiation source.

The trefoil (three-blade) symbol in magenta and yellow or black and yellow will be displayed with the words "CAUTION - RADIATION AREA" in areas accessible to personnel where radiation levels exist such that a major portion of the body could receive an external dose equivalent in excess of five millirem in any one hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

Areas with potential for greater external dose equivalents do not exist at Bowater

#### 8.0 Receipt, Handling, and Identification of Radioactive Materials

Incoming packages known or suspected to contain radioactive materials shall be monitored for exposure rate and removable external contamination in accordance with 10 CFR 20.1906. Radioactive material shall be marked as such to ensure proper handling and storage, as stated in SRPAR 1200-2-5-.115, Procedures for Receiving and Opening Packages, and SRPAR 1200-2-5-113, Labeling Containers.

Equipment containing internal radioactive sources which are brought intact for installation by the manufacturer to Bowater is exempt from such monitoring. However, Bowater will maintain a current listing of received materials in accordance with the requirements of the Radioactive Materials License.

A designated storage area will be identified and maintained. The storage area will be clearly posted in accordance with the dose rates, 10CFR20, and Tennessee State Regulations (SRPAR 1200-2-5).

#### 9.0 Transportation of Radioactive Materials

Radioactive material which is shipped from Bowater shall be packaged and shipped in a manner which minimizes the radiation exposure to the shippers, the general public, and to the environment. Shipments shall be packaged, surveyed, and labeled in accordance with U.S. Department of Transportation (DOT) regulations, 49 CFR 173.400, Subpart I. Prior to shipment of radioactive material from Bowater, the RSO shall determine that the receiver is licensed to receive the type, quantity, and form of radioactive material present in the shipment. A copy of the receiving facility's license or a certification that the facility is licensed for possession of the material is required prior to shipment.

#### 10.0 Radiation Protection Records

Records shall be maintained in order to document implementation of this RPP and to demonstrate compliance with state license requirements. Records relating to this RPP shall be maintained for the duration of the license, or disposed as authorized by the Tennessee Department of Radiological Health. Records shall include:

- Training records on each worker indicating date of training, test results, instructor name/company name, examination, and course lesson plans

- Instrument calibration records
- Documentation on dose/exposure estimates
- Site monitoring data (surveys, leak tests, etc.) collected by Bowater employees or contractors.

These records will be maintained by the RSO or designee.

ATTACHMENT I  
Hazard Review

Review Date:

Reviewer:

Expected date(s) for task performance:

Name(s) and ID numbers of employee(s) or contractor(s) to perform work:

Location(s) of radioactive source (Note here if provided as attachments.):

Task description:

Expected task duration:

Expected dose (millirem) to each worker:

Comments:

Reviewers Signature and Date:

Worker(s) Signature(s) and Date: