ALASKA WELDING CENTER, INC.

RADIATION SAFETY PROGRAM

REVISION SHEET

Rev. _____

Date _____

Appr. S.M.W.

REV. NO.	REV. DATE	PART NO.	SECTION NO.	SECTION PAGES	DESCRIPTION OF CHANGE	SIGNATURE
11	5-31-85	I	Front Matter	i, ii, iii, v, vi	Revised Page Numbers Add Page iii	S.M. Watson
		II	Front Matter	i, ii	Revised Page Dates	
		II	15.0	1,2,3,4,5 2,3,4,5	Revised Page Numbers Add new license amend. No. 12	
12	12-26-85	I	Front Matter	iii	Add Revision No. 12 to AWC Program	S.M. Watson
		I	Index	v	Add Para.10.0 to Sect.5.0	
		I	5.0	24,25	Add Pages	
		I	5.0	1 through 23	Change Page Numbers	
13	04-13-87	I	Front Matter	iii	Add Revision No. 13 to AWC Program	S.M. Watson
		I	Index	v	Add Para.11.0toSect.5.0	
		I	5.0	26,27	Add Pages	
		I	5.0	1 through 25	Change Page Numbers, Rev. No. and Date	
		II	Index	ii	Add Para.12.0toSect.9.0	
		II	9.0	31,32	Add Pages	
		II	9.0	1 through 30	Change Page No., Rev. No., and Date	
14	08-24-87	I	Front Matter	iii	Add Reveision No. 14 to AWC Program	S.M. Watson
		I	Index	v	Add Para.12.0toSect.5.0	
		I	5.0	28,29	Add Pages	
		I	5.0	1 through 29	Change Page Numbers, Rev. No. and Date	
		II	Index	ii	Add Para.12.0toSect.9.0	
		II	9.0	33,34,35,36	Add Pages	
		II	9.0	1 through 36	Change Page No., Rev. No., and Date	

RADIATION SAFETY PROGRAM
PART I
INDEX

ADMINISTRATIVE PROCEDURES

12.0 TECHNICAL OPERATION "GAMMA RAY PROJECTOR" MODEL 676

12.1 General

It is imperative to avoid dirt from entering the control and guide tubes. Small amounts of dirt may clog cables, tubes and connectors thus causing the unit to jam.

12.2 Control Cable

Inspect the control cable daily for signs of damage. Do not drag cables on ground or floor, stand on cables, or twist or bend excessively. Use protective connector cover when not in use. Recoil the control cable carefully for storage.

12.3 Guide Tubes

Guide tubes shall be given the same careful consideration as control tubes above.

12.4 Cleaning and Lubricating System Cables

The frequency of cleaning and lubrication depends on the amount and type of use. The procedures should be performed whenever the cranking of the control unit becomes difficult. Perform the following:

a) Disconnect the control cable from the projector.

b) Turn the hand crank in the EXPOSE (counterclockwise) direction until the cable disengages from the drive gear. This becomes apparent because further turning of the hand crank will have no effect on the control cable.

c) Pull cable free and coil (not less than 4 inches radius), then soak in non-water-based degreasing solvent. Soak until all foreign matter has been removed. Chlorothene or carbon tectrochloride are acceptable degreasing solvents.

d) Remove the control cable from the control unit by loosening the two fittings. (Before removing the fittings, label them to facilitate reassembly.)

e) Pour degreasing solvent into the control cable tubing to clean. Continue to flush the tubing until the solvent leaving the tubing is free from impurities.

f) Use compressed dry clean air (do not exceed fifteen pounds) to thoroughly dry both the tubing and cable. Any remaining solvent could cause permanent damage. NOTE: Dust or dirt must not come in contact with the cleaned cable and control tube.

g) Lightly grease the drive cable with "Texaco Unitemp" grease. Other greases may form tars or corrosive compounds when exposed to radiation.

h) Carefully feed the cable into the tubing from the cable end which attaches to the projector.

i) When the cable reaches the control unit fitting, guide the cable into the hand crank housing. Slowly turn the hand crank in the RETRACT (clockwise) direction until the cable engages the crank gear.

j) Reconnect the two fittings which connect the control cable to the control unit.

k) Turn the hand crank in the RETRACT direction until the cable is completely contained in the housing. If the odometer reading is not 000 at this time, refer to number 4.6 of this section

12.5 Replacing the Control Cable

To replace the control cable, refer to the cleaning procedure given in Para. 4.4.

12.6 Odometer Adjustment

The odometer in both the 664 and 604 control units has a screwdriver adjustment control. If the hand crank is in full RETRACT position, the odometer should indicate 000. If not, slowly adjust the control to obtain a 000 reading.

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RADIATION SAFETY PROGRAM
PART II
INDEX

13.0 TECHNICAL OPERATIONS "GAMMA RAY PROJECTOR" MODEL 676

13.1 Preparation for Use

Warning: Assemble the system for use only in areas monitored with appropriate radiation measuring equipment.

13.1.1 Guide Tube Assembly

a) At the radiographic focal point, position and secure the snout of the master guide tube using the tripod stand and swivel clamps.

b) Remove the plastic dust caps and attach additional extender guide tubes, as necessary, to the master guide tube.

c) Determine the position of the projector allowing for maximum possible operating shielding. Assuming appropriate shielding is available, the operator will be approximately twenty-five feet from the projector during the actual operation.

d) Lay out the guide tubes as straight as possible directing them toward the projector. Note that the bend radius of the guide tubes should not be under twenty inches. Smaller bend radii may restrict the movement of the control cables.

Note: The guide tubes should not be subjected to any undue stress or abuse which would cause restrictions in the tubes.

e) Remove the shipping plug from the projector connector and attach the last guide tube to the projector.

Caution: Never operate the system with more than three guide tube sections (including the master).

13.1.2 Control Unit

a) Determine the operating site of the control unit. For maximum safety, the operator should be located behind a protective shield.

b) Lay out the control cable as straight as possible directing it toward the projector. Note that the bend radius should not be less than three feet. Smaller bend radii may restrict the movement of the control cable.

Note: The control cable should not be subjected to any undue stress or abuse which could cause restrictions in the cable.

c) Attach the control cable to the projector in accordance with the following sequence:

1) Unlock the projector with the key provided and turn the connector selector ring from the LOCK position to the CONNECT position. When the ring is in the CONNECT position, the storage cover will disengage from the projector.

2) Slide the control cable collar back and open the jaws of the control cable connector. This exposes the male position of the swivel connector.

3) Engage the male and female portions of the swivel connector by depressing the spring-loaded locking pin toward the projector with the thumbnail. Release the locking pin and test that the connection has been properly made.

4) Close the jaws of the control cable connector over the swivel-type connector.

5) Slide the control cable collar over the connector jaws.

6) Hold the control cable collar flush against the projector connector and rotate the selector ring from the CONNECT position to the LOCK position. Keep the projector in the LOCK position until actual operation is ready to start.

13.2 Operation

Thoroughly check all cable connections and bend radii and the position of the snout of the master guide tube. (This represents the radiographic focal point of the source.) To operate the system, perform the following:

Warning: Operate the system only in areas monitored with appropriate radiation measuring equipment.

13.2.1 Unlock the projector connector and rotate the selector ring to the OPERATE position. The source is now free to move.

Note: If cranking becomes difficult at any time during the next step, reverse the direction of the cranking to return the source to the stored position in the projector. First monitor the area with a survey meter to insure that the source is properly stored. Then check the control and guide tubes for excessively small bend radii and repeat the step.

13.2.2 At the control unit (in a shielded area), rapidly rotate the hand crank in the EXPOSE (counterclockwise) direction to move the source out of the projector and into the guide tubes toward the radiographic focal point. Continue to rotate the hand crank until the source reaches the snout which serves as a mechanical stop for the source. The odometer reading will indicate the total distance the source traveled (approximately seven feet for one guide tube section, fourteen feet for two sections, and twenty-one feet for three sections).

13.2.3 Specimen exposure should be figured from the time that the source reaches the snout or stop.

13.2.4 To return the source to the projector, after the desired exposure time has elapsed, rapidly turn the hand crank in the RETRACT (clockwise) direction. Continue to turn the crank until the odometer reading reaches 000 position (Source properly stored).

Caution: After exposure, the projector should be thoroughly monitored with a survey meter before continuing with Step 4.2.5.

13.2.5 At the projector, rotate the connector selector from the OPERATE position to the LOCK position and secure the projector lock.

NOTE: If the projector selector ring cannot be rotated to the LOCK position, the source has not been fully retracted. Check the control unit odometer reading. It should be 000. Turn the hand crank to the full clockwise (RETRACT) direction.

13.3 Operator Disassembly

If the system is to be moved for another exposure or to be stored, the components should be disassembled. Unscrew the guide tube sections from each other and remove the master guide tube from the tripod stand. Place the plastic caps on the tube ends and projector connector to eliminate dust and dirt from entering the tubes. Store the tubes in an area where they will not be subjected to any undue stress or abuse which could cause restrictions.

To disconnect the control unit from the projector, perform the following:

13.3.1 Unlock the projector using the supplied key.

13.3.2 Rotate the connector selector ring from the LOCK position to the CONNECT position. When the selector ring reaches the CONNECT position, the control cable connector will partially disengage from the projector.

13.3.3 Slide the control cable connector collar over the jaws away from the projector.

13.3.4 Open the connector jaws and disconnect the swivel-type connector by depressing the spring-loaded locking pin towards the projector with the thumbnail and separating the male and female swivel connector.

13.3.5 Replace the storage cover on the projector connector and rotate the selector ring to the LOCK position. Remove the key and engage the lock to secure the projector.

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ATTACHMENT TO APPLICATION DATED AUGUST 24, 1987

1. The Technical Operations Model A424-13 source and exposure device Model 676 will be utilized on the Alyeska 48" mainline in the area of Atigan Pass in Northern Alaska. Alaska Welding Center will perform direct visual monitoring and survey of the subject equipment being used in the location described.

   A collimator, Technical Operations Model 719, will be utilized at all times when possible. When no collimation is used a means of shielding such as a ditch, mound of dirt or a piece of heavy equipment (CAT, side boom or ditcher) will be used for additional shielding. Additional shielding will be used such as sheets of lead affixed to the pipe and/or the collimator.

2. Three radiographers will be used to maintain surveillance of the operation.

3. Instruction to all radiographers or assistant radiographers as to the importance of this unusually large curie strength cobalt 60 source will be explained prior to use.

4. Radiographers will be instructed not to attempt to retrieve a disconnected source.

5. The Radiation Safety Officer will determine the recovery procedure to be used in case of an emergency.

Date: August 24, 1987

Sandy N. Watson

Sandy N. Watson, President
Alaska Welding Center, Inc.

Information was given orally to
Beth Riedlinger and R. D. Thomas

R. D. Thomas

R. D. Thomas, Chief
Nuclear Materials Safety Section
Nuclear Regulatory Commission