

SAFE PLANT OPERATIONS APPLYING THE TECHNICAL RECOMMENDATIONS DOCUMENT (TRD)

G.E. (Friedl) Brudermann
Frido Consulting, 8015 Redrooffs Road, Halfmoon Bay, B.C. V0N 1Y1

Abstract

The current TRD is a 1999 update of the original five TRDs published in 1988. It was developed by a committee consisting of federal and provincial regulators and industry representatives. The TRD sets objectives for the design and operation of wood preservation facilities aimed at preventing environmental contamination and worker exposures to wood preservatives. Sets of recommendations based on best available technology are provided for each of the commercial preservatives. These are considered to lead to meeting the TRD objectives. Detailed recommendations are made for the safe design of all plant features, including containment, tankage, ventilation, process equipment, drip areas and storage yards as well as operational practices that include training, protective equipment, hygiene, waste management, emergency response and site and workplace monitoring.

The TRD objectives have been adopted by the Strategic Options Process (SOP) conducted by Environment Canada, by which all preservation plants are compelled to comply by year-end 2005.

Background

Wood preservation prolongs the service life of a wide range of wood products. Hence, it has become essential to the Canadian economy and the life style of Canadians through products such as railway ties, power and telephone poles and wood materials used for structures in bridges, highways and around homes.

Wood preservation chemicals by their very nature are toxic and can cause harm to the environment and those persons involved in their application at treatment plants if not used properly. The impregnation processes require bulk storage and handling of these chemicals and great care must be taken in the effective custody throughout the process to prevent any adverse impacts on the environment and worker health.

Under the Strategic Options Process (SOP) for the wood preservation industry that is currently being carried out by Environment Canada, all management practices of that sector have been reviewed and recommendations made that are considered to lead to the safe use of preservative chemicals.

One of the recommendations was for the industry to meet the objectives of the “Recommendations for the Design and Operation of Wood Preservation Facilities” (TRD) by 2005. The current TRD, published by Environment Canada in 1999 is an update of the original five TRDs issued in 1998, each covering one of the preservative systems: CCA, ACA, Creosote, Pentachlorophenol pressure facilities and Pentachlorophenol thermal facilities.

The current TRD encompasses all these systems in one document. It contains background information on the industry, the processes used and the characteristics of the preservative chemicals.

Objectives are presented for the design and operation of facilities and recommendations made, how these objectives can be met. These recommendations are based on best available technology. They cover plant design aspects for all distinct functional areas:

- Chemical receiving and unloading
- Chemical storage
- Chemical mixing
- Treatment process systems
- Freshly treated wood drip areas
- Treated wood storage yards

Recommendations are also made for all required good practices in plants, including:

- Personnel training and manuals
- Precautions and protective equipment
- Personal hygiene
- Housekeeping and maintenance
- Solution management
- Process controls
- Record keeping
- Emergency response
- Waste handling
- Workplace and site monitoring

These recommendations have recently been supplemented by more detailed information contained in “Technical Guidance Document for the Development of TRD Implementation Plans for the Wood Preservation Sector” (Environment Canada, 2001).

Industry, under the SOP, is now implementing the recommendations. It will have to comply with the TRD objectives by December 31, 2005. The following presentation outlines some of the main recommendations contained in the TRD.

**SAFE PLANT OPERATIONS
USING THE
TECHNICAL
RECOMMENDATIONS
DOCUMENT (TRD)**

Presented by

G.E. Brudermann, M.Sc.F.

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TRD BACKGROUND

- **1984-1988 ORIGINAL DEVELOPED BY STEERING COMMITTEE (5 DOCUMENTS)**
- **1995-1999 UPDATE (SINGLE DOCUMENT)**
- **CONTENTS:**
 - » **GENERAL INFORMATION**
 - » **SPECIFICS FOR CCA, ACA, CREOSOTE, PCPP, PCPT**
- **2001 ADDITIONS:**
 - ACQ, ACZA, BORATES**

TRD CONTENTS

- **BACKGROUND INFORMATION**
- **OBJECTIVES**
- **DESIGN AND PRACTICES BASED
ON BEST AVAILABLE
TECHNOLOGY**
- **SUPPLEMENTED BY GUIDELINES**

TRD OBJECTIVES

**REDUCE OR ELIMINATE THE
RELEASE OF WOOD
PRESERVATIVE CHEMICALS
INTO THE ENVIRONMENT**

**MINIMIZE THE EXPOSURE OF
WORKERS TO WOOD
PRESERVATION CHEMICALS**

PLANT OPERATING OBJECTIVES

- **MAINTAIN THE VALUE OF
ASSETS**
- **MINIMIZE THE POTENTIAL
FOR LIABILITIES**

PLANT SITING

- **FOR NEW PLANTS
CONSIDERATION OF SITE
CONDITIONS (e.g. TOPOGRAPHY,
HYDROGEOLOGY, SOILS) ;
POSITIONING TO SURFACE
WATER BODIES AND
GROUNDWATER**
- **NEW AND EXISTING PLANTS:
MORE SENSITIVE SITES REQUIRE
MORE ELABORATE SAFEGUARDS
IN DESIGN AND OPERATING
PRACTICES, AT GREATER COST**

PLANT DESIGN (1)

- **CONTAINMENT**
- **CHEMICAL STORAGE**
- **TREATMENT PROCESS SYSTEM**
- **DRIP AREAS**
- **FIXATION FOR CCA**
- **TREATED WOOD STORAGE**

PLANT DESIGN (2)

CONTAINMENT

**FOR ALL AREAS, WHERE
PRESERVATIVES ARE HANDLED,
STORED AND USED**

- **PRIMARY CONTAINMENT:
SIZE (VOLUME), INTEGRITY,
IMPERMEABILITY
SEALED JOINTS, PROVISION FOR
WASHDOWNS**
- **SECONDARY CONTAINMENT:
IMPERMEABLE TOP COATING OR
LINER UNDER**
- **LOCAL SPILL CONTAINMENT
(PUMPS, VALVES, etc.)**
- **SUBSURFACE LEAK DETECTION,
CONTAINMENT, COLLECTION**

PLANT DESIGN (3)

CHEMICAL STORAGE

- **CONTAINMENT (continuous)**
- **SOUND TANK FARM**
- **ACCURATE, PROTECTED
LEVEL INDICATORS**
- **HIGH LEVEL ALARMS WITH
SHUT-OFF**
- **OVERFLOW PROTECTION
(TO TANKAGE OR
CONTAINMENT)**
- **EXTERIOR VENTING WITH
TRAPS OR INTO KNOCK-OUT
TANK**
- **SIMPLE PIPING, LABELED,
COLOR-CODED (NO
UNDERGROUND PIPING)**
- **SECURITY (UNAUTHORIZED
OPERATION, VANDALISM)**

PLANT DESIGN (4) TREATMENT PROCESS SYSTEM

- **CONTAINMENT**
- **PROTECTED CONTROLS/OPERATOR AREA (INCL. DOOR OPERATION)**
- **EFFECTIVE, WELL MAINTAINED OPERATING EQUIPMENT**
- **VENTING PROVISIONS (NOT INTO WORK AREAS)**
- **RECYCLE PROVISIONS**
- **SUMPS: WITH TERTIARY CONTAINMENT**
- **FLOORS FOR EASY CLEANING**

PLANT DESIGN (5)

DRIP AREAS

- **COMPLETE CONTAINMENT,
ROOFING**
- **PROVISION FOR RECYCLING**
- **PROVISION FOR CLEAN-UP:
SLOPE
SMOOTH SURFACE**
- **PREVENTION OF TRACKING**

PLANT DESIGN (6)

FIXATION FOR CCA

**ONLY WOOD THAT HAS BEEN PROVEN TO
BE FIXED ALLOWED INTO
UNPROTECTED AREA**

- **FIXATION UNDER AMBIENT
CONDITIONS:**
 - CONTAINMENT, ROOFING**
 - PROVISION FOR RECYCLING**
 - PROVISION FOR CLEAN-UP**
 - PREVENTION OF TRACKING**
- **ACCELERATED FIXATION IN
DESIGNATED FACILITIES:**
 - ROOFED, CONTAINED TRANSFER
AREAS**
 - FIXATION CHAMBERS WITH
CONTAINMENT**
 - COLLECTION OF LIQUID /DRY
RESIDUE**
- **FACILITIES AND EQUIPMENT TO TEST
WOOD**

PLANT DESIGN (7)

TREATED WOOD STORAGE

- ONLY DRIP-FREE/FIXED MATERIAL INTO UNPROTECTED YARD
- SEGREGATE TREATED FROM UNTREATED WOOD-MINIMIZE AREA
- PREVENT RUN-OFF INTO SURFACE WATER BODIES
- ELEVATE MATERIAL ABOVE GROUND
- FOLLOW FIRE CODE REQUIREMENTS:
 - VEGETATION CONTROL
 - FIRE LANES
 - STORAGE AWAY FROM BUILDINGS

PRACTICES (1)

- **TRAINING AND MANUALS**
- **PRECAUTIONS AND PROTECTIVE EQUIPMENT**
- **PERSONAL HYGIENE**
- **HOUSEKEEPING AND MAINTENANCE**
- **SOLUTION MANAGEMENT**
- **PROCESS CONTROL**
- **RECORD KEEPING**
- **EMERGENCY RESPONSE**
- **WASTE HANDLING**
- **WORKPLACE AND SITE MONITORING**

PRACTICES (2)

TRAINING AND MANUALS

- **ESTABLISH PROGRAM FOR INITIAL AND CONTINUING TRAINING FOR ALL PLANT PERSONNEL IN ALL ASPECTS OF CHEMICAL HANDLING AND OPERATION, INCLUDING:**
 - CHEMICAL CHARACTERISTICS AND HAZARDS**
 - PROTECTIVE MEASURES AND HYGIENE**
 - OPERATING PROCEDURES (INCL. SOLUTION MAINTENANCE)**
 - EMERGENCY RESPONSE**
 - WASTE HANDLING**
- **UP-TO-DATE PLANT SPECIFIC MANUALS ON ALL ASPECTS OF CHEMICALS AND OPERATION, INCLUDING:**
 - FACILITY DESIGN**
 - OPERATING PROCEDURES**
 - CHEMICAL HANDLING**
 - FIRST AID AND EMERGENCY RESPONSE**

PRACTICES (3) PRECAUTIONS AND PROTECTIVE EQUIPMENT

- **WORK ENVIRONMENT TO BE CLEAN AND DEVOID OF EMISSIONS FROM TANKAGE AND PROCESS EQUIPMENT**
- **AVOID ALL SKIN CONTACT AND INHALATION**
- **WEAR IMPERMEABLE PROTECTIVE EQUIPMENT, WHEREVER POTENTIAL EXISTS FOR CONTACTING PRESERVATIVES (GAUNTLETS, BOOTS, APRON)**
- **WEAR EYE PROTECTION, WHEREVER POTENTIAL EXISTS FOR SPLASHING, AEROSOLE EMISSIONS, etc. (CYLINDER OPENING, VESSEL ENTRY, LEAKS, etc.)**
- **WEAR RESPIRATOR/OXYGEN MASK ON POTENTIAL EXPOSURE TO AIR CONTAMINATED WITH PRESERVATIVE COMPONENTS (e.g. CYLINDER DOOR OPENING, VESSEL ENTRY, WELDING)**

PRACTICES (4)

PERSONAL HYGIENE

- **PREVENT SKIN ABSORPTION, INHALATION AND INGESTION**
- **NO FOOD, CIGARETS AND DRINKS IN WORKING AREAS**
- **WASH HANDS WHEN LEAVING WORKING AREAS, BEFORE**

EATING, DRINKING, SMOKING OR USING THE TOILET

- **WASH SKIN IMMEDIATELY ON PRESERVATIVE CONTACT**
- **GET FIRST AID TREATMENT FOR EYE AND SKIN EXPOSURE**
- **SHOWER AFTER EVERY SHIFT, LEAVE WORK CLOTHING AT THE PLANT AND CHANGE INTO STREET CLOTHING**
- **LAUNDER SOILED WORK CLOTHING SEPARATELY FROM OTHER CLOTHING**

PRACTICES (5) HOUSEKEEPING AND MAINTENANCE

- **ENSURE ENTIRE WORK AREA IS CLEAN, UNOBSTRUCTED AND FREE OF OPEN PRESERVATIVE LIQUID OR DRY RESIDUE**
- **DO NOT USE GENERAL WORK AREA FOR STORAGE OF EQUIPMENT AND MATERIALS**
- **INSPECT PLANT AND CLEAN UP DAILY**
- **REPAIR ALL LEAKS PROMPTLY**
- **ENSURE ALL EQUIPMENT IS OPERATIONAL AND CAN DELIVER THE SPECIFIED PARAMETERS**
- **HAVE A MAINTENANCE PLAN DETAILING PROCEDURES AND RESPONSIBILITIES**

PRACTICES (6)

SOLUTION MANAGEMENT

- **MIX EXACT PROPORTIONS OF COMPONENTS**
- **TEST SOLUTION AFTER EVERY MIX FOR CONCENTRATION AND COMPONENT BALANCE**
- **KEEP SOLUTIONS CLEAN**
- **FILTER RECYCLED SOLUTIONS, WASHDOWN LIQUIDS, etc. PRIOR TO RETURN TO STORAGE**

PRACTICES (7)

PROCESS CONTROL

- **UNLOADING CHEMICALS**
TRAINED AUTHORIZED
PERSONNEL
ACCESS TO EMERGENCY
EQUIPMENT
- **SOLUTION PREPARATION, MIXING**
WEAR ALL PROTECTIVE
EQUIPMENT
FOLLOW WRITTEN
PROCEDURES
- **SOLUTION MAINTENANCE**
- **CHECK SYSTEM FOR LEAKS - EVERY SHIFT**
- **CHECK/CLEAN DOOR SEALS**
- **COMPARE GAUGES WITH RECORDER DATA**
- **OBSERVE PRESSURE AND VACUUM LEVELS**
- **BE PREPARED FOR ABNORMAL EVENTS**
- **WEAR IMPERMEABLE GEAR AND FACE**
SHIELD ON DOOR OPENING
- **WEAR IMPERMEABLE GEAR FOR HANDLING**
OF WOOD, CHARGE REMOVAL, etc.

PRACTICES (8) RECORD KEEPING

- **DAILY RECORDS FOR
CHEMICAL DELIVERY ,
USE AND INVENTORY

CHARGE/TREATMENT
DETAIL

EQUIPMENT CONDITION
AND MAINTENANCE**
- **WASTE INVENTORY (AS
REQUIRED)**

PRACTICES (9)

EMERGENCY RESPONSE

- **HAVE UP-TO-DATE PLANT
SPECIFIC CONTINGENCY PLANS
FOR SPILLS AND FIRE**
- **CONDUCT SPILL AND FIRE DRILLS**
- **HAVE ALL EMERGENCY
EQUIPMENT READY**
 - PERSONNEL PROTECTIVE
EQUIPMENT**
 - FIRE FIGHTING EQUIPMENT**
 - SPILL GEAR**
 - DISPOSAL PROVISIONS**

PRACTICES (10)

WASTE HANDLING

- **MINIMIZE WASTES /SLUDGES BY PROPER SOLUTION MAINTENANCE AND PROCESSING CONTROLS**
- **TRAIN PERSONNEL**
- **FOLLOW VESSEL CLEAN-OUT PROCEDURES**
- **STORE WASTE IN SOUND, CLOSED CONTAINERS - LABEL CONTENTS**
- **KEEP RECORDS**
- **ARRANGE FOR APPROPRIATE DISPOSAL**

PRACTICES (11)

WORKPLACE MONITORING

- **TO ENSURE WORKPLACE IS SAFE**
- **PLAN FOR REGULAR, ALL ENCOMPASSING TESTING (FREQUENCY, AREAS, PERSONNEL, CHEMICALS AND COMPONENTS)**
- **PEAK AND AVERAGE LEVELS**
- **PRE-EMPLOYMENT AND ANNUAL MEDICALS**

PRACTICES (12)

SITE MONITORING

- **TO DETERMINE ON- AND OFF-SITE CONTAMINATION**
- **ESTABLISH A SITE SPECIFIC MONITORING PLAN**

SOIL

GROUND WATER

SURFACE WATER BODIES

FREQUENCY

CONSTITUENTS

AIR EMISSIONS

LIQUID WASTE STREAMS

(INCL. STORMWATER RUN-OFFS)