NY/NFSS WP 0684

NIAGARA FALLS STORAGE SITE

K-65 RESIDUE TRANSFER

WORK PLAN

200-1e

NFSS_01.06_0201_a

NFSS K65 RESIDUE TRANSFER WORK PLAN

Task List

Number	Description
1	Preliminary Inspection of Conditions Inside the Top Dome of Building 434 (Includes Building 434 Survey Plan)
2	Refurbish Existing Tower Ladder
3	Set Platform Pads and Remove Vent Cap
4	Install Work Platform on Building 434
4A	Relief Drain Valve Installation
5	Install Electrical Power, Instrumentation, Cable Climber and Air Hose on Building 434
6	Install Breathing Air Manifold and Air Supply Hose on Top of Pipe Erection Scaffold
7	Cut 5 foot x 5 foot Hole Through the Center of the Building 434 Dome Top
8	Transfer Water from Building 411 to the Building 434 Water Retention Pond
9	Install Hydraulic Mining Unit (P-03) in Building 434 and Transfer of K-65 Residues to Building 411
10	Flush Mining Unit and Hoses and Remove from Building 434
11	Remove Residue Trapped by Lower Convex Dome
12	Cut and Remove Concrete Section of Lower Dome
13	Cut and Remove Concrete Section from Side of Building 434
14	Reattach Hoses to Hydraulic Mining Unit (HMU) and Resume Mining in Lower Sections
15	Clean Out Residues Remaining in Bottom of Building 434

NFSS K-65 RESIDUE TRANSFER WORK PLAN

Task #1 - Preliminary Inspection of Conditions Inside the Top Dome of the Building 434

1.0 OBJECTIVE

- To perform a preliminary inspection of the radiological conditions of the building surface, and of the inside of the top dome through an existing 1-1/8" dia. hole in the top dome. Refer to attached "Building 434 Survey Plan," (Appendix A).

2.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment is required for this task:

1	TLD tree - 6' long with TLDs placed at 1 foot intervals (B)*
2	Air samplers - one short term and one long term (Sample Train per Figure 1) (B)
1	Heavy duty electric powered drill
1	Electric Generator, 5 KW min.
1	1-1/8" carborundum drill bit
1	1-1/4" tapered wood plug
1	Wood Rod - 1 meter long
2	Radiation survey meters (Eberline Model Numbers RO2 or PRS-1/AC-3) or equivalent (B)
1	Hammer, 2 lb.
1	1' x 3/4" chisel
1	Crane for hoisting man cage with personnel and tools to the top of Building 434.
1	Man lift cage sized to carry 2 men, air cylinders, tools and equipment
2	Radios for communication (B)
4	Bottles breathing air, size 9" x 52", 220 ft^3 ea., tied together in pairs (B)

*(B) Indicates Bechtel-furnished equipment or material.

3.0 INITIAL CONDITIONS

- Materials and equipment for radiological and safety protection and controls are available.
- Radiation control zones have been established.
- Radiation control procedures are in place.
- Radiological and safety training of all involved personnel has been completed.
- Industrial safety requirements for the job have been determined and are understood by all personnel.
- Emergency personnel safety plan is in place.
- Radiation Work Permits (RWPs) for the task have been prepared.
- All tools, material, and equipment required for the task are available.
- Communication equipment is on hand and ready for use.
- The approved mancage is on site and located near Building 434.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this task shall have received radiological and industrial safety training.

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment, of size equal to or larger than electric drills.

Initially, all operations performed on top of Building 434 will require full radiation protection gear, including supplied air breathing apparatus. These requirements may be reduced if monitoring indicates that they are not required.

At least two workers shall be required for any task on top of Building 434 to allow for rescue operations if required. Communication between both workers is required.

5.0 PROCEDURE

	Estimated Time Req'd. Minutes	Dose mrem
Step 1 - After dress out of personnel, one worker and one Bechtel HP technician along with breathing air supply cylinders and all equipment and tools required to perform work will be raised to Building 434 dome in the mancage using the crane.	60	

(a) Raise mancage to approximately the 422 ft elevation

(b) Obtain a direct gamma reading at the surface of the building, and at 1 meter from the surface of the building.

(c) Obtain direct alpha readings on surface of building.

(d) Obtain a removable contamination wipe from surface of building, using premarked wipes.

(e) Raise mancage about 10 feet, and repeat Steps b-d.

(f) Repeat Step e until top of building is reached (approximately 5 total positions).

(g) Position mancage at top of building. Before leaving mancage tie off to mancage. As soon as it is convenient tie off to vent cap.

(h) Proceed to plugged hole.

(i) Remove wooden plugs from hole.

(j) Insert sample tube approximately 3 feet into hole (see Figure 1), and obtain about a 10 liter sample (5 minutes at about 2,000 ml per min.)

(k) Retrieve and "bag" sample train.

	Estimated Time Req'd. Minutes	Dose mrem

Note: To comply with sample analysis regime, air sample must be <u>in the counter</u> within 80 minutes after the sampler has been shut off!

Step 2 - (a) Insert T.L.D. tree into hole and secure. Record time.

(b) Obtain gamma readings, at the building surface and at 1 meter from the building surface, in the locations shown in Figure 2.

(c) Obtain fixed and removable alpha contamination readings (and smears), if time permits.

(d) Retrieve TLD tree from hole, record time and "bag" tree. (Minimum time in hole - 15 minutes).

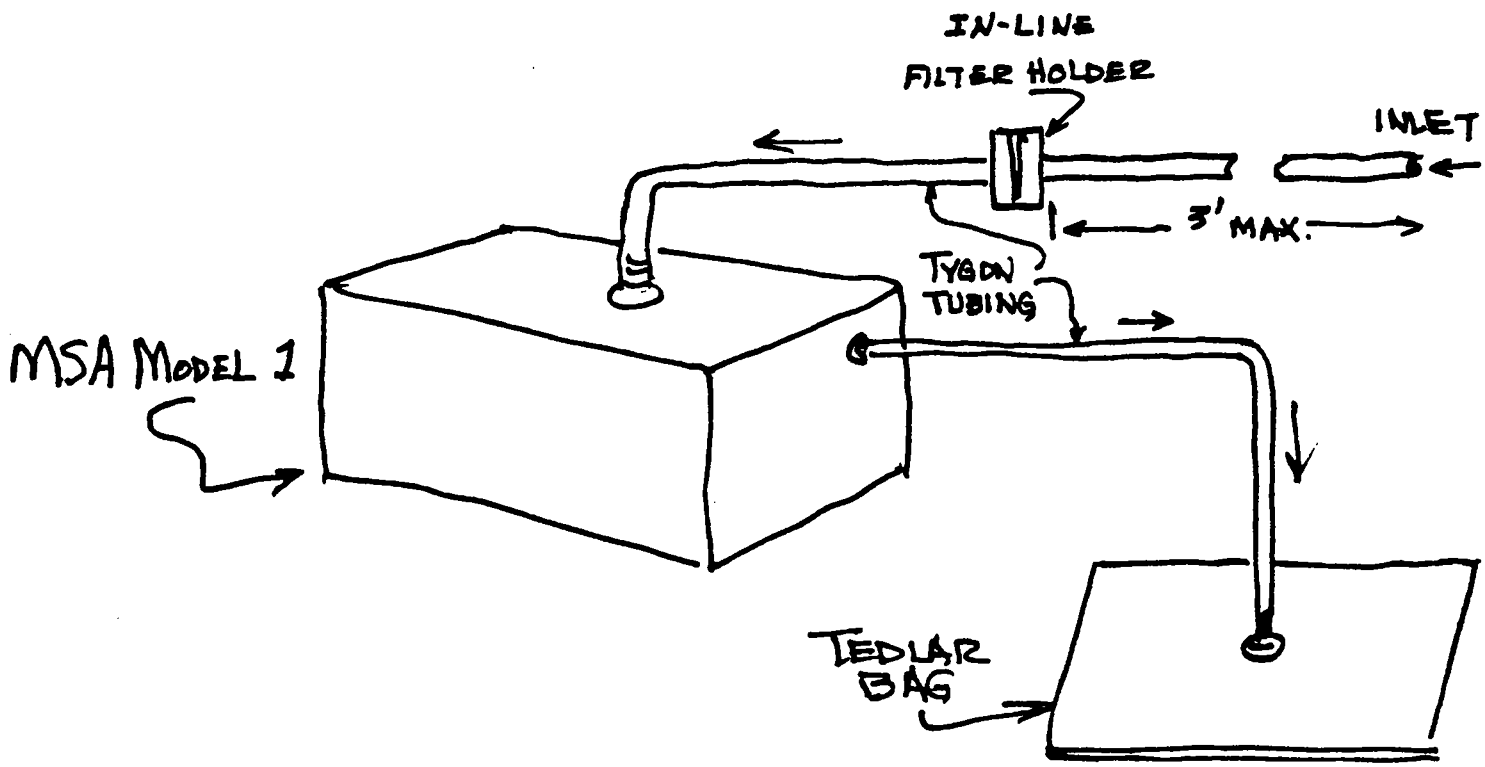
(e) Re-plug hole.

(f) "Bag" all equipment used and return to mancage.

(g) Return to ground level.

Figure 1

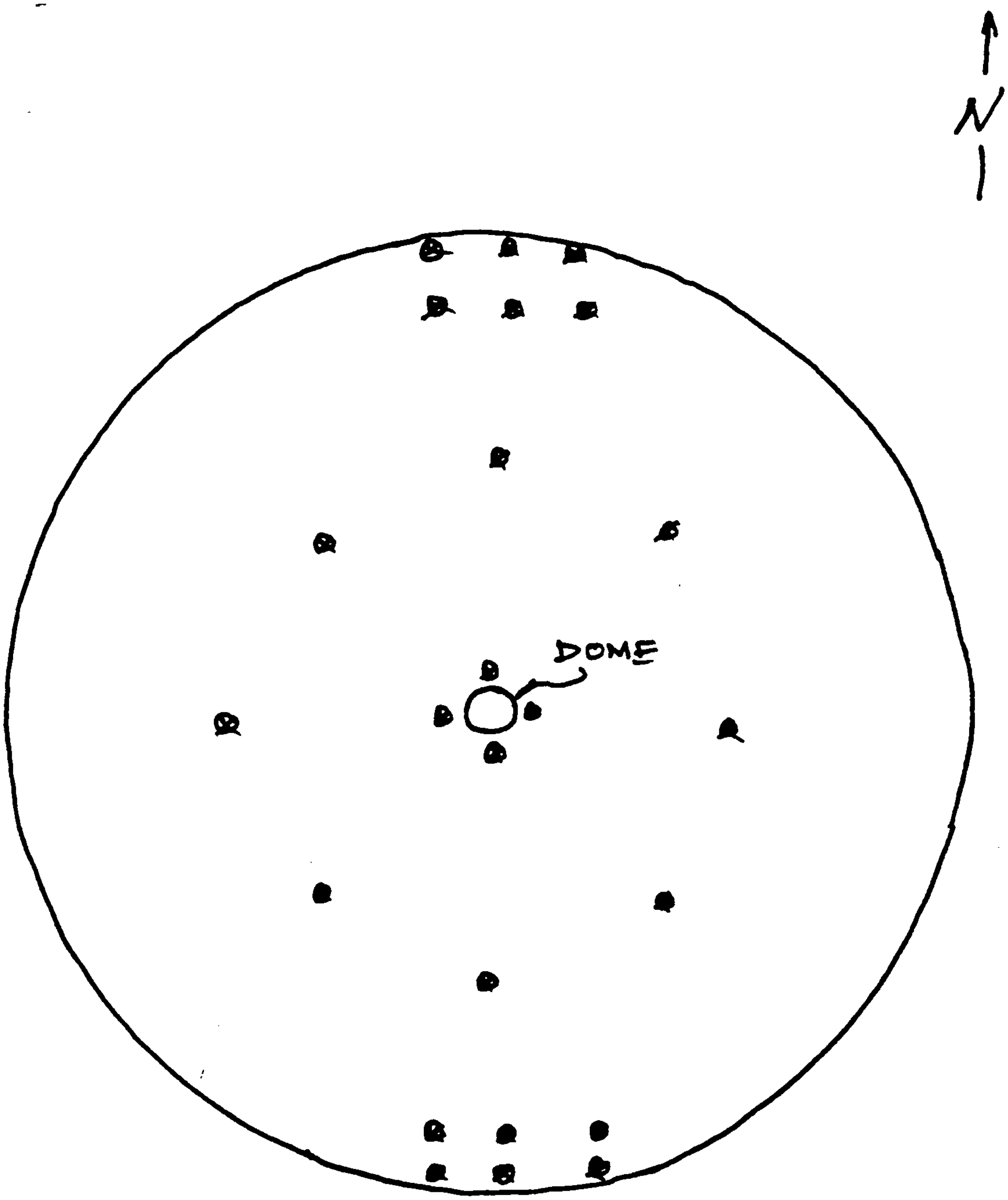
Sample Train



NOTE: → INDICATES DIRECTION OF AIRFLOW

Figure 2

Alpha and Gamma Survey Points



●= SURVEY POINT

APPENDIX A

BUILDING 434 SURVEY PLAN

1.0 OBJECTIVE

The objective of this plan is to provide the requirements for various radiation surveys inside and on top of Building 434. A secondary objective of the plan is to provide the initial Radiation Work Permit (RWP) conditions for access to the top of Building 434.

2.0 REQUIREMENTS

2.1 The Health Physics Subcontractor (Eberline Instrument Corporation) shall be responsible for performing the surveys.

2.2 Construction Subcontractor shall be responsible for providing a helper (laborer) for the Health Physics Subcontractor and providing access to the top of building.

2.3 The Construction Subcontractor shall be responsible for providing an oxygen and combustible gas atmospheric check and a trained individual to operate and interpret the detector's readings.

3.0 SURVEY PLAN

The survey plan shall consist of 5 segments, to be executed in the following sequence.

3.1 Direct penetrating (gamma) radiation readings shall be taken up the side of the building in 10-foot increments, starting at approximately the 422 foot level (or at the point where the outer layer of concrete ends) and ending at the top of the building (or at about the 468 foot elevation).

3.2 A particulate sample of the air inside the building shall be collected and evaluated for radon daughters (e.g. modified Kusnetz method).

3.3 A gaseous air sample shall be collected from inside the building, and evaluated for Radon-222.

Note: Steps 3.2 and 3.3 may be combined if the exhaust of the particulate sampler can be used to fill the bag sample for radon gas.

3.4 Gamma exposure rates shall be obtained from inside the building. These measurements shall reflect the gamma exposure rates at 1 foot increments, from the top of the residues to the top of the building. At least three measurements should be taken at each position to assure accurate data.

Note: In steps 3.2-3.4, extreme care should be taken to assure that sampling/monitoring equipment is not dropped into the residues. In like manner, extreme care should be taken to assure that samples and dosimeters do not become contaminated during sampling and subsequent handling.

3.5 Gamma exposure rates shall be determined over the top of the tower in areas of anticipated work (e.g. along the area where the platform is to be installed), and along a radius approximately one-half that of the building. These readings shall be taken at the surface, and at waist level.

3.6 The atmosphere within Building 434 accessed through the 1-1/8" diameter hole shall be analyzed for oxygen content and combustible gas levels by the Subcontractor. The monitoring device shall be capable of measuring percent of oxygen in the atmosphere, as a percentage of lower explosive limit for combustible gases. The probe is to be inserted into the 1-1/8" diameter hole and allowed to operate for 1 minute on each of the two modes.

4.0 RADIATION WORK PERMIT

The following details the RWP requirements necessary to provide protection against skin contamination and airborne radioactive materials.

Given the time constraints associated with the air sample analysis and the scope of work to be performed, the bottom to bottom time should not exceed 1 hour unless authorized by the Bechtel Health and Safety representative.

Access to the top of Building 434 will require that all individuals shed all personnel clothing and jewelry, (except underwear, shoes and socks) and in the sequence shown, don the following protective clothing/equipment.

- o One piece, white cotton, front entry, zipper closed coveralls. Using 3 in. wide duct tape, tape zipper cover flap closed.
- o Disposable cotton gloves.
- o Disposable plastic (i.e., 5 mil vinyl) gloves, taped to coverall sleeves.
- o Heavy duty, high top, cotton shoe covers taped to coverall legs.
- o Disposable high top, plastic shoe covers taped to coverall legs.
- o Full length, white cotton hood, with shoulder apron taped to coveralls.
- o A TLD and two pocket ionization chambers taped to the coveralls at the waist level.
- o Ankle dosimeters (TLD) taped to ankle.

The foregoing constitutes the inner layer required for contamination protection during removal of the following (outer) air suit layer, and for proper use of exclusion area step off pads.

- o One piece, top entry, 6 mil P.V.C. "Bag" suit.
- o Rolled cuff, 12 in. long, 18 mil, natural rubber gloves taped on bag suit with 3 in. duct tape.
- o Supplied air, double bib hood. The air hood must be classified Type C (Ref. 30 CFR 11 for continuous flow class respirators) and must be NIOSH/MSHA approved. The outer air hood bib is to be taped to the top of the bag suit with duct tape.
- o Low cut rubber overshoes to protect feet of bag suit.
- o A radon badge attached to the air hood as close to the breathing zone as possible.

- A Klien-Burke safety belt (Type 30R) equipped with a 6 to 12 ft. adjustable lanyard (these belts are currently available).

- A lapel air sampler (if required) fastened to the safety belt (motor/pump unit) and at the shoulder (filter paper holder).

Task #2 - Refurbish the existing tower ladder.

1.0 OBJECTIVE

- To refurbish the existing tower ladder so that it will meet current safety standards for center rail ladders.

2.0 EQUIPMENT REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment and materials are available at the work stations.

The following equipment is required for this task:

1 Safety cable with fasteners

2 Grab lock assemblies for connection to cable

2 Sets of tools for mounting cable to ladder

2 Safety belts for use with the safety belt system

1 Crane for hoisting man lift cage to top of tower

1 Man lift cage for two workers, tools, equipment and 4 breathing air cylinders

3 Radios for communication

4 Breathing air supply cylinders, 220 cu. ft./ea. (B)*

3.0 INITIAL CONDITIONS

- o Materials and equipment for radiological and safety protection and controls are available.
- o Radiation control zones have been established.
- o Radiation control procedures are in place.
- o Radiological and safety training of all involved personnel has been completed.
- o Industrial safety requirements for the job have been determined and are understood by all personnel.
- o Emergency personnel safety plan is in place.
- o RWPs for the task have been prepared.

*(B) Indicates Bechtel-furnished equipment or material.

- o All tools, material, and equipment required for the task are available.

- o Communication equipment is on hand and ready for use.

4.0 HEALTH AND SAFETY REQUIREMENTS

- o All personnel involved in the task shall have received radiological and industrial safety training.

- o All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

- o Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails or on the tower ladder prior to installation of the safety cable. Tether lines are required for all portable tools and equipment, of size equal to or larger than electric drills.

5.0 PROCEDURE

The procedure set forth below covers only one method for performing this work task. The procedures developed allow an estimate of the time required to perform this task and consequently allow an estimate of the dose rate for personnel performing the work.

	Estimated Time Req'd. Minutes	Dose mrem
Step 1- After dress out, two workers along with breathing air cylinders if required, cable for ladder and all tools and equipment, will be raised to the ladder work platform on top of the tower. One worker will be dressed out and positioned at the bottom of the ladder at ground level. The upper end of the cable will be anchored to the tower according to manufacturer's requirements. The cable will be lowered down through the cage on the ladder, directed by one worker on top and the one at ground level. The worker at ground level will anchor the lower end of the cable per manufacturer's recommendations. The worker on top will collect tools and equipment	60	

	Estimated Time Req'd. Minutes	Dose mrem
and exit the tower via the mancage. The third worker will complete any other attachments required. If these changes are intermediate, he will exit down the ladder. If the changes are at the top, he will exit via the mancage.		

Task 3 - Set Platform Pads and Remove Vent Cap

1.0 OBJECTIVE

To locate the pad positions for the work platform, place shim stacks, and remove vent cap.

2.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment and materials are required for this task. (Provide all tools of size equal to or larger than electric drills with tie rings.)

- 1 - Crane for hoisting personnel and tools to the top of the tower
- 2 - Heavy duty electric powered drills, with 3/4" carbide bits
- 4 - 1/2" Cinch anchors (more required for anchoring man cage) to be used as personnel tie-offs
- 4 - 1/2" Eye bolts
- 1 - 20 foot T-bar straight edge with carpenter's level
- 4 - 3" x 3" steel shims
- 1 - 25 lb. bucket quick set mortar cement
- 1 - Pointing trowel
- 2 - Heavy duty electric powered impact wrenches, with 1-1/8" sockets
- 1 - Clevis assembly, 3/4"
- 1 - 5/8" x 8' double eye choker
- 1 - Concrete bush hammer
- 1 - Pry bar, 3' min.
- 1 - Mancage large enough to hold a minimum of 2 men, all materials and tools required for work and up to six breathing air gas cylinders, 220 cu. ft. 9" x 52", with manifolds
- 2 - Radios for communication

2 - Safety Belts with Lanyards

1 - Electric Generator, 5KW min

1 - 250' 3 phase #10 power cable with 4-outlet box termination

4 - 50' 3 phase #12 extension cords

1 - Lot plastic bags

2 - 1 gallon plastic jugs of water

1 - Lot plastic sheeting (8 mil)

1 - Supply of rope, including 1 pc. 1" x 20', 3 pcs. 1/2" x 50', and minimum 1 pc. 1/2" x 30' for each tool.

3 - Rolls duct tape

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins.

- o The mancage is on site and near Building 434
- o The crane is in place and ready for lifting
- o The drills, impact wrenches, drill bits, and other tools and materials are ready for use, including tie ropes attached
- o Materials and equipment for radiological controls, such as coveralls, boots, airsuits, air cylinders, etc., are on hand and available
- o Radios for communication are on hand and tested for working order
- o Radiological control zones have been determined
- o Radiological control procedures are in place
- o Radiological training of the Subcontractor personnel has been completed
- o Industrial safety measures have been determined for work to be performed and understood by all personnel
- o Emergency Personnel Safety Plan is in place
- o RWPs have been prepared for work to be performed
- o 5 kw motor-generator at crane location for power to top of tower. Motor running and 10 gallons extra gas.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this task shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied suits or respirators.

Initially all operations performed on top of the Building 434 will require full rad safety gear, including air-supplied breathing apparatus. These requirements may be reduced if monitoring indicates they are not required.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment of size equal to or larger than electric drills.

At least two workers shall be on top of Building 434 while performing tasks, to allow for rescue.

Operations will be stopped and workers returned to the ground during high winds, rain or thunderstorms.

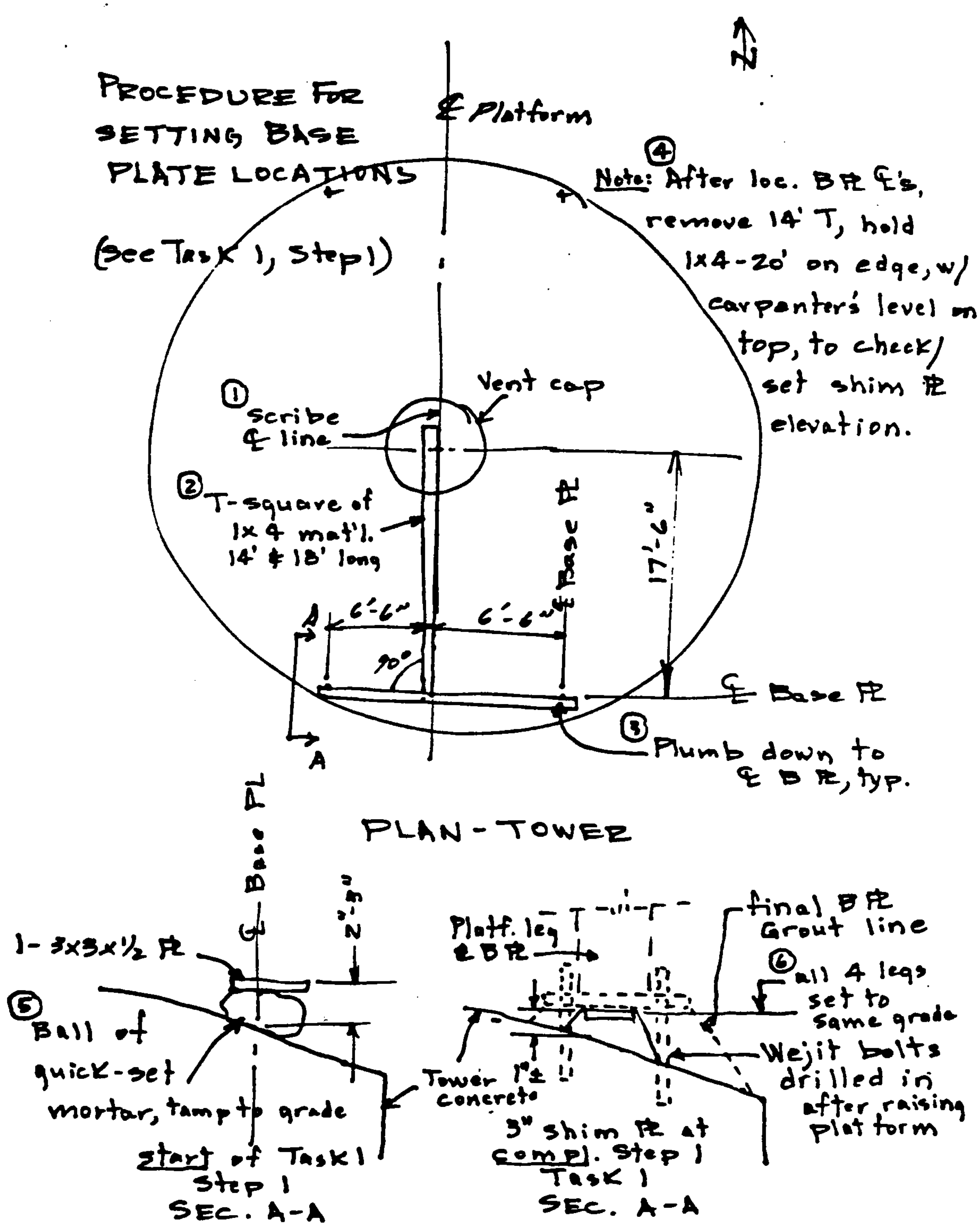
5.0 PROCEDURES

The procedures set forth below cover only one method for performing this work task. The procedures developed allow an estimate of the time required to perform this task and consequently allow an estimate of the dose rate for the personnel performing the work.

	Estimated Time Req'd. Minutes	Dose mrem
Step 1 - After dress out of personnel two workers along with breathing air supply cylinders and all equipment and tools required to perform the work will be raised to the top of the tower in the mancage using the crane. Workers will secure themselves to the dome vent cover in the center of tower dome, by tying off to a 1" rope placed over the cap. The workers will install four cinch anchored eye bolts to be used as man tie-offs and later to be used as temporary tie down for the	20	

		Estimated Time Req'd. Minutes	Dose mrem
	platform. Water will be used to reduce the amount of air borne particulates. The workers will determine if the vent cap is located within 2" of the center line of the tower and then scribe a platform center line on the vent cap. Using a 20-foot T-bar straight edge with level the workers will locate the centers of the shim stacks for the platform legs. The concrete, where the footings will be placed, will be roughened and the 3" x 3" steel shim stack set on quick set mortar (see attached sketch). (Ref. Step 1, Task 4, for alternate to this step.)		
Step 2	The nuts will be removed from the 23 cap hold-down cinch anchored bolts, put in a bag and stowed on the mancage. The clevic assembly shall be inserted in the lifting eye in the top of the cap and connected via the 5/8" choker to the crane whip line hook. Cover the cap with plastic sheeting, tape with duct tape or fiber glass tape, lower it to a haul truck, and transport it to the Building 410 debris storage area. Cover the now-exposed vent with 8 mil PVC or EPDM and seal with tape.	35	
	The tools and other materials will be stowed on mancage and the workers lowered to the ground.	5	

Sketch


PROCEDURE FOR SETTING BASE PLATE LOCATIONS
(See Task 1, Step 1)
℄ Platform
N
④ Note: After loc. B PL ℄'s, remove 14' T, hold 1x4-20' on edge, w/ carpenter's level on top, to check/ set shim PL elevation.
① scribe ℄ line
Vent cap
② T-square of 1x4 mat'l. 14' & 18' long
℄ Base PL
17'-6"
6'-6"
6'-6"
90°
A
A
℄ Base PL
③ Plumb down to ℄ B PL, typ.
PLAN - TOWER
℄ Base PL
2'-3"
1- 3x3x½ PL
⑤ Ball of quick-set mortar, tamp to grade
Start of Task 1 Step 1 SEC. A-A
Tower 1'± concrete
Platf. leg ℄ B PL
final B PL Grout line
⑥ all 4 legs set to same grade
Wejit bolts drilled in after raising platform
3" shim PL at compl. Step 1 Task 1 SEC. A-A

NFSS K-65 RESIDUE TRANSFER

Task #4 Install Work Platform on Building 434

1.0 OBJECTIVE

To place the work platform on Building 434 to provide a stable, safe working area for the ongoing work to be performed at this location.

2.0 EQUIPMENT AND MATERIAL REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment and materials are available at the work stations.

The following equipment and materials are required for this task:

1	Crane for hoisting personnel and tools to the top of the tower and for lifting the work platform in place
2	Heavy duty electrically operated drills
4	1-inch diameter concrete drill bits
4	1/2-inch diameter concrete drill bits
18	1-inch diameter Wej-It, or equal, anchors, nine-6 inches long, and nine-12 inches long, with nuts and flat washers. Embedment depth to be 4-1/2 inches (includes one each spare for each size)
18	1/2-inch diameter Wej-It, or equal, anchors 6 inches long with nuts and flat washers. Embedment depth to be 2-1/2 inches (includes 2 spares)
2	Sets of wrenches and miscellaneous hand tools
1	Man cage large enough to hold a minimum of 2 men, all materials and tools required for work, and a minimum of six breathing air gas cylinders 220 cu. ft., 9" x 52"
3	Radios for communication
3	2-Gallon plastic jugs of water
8	1/2-inch x 12" double eye chokers
4	1-Ton chain or coffing hoists
1	Set chokers for platform rigging

2 ea.	1" x 10" and 3/4" x 6" special toggle bolts (B)*
1	Pre-assembled work platform per Dwg. 202-DD25-C-02
4	50-lb. bags Embeco or equal dry pack mix
1	Mortar mixing pan
2	4" x 16" wood floats for concrete
2	8" Mason's pointing trowel
2	Dry pack sticks, 3/4" x 2" x 18"
16	3" x 3" x 1/2" shim plates
16	3" x 3" x 1/4" shim plates
1	24" Carpenter's level

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins:

- o The tower platform shall be preassembled, outfitted with all electrical equipment and the 4-point breathing air manifold, located near the tower and rigged for lifting
- o The mancage is on site and near Building 434
- o The crane is in place and ready for lifting
- o Radiation control zones have been determined
- o Radiation control procedures are in place
- o Radiological training of the Subcontractor personnel has been completed
- o Industrial safety measurements have been determined for work to be performed and understood by all personnel
- o Emergency Personnel Safety Plan is in place
- o RWPs have been prepared for work to be performed
- o Material and equipment for radiological controls, such as coveralls, boots, airsuits, air cylinder, etc. are on hand and ready for use
- o All the tools and materials to be supplied by the Subcontractor are on hand and available
- o Communication equipment is on hand and in working order.

(B) Indicates Bechtel-furnished equipment or materials.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in installing the platform shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied respirators.

Initially, all operations performed on top of Building 434 will require full rad safety gear including air supplied breathing apparatus. These requirements may be reduced if monitoring indicates they are not required.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment, of size equal to or larger than electric drills.

The area at the base of Building 434 is roped off to prevent entry when danger of falling objects exists.

At least two workers shall be on top of Building 434 while performing tasks to allow for rescue.

Operations will be stopped during high winds, rain or thunderstorms.

5.0 PROCEDURES

The procedures set forth below cover only one method for installing the work platform on Building 434. The procedures developed allow an estimate of the time required and consequently allow an estimate of the dose rate for the personnel performing the work.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out of personnel, three workers, along with breathing air supply cylinders and all equipment and tools required to perform the work, will be raised to the top of the tower in the mancage using the crane. The mancage will be secured to the dome by attaching to previously placed anchors. Workers will also tie off to the previously placed anchors. The man cage will be disengaged from the crane.	15	

		Estimated Time Req'd. Minutes	Dose mrem
	The crane hook will be lowered and attached to the work platform. The platform will be raised to the dome top and positioned in place (Ref. Task 5). If subcontractor did not set 3 x 3 plates during Task 3, he shall land the platform legs on wooden "softeners" to avoid a point load impact of base plates against the tower. The "softeners" shall be removed and replaced by maximum 3 x 3 shim stacks to level the platform.	15	
	The platform will be aligned and tied off to four of the previously placed anchors.	10	
	The holes will be drilled, for the anchor bolts, the bolts inserted and the nuts tightened. While the holes are being drilled one worker will disengage the crane from the platform and the crane hook will be lowered to pick up the dry pack grout (water added in mix pan before raising). The workers will then dry pack the base plates after the nuts have been tightened. The crane will then be attached to the mancage.	25	
Step 2	The holes will be drilled for the platform tension rod anchors (tension rods should be already attached to the platform), Wej-It or equal and nuts tightened and the rod tension adjusted. Equipment and materials should be stowed on the mancage and the mancage disengaged from the anchors. The mancage will then be lowered to the ground.	25	

TASK #4

SUPPLEMENT INSTALLATION OF SHIELDING BOOTH

1.0 OBJECTIVE

To fasten the shielding booth to the work platform on top of Building 434.

2.0 EQUIPMENT REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment and materials are available at the work stations.

The following equipment and materials are required for this task:

1	Crane for hoisting personnel and tools to the top of the tower and for lifting the shielding booth rate place.
1	Mancage large enough to hold a minimum of two men, all materials and tools required for work and a minimum of six breathing air gas cylinders 220 cu. ft., 9" x 52"
2	Radios for communication
1	Pre-assembled shielding booth
108	Lead blankets (B)
1	240 amp welding machine
1	Supply welding rod

1	50 foot length of 1/2-inch rope
1	Electric drill with 9/16-inch diameter wood bit
2	4' x 8' 3/4-inch exterior plywood
35	20 penney nails

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins:

- o The work platform shall have been installed on the top of Building 434
- o The mancage is on site and near Building 434
- o The crane is in place and ready for lifting
- o Radiation control zones have been determined
- o Radiation control procedures are in place
- o Radiological training of the Subcontractor personnel has been completed
- o Industrial safety measurements have been determined for work to be performed and understood by all personnel
- o Emergency Personnel Safety Plan is in place
- o RWPs have been prepared for work to be performed

- Material and equipment for radiological controls, such as coveralls, boots, airsuits, air cylinder, etc., are on hand and ready for use

- All the tools and materials to be supplied by the Subcontractor are on hand and available

- Communication equipment is on hand and in working order.

4.0 HEALTH AND SAFETY REQUIRMENTS

All personnel involved in installing the platform shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied respirators.

Initially, all operations performed on top of Building 434 will require full rad safety gear including air supplied breathing apparatus. These requirements may be reduced if monitoring indicates they are not required.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment, of size equal to or larger than electric drills.

The area at the base of Building 434 is roped off to prevent entry when danger of falling objects exists.

At least two workers shall be on top of Building 434 while performing tasks to allow for rescue.

Operations will be stopped during high winds, rain or thunderstorms.

5.0 PROCEDURES

The procedures set forth below cover only one method for installing the shielding booth on the work platform. The procedures developed allow an estimate of the time required and consequently allow an estimate of the total cost for the personnel performing the work.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out of personnel, two workers along with air supply cylinders and all equipment and tools required to perform the work, will be raised to the top of Building 434 in the mancage using the crane. The workers will exit the mancage and enter the work platform.	10	
Step 2	The crane will then lift the shielding booth to the top of Building 434. The booth will then be secured into place as directed by Bechtel.	120	
Step 3	After the shielding booth is installed, the lead blankets for the sides will be attached to the shielding booth.	180	
Step 4	After laying the lead blankets on the floor with all the grommets lined up, the 20 penney common nails to anchor the blankets to the wood decking. Bend nails over grommets. Install the plywood floor (cut to fit).		

NFSS K-65 RESIDUE TRANSFER WORK PLAN

TASK 4A - RELIEF DRAIN VALVE INSTALLATION

1.0 OBJECTIVE

To install a relief drain for the upper dome compartment.

2.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment and materials listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

- 1 Heavy duty electric powered drill, with two 1/2" carbide bits
- 1 Core drill, electric powered, with rope tether
- 1 3" diameter diamond concrete core drill bit with one 3 foot core barrel (includes 1 spare)
- 7 1/2" cinch anchor bolts, depth 2" with nuts and washers (includes spare, and bolts for core drill support)
- 1 Template to space cinch anchors
- 1 12" x 12" x 3/8" neoprene gasket
- 1 Caulking gun and caulk
- 1 Plate and penetration valve assembly (Figure 1)
- 1 Set of miscellaneous hand tools, with rope tethers
- 1 3/c electric power cable to supply drills, 200' long
- 1 100' x 3/4" water hose (from source to tower top)
- 2 Radios for communication
- 1 Lot Plastic sheeting to "bag" equipment

3.0 INITIAL CONDITIONS

- o Hydraulic mining has not commenced
- o Materials and equipment for radiological and safety protection are available
- o Radiation control zones have been established for the work to be performed
- o Radiological and safety training of all involved personnel has been completed

- o Industrial safety requirements for the job have been determined and are understood by all personnel.
- o Emergency personnel safety plan is in place
- o RWPs for the work to be performed are prepared

All tools, materials, and equipment required for the work to be performed are available at the work location.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this work shall have received radiological and industrial safety training.

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

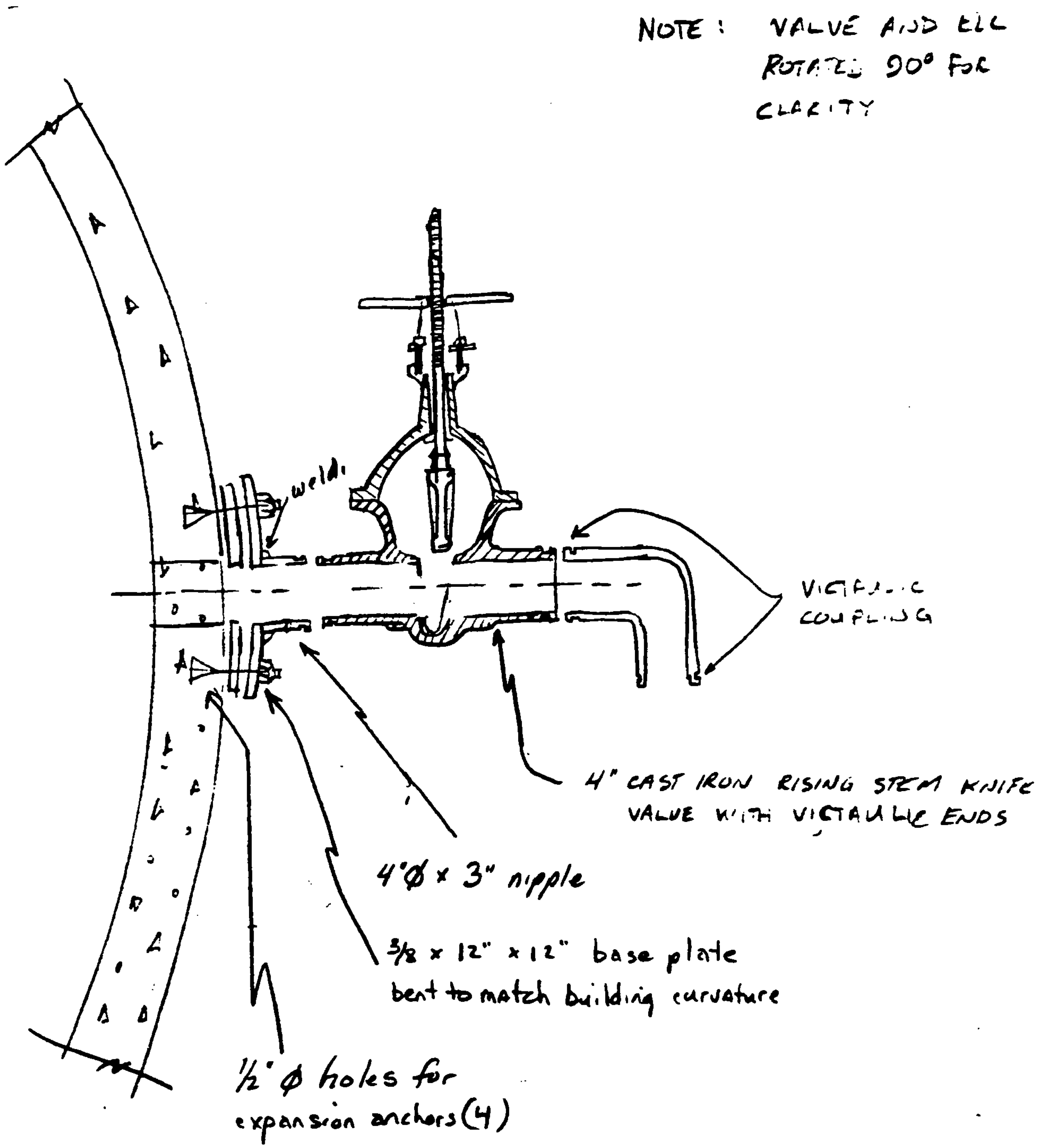
5.0 PROCEDURE

The procedure set forth below covers only one method for performing this work task. The procedure developed allows an estimate of the time required to perform this task and consequently allows an estimate of the dose rate for the personnel performing the work.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out of personnel, two workers and one rad technician along with breathing air supply will proceed to the top of the pipe erection scaffold, east side of Building 434. Locate and mark penetration location.	15	
Step 2	Drill holes (control dust with water hose) and install cinch anchors. Caulk and install neoprene gasket, and plate and penetration valve assembly. Tighten nuts.	40	
Step 3	Open penetration valve and set up core drill to pass through the valve and cut 3" diameter penetration in Building 434.	30	

		Estimated Time Req'd. Minutes	Dose mrem
Step 4	Core drill the 3" diameter penetration, using water to aid cutting and dust control. Upon completion of penetration drilling remove drill and concrete/residue plug and close the penetration valve. Tie a plastic bag over the end of the pipe. Bag the drill assembly and the concrete/residue plug. Dispose of concrete/residue plug in Building 410 debris disposal area.	30	
Step 5	The workers will retrieve tools, etc. and return to the ground.	15	

Figure A - Plan View



Task #5 Install Electrical Power, Instrumentation, and Air Hose on Building 434

1.0 OBJECTIVE

To install all electrical and instrumentation cables and cabinets on Building 434 required for the hydraulic mining unit and TV monitors. To include breathing air supply hose to platform manifold.

2.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment and materials are required for this task. (Provide all tools of size equal to or larger than electric drills with tie rings):

180 Linear feet of 1-1/2" electrical conduit

180 Linear feet of 1-1/4" electrical conduit

180 Linear feet of 1" electrical conduit

200 Linear feet of high pressure breathing air hose certified for use. (B)*

580' Conductors, #2

180' Conductors, #6

180' Conductors, #14

5 Shielded Pairs 180 feet long

360' 2/0 bare, ground wire

4 Electrical pull boxes

30' 16c - #16 Conductors

10 Pipe straps, 2 hole for 1-1/2" conduit

10 Pipe straps, 2 hole for 1-1/4" conduit

10 Pipe straps, 1 hole for 1" conduit

80 Cinch anchors for 1/4" bolts, depth 2 inches

80 Square or hex head bolts 2" long

(B) Indicates Bechtel-furnished equipment or materials.

1	TV Camera assembly
10	Pipe straps, 2 hole for ____" air hose
2	Sets of miscellaneous tools (ratchets, sockets, screw drivers, center punch, etc.)
4	Concrete drill bits, 1/2" diameter, for cinch anchors
1	200' Fish tape
1	Electrical power cable to supply drills, etc.
1	Lot Cable/conductor connection fittings
4	Rolls Vinyl and rubber electrician's tape
2	Electrically operated drills
1	Crane for lifting conduit and air hose
2	Radios for communication
1	Mancage for crane

3.0 INITIAL CONDITIONS

- o Industrial safety measures have been specified and reviewed with all personnel
- o Radiological control procedures are in place
- o Radiological training of the Subcontractor personnel has been completed
- o Emergency Personnel Safety Plan is in place
- o RWPs have been prepared for the work to be performed
- o Radiological control zones have been determined
- o The ladder up the tower has been upgraded and can be used
- o Radios for communication are on hand and tested for working order
- o Materials and equipment for radiological control are on hand and available for use
- o TV camera system has been tested at ground level

- TV control panel and support cable reel had been mounted on the work platform before it was raised into tower top position

- All materials (straps, bolts, anchors, bolts, etc.) and equipment are on hand and available

- Power supply generator and fuel for electrically operated tools is available

- Work platform has been placed on the tower

- Conduit will be assembled on the ground in maximum of 80 foot lengths

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this task shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing, including air supplied suits or respirators if required.

Workers that will be located in or near the tower ladder cage below the 148 foot level will be required to wear contamination clothing, but may not be required to wear respiratory equipment. Above the 148 foot level the workers will be required to wear full radiological protection clothing including air-supplied suits. Depending on conditions, a respirator may be required below the 148 foot level.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment, of size equal to or larger than electric drills.

At least two workers shall be on top of Building 434 while performing tasks, to allow for rescue.

Operations will be stopped and workers returned to the ground in the event of high winds, rain, or thunderstorms.

The area at the base of Building 434 must be roped off to prevent entry when danger of falling objects exists.

5.0 PROCEDURES

The procedures set forth below cover only one method for performing this work task. The procedures developed allow an estimate of time required to perform this task and consequently allow an estimate of the dose rate for the personnel performing the task.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out, two workers will start up the tower ladder and drill holes and install cinch anchors and pipe straps for the hose and conduit with bolts finger tight. Straps should be installed every 20 feet.	100	
Step 2	After dress out, two workers, along with tools, equipment and materials (TV camera, reels of wire to be pulled through conduit, etc.) and breathing air supplied by gas cylinders, will be raised to the top of Building 434. The workers will tie off to the work platform.	10	
	One or two workers will be positioned at the 100 foot level on the tower ladder. When all personnel are in place, the crane line will be bridled to an 80 foot length of preassembled conduit and raise the conduit to the top of the tower. The worker on top the tower will fasten conduit to tower platform and workers on the ladder will strap the conduit to the tower in at least two places. The above operation will be repeated until all three upper conduits and the breathing hose are attached to the tower.	45	

		Estimated Time Req'd. Minutes	Dose mrem
	The crane will then raise the lower preassembled conduit sections to the workers on the ladder who will attach the lower conduit sections to the upper sections and strap the conduits to tower in at least two locations.	45	
	A worker on the ground will strap the conduit to the tower. The above operation for the lower conduit will be repeated until all conduits and hoses are attached to the tower. The worker on tower ladder will then attach the conduits and hose to the tower at all previously determined positions. The ladder worker can then return to the ground.		
Step 3	While the lower sections of conduits are being attached and the remainder of straps fastened, the workers on the tower will be installing and pulling wire as required on the work platform. As each of the conduits is attached to the side of the tower the wire will be pulled through the conduit from the top of the tower to the ground. Once the wire is installed in the conduit, the wiring will be attached to the electrical boxes and instruments.	200	
	The TV camera will be connected to its previously-mounted cable reel and to its power source. A test run will be conducted to determine that the camera will be operable and that an acceptable picture is received on the monitor.	20	

	Estimated Time Req'd. Minutes	Dose mrem
The air hose will be attached to the previously installed manifold on the work platform.	20	
The workers will retrieve tools and materials and be lowered to the ground in the man cage.	20	

Task #6 - Install breathing air manifold and air supply hose on top of pipe erection scaffold.

1.0 OBJECTIVE

To install a breathing air supply to the top of the pipe scaffold for the workers at this position requiring breathing air.

2.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment and materials are available at the work station.

The following equipment and materials are required for this task:

3	Manifolds with four breathing air hose connections each (B)*
1	Length of high pressure breathing air hose 200 feet long (B) rated at 300 psi operating pressure, certified for use.
100	Cable ties
5	U-bolts with nuts and plates, 2-1/2" diameter for manifold and hose
1	Crane for lifting hose and manifold

3.0 INITIAL CONDITIONS

- o Radiological and safety training of all involved personnel has been completed.
- o Industrial safety requirements for the work to be performed have been determined and are understood by all personnel.
- o Emergency personnel safety plan is in place.
- o RWPs for the task have been prepared.
- o All tools, material, and equipment required for the task are available.
- o Radiological equipment and materials are available, such as boots, coveralls and gloves.

* (B) Indicates Bechtel-furnished equipment or materials.

- o Scaffold has been erected.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in performing this work task shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air-supplied respirators.

At least two workers shall be on the scaffold while performing this task to allow for rescue.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines will be required for all portable equipment, of size equal or to larger than electric drills.

5.0 PROCEDURES

The procedure set forth below covers only one method for performing this task. The procedure developed allows an estimate of time required, and consequently allows an estimate of the dose rate for personnel performing work.

		Estimate Time Req'd. Minutes	Dose mrem
Step 1	After dress out two workers will climb to the top of the pipe scaffold. The breathing air manifolds and one end of the 200 foot breathing air hose will be attached to the crane and lifted to the top of the scaffold. The manifolds will be detached from crane load line and attached to the scaffold hand railing with the U-bolts. The hose will be attached to the manifold and to the scaffold using U-bolts. The hose will be hanging from the top so that the worker can descend the scaffold and secure the hose to the scaffold at 10-foot intervals with cable ties.	60	

NFSS K-65 RESIDUE TRANSFER

Task #7 - Cut 5 foot x 5 foot Hole Through the Center of Building 434 Dome Top

1.0 OBJECTIVE

To cut a 5 foot by 5 foot hole through the concrete top dome of Building 434 to allow access for the hydraulic mining unit.

2.0 EQUIPMENT REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment is required for this task:

1	Crane for hoisting personnel, equipment and tools to the top of the tower and for the concrete plug removal.
1	Concrete saw capable of cutting through 6" thick concrete containing rebar. Include 1 spare blade of size required.
1	Personnel hoisting cage capable of lifting three workers, three small breathing air supply cylinders, size 8" dia. by 27" long and all tools, materials and equipment required for this task.
1	Set of material such as expansion anchor tethers required to anchor, etc., to prevent the 5' x 5' section of concrete from falling into the tower and to allow removal and lowering to the ground. (Minimum: four-3/4" Wej-It or equal eye bolts, four-5/8 x 12' dbl. eye chokers, and four-3/4" shackles.)
200 ft	3/4" heavy duty hose, with 30 gpm booster pump for water supply to prevent dusting while sawing concrete. Water hose shall remain at the top platform for decon and spray
1	Spray can, red paint, for cut lay out
2	12' metal tape for layout
2	Heavy duty drills
4	3/4" Concrete drill bits

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins:

- o The work platform shall have been installed on the top of Building 434
- o The mancage is on site and near Building 434
- o The crane for lifting mancage is in place and ready for lifting
- o Radiation control zones have been determined
- o Radiation control procedures are in place
- o Industrial safety requirements have been determined for the work to be performed and are understood by all personnel involved
- o Emergency Personnel Safety Plan is in place
- o RWPs have been prepared for work to be performed
- o Radiological training of the Subcontractor personnel has been completed
- o Materials and equipment for radiological controls, such as coveralls, boots, airsuits, air cylinders, etc., are on hand and ready for use
- o Communication equipment is on hand and in working order
- o Prefabricated cover and hold-down device, for the hole in the dome after concrete removal, is ready for use.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in performing this work task shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied respirators.

Area at base of Building 434 must be roped off to prevent entry when danger of falling objects exists.

All operations performed during this task will require full rad safety gear including air supplied breathing apparatus. Refer to RWP for details.

At least two workers shall be on the top of Building 434 while performing this task to allow for rescue.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment of size equal to or larger than electric drills.

Operations will be stopped during high winds, rain or thunderstorms.

5.0 PROCEDURES

The procedure set forth below covers only one method for performing this task. The procedures developed allow an estimate of the time required, and consequently allow an estimate of the dose rate for the personnel performing the work.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out of personnel, two workers, one H.P. technician, and all equipment, materials and tools required to perform the work will be raised to the top of the tower in the mancage using a crane. The workers will exit the mancage, disconnect from the breathing air cylinders, and connect to the air manifold previously installed on the platform. Four cable chokers shall be attached to the eye bolts on the concrete section and to the crane to prevent the 5' x 5' plug from falling into the tower when the final saw cut is made.	20	
Step 2 -	The saw cut lines will be marked on the dome. If the tension anchors fastened to the tower interfere with saw cutting at the corners, the tension rod at the corner may be disconnected from the dome until the saw cut is made and then reconnected. Only one tension anchor shall be disconnected at any one time. The concrete sawing can be	60	

	Estimated Time Req'd. Minutes	Dose mrem
performed with the present configuration of the work platform if a small saw is used, one less than 2-1/2 feet high. If the saw requires a higher clearance, the 8 and 10 inch beams will have to be removed from the platform to allow clearance for the saw. During sawing, water will be supplied to reduce dust and heat. As soon as the 5' x 5' dome hole sawing is completed, the 5' x 5' slab section shall be lifted from the dome with the crane. The concrete shall be wrapped in plastic and hauled to the Waste Disposal Area. The water hose shall be used to moisten the entire exposed residue surface and interior tower walls above the residues. (Note: Do not cover residues with water.) The temporary opening frame shall be installed. The cover shall be installed when spraying is complete. Any beams removed shall be bolt connected back on the platform and the plank covers reinstalled in the platform opening. The workers will disconnect their breathing air from the air manifold and reconnect to the cylinders on the man cage. The manifold connections shall be covered with clear plastic to prevent contamination of the air supply. The workers will then be lowered to the ground.		

		Estimated Time Req'd. Minutes	Dose mrem
Note:	The dose rate on top of the dome with the radon discharging along with the radiation through the sawed slot is unknown, which may reduce the working time during this operation.		
Contingency Step	If the tower vent interferes with the sawing of the concrete, it will require removal. The vent should be removed by sawing. The material of construction of the vent will be known and the vent size will be determined when the vent cover is removed. The type of saw will be determined by the material of construction.	20	

NFSS K-65 RESIDUE TRANSFER

Task #8 - Transfer Water From Building 411 to the Building 434 Water Retention Pond

1.0 Objective

To configure the slurry transfer system to transfer the water from Building 411 to the Building 434 water retention pond.

2.0 Equipment Required

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment is required for this task:

1 - pump P-01 to transfer water from Building 411 to water (B)* retention pond
1 - radio for communications

3.0 Initial Conditions

The following conditions shall exist before this work task begins:

- o Instrumentation shall be tested and operating procedures in place.
- o Radiation control zones have been determined.
- o Radiation control procedures are in place.
- o The slurry pipe line is installed and tested.
- o The water retention pond is installed .
- o Radiological training of the Subcontractor personnel has been completed.
- o Industrial safety measures have been determined for work to be performed and understood by all personnel.
- o Emergency personnel safety plan is in place.
- o RWP's have been prepared for work to be performed.
- o Material and equipment for radiological controls, such as coveralls, boots, airsuits, air cylinders, etc. are on hand and ready for use.
- o All communication equipment is on hand and in working order.

(B)* Indicates Bechtel-furnished equipment or materials.

4.0 Health and Safety Requirements

All personnel involved in water transfer operations shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied respirators.

5.0 Procedure

This operation shall be carried out while the hydraulic mining and slurry transfer system is not in operation (during off hours).

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	Align the system to allow only the flow of water from Building 411 to the water retention pond. Refer to Operating Procedure B.	30	
Step 2	Transfer water in accordance with Operating Procedure B allowing for a 6" freeboard at the 434 pond.	Var.	

NFSS K-65 RESIDUE TRANSFER

Task #9 - Install Mining Unit P-03 in Building 434 and transfer of K-65 residues to Building 411

1.0 OBJECTIVE

Place Hydraulic Mining Unit (HMU) P-03 into Building 434 tower, connect to hoses, power and instrumentation, and begin pumping slurry.

2.0 REQUIRED EQUIPMENT

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment is required for this task:

1	Hoist for hoisting personnel and tools to the top of the tower
1	Crane with 2 load lines of minimum 5 ton capacity, for lifting mining unit and hoses to the top of Building 434 and lowering mining unit and hoses into the tower during the mining operations. Lift required - Bottom of pump to clear 161 feet
1	250 gpm hydraulic mining unit P-03 (B)*
7	20' sections - 4" diameter rubber slurry hose (B)
7	20' sections - 3" diameter rubber water hose (B)
1	Semi-circular hose carrier yoke (B)
1	TV monitor system
1 set	Power and control cables for the HMU (B)
1 set	Takeup reels for power/control cable
1 set	Power and control panels for power to HMU
1	300 KW generator, w/40 hour fuel tanks
1	Access platform (scaffold) at hard pipe connection, east side of tower
6	Walkie talkies (2 to be hands-free voice actuated) (Includes one for pipeline and one for Building 411.)

*(B) Indicates Bechtel-furnished equipment or materials.

2 3/4" shackle for connection P-03 and hose yoke to load and whip lines

1 Box miscellaneous hand tools

1 Grapple for debris

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins:

- o The crane is in place and ready for lifting
- o Laydown area for mining unit P-03, the hoses, and hose support saddle, has been constructed and ready for use
- o The electrical and instrumentation is installed, tested and ready for connection to HMU
- o Hose required is located at tower ready for connection
- o Hose yoke or approved bridles are constructed and ready for use at Building 434
- o Radiation control procedures are in place
- o Industrial safety requirements have been determined for work to be performed and understood by all personnel
- o The elevator, or equal, is connected and tested
- o Materials and equipment for radiological controls, such as coveralls, boots, air suits, air cylinders, etc. are on hand and available
- o Radios are on hand and tested
- o Radiological training of Subcontractor's personnel is complete, including respiratory exams
- o Emergency personnel plan is in place
- o RWPs have been prepared for this work
- o Pipeline to, and manifold at, 411 Building are complete and tested
- o All 411 Building manifold branch line valves, 001-008, 010, 022 are closed, except on the most southerly feed to Bay C, 009

- Platform is installed, including lead shielded enclosure
- The 250,000 gallon storage pond at Building 434 is at least 60 percent full of water
- Personnel have been trained in the operation of the system
- Radiation technicians available to be present at all operations per direction of Site Health Physics Specialist
- A supply of clean water is available at the top of the tower
- Other Subcontractors are notified of pumping operation, and to stay clear of Building 411 dump bay and the 4" pipe line
- 300 KW generator is running and has a 12-hour fuel supply
- The HMU unit has been tested and has floodlights in operation
- Power and instrument cables are connected to the platform - mounted panels and reeled on the pay-out reels
- HMU vendor's representative is at work site
- Gland seal water is connected to pump P-04 packing seal at proper pressure.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this task shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied suits or respirators.

Initially all operations performed on top of Building 434 will require full rad safety gear, including air-supplied breathing apparatus. These requirements may be reduced if monitoring indicates they are not required.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment.

The area at the base of Building 434 must be roped off to prevent entry when danger of falling objects exists.

At least two workers shall be on top of Building 434 while performing tasks, to allow for rescue.

Operations will be stopped and workers returned to the ground during high winds, thunder storms, or rain.

5.0 PROCEDURES

The procedures set forth below cover only one method for performing this work task. The procedures developed allow an estimate of the time required to perform this task and consequently allow an estimate of the dose rate for the personnel performing the work.

Step	Description	Estimated Time Req'd. Minutes	Dose mrem
Step 1 -	Connect 100 feet (5 sections) each of the 3" and 4" hoses to the HMU, having the <u>second section out</u> from the HMU draped over the yoke, leaving 60' suspended below the opposite side of the yoke. Tie off the hoses, temporarily, to the yoke.	30	
Step 1a	Lift two dressed out workers to the tower top platform.	10	
Step 2 -	Connect the HMU and yoke to the crane load and whip lines.	15	
Step 3 -	Simultaneously raise the HMU and yoke, until the unconnected end of the hoses is even with the tops of the hard pipes. (The bottom of the yoke should be about 10' above the handrail on the platform.)	5	
Step 4 -	Connect the hoses to the hard pipe.	10	
Step 5 -	Lower the HMU to the platform above the top dome opening, simultaneously lowering the yoke. (Yoke to be lowered 1 foot for each 2 feet drop on the HMU.)	5	
Step 6 -	Connect the power and control cables from the takeup/payout reels to the HMU. Turn on the floodlights.	10	
Step 7 -	Continue lowering the HMU until it contacts the residue surface.	5	
Step 8 -	Startup, operation, and shutdown of the HMU shall be in accordance with Operating Procedure A.	15	

		Estimated Time Req'd. Minutes	Dose mrem
Step 9 -	Pump residue, per vertical foot of tower. Requires 2 men on tower, one of which may be rad tech.	200/ft	
Step 10-	As the HMU is lowered into the Building, it will become necessary to add lengths of hose to the high pressure water and slurry discharge lines. This should be done when the hose saddle is in the lowest position. o Secure both hoses to the saddle via a chain. o Disconnect the end of the hose fastened to the rigid pipe. o Install a new 20 foot section and reconnect the new hose to the rigid pipe. Secure all connections. o Remove the security chains. o Raise the hose saddle until all the slack is taken out of the hoses.		
Step 11-	Check generator fuel supply, and maintain, unit, end/start of each shift of pumping.	20	

Task #10 - Flush Mining Unit and Hoses and Remove from Building 434

1.0 OBJECTIVE

To provide a procedure for removing the hydraulic mining unit and hose from the upper tower compartment in preparation for installing unit in the lower compartment.

2.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

1 Crane with two lines

1 Set of plastic bags for covering mining unit and hose sections (5' diameter tube bag for HMU and four-8" diameter by 22' long tube bags for hose sections)

2 Rolls of 1" fiberglass tape for taping bags shut

1 Set of tools for disconnecting hose

3.0 INITIAL CONDITIONS

- o Communication equipment is on hand and ready for use.
- o The pipe sections have been fabricated and assembled to test for fit and have been disassembled into pieces for installation.
- o Materials and equipment for radiological and safety protection and controls are available.
- o Radiation control zones have been established.
- o Radiation control procedures are in place.
- o Radiological and safety training of all involved personnel has been completed.
- o Industrial safety requirements for the job have been determined and are understood by all personnel.
- o Emergency personnel safety plan is in place.
- o RWPs for the task have been prepared.

- All tools, material, and equipment required for the task are available.

- Residue mining has been completed in the upper tower compartment.

- Mining unit and hose laydown area is ready for use.

- Water is available on top of the tower for washing down mining unit and hose.

4.0 HEALTH AND SAFETY REQUIREMENTS

- All personnel involved in this task shall have received radiological and industrial safety training.

- All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

- Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment of size equal to or larger than electric drills.

- The area at the base of Building 434 must be roped off to prevent entry when danger of falling objects exists.

- At least two workers shall be on Building 434 while performing tasks, to allow for rescue.

- Operations will be stopped and worker returned to ground during high winds, rain, or thunderstorms.

5.0 PROCEDURES

The procedures set forth below cover only one method for performing this work task. The procedures developed allow an estimate of the time required to perform this task and consequently allow an estimate of the dose rate for personnel performing the work.

		Estimate of Time Req'd. Minutes	Dose mrem
Step 1	After dress out of two workers, including breathing air, they will proceed to the top of the tower. There, they will connect their air lines to the manifold. When it has been determined that the HMU has removed all possible residue from the upper	90	

		Estimate of Time Req'd. Minutes	Dose mrem
	compartment, the water will be allowed to rise in the compartment with a minimum of pumping. When the water reaches the upper limit set point on the mining unit, the mining unit will be raised approximately 1 foot and the water to the unit cut off. The HMU will be speeded up and water pumped until the lower set point on the mining unit is reached. The mining unit will then be shut off, raised above the water and allowed to drain.		
Step 2	After draining, the HMU will be raised out of the upper dome. As the unit is raised, the unit and hoses will be washed with water, with the water flowing back into the tower. The hoses will be secured to the saddle by chains or rope. The hoses will be disconnected from the mining unit, the HMU enclosed in a plastic cover, and taped shut. The hose ends for the water supply and slurry line will be covered with plastic and sealed with tape.	20	
Step 3	The worker will tie off to the platform the first three 20-foot sections of water hose and slurry hose attached to the piping. The hoses will then be separated leaving the rest of the hoses, two sections each, connected to the saddle. The hose ends will be sealed in plastic tubes. The mining unit and the hose attached to the saddle will be lowered to the laydown area. The workers will return to the ground.	30	

NFSS K-65 RESIDUE TRANSFER

Task #11 - Remove Residue Trapped By Lower Convex Dome

1.0 OBJECTIVE

Removal of the residues trapped by the lower dome and the side walls after slurry mining residues from the upper tower section.

2.0 REQUIRED EQUIPMENT AND MATERIAL

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment is for this task:

1	Crane with boom length capable of serving top of work platform
1	Core drill, gasoline-engine driven, similar to "Minutemen" by Mobile Drill Co.
1	Set-drill rod for above, two 5/8" diameter, 60' minimum assembled length, five-10', three-3', two-2'
1	Water tank, on platform (or booster pump for hydrant water)
2	6" diameter diamond core bits, with 10' core barrel (includes 1 spare core bit)
1	TV monitor system
1 set	1-1/2" x 250' fire hose
1 set	Hand tools for platform modification
1	Temporary platform extension with hand rails (to be used in 4 locations)
10 gal	Fuel for power drill
1	2" x 12" x 12" wood starter block for core bit
1	12' aluminum ladder
1	Ramset gun, with twenty-2-1/2" powder actuated studs.
1	50-foot steel tape
	Plastic sheeting to "bag" equipment

3.0 INITIAL CONDITIONS

The following conditions shall exist before the work task begins:

- o Residues have been mined from the upper tower section to the level of the top of the inner dome
- o The hydraulic mining unit has been bagged and placed on the ground in its temporary storage area.
- o The crane is available to raise material to the platform

- A booster pump (gland seal water supply, or other) is available to boost hydrant pressure to 100 psig at top of tower

- The core drill is rigged for lifting at the base of the tower, and has a full fuel tank

- Materials and equipment for radiological controls, such as coveralls, boots, airsuits, air cylinders etc., are on hand and available

- Safety belts and tether lines

- Radios for communication are on hand and tested for working order

- Radiological control zones have been determined

- Radiological control procedures are in place

- Radiological training of the Subcontractor personnel has been completed

- Industrial safety measures have been determined for work to be performed and understood by all personnel

- Radiation technicians are available to monitor all activities at the point of work as directed by the Site Health Physics Specialist

- Emergency Personnel Safety Plan is in place

- RWPs have been prepared for work to be performed

- The cover for the 5' x 5' opening for the upper dome is in place

- A design has been completed for temporary outrigger platform to support the drill at four locations, including a handrail removal/replacement arrangement.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this task shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied suits or respirators.

Initially all operations performed on top of Building 434 will require full rad safety gear, including air-supplied breathing apparatus. These requirements may be reduced if monitoring indicates they are not required.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment, of size equal to or larger than electric drills.

At least two workers shall be on Building 434 while performing tasks, to allow for rescue.

Operations will be stopped and workers returned to the ground during high winds, thunder storms, or rain.

The area at the base of Building 434 must be roped off to prevent entry when danger of falling objects exists.

5.0 PROCEDURES

The procedures set forth below cover only one method for performing this work task. The procedures developed allow for estimate of the time required to perform this task and consequently allow an estimate of the dose rate for the personnel performing the work.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out of personnel, three workers will be sent to the platform at the top of the tower. They will carry with them the hand tools and breathing air to supply air during the ascent.	10	
Step 2	Two workers will remove a section of platform handrail near one corner of the platform. The other worker will receive the platform outrigger section raised by the crane.	10	
Step 3	One worker will tie off to the platform, set the 12' ladder in place and tie it off, then lower himself to the coring location, approximately 18" away from the outer face of the tower wall. Here he will attach the wood starter block for the core bit, using powder actuated studs.	15	

		Estimated Time Req'd. Minutes	Dose mrem
Step 4	The platform outrigger section will be fastened in place by two workers as the third receives the power drill which will have a combined length of 12 feet of drill rod, drill pipe and core bit (including 10' of core barrel already attached). The drill will be set up on the outrigger platform with the core section near the surface of the upper dome, aligned with the wood starter block.	10	
Step 5	One worker will connect the water line to the water swivel on the drill and turn on the water.	5	
Step 6	Two workers will start the drill motor and proceed to core through the upper dome, then retract the drill string and detach it from the drill.	10	
Step 7	A 30' length* of pre-assembled 2-5/8" diameter drill rod shall be raised to the drill location, attached to the 10' core barrel and lowered through the cored opening. [(*Actual length shall equal the distance from the upper dome to the surface of the trapped residue. This must be determined for each hole after coring through the upper dome, by measuring with a 50' steel tape). Then the drill string shall be attached to the drill motor/water swivel, the motor started, water applied, and coring through the residues begins. (The 10' core barrel above the core bit allows for capture of the residues without plugging the core bit and preventing it from coring through the concrete of the lower dome)].	15	

		Estimated Time Req'd. Minutes	Dose mrem
Step 8	As coring progresses through the residue, 2' and 3' drill rod extensions shall be added. Upon coring through the lower dome, the drill string shall be extracted, using the crane to raise the assembly from the hole, bag it, and lay it upon the platform. Leave a length of 1/2" cable, with a 10' section of 3" pipe affixed to its lower end, through each vertical pair of holes, upper end of cable tied off to the platform. Place a plug around the cable at the upper hole.	20	
Step 9	The core barrel pipe assembly shall have the captured residues (also possibly, concrete plug) removed, by probing/washing the material back into the upper dome opening.	15	
Step 9a	One worker shall connect the 150' fire hose, turn on the water, and begin to wash residues through the now-opened 6-inch hole. Continue as openings are completed. Scan with TV camera to determine when all possible residue is washed down.		
Step 10	The power drill shall be removed from the outrigger platform, the outrigger relocated to another corner of the platform, the drill reset, and drilling resumed per Step 4. (The wood starter block, Step 3, shall have been reset following Step 6). The handrail opening shall be closed.	20	
	TOTAL Time (4 Openings)	380	
Step 11	Following completion of drilling 4 holes (total 8 cores) the drill rig shall be rough cleaned by washing back into the upper	15	

		Estimated Time Req'd. Minutes	Dose mrem
	dome opening and lowered to the ground by the crane, including all drill rod, pipe, etc. Items lowered to the ground shall have been bagged in plastic.		
Step 12	The platform outrigger and all hand tools shall be lowered to the ground, and the handrail openings closed. Contaminated items shall be bagged.	15	
Step 13	Drill rig cleaning shall be completed in the decon/laydown area, or decon pad, as available.	30	
	TOTALS for Drilling	440 = 7 hrs. 20 min.	

NFSS K-65 RESIDUE TRANSFER

Task #12 - Cut and Remove Concrete Section of Lower Dome

1.0 OBJECTIVE

To remove a 5 foot by 5 foot section of the lower concrete dome allowing the removal of the K-65 residues from the lower dome.

2.0 SUGGESTED ALTERNATIVES

The below listed concepts may be used or Subcontractor may submit additional alternatives to Bechtel for review:

A Concrete saw
B Overlapping core holes
C Thermite cut concrete

2.1 Alternative A Saw Cut Opening

This alternative utilizes a concrete saw operated remotely to cut opening in lower dome. The saw is mounted on a pipe guide frame and lowered onto the lower dome surface. The guide frame is placed sequentially to hold the saw on track for each of the four cuts required for the opening. See Figure 1.

2.2 Alternative B Overlapping Core Holes

2.2.1 Core Drilled From on Top of Tower

This concept utilizes a 6-inch gasoline engine powered coring machine (Minuteman by Mobile Drill Co. 7 hp Briggs and Stratton). The cores will be drilled continuously around the center of the lower dome to provide the minimum 5' x 5' square opening required to permit slurry mining of the residues in the lower dome. The coring machine will be physically located on the platform on top of the tower using 40 feet of 2 5/8" diameter drill rod to reach the lower dome. The core bit will be held in place with a square template as shown in Figure 2.

2.2.2 Core Drilled With Remotely-Operated Core Drill

This concept utilizes a 6-inch electric-powered coring machine. The core drill is mounted on a jig which is attached to the 24" diameter riser pipe, or spaced by guide rods from the pipe opening, cutting a 5-foot diameter hole in the dome. The apparatus is moved between successive core holes with an electric motor, or can be pulled into place from above with cables. See Figure 3, attached.

FIGURE 1
ALTERNATIVE A
PLUG CUT - LOWER DOME

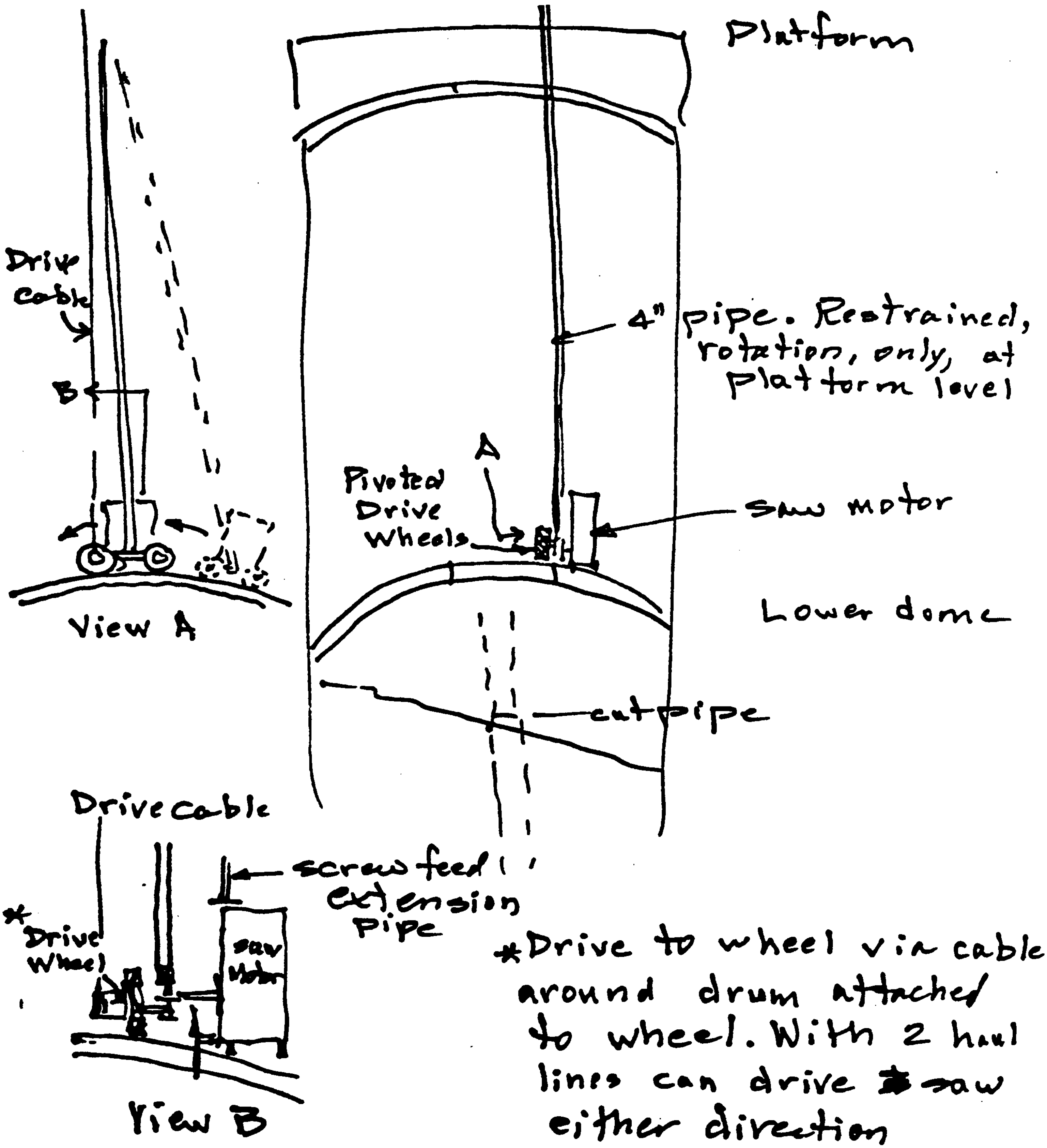


FIGURE 2
TEMPLATE DETAIL FOR OVERLAPPING CORE HOLES

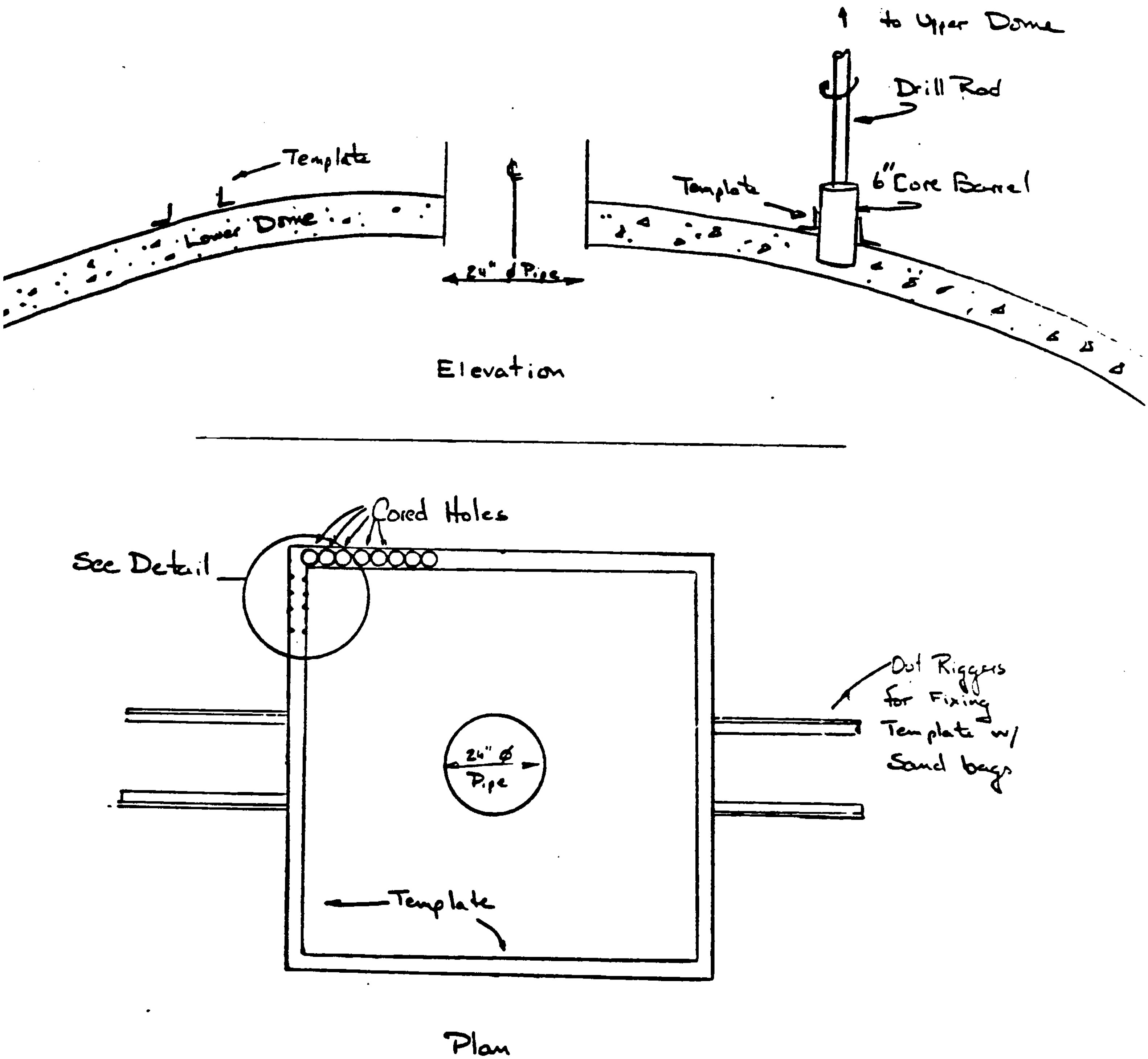
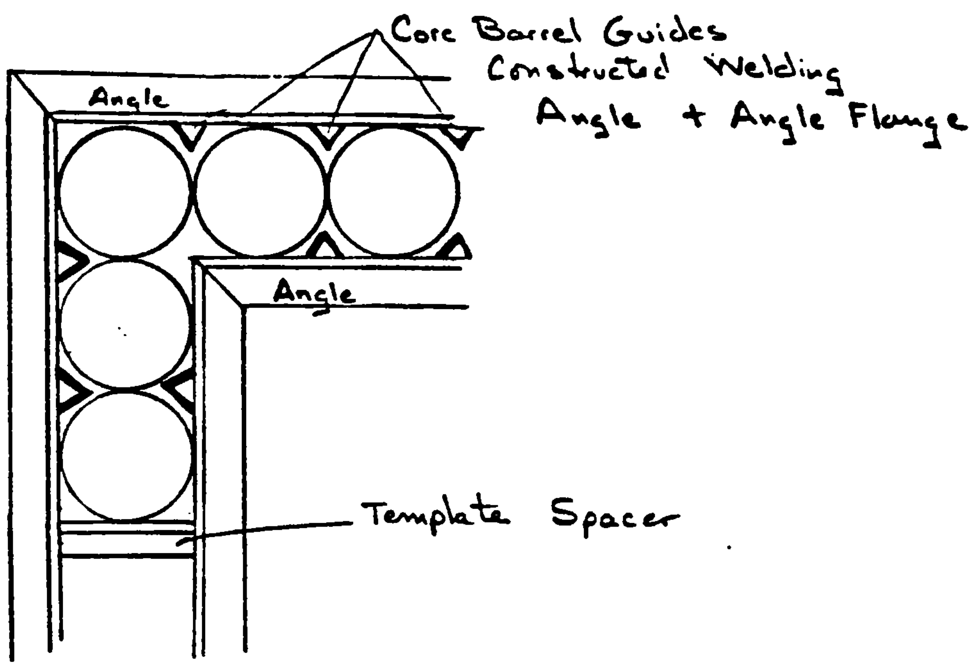
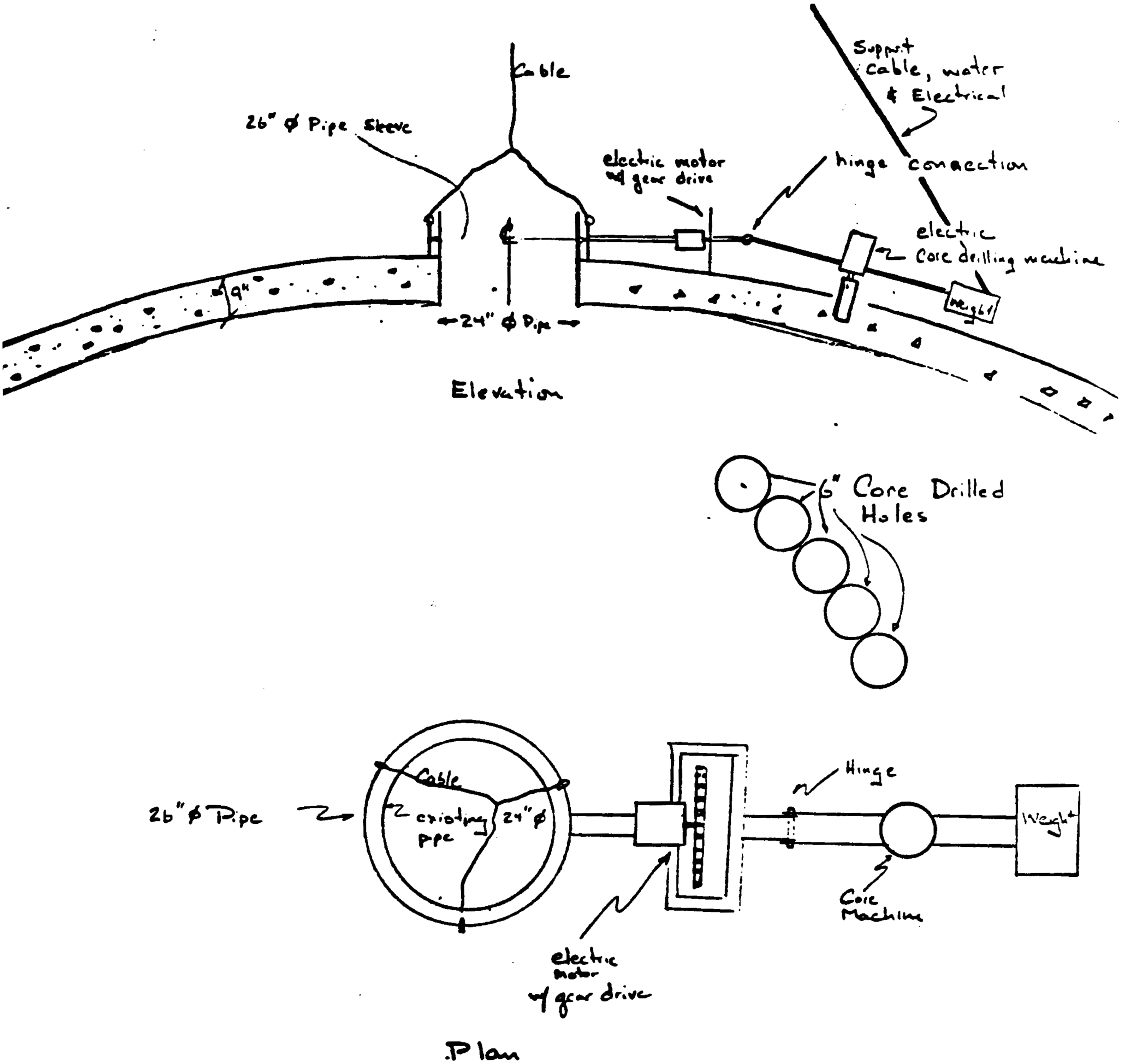


FIGURE 2
TEMPLATE DETAIL FOR OVERLAPPING CORE HOLES
(CONTINUED)



Detail from Figure 2

FIGURE 3
RADIAL CORING - OVERLAPPING HOLES



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3.0 EQUIPMENT REQUIRED

3.1 The following equipment is required for this task for Alternative A.

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

- o Crane for lifting man cage
- o Crane for setting the saw and support frame into the upper dome
- o 24-inch concrete saw
- o Winch (electrically or gasoline operated)
- o Pre-fabricated template for saw
- o Diamond core bit on drill rig
- o Acetylene torch
- o Lifting chains
- o Pre-fabricated template to cut existing 24-inch pipe
- o Support frame for concrete saw
- o Template to space concrete saw the correct distance from center of dome
- o TV camera (to observe operations)
- o Toggle Beam

3.2 The following equipment is required for Alternative B - Overlapping Core Holes (both Local and Remote Operation Concepts)

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

- o Crane for lifting mancage
- o Crane for setting coring machine and template/jig in place
- o Coring equipment and template/jig
- o Acetylene torch
- o Lifting chairs and toggle beams
- o Pre-fabricated template to cut existing 24" pipe
- o TV Camera (to observe operation)

4.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins.

- o The tower work platform shall be installed
- o The K-65 residues shall be removed from the upper dome
- o The 4 wash holes shall be drilled in the lower dome and trapped residues removed
- o The prefabricated support frame shall be at the site
- o Radiation control zones have been determined
- o Radiation control procedures have been delivered
- o Industrial safety requirements have been determined for work to be performed

- o RWPs have been prepared for this work.
- o Emergency personnel safety plan is in place
- o All tools, materials and equipment to be supplied by the Subcontractor are on hand
- o Communication equipment is on hand and in working order.

5.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in removing the section of Building 434 lower dome shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied respirators.

All operations performed on Building 434 to remove the lower dome section will require full rad safety gear including air supplied breathing apparatus.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails or cages. Tether lines are required for the concrete saw, and all portable tools and equipment.

At least two workers shall be on top of Building 434 work operations.

Operations will be stopped during high winds, rain, or thunderstorms.

6.0 PROCEDURE

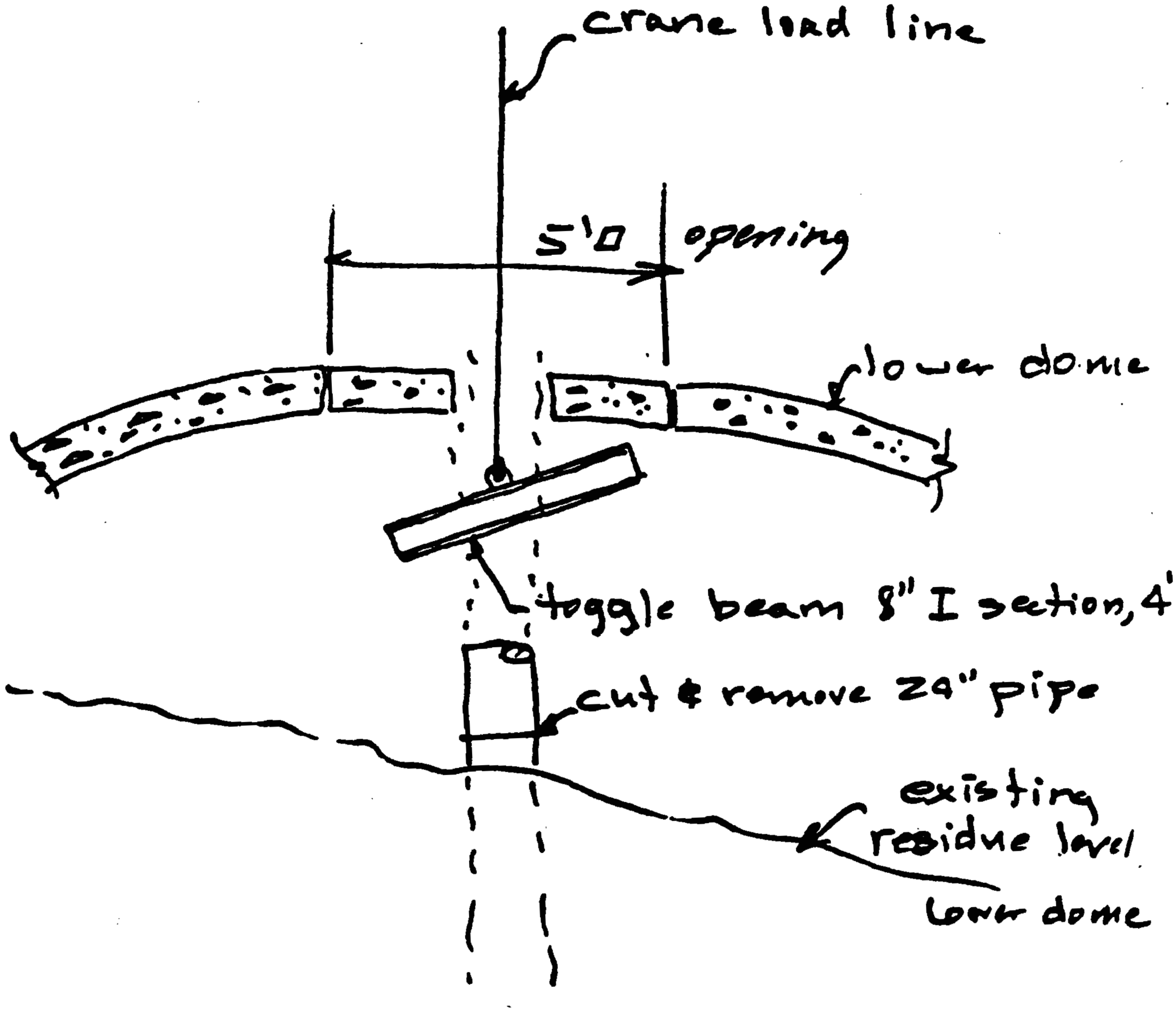
6.1 Procedures set forth below cover the saw-cut method for removing the required section of the Building 434 lower dome.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out of personnel, two workers and one rad technician along with breathing air shall be lifted to the top of the tower. After leaving the man cage, disconnect from the air supply in cage and connect to the air manifold on top of the tower. Lift acetylene torch, gas for torch (oxygen and acetylene) and templates to the top of the tower.	30	

		Estimated Time Req'd. Minutes	Dose mrem
Step 2A	If 24-inch pipe projects through the lower dome, and is not connected to the dome, torch-cut a lifting hole in the projecting pipe, place crane-connected hook in the hole, lower the pipe cutting template to a point below the lower dome and cut pipe (See Figure 4). Remove template, torch and cut section of pipe.	60	
Step 2B	If no pipe projects through the lower dome proceed to step 3.		
Step 3	Plug to be sawed by 24" diameter diamond saw. Use standard slab cutting saw supported from two-4" diameter x 40' pipes. This holds saw in vertical position, yet permits travel over curved dome surface. Assemble support frame on the ground. Lift frame and saw to the top of the tower.	30	
Step 4	The support frame is inserted through the platform opening per Figure 5. Clamp the 7' long track section loosely to the pipe frame. Fasten the saw frame plate to the flange on the end of the 4" x 15" outrigger pipe. Lower the saw, with engine running, using crane whip line on saw, and hand line on sliding bracket. Saw to be in retracted (up) position. The pipe extension of the saw screw feed is attached to the screw hand wheel with a universal joint.	48	
Step 5	Install "toggle I-beam" through pipe opening and take a strain on the crane's load line (see Figure 4).	30	

FIGURE 4

TOGGLE BEAM FOR REMOVING PIPE



		Estimated Time Req'd. Minutes	Dose mrem
Step 6	Using the hand line, pull the saw to the beginning of the track and start sawing. Lower the saw blade with screw feed as it cuts into the concrete. When the saw has cut through the concrete dome, use the hand line to pull the saw along the track. When first line is cut, retract saw blade using screw feed in reverse.	30	
Steps 7 8, 9	Raise saw and support frame simultaneously. Rotate 90°, reset on next side of 5' square. Retract saw frame to back of 7' track. Continue operations as on previous cut.	3 hours	
NOTE:	The 5' square plug must be supported from the platform or from the crane load line while the final 3 cuts are being made. The attachment to the plug section will be either through the projecting 24" pipe or with toggle beam. See Figure 4.		
Step 10	Remove saw and support system from tower. All equipment must be bagged for later decontamination operations.	30	
Step 11	Remove the cut portion of the lower dome.Bag the concrete as it leaves the dome. Dispose of concrete in Building 410.	30	
Step 12	Moisten the exposed surface of the residues in the lower tower section.	20	

FIGURE 5
MODIFIED ALTERNATE A

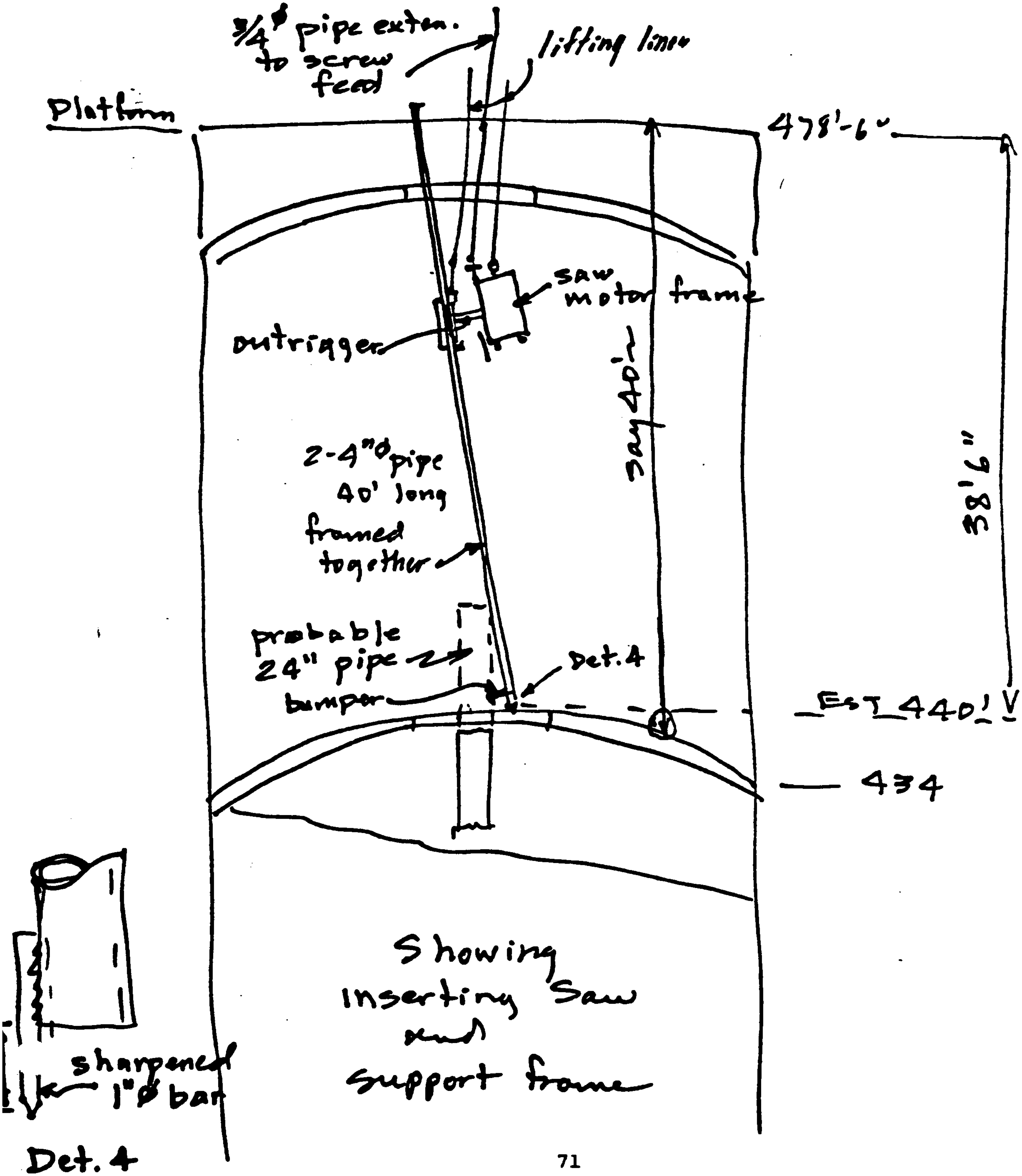


Figure 6

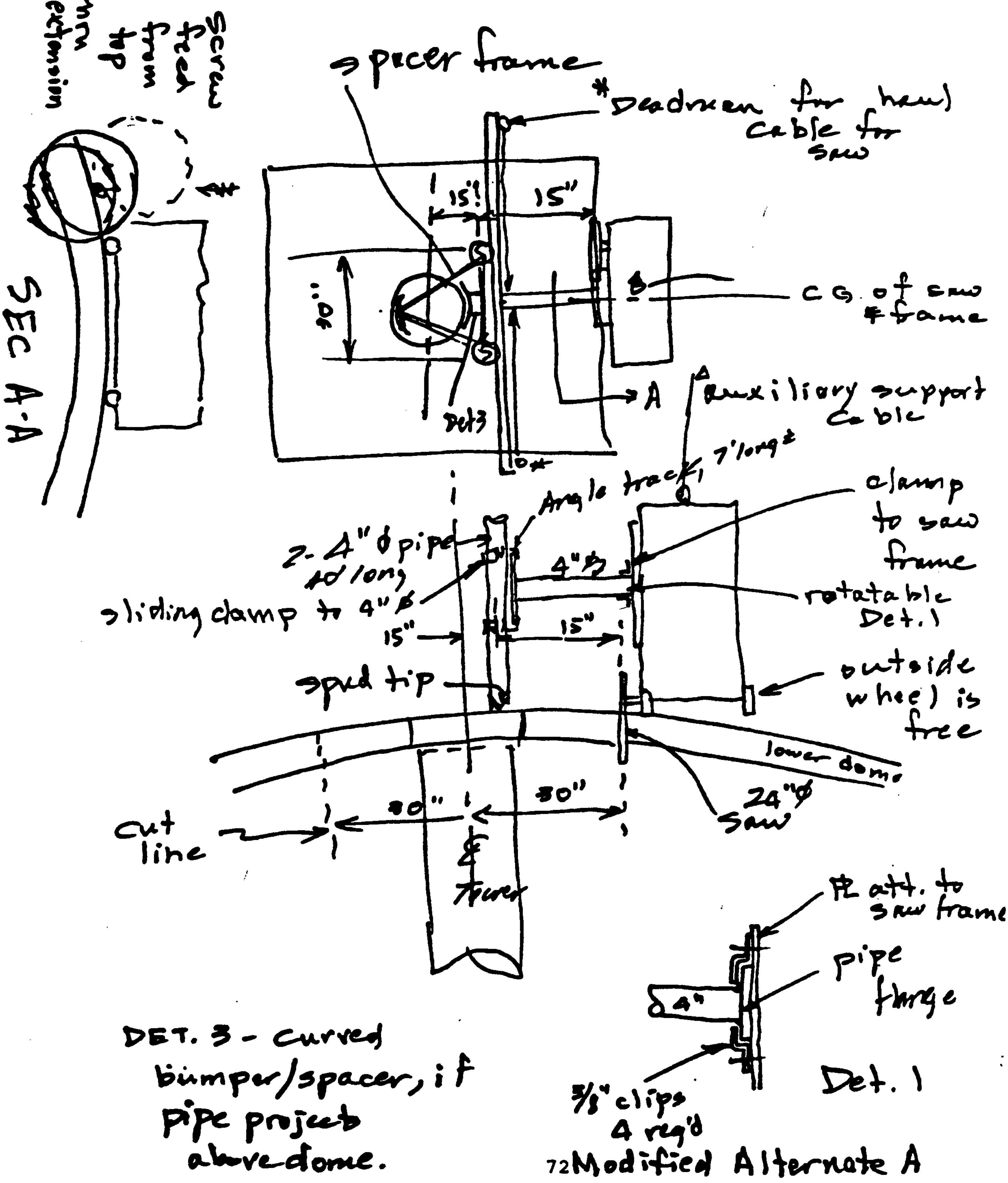
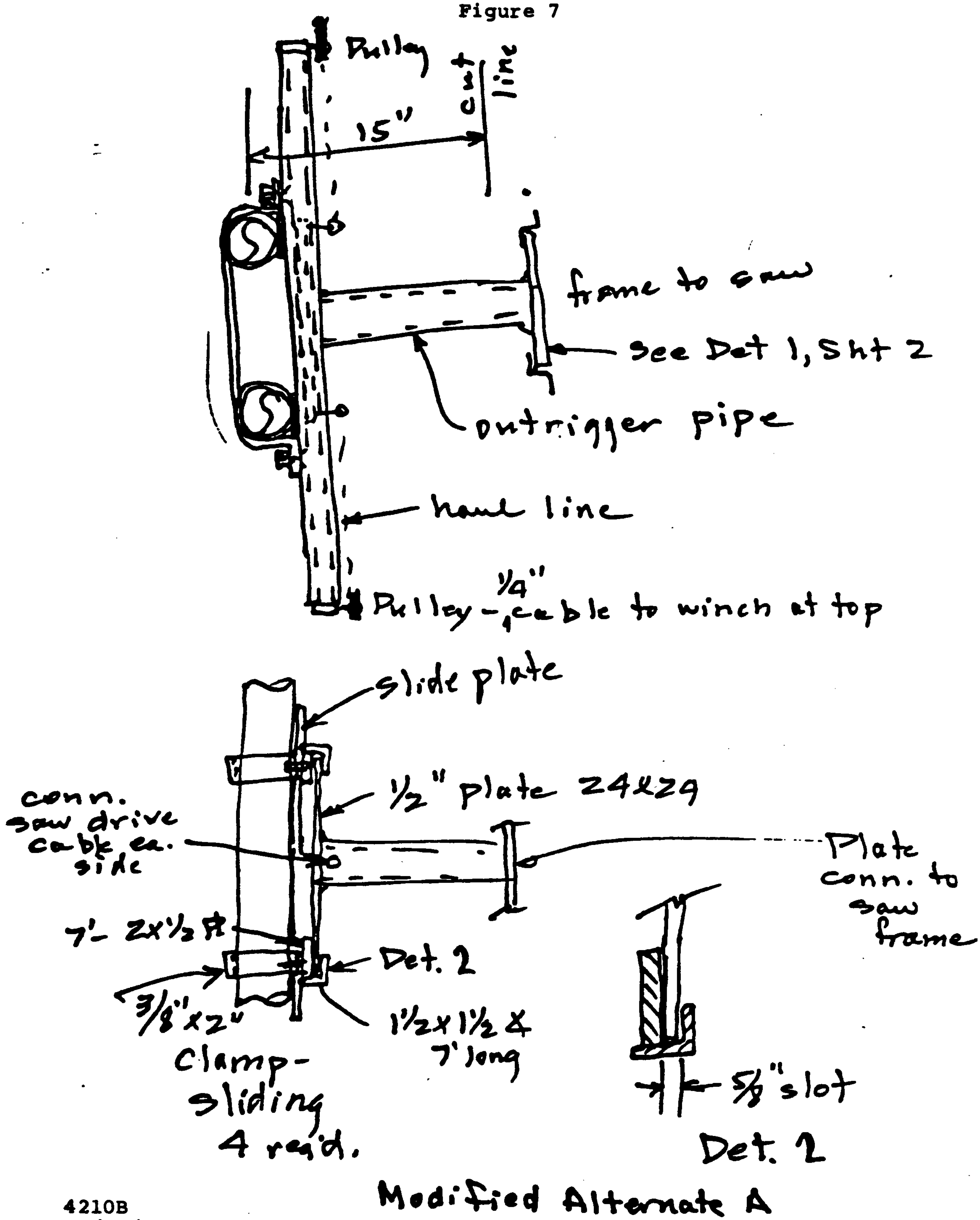

Screw fixed from top
Arm extension
spacer frame
*Deadman for haul cable for saw
15"
15"
30"
CG of saw & frame
Det 3
A
A
auxiliary support cable
7' long±
Angle track
clamp to saw frame
2-4" ϕ pipe 20' long
sliding clamp to 4" ϕ
4" ϕ
rotatable Det. 1
15"
15"
spud tip
outside wheel is free
lower dome
24" ϕ saw
30"
30"
cut line
℄ Tower
SEC A-A
PL att. to saw frame
pipe flange
4"
3/8" clips 4 req'd
Det. 1
DET. 3 - curved bumper/spacer, if pipe projects above dome.
Modified Alternate A

Figure 7


Pulley
cut line
15"
frame to saw
See Det 1, Sht 2
outrigger pipe
haul line
Pulley - 1/4" cable to winch at top
slide plate
1/2" plate 24x29
conn. saw drive cable ea. side
Plate conn. to saw frame
7'- 2x1/2 Ft
Det. 2
3/8"x2"
1 1/2x1 1/2 & 7' long
Clamp- sliding 4 req'd.
5/8" slot
Det. 2
Modified Alternate A

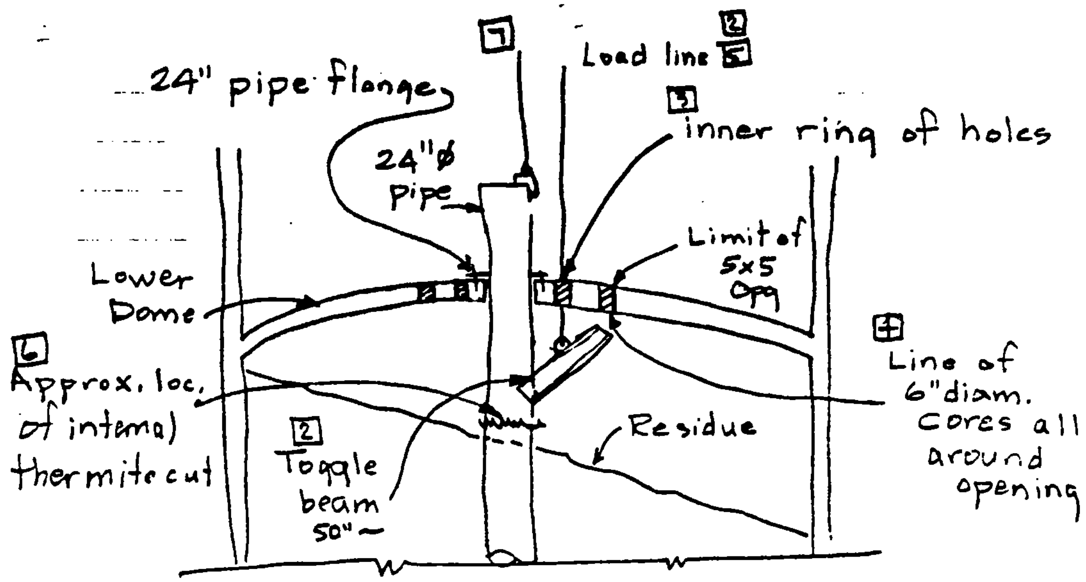
6.2 Procedures set forth below cover the radial core drilling alternatives for removing the required section of the Building 434, lower dome.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1-3	Repeat procedure described in Section 6.1 above.	120	
Step 4	Concrete plug to be cut using overlapping core holes drilled through the concrete. The coring machine and jig shall be assembled on the ground. The jig is held in place with a 26" diameter pipe sleeve fitted over the existing 24" riser pipe. If the 24" pipe does not exist, or is a different diameter, the sleeve (or standoff guide) must be changed accordingly. Raise jig and coring machine to top of tower.	30	
Step 5	The jig is lowered into the tower with the sleeve lowered over the 24" diameter riser pipe.	30	
Step 6	The coring machine cores the first hole and is then raised with the support cable to clear the cored hole and moved to the next position with the electric motor. An estimated 50 core holes are required. The concrete plug must be supported during the coring operation.	510	
Step 7	Remove the coring apparatus and bag the equipment for later decontamination operations.	30	
Step 8	Remove the concrete plug, bag the concrete, and place it in Building 410.	30	
Step 9	Spray the exposed residue surface with water.	20	

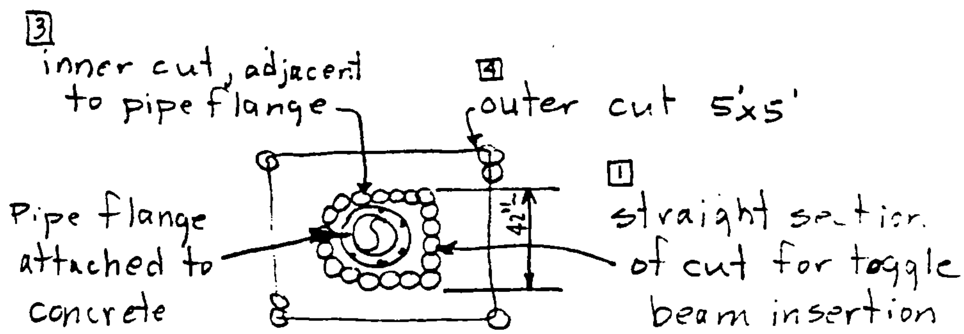
6.3 Procedures set forth below cover alternate cutting for lower dome, if the 24" pipe is found to be attached to the lower dome concrete slab (See Figure 8).

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	Same as step 5 of Alternate B		
Step 2	Lower a template for inner "D-shaped" ring of holes.	15	
Step 3	Drill a line of 6" holes tangent to the pipe flange and 42" long. Retract the drill and move it to the opposite side of the 24" pipe.	80	
Step 4	Lower the toggle beam, on a crane load line, through the 42" slot. Straighten the beam and take a strain on the load line, with the toggle beam holding the to-be-cut 5' x 5' panel.	15	
Step 5	Resume drilling, and complete the inner "D-shaped" ring of holes.	240	
Step 6	Move the drill to the outer 5' x 5' template, and drill the square pattern to release the 5'x 5' panel.		
Step 7	Same as step 9 of Alternate B, to completion of panel removal and storage.		

Figure 8



ELEVATION



PLAN

LOWER DOME, PIPE OPENING

ALTERNATE CUT: Lower dome opening, where 24" pipe is found connected to the lower dome slab.
Sequence, typical: 2

NFSS K-65 RESIDUE TRANSFER

Task #13 - Cut and Remove Concrete Section from the Side of the Tower

1.0 OBJECTIVE

To cut an opening in the east side of the tower to provide an access port for the HMU hoses.

2.0 EQUIPMENT REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station. The following equipment is required for this task.

1 lot	Scaffolding to provide work station for core drill, provided with safety hand rails
1	Crane to lift equipment to scaffold work station
2	1/2" x 12' double eye choker to rig drill to crane hook and to silo
1	Core drill, electric powered
2	6" diam x 18" long coring bits, diamond
1	Drill, heavy duty, electric
2 -	1/2" concrete drill bits
1 lot	Support for core drill
1 -	Can spray paint, red
1 -	6' measuring tape
1 -	100' measuring tape
4 -	1/2" eye bolts (WEJ-IT or equal)
12 -	Lead anchors for 1/2" bolts, 3/4" O.D.
6 -	1/2" dia. by 3" long hex head steel bolts with flat washers
150' -	1/2" or 3/4" heavy duty hose for water supply to core drill
1 -	Booster pump for hydrant, min. 20 gpm. to provide 100 psi at drill station

1 - Chain "come-along," 1-ton capacity, by 10' lift

1 - Breathing air hose, size ___, from air trailer, equipped with 3-point manifold

1 - Crane

1 - Crane man cage

6 - 1/2" shackles

1 set - Hand tools; wrenches, pliers, 2# hammer, screw driver, etc.

2 - 3/4" star drills

2 - 3/4" x 12" concrete chisel

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins:

- Upper section of Building 434 is empty
- Scaffolding work station shall be erected and secured to the tower
- Crane is in place and ready for lifting
- Radiation control zones have been determined
- Radiation control procedures are in place
- Radiological training of the Subcontractor's personnel has been completed
- Industrial safety measures have been determined for work to be performed and are understood by all personnel
- Emergency Personnel Safety Plan is in place
- RWP's have been prepared for work to be performed
- Material and equipment for radiological controls, such as coveralls and boots, are on hand and ready for use.
- Breathing air manifold is available at the scaffold work platform
- All the tools and materials to be supplied by the Subcontractor are on hand and available.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in cutting the Building 434 wall access port shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied respirators.

All operations required to remove the concrete for the access port will require full rad safety gear including air supplied breathing apparatus (see RWP for details).

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails or cages. Tether lines are required for all portable tools and equipment.

The area at the base of Building 434 must be roped off to prevent entry when danger of falling objects exists.

At least two workers shall be on the scaffolding during work operations.

Operations will be stopped during high winds, rain, or thunderstorms.

5.0 PROCEDURES

The procedures set forth below cover only one method for cutting an access port in the Building 434.

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After personnel dress out, including small breathing supply cylinders, two workers with core drill and tools, shall proceed to the scaffold work station. Reconnect mask/suit to air manifold at top of scaffold. The 24" x 24" hole shall be laid out. Anchors will be installed to provide picking points for the concrete, and to provide tie-offs for the core drill. The 24" square concrete shall be tied off to the above anchors.	45	

		Estimated Time Req'd. Minutes	Dose mrem
Step 2	Using chain "come-along" lift concrete core drill to the opening location. Connect power and water to drill.	20	
Step 3	Cut concrete access port, using overlapping holes, sixteen-6" diameter cores required. Remove cores, bag and place in mancage.	120	
Step 4	Remove concrete wall section, bag and dispose of in Building 410. Descend the scaffold.	30	

Task #14 - Reattach Hoses to Hydraulic Mining Unit (HMU) and Resume Mining in Lower Section

1.0 OBJECTIVE

Reinstall the HMU, and connect the relocated hoses, to mine residues from the lower section of the tower, after cutting an opening in the lower dome and in the side wall above the lower dome.

2.0 REQUIRED EQUIPMENT AND MATERIAL

This equipment/material listing may not be all inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment is required for this task:

1 - crane with boom length sufficient to handle the hoses/HMU on top of the work platform

1 - line gun or bow capable of shooting a light line - carrying projectile accurately for 100 feet (Incl. 3 spare projectiles)

1 - 25' x 1-1/2" pike pole with hook (alternate to above)

1 - 100-foot length of 1/2" line, nylon or polypropylene preferred

2 - Klein "Chicago" grips for 1/2" wire rope

1 - heavy duty electric drill, with 2-1/2" concrete bits

1 - 75' length of 1/2" wire rope, or 1" nylon line

4 - single point rope slings to tie off the hose sections

2 - 3-point pick, 1" rope bridles to support hose at bend points

1 - 11' x 4" diameter pipe section with 90° elbow and hose adaptor fitting at upper end, plus 1 pipe clamp and Wejit anchors with nuts

1 - 11' x 3" diameter pipe section with 90° elbow and hose adaptor fitting at upper end, plus 1 pipe clamp and Wejit anchors with nuts

2 - 5/8" x 12' double eye chokers

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins:

- The mancage is on site and near Building 434.
- The crane is in place and ready for lifting.
- The tools and materials are ready for use, including tie ropes attached.
- Materials and equipment for radiological controls, such as coveralls, boots, airsuits, air cylinders, etc., are on hand and available.
- Radios for communication are on hand and tested for working order.
- Radiological control zones have been determined.
- Radiological control procedures are in place.
- Radiological training of the Subcontractor personnel has been completed.
- Industrial safety measures have been determined for work to be performed and understood by all personnel.
- Emergency Personnel Safety Plan is in place.
- RWPs have been prepared for work to be performed.
- The HMU is on the ground in its storage area.
- Sixty feet, three sections of each hose, 3" and 4", remains connected to the tops of the riser pipes and tied off to the platform steel.
- The two 11' pipe sections are at the tower base, with clamps for attaching to concrete.
- A 3-point air manifold supplies breathing air to the top of the scaffold, which is erected to a point even with the bottom of the 24" square tower wall opening.
- The wall opening has a piece of EPDM curtain draped over it.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this task shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied suits or respirators.

Initially, all operations performed on top of the Building 434 will require full rad safety gear, including air-supplied breathing apparatus. These requirements may be reduced if monitoring indicates they are not required.

Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment.

At least two workers shall be on top of Building 434 while performing tasks, to allow for rescue.

Operations will be stopped and workers returned to the ground during high winds, rain, or thunderstorms.

5.0 PROCEDURES

The procedures set forth below cover only one method for performing this work task. The procedures developed allow an estimate of the time required to perform this task and consequently allow an estimate of the dose rate for the personnel performing the work.

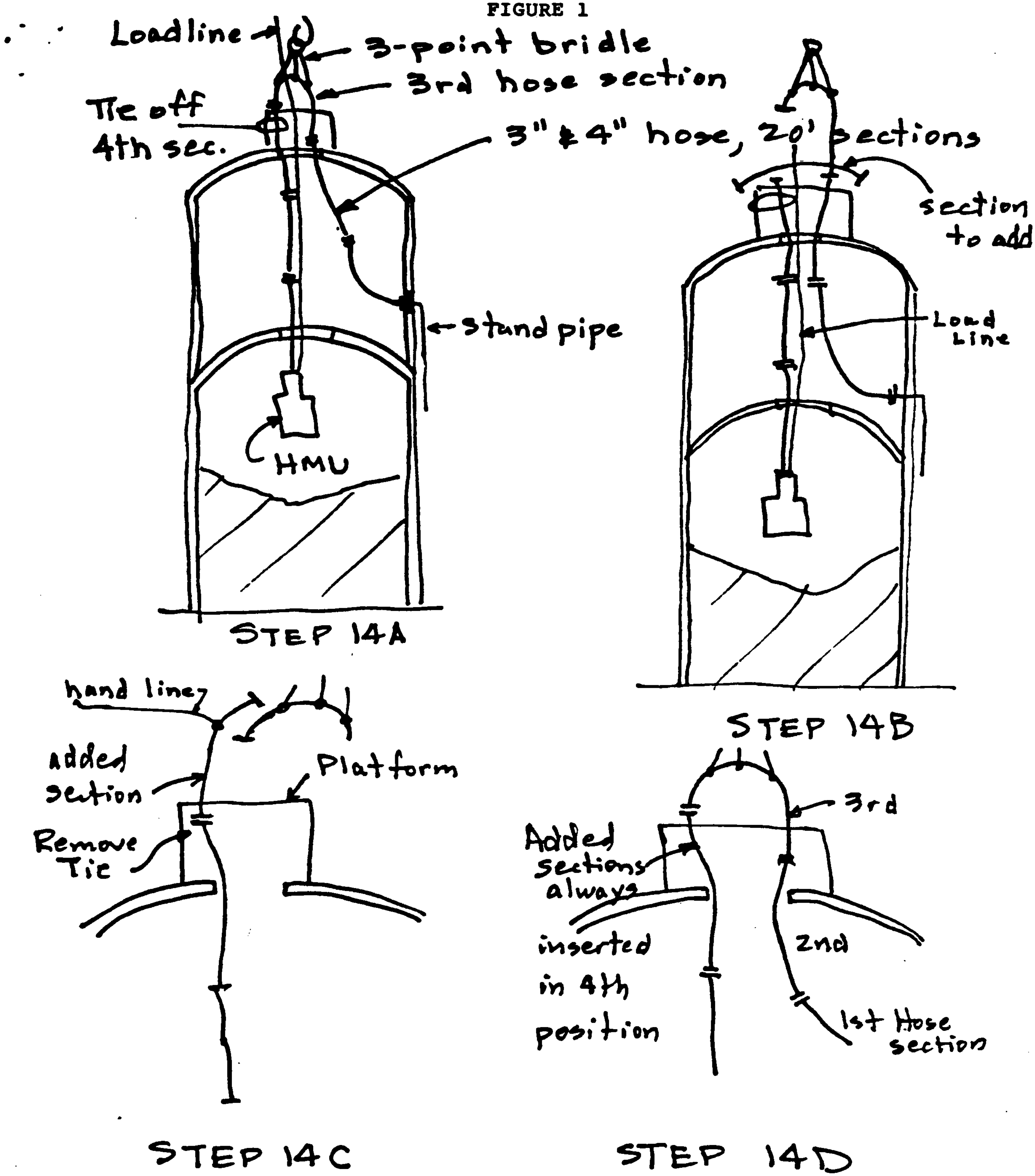
		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out of 2 workers, they are raised by crane mancage; including 2 small air bottles, the two 11' pipe sections, pipe brackets, anchors, drill, pike pole and hand tools; to the top of the scaffold.	10	
Step 2	At the scaffold work platform level, the workers tie off the pipe and fittings to the scaffold, after connecting their air lines to the manifold. The workers then disconnect the bottom ends of the 3" and 4" hoses from the riser pipes and bag the ends.	15	

		Estimated Time Req'd. Minutes	Dose mrem
Step 3	The workers fasten the pipe clamps to the tower wall 12" below the wall opening, connect the 11' pipe sections to the tops of the existing riser pipes, and turn the 90° bends into the wall opening.	20	
Step 4	Two workers after dress out are raised to the top of tower work platform in the mancage with air bottles, carrying the rope slings, line gun (or bow), and all lines and chokers. They connect to the tower top air manifold.	10	
Step 5	They remove the temporary EPDM cover from the upper dome opening and tie it off.	5	
Step 6	They fasten rope bridles near the upper ends of the 60' hose assemblies, (5' back of hose end) and connect them to the crane, which lowers the tops of the hoses to the scaffold platform; after the workers there have disconnected hoses from the riser pipes, Step 2. Tie off the hose bridles to the scaffold.	10	
Step 7	After the 2 bottom workers have completed Step 3, the top workers assure that they are clear and shoot a projectile from the top opening through the side wall opening, carrying light line. (Alternate: lower the 1/2" nylon line from the top opening and fish it to the side wall opening with a hooked 25' long pike pole.)	10	
Step 8	The lower workers tie the 1/2" line to the light cord, and the upper workers pull it to the top. In turn, the 1/2" line is used to pull up the 1/2" wire rope or a 1" nylon line.	15	

		Estimated Time Req'd. Minutes	Dose mrem
Step 9	The upper end of the 1/2" wire rope is connected to the crane hook by means of the "Chicago" grip, and the lower end to 3-point bridles tied at the 1/4-points of the top hose of the 60' hose sections. The hoses are drawn to the upper platform through the top opening, in increments, using the second "Chicago grip" to tie off the 1/2" cable to the platform steel as the crane hook nears "two-blocking."	20	
Step 10	The lower ends of the hoses are retained to prevent them from being drawn through the sidewall opening, using 2 rope grips and a 1/2" tag line. They are connected to the inner ends of the pipe 90° bends.	10	
Step 11	The 3-point rope bridle has been attached to the 3rd hose section up from the riser pipe to promote uniform hose bending. This will bring the top end of the 60' section near the upper platform opening where it is tied off temporarily. The crane then raises the HMU and lowers it partially through the platform after connecting the power and control cables from the reels. The upper ends of the hoses are brought into contact with the HMU and connected.	20	
Step 12	The HMU and hoses are lowered by means of the 2 crane lines, through the lower dome opening, and mining resumes, using Operating Procedure A.	15	
Step 13	Pump residue, in accordance with Operating Procedure A.	200 min/foot	

		Estimated Time Req'd. Minutes	Dose mrem
Step 14	To add hose, raise the HMU and 3rd hose section (with 3-point bridle) to the platform opening. (See Figure 1) Disconnect pump side of 3rd hose after tying off line side of 4th hose. Connect a new (4th, etc.) hose section to the pump side and disconnect the tied off hose end. Lower the pump until the line end of the added hose is even with the bridled 3rd section. Connect the added hose to the bridled section. Then lower both HMU and hose until HMU contacts residues. Resume pumping (Refer to Operating Procedure A).	45 (per hose section addition)	
Step 15	Should a barrel or other debris come in contact with and affect the operation of the HMU, the TV camera shall be lowered through the opening(s) to examine the condition. If the obstruction requires removal, disconnect the HMU and hose from the crane, temporarily suspending them with cable chokers from the platform steel. Connect a tong or grapple to the crane load line, and using the TV camera to observe, fish for the obstruction and raise it from the tower. Before raising it through the upper dome, wash off all residue, then wrap the obstruction with plastic and haul it to the 411 Building area waste disposal site.	Var.	

FIGURE 1



Loadline
3-point bridle
3rd hose section
Tie off 4th sec.
3" & 4" hose, 20' sections
Stand pipe
HMU
STEP 14A
section to add
Load Line
STEP 14B
hand line
Added section
Platform
Remove Tie
STEP 14C
3rd
Added sections always inserted in 4th position
2nd
1st Hose section
STEP 14D

NFSS K-65 RESIDUE TRANSFER

Task #15 - Clean Out Residues Remaining in the Bottom of Building 434.

1.0 OBJECTIVE

To remove the remaining water and residue from the bottom of Building 434 after all possible residues have been removed with the hydraulic mining unit.

2.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment and material listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required. This task permits three alternatives.

The following equipment is required for the three alternatives.

Alternative 1:

2 Plastic drip bags, 24" x 36"
1 55-gallon drum, with cover
1 Crane for lowering equipment and personnel from platform at top dome of Building 434
1 Diaphragm pump, air operated
1 Mancage for two workers plus air cylinders, must pass through 5' x 5' opening
1 150 cfm air compressor for pump
100'Length of air hose for pump
250' 3" pump discharge hose, from center of tower to Building 434 pond
2 Portable lights, waterproof
1 Welding/cutting torch, with gas bottles
1 Set of tools for connecting hoses, etc.
1 Winch with drum and 175' of cable capable of lifting 1000 pounds, manually operated
4 3-inch C clamp
1 Bosun's chair

Alternate 2:

1 Diaphragm pump, air operated
1 150 cfm air compressor for pump
15' 4" suction hose
250' 3" discharge hose
1 55-gallon drum, with cover
2 Plastic drip bags, 24" x 36"

Alternate 3:

1	Diaphragm pump, air operated
1	4" core drill bit and motor
1	150 cfm air compressor for pump
50'	Light weight 2" diameter hose for suction of pump
250'	3" diameter discharge hose
100'	3/4" water hose
1	55-gallon barrel, with cover
2	Plastic drip bags, 24" x 36"

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins:

General

- o The hydraulic mining unit has mined all possible residue from lower tower and has been removed from the tower.
- o Radiological training of the Subcontractor personnel has been completed.
- o Radiation control procedures are in place.
- o Radiation control zones have been determined.
- o Emergency Personnel Safety Plan is in place.
- o Communication equipment is on hand and in working order.

Alternate 1 Conditions

- o A crane is in place and ready for lifting.
- o The work platform on top Building 434 is still operational.
- o The man lift cage is in place and ready for lifting (cage sized to pass through 5' x 5' opening).
- o RWPs have been prepared for work to be performed.
- o All tools, pumps, and materials to be supplied by the Subcontractor are on hand and available.
- o Materials and equipment for radiological controls, such as coveralls, boots, air suits, air cylinders, etc. are on hand and ready for use.
- o Electrical power for lighting is available on tower.

Alternate 2 Conditions

- o Before any mining has been performed on Building 434 lower compartment, the cover on a lower 4" sampling port on the southwest side of the building shall have been removed and a 4" flanged tee and valve attached (see supplement to Task 15 procedure).

- o All tools, equipment and materials to be supplied by the Subcontractor are available.

- o The hydraulic mining unit has completed all possible mining on the bottom compartment of Building 434.

4.0 HEALTH AND SAFETY REQUIREMENTS

- o All personnel involved in this work shall have received radiological and industrial safety training and shall be qualified to perform operations when fully dressed in radiological protection clothing including air supplied respirators.

- o Operations inside Building 434, when the entry is made from the top of the building, will require two workers inside and two workers located on building top.

- o Air suits and breathing air supply will be required for entry into the building even though 99% of the residues have been removed.

- o Safety belts and tether lines are required for all individuals working outside of areas enclosed by guard rails. Tether lines are required for all portable tools and equipment on top the building.

- o Operations will be stopped and workers returned to the ground during high winds, rain, or thunderstorms.

5.0 PROCEDURES

Alternate 1

		Estimated Time Req'd. Minutes	Dose mrem
Step 1	After dress out workers will cut the covers from three sampling ports at the 25-foot level near the base of Building 434 and determine that the openings into the tower are clear, by rodding.	45	

		Estimated Time Req'd. Minutes	Dose mrem
Step 2	After dress out, two workers will be raised to Building 434 dome work platform. Two of the workers who will remain on top of the tower will be raised using the mancage and be dressed for entry into Building 434. The air-operated pump along with a winch will be raised to the top of the tower using the crane. The winch will be attached temporarily to the tower platform with C clamps. The winch will be the emergency lifting device to remove personnel from inside the tower. A rope will be attached to the pump and the pump lowered through the two dome 5' x 5' openings until it is approximately 2 feet from the bottom of the building at which time it will be tied off to the platform.	40	
Step 3	After dress out including air suits, two workers, along with their breathing air supply for entry into Building 434 will be raised to the work platforms on Building 434 using a crane and a mancage that can pass through the 5' x 5' openings in the dome. The two workers in air suits along with their air supply will be lowered in the mancage to the inside bottom of the tower using the crane. The workers inside the tower will locate the diaphragm pump on the floor of the tower. Hoses for the air supply for the pump motor, a 1" water supply hose, 3" discharge hose for pump and the suction hose will be pushed through the sample ports into the Building 434. The air	120	

		Estimated Time Req'd. Minutes	Dose mrem
	hose, the discharge hose, and the suction hose will be connected to the pump. The discharge hose will be run to the Building 434 pond. The pump will be started and the workers will direct the suction hose to vacuum up as much residue as possible. The water hose will be used to wash the residues toward the pump suction for pickup. When the cleanup is completed the hoses will be disconnected from the pump, pulled back through the ports and covered with plastic sleeves. The pump will be attached to a rope to the dome. The workers will be raised in a man cage to the dome top and lowered to the ground.		
Step 4	The workers who remain on the platform will raise the pump to the top dome opening, wash it off and wrap it in plastic. The crane will lower the pump to the lay down area. The workers will retrieve tools, etc., and return to the ground.	20	
Step 5	Two workers dressed for the possibility of being sprayed with contaminated water will enter the crawl space under the Building 434 lower compartment bottom and attach a drip bag around the 4" flange outside the wall surrounding the tower center drain. A 55-gallon barrel will be placed under the drain and the bag placed so that it will direct any water and/or residue into the barrel. The air operated diaphragm pump will be placed outside Building 434 with the attached suction hose routed inside the crawl space and placed in the	90	

		Estimated Time Req'd. Minutes	Dose mrem
	barrel. The hose on the discharge of the pump shall be routed to the Building 434 pond. The workers will loosen the flange at the elbow and allow water and residue to drain into the drum. The diaphragm pump will be turned on to pump the water and residue to the Building 434 pond. When the water and residue have been drained the flange will be reconnected and the drum bag removed. The drum will be moved to contaminated storage.		
Alternate 2			
Step 1	Two workers after dress out as required for work to be performed will attach a 4" hose to the ball or plug valve previously installed on one of the existing bottom sample ports on Building 434. The other end of the hose will be connected to the air operated diaphragm pump suction. A hose will be attached to the discharge of the pump and run to the 434 pond. The valve will be opened and the pump started. Residue will be pumped out through the port. If there is no flow, the valve will be closed, the connection on the pump will be reversed, the valve opened and water pumped through the port into the tower to assure that the port is clear. When the port is clear the valve will be closed, the hose to the pump reversed, the valve opened and any water and residue pumped from the tower.	100	
Step 2	Perform Step 5 of Alternate 1.		

		Estimated Time Req'd. Minutes	Dose mrem
Alternate 3			
Step 1	After dress out, as required, workers will set up a 6-inch core drill and cut a 3' x 3' hole in the tower side by overlapping the drill holes. The bottom of the 3' x 3' opening will be two feet above the bottom of the tower lower compartment. The concrete plug will be pushed into the tower after cutting.	300	
Step 2	The air operated diaphragm pump will be set up outside the opening with a 2-inch hose on the suction and a hose from the discharge to the Building 434 pond. The suction hose along with a water hose will be pushed into the opening on the building side. Two workers appropriately dressed for the work will enter the tower through the opening. The water will be turned on the hose and the pump started. Lighting will be provided through the opening by a third worker. By using the water hose and suction hose, the residue will be swept and vacuumed from the tower floor. Upon completion of cleaning, the hose and pump will be removed, encased in plastic bags and stored.	200	
Step 3	Step 5 of Alternate 1 will be performed.		

NFSS K-65 Residue Transfer

Task #15 Supplement - Supplement to alternate 2, remove cover and attach 4" pipe tee and valve to an existing lower sampling port at Building 434 bottom.

1.0 OBJECTIVE

To provide a means for removing water and residue remaining after the mining unit has removed all possible residue. Opening to be made before residue is fluidized.

2.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

The following equipment is required for this task:

1	Cutting torch with gas cylinders
1	4" x 4" x 4' flanged steel tee
1	4" ball valve, flanged
2	Blank pipe flanges, 4"
24	Bolts and nuts for 4" pipe flange
3	4" flange gaskets, neoprene
1	Welding machine, with supply 1/8" rod

3.0 INITIAL CONDITIONS

The following conditions shall exist before this work task begins:

- o All personnel involved in performing this work task shall have received radiological and industrial safety training.
- o Radiological control zones have been established.
- o Radiation control procedures are in place.
- o Industrial safety requirements for the job have been determined and are understood by all personnel.
- o Emergency personnel safety plan in in place.
- o RWPs for the task have been prepared.
- o All tools, materials, and equipment required for the task are available.
- o Hydraulic mining operations have not started in the lower compartment of Building 434.

4.0 HEALTH AND SAFETY REQUIREMENTS

- All personnel involved in this task shall have received radiological and industrial safety training.

5.0 PROCEDURES

	Estimated Time Req'd. Minutes	Dose mrem
Step 1 Two workers, after dress out, will remove the cover over the lower southwest sample port at the tower bottom using a welding/cutting torch. After removing the cover, the worker will bolt a flanged 4" tee to the port. If the existing flange on the tower will not accommodate a new gasketed, bolted flanged tee, seal weld to the existing pipe in lieu of bolting. A blind flange will cover the outstanding leg of the tee, and a 4" ball valve will be attached to the other tee outlet. The valve will be closed and a blind flange attached to the valve outlet.	60	

FUSRAP

NFSS K-65 RESIDUE TRANSFER
TASK CHECK LIST PROCEDURE

CONTENTS

Responsibility	Action
	3. Call coordinating meeting with S/C's and the site Health Physics Specialist prior to starting a task to resolve comments and determine readiness to perform specific task.
S/C's	4. Review work plan to determine readiness to complete specific task. Coordinate the TCL with Lead Field Engineer and other S/C's as necessary.
	5. Denote readiness to perform task by signing TCL in the appropriate space. For items such as pumping or residue transfer, an abbreviated TCL, covering items requiring daily checking prior to resumption of these continuing tasks, shall be signed by the S/C and require daily approval by the Lead Field Engineer
	6. Retain copy of TCL as a record of readiness to perform.
	7. Give original TCL, after S/Cs have signed, to Lead Field Engineer.
Lead Field Engineer	8. If the TCL cannot be completed to either the S/C's or Lead Field Engineer's satisfaction (e.g., cannot obtain "sign-off" in a timely manner) take action a. or b. below, as appropriate. a. Obtain S/C agreement to comment resolution, revise work plan and/or TCL as appropriate. b. Consult Site Superintendent, as necessary, of problems which cannot be resolved with the coordinating meeting.
Site Superintendent	9. Take action a. or b. below, as appropriate:

Responsibility	Action
	a. Obtain S/C agreement to problem resolution, revise work plan and/or TCL as appropriate.
	b. Consult appropriate Oak Ridge personnel, as necessary.
	10. Advise Lead Engineer of problem resolutions.
Lead Field Engineer	11. Attach applicable Residue Transfer Work Plan Task, RWP(s), and certification to TCL.
	12. Initial each item of check list as it is verified and/or completed.
	13. Upon successful completion of a task, sign and date the TCL.
	14. Route copy of completed TCL and attachments to Site Superintendent.
	15. Retain original of completed TCL's and attachments in field office fields and route copies to: Project Engineer Supervisor of Safety and Licensing, and Task Manager, via Project Document Control Center; and to applicable Subcontractors.

NIAGARA FALLS STORAGE SITE

K-65 RESIDUE TRANSFER

CHECK LISTS

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 1 PRELIMINARY INSPECTION OF CONDITIONS INSIDE THE TOP DOME OF BUILDING 434

_____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

____________________	____________________
EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
____________________	____________________
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER
____________________	____________________

_____ EQUIPMENT AND MATERIAL ON HAND

- o TLD TREE, 1 1/4" TAPERED WOOD PLUG, 2-METER WOOD ROD
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 1 WORK PLAN, SECTION 2.0
- o EQUIPMENT BAGGING MATERIAL (FOR REMOVAL FROM BUILDING 434)

_____ RWP APPROVED (COPY ATTACHED)

_____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

_____ WORK ZONES ESTABLISHED

_____ HEALTH PHYSICS & INDUSTRIAL SAFETY SUPPORT AVAILABLE

_____ PROCEDURE STEP 1 COMPLETED

_____ PROCEDURE STEP 2 COMPLETED

_____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

_____ CONTAMINATED MATERIAL RELEASED TO ____________

CHECK LIST TASK 1 (CONT'D)

____ TASK 1 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)________________
CERTIFICATIONS
TASK 1 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

____
Print Name

____
Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 2 REFURBISH THE EXISTING TOWER LADDER

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER
________________	________________

____ EQUIPMENT AND MATERIAL ON HAND

- o SAFETY CABLE AND LOCK ASSEMBLIES
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 2 WORK PLAN, SECTION 2.0
- o EQUIPMENT BAGGING MATERIAL (FOR REMOVAL FROM BUILDING 434)

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ____________.

____ TASK 2 AND CHECK LIST COMPLETED

BECHTEL FIELD ENGINEER

SIGNATURE DATE

ATTACHMENTS:

RWP(S)________________
CERTIFICATIONS
TASK 2 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. ________.

Name	Organization	Training Completion Date	Briefing Date

____

Print Name

____

Signature Date

6706A

Sheet of

CHECK LIST TASK 3 SET PLATFORM PADS AND REMOVE VENT CAP

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

____________________ EIC-SUPERVISOR	____________________ BECHTEL HEALTH AND SAFETY REPRESENTATIVE
____________________ SICOLI AND MASSARO	____________________ BECHTEL - FIELD ENGINEER
____________________	____________________

____ EQUIPMENT AND MATERIAL ON HAND

- o 1/2" CINCH ANCHORS, 1/2" EYE BOLTS, T-BAR, QUICK SET MORTAR
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 3 WORK PLAN, SECTION 2.0
- o EQUIPMENT BAGGING MATERIAL (FOR REMOVAL FROM BUILDING 434)

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ PROCEDURE STEP 2 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

____ TASK 3 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)________________
CERTIFICATIONS
TASK 3 PROCEDURE

NFSS K-65 RESIDUE TRANSFER

CHECK LIST - TASK 2

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

____
Print Name

____
Signature Date

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 4 INSTALL WORK PLATFORM ON BUILDING 434

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER

____ EQUIPMENT AND MATERIAL ON HAND

- o PREASSEMBLED WORK PLATFORM (DWG. 202-DD25-C-02) COMPLETED
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 4 WORK PLAN, SECTION 2.0
- o EQUIPMENT BAGGING MATERIAL (FOR REMOVAL FROM BUILDING 434)

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ PROCEDURE STEP 2 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ____________.

____ TASK 4 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)______________
CERTIFICATIONS
TASK 4 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. ______.

Name	Organization	Training Completion Date	Briefing Date

Print Name

Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 4A RELIEF DRAIN VALVE INSTALLATION

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

EIC-SUPERVISOR	BECHTEL HEALTY AND SAFETY REPRESENTATIVE
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER

____ EQUIPMENT AND MATERIAL ON HAND

- o CORE DRILL
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 4A WORK PLAN, SECTION 2.0
- o EQUIPMENT BAGGING MATERIAL (FOR REMOVAL FROM BUILDING 434)

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH PHYSICS & INDUSTRIAL SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ PROCEDURE STEP 2 COMPLETED

____ PROCEDURE STEP 3 COMPLETED

____ PROCEDURE STEP 4 COMPLETED

____ PROCEDURE STEP 5 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ____________

_____ TASK 4A AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)__________________
CERTIFICATIONS
TASK 4A PROCEDURE

NFSS K-65 RESIDUE TRANSFER

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. ______.

Name	Organization	Training Completion Date	Briefing Date

____
Print Name

____
Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 5 INSTALL ELECTRIC POWER, INSTRUMENTATION, MAN LIFT, AND AIR HOSE ON BUILDING 434

_____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER

_____ EQUIPMENT AND MATERIAL ON HAND

- o 1 1/2", 1 1/4", AND 1" ELECTRICAL CONDUIT, H.P. AIR HOSE
- o TV MONITORING EQUIPMENT
- o MAN LIFT
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 5 WORK PLAN, SECTION 2.0

_____ RWP APPROVED (COPY ATTACHED)

_____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

_____ WORK ZONES ESTABLISHED

_____ HEALTH & SAFETY SUPPORT AVAILABLE

_____ PROCEDURE STEP 1 COMPLETED

_____ PROCEDURE STEP 2 COMPLETED

_____ PROCEDURE STEP 3 COMPLETED

CHECK LIST TASK 5 (CONT'D)

____ PROCEDURE STEP 5 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

____ TASK 5 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

ATTACHMENTS:

____
SIGNATURE DATE

RWP(S)______________
CERTIFICATIONS
TASK 5 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

____
Print Name

____
Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

REV.0

CHECK LIST TASK 6 INSTALL BREATHING AIR MANIFOLD AND AIR SUPPLY HOSE ON TOP OF PIPE ERECTION SCAFFOLD

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

____________________	____________________
EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
____________________	____________________
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER
____________________	____________________

____ EQUIPMENT AND MATERIAL ON HAND

- o BREATHING AIR MANIFOLD
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 6 WORK PLAN, SECTION 2.0

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

_____ **TASK 6 AND CHECK LIST COMPLETED**

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)_______________
CERTIFICATIONS
TASK 6 PROCEDURE

NFSS K-65 RESIDUE TRANSFER

CHECK LIST - TASK 6

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

____

Print Name

____

Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 7 CUT 5 FOOT BY 5 FOOT HOLE THROUGH THE CENTER OF BUILDING 434 DOME TOP

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

________________________	________________________
EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
________________________	________________________
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER
________________________	________________________

____ EQUIPMENT AND MATERIAL ON HAND

- o CONCRETE SAW
- o 30 gpm BOOSTER PUMP AND HEAVY DUTY HOSE
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 7 WORK PLAN, SECTION 2.0

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ PROCEDURE STEP 2 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

CHECK LIST TASK 7 (CONT'D)

____ TASK 7 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)______________
CERTIFICATIONS
TASK 7 PROCEDURE

NFSS K-65 RESIDUE TRANSFER

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

Print Name

Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 8 TRANSFER WATER FROM BUILDING 411 TO THE BUILDING 434 WATER RETENTION POND

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

____________________ EIC-SUPERVISOR	____________________ BECHTEL HEALTH AND SAFETY REPRESENTATIVE
____________________ SICOLI AND MASSARO	____________________ BECHTEL - FIELD ENGINEER
____________________	____________________

____ EQUIPMENT AND MATERIAL ON HAND

- o SLURRY PIPE LINE INSTALLED AND TESTED
- o PUMP P-01 OPERABLE, OPERATING PROCEDURES IN PLACE
- o WATER RETENTION POND INSTALLED
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 8 WORK PLAN, SECTION 2.0

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ PROCEDURE STEP 2 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

CHECK LIST TASK 8 (CONT'D)

____ TASK 8 AND CHECK LIST COMPLETED

BECHTEL FIELD ENGINEER

SIGNATURE DATE

ATTACHMENTS:

RWP(S)____________
CERTIFICATIONS
TASK 8 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. ______.

Name	Organization	Training Completion Date	Briefing Date

____

Print Name

____

Signature Date

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 9 INSTALL MINING UNIT P-03 IN BUILDING 434 AND TRANSFER K-65 RESIDUES TO BUILDING 411

_____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER

_____ EQUIPMENT AND MATERIAL ON HAND

- o 250 gpm HMU SYSTEM OPERABLE, OPERATING PROCEDURES IN PLACE
- o HMU VENDOR REP. ON SITE
- o CRANE WITH 2 5-TON LOAD LINES
- o 300 KW GENERATOR WITH 12 HR FUEL SUPPLY
- o TV MONITORING EQUIPMENT
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 9 WORK PLAN, SECTION 2.0

_____ RWP APPROVED (COPY ATTACHED)

_____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

_____ WORK ZONES ESTABLISHED

_____ HEALTH & SAFETY SUPPORT AVAILABLE

_____ PROCEDURE STEP 1 COMPLETED

_____ PROCEDURE STEP 2 COMPLETED

_____ PROCEDURE STEP 3 COMPLETED

_____ PROCEDURE STEP 4 COMPLETED

_____ PROCEDURE STEP 5 COMPLETED

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 9 (CONT'D)

_____ PROCEDURE STEP 6 COMPLETED

_____ PROCEDURE STEP 7 COMPLETED

_____ PROCEDURE STEP 8 COMPLETED

_____ PROCEDURE STEP 9 COMPLETED

_____ PROCEDURE STEP 10 COMPLETED

_____ PROCEDURE STEP 11 COMPLETED

_____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

_____ CONTAMINATED MATERIAL RELEASED TO _______________.

_____ TASK 9 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

ATTACHMENTS:

____
SIGNATURE DATE

RWP(S)_______________
CERTIFICATIONS
TASK 9 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

Print Name

Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

REV. 0

CHECK LIST TASK 10 FLUSH MINING UNIT AND HOSES AND REMOVE FROM BUILDING 434

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

______________ EIC-SUPERVISOR	______________ BECHTEL HEALTH AND SAFETY REPRESENTATIVE
______________ SICOLI AND MASSARO	______________ BECHTEL - FIELD ENGINEER
______________	______________

____ EQUIPMENT AND MATERIAL ON HAND

- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 10 WORK PLAN, SECTION 2.0

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ PROCEDURE STEP 2 COMPLETED

____ PROCEDURE STEP 3 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

CHECK LIST TASK 10 (CONT'D)

_____ TASK 10 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)______________
CERTIFICATIONS
TASK 10 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

____
Print Name

____
Signature Date

CHECK LIST TASK 11 REMOVE RESIDUE TRAPPED BY LOWER CONVEX DOME

_____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER

_____ EQUIPMENT AND MATERIAL ON HAND

- o GASOLINE-ENGINE DRIVEN CORE DRILL, ACCESSORIES AND FUEL
- o CORE DRILL WATER SUPPLY AVAILABLE
- o TV MONITORING EQUIPMENT
- o OUTRIGGER PLATFORM FOR DRILL COMPLETED
- o 5'x 5' COVER COMPLETED
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 11 WORK PLAN, SECTION 2.0

_____ RWP APPROVED (COPY ATTACHED)

_____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

_____ WORK ZONES ESTABLISHED

_____ HEALTH & SAFETY SUPPORT AVAILABLE

_____ PROCEDURE STEP 1 COMPLETED

_____ PROCEDURE STEP 2 COMPLETED

_____ PROCEDURE STEP 3 COMPLETED

_____ PROCEDURE STEP 4 COMPLETED

_____ PROCEDURE STEP 5 COMPLETED

CHECK LIST TASK 11 (CONT'D)

____ PROCEDURE STEP 6 COMPLETED

____ PROCEDURE STEP 7 COMPLETED

____ PROCEDURE STEP 8 COMPLETED

____ PROCEDURE STEP 6 COMPLETED

____ PROCEDURE STEP 7 COMPLETED

____ PROCEDURE STEP 8 COMPLETED

____ PROCEDURE STEP 9 COMPLETED

____ PROCEDURE STEP 9A COMPLETED

____ PROCEDURE STEP 10 COMPLETED

____ PROCEDURE STEP 11 COMPLETED

____ PROCEDURE STEP 12 COMPLETED

____ PROCEDURE STEP 13 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

____ TASK 11 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)______________
CERTIFICATIONS
TASK 11 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

Print Name

Signature Date

6706A

Sheet of

CHECK LIST TASK 12 CUT AND REMOVE CONCRETE SECTION OF LOWER DOME

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

______________________	______________________
EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
______________________	______________________
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER
______________________	______________________

____ EQUIPMENT AND MATERIAL ON HAND

- o CONCRETE SAW (ALTERNATE A)
- o GASOLINE ENGINE POWERED CORE DRILL (ALTERNATE B)
- o GASOLINE - ENGINE DRIVEN CORE DRILL, ACCESSORIES AND FUEL
- o TV MONITORING EQUIPMENT
- o PREFABRICATED TEMPLATES (2)
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 12 WORK PLAN, SECTION 2.0

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ PROCEDURE STEP 2 COMPLETED

____ PROCEDURE STEP 3 COMPLETED

CHECK LIST TASK 12 (CONT'D)

_____ PROCEDURE STEP 4 COMPLETED

_____ PROCEDURE STEP 5 COMPLETED

_____ PROCEDURE STEP 6 COMPLETED

_____ PROCEDURE STEP 7 COMPLETED

_____ PROCEDURE STEP 8 COMPLETED

_____ PROCEDURE STEP 9 COMPLETED

_____ PROCEDURE STEP 10 COMPLETED

_____ PROCEDURE STEP 11 COMPLETED

_____ PROCEDURE STEP 12 COMPLETED

_____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

_____ CONTAMINATED MATERIAL RELEASED TO _______________.

_____ TASK 12 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)_______________
CERTIFICATIONS
TASK 12 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

Print Name

Signature Date

6706A

Sheet of

CHECK LIST TASK 13 CUT AND REMOVE CONCRETE SECTION FROM THE SIDE OF THE TOWER

____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

______________________ EIC-SUPERVISOR	______________________ BECHTEL HEALTH AND SAFETY REPRESENTATIVE
______________________ SICOLI AND MASSARO	______________________ BECHTEL - FIELD ENGINEER
______________________	______________________

____ EQUIPMENT AND MATERIAL ON HAND

- o ELECTRIC-POWERED CORE DRILL AND ACCESSORIES
- o 20 gpm ELECTRIC-POWERED BOOSTER PUMP
- o 300 KW GENERATOR WITH 12 HR FUEL SUPPLY
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 13 WORK PLAN, SECTION 2.0

____ RWP APPROVED (COPY ATTACHED)

____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

____ WORK ZONES ESTABLISHED

____ HEALTH & SAFETY SUPPORT AVAILABLE

____ PROCEDURE STEP 1 COMPLETED

____ PROCEDURE STEP 2 COMPLETED

____ PROCEDURE STEP 3 COMPLETED

____ PROCEDURE STEP 4 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

____ TASK 13 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)______________
CERTIFICATIONS
TASK 13 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

____
Print Name

____
Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 14 REATTACH HOSE TO HYDRAULIC MINING UNIT (HMU) AND RESUME MINING LOWER SECTION

_____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

______________________	______________________
EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
______________________	______________________
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER
______________________	______________________

_____ EQUIPMENT AND MATERIAL ON HAND

- o 250 gpm HMU SYSTEM OPERABLE, OPERATING PROCEDURE IN PLACE
- o HMU VENDOR REP. ON SITE
- o LINE GUN
- o TV MONITORING EQUIPMENT
- o CRANE WITH 2 5-TON LOAD LINES
- o 300 KW GENERATOR WITH 12 HR. FUEL SUPPLY
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 14 WORK PLAN, SECTION 2.0

_____ RWP APPROVED (COPY ATTACHED)

_____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

_____ WORK ZONES ESTABLISHED

_____ HEALTH & SAFETY SUPPORT AVAILABLE

_____ PROCEDURE STEP 1 COMPLETED

_____ PROCEDURE STEP 2 COMPLETED

_____ PROCEDURE STEP 3 COMPLETED

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 14 (CONT'D)

____ PROCEDURE STEP 4 COMPLETED

____ PROCEDURE STEP 5 COMPLETED

____ PROCEDURE STEP 6 COMPLETED

____ PROCEDURE STEP 7 COMPLETED

____ PROCEDURE STEP 8 COMPLETED

____ PROCEDURE STEP 9 COMPLETED

____ PROCEDURE STEP 10 COMPLETED

____ PROCEDURE STEP 11 COMPLETED

____ PROCEDURE STEP 12 COMPLETED

____ PROCEDURE STEP 13 COMPLETED

____ PROCEDURE STEP 14 COMPLETED

____ PROCEDURE STEP 15 COMPLETED

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

____ TASK 14 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

____
SIGNATURE DATE

ATTACHMENTS:

RWP(S)______________
CERTIFICATIONS
TASK 14 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. _______.

Name	Organization	Training Completion Date	Briefing Date

____

Print Name

____

Signature Date

6706A

Sheet of

NFSS K-65 RESIDUE TRANSFER

CHECK LIST TASK 15 CLEAN OUT RESIDUES REMAINING IN THE BOTTOM OF BUILDING 434

_____ PROCEDURE HAS BEEN REVIEWED BY PARTICIPANTS

EIC-SUPERVISOR	BECHTEL HEALTH AND SAFETY REPRESENTATIVE
SICOLI AND MASSARO	BECHTEL - FIELD ENGINEER

_____ EQUIPMENT AND MATERIAL ON HAND

- o AIR OPERATED DIAPHRAGM PUMP
- o 150 CFM AIR COMPRESSOR
- o WATER-PROOF, PORTABLE LIGHTS
- o BREATHING AIR
- o COMMUNICATION EQUIPMENT
- o EQUIPMENT AND TOOLS PER TASK 15 WORK PLAN, SECTION 2.0

_____ RWP APPROVED (COPY ATTACHED)

_____ RADIOLOGICAL AND SAFETY TRAINING CERTIFICATION (ATTACHED)

_____ WORK ZONES ESTABLISHED

_____ HEALTH & SAFETY SUPPORT AVAILABLE

_____ PROCEDURE STEP 1 COMPLETED

_____ PROCEDURE STEP 2 COMPLETED

_____ PROCEDURE STEP 3 COMPLETED

_____ PROCEDURE STEP 4 COMPLETED

_____ PROCEDURE STEP 5 COMPLETED

CHECK LIST TASK 15 (CONT'D)

____ EQUIPMENT AND MATERIAL EXIT SURVEY COMPLETE

____ CONTAMINATED MATERIAL RELEASED TO ______________.

____ TASK 15 AND CHECK LIST COMPLETED

____
BECHTEL FIELD ENGINEER

ATTACHMENTS:

____
SIGNATURE DATE

RWP(S)______________
CERTIFICATIONS
TASK 15 PROCEDURE

COMMENTS:

RADIOLOGICAL AND SAFETY TRAINING

In accordance with the FUSRAP Project Radiation Protection Manual (Instruction Number 20.01) the following individuals have successfully completed training in the basic principles of radiation protection. Additionally, they have been briefed on the radiological and industrial safety requirements of Task No. ______.

Name	Organization	Training Completion Date	Briefing Date

____
Print Name

____
Signature Date

6706A

Sheet of

NIAGARA FALLS STORAGE SITE

K-65 RESIDUE TRANSFER

OPERATING PROCEDURE

TITLE: (A) OPERATING PROCEDURE FOR TRANSFERRING K-65 RESIDUES FROM BUILDING 434 TO BUILDING 411

EQUIPMENT REQUIRED:

System Equipment:

- Pumps - P-02, P-03, P-04
- Piping, Valves - Shown on Figure 1, 2, 3, 4
- 4" and 3" Hoses for Pump P-03
- P-03 Hose Saddle
- Electrical - Starter Panel for P-02, Starter Panel and Control Panel for P-03, Starter Panel for P-04, P-03 Light Bar and Lights
- Instrumentation - Pressure readings (PI-1003) (PI-1007), Flow readings (FI-1004) (FI-1008), Density Reading (DI-1010)

Support Equipment:

- Diesel Driven Electrical Generator with Primary Connections for Power, Control and Instrumentation
- Crane to support pump P-03 and Hose Saddle
- Communication System
- CCTV System

Operational Constraints:

- System Components and Sub systems are installed and serviced (lubrication, belts enclosed etc.)
- Piping system is leak checked and full
- System components and sub systems have operated in all mechanical, electrical and instrument check-out (C/O) modes

- Health and Safety Requirements Implemented
- Communications System on the line with Assistant Operators stationed as follows:

  Assistant Operators on the Tower Platform
  Assistant Operator on Crane (Crane Operator on Pump Pad)
  Operator will run the operating procedures and maintain operation log sheets (Figures 7,8)

- Minimum bending radius for 3 and 4 inch P-03 hoses is 30 inches

- Pump P-03 shall not be operated so that the amps would exceed 36.5 (Red Line Valve)

- Pond working volume is sufficient for an 8 hour run (Figure 4)

- Operator and Assistant Operators have been qualified in the Operators Training Class

- Radiation Work Permit (RWP) released 2(A)

Building 434 to 411 Operation: The following start-up, run and shut-down procedures are typical for all positions in the tower.

START-UP

Pad Operator	o (Figure 1,2) verify valves 010, 022 and all the header valves except for the one to be used for this run into Bay C are closed (Visual), start diesel generator
Pad Operator	o (Figure 3) verify valves 014, 017, 020, 019 and 011 are closed while valves 015 and 021 are open (Visual)
Tower Operator	o (Figure 5) verify Pump P-03 valves are closed, sink valve, eductor valve, jet valve (actuate switch - close) and jet rotate is in off position
Crane Operator	o Lower Pump P-03 until the low immersion light switches from on to off (Figure 5)
Pad Operator	o Prime and start pump P-02 (See Figure 6) open valve 014 to the second detent position
Tower Operator	o Open the eductor valve on Pump P-03 (15 seconds travel) and start Pump P-3, verify pump run light is on, open the sink valve (15 seconds travel) and close eductor valve, monitor ammeter

Crane Operator	o Lower Pump P-03 slowly an additional two feet while monitoring the ammeter for stable flow. NOTE: The red line valve of 36.5 amps should not be exceeded
Tower Operator	o When the ammeter readings drops off indicating a low residue volume, open the jet valve (5 second travel) and close the sink valve (15 seconds travel) Turn the jet rotate to on. NOTE: (PI-1003) (FI-1004) Monitor water Flow-CP02 (PI-1007) (FI-1008) Monitor Slurry Flow CP-02 (Figure 9)
Pad Operator	o Verify seal water is on to Pump P-04 and is at least 20 psig higher than (PI-1007)
Pad Operator	o Open valve 020, start pump P-04, open valve 019, close valve 021
Tower Operator Crane Operator	o Vary the height of Pump P-03 or water rate to achieve (DI-1010) values of 30%.

RUN

Pad Operator	o Will record on the operation log sheets start and stop times of all pumping units, steady state instrumentation readings and valve throttled positions by detent notch.
Pad Operator	o Will verify with the electrical support technician on acceptable operation of the emergency diesel generator
	o Will monitor shaft leakage from Pumps P-02 and P-04 to the pond.
	o Will monitor the pond working volume
	o Will record on an hourly basis the volume of water added to the tower and the volume of slurry discharged from the tower.
	o Will record results on pipe line walk-downs (2 hour intervals)
	o Will monitor the slurry discharge into Bay C at Building 411 and switch valves when necessary
	o Obtain at least three or four samples each 8 hour shift to verify slurry flow conditions

RUN (Continued)

Tower Operator	o Will report on Pump P-03 height and CP-02 instrumentation readings on an hourly basis
	o Will monitor electric cabling and hose feed into the tower

SHUT-DOWN

Tower Operator	o Stop Pump P-03, close the water valves sink ring or jet and stop jet rotate
Crane Operator	o Raise Pump P-03 until the low immersion light switches from off to on
Pad Operator	o Open valve 017, to the first detent position, stop pump P-04, close valves 020, 019, and 014 back flush slurry line, hoses and pump P-03
Pad Operator	o Open valve 021 and close 015 to flush by pass line
Pad Operator	o Open valve 020, start pump P-04, open valve 019 to second detent position, close valve 021, monitor flow rate on (FI-1008) until line is flushed to Building 411

SHUT-DOWN (Continued)

Pad Operator	o Stop Pump P-02, Close Valves 017, 020, 109 and Open Valve in Building 411
Crane Operator	o Raise Pump P-03 at least two feet higher than the low immersion level, set brakes
Tower Operator	o Deenergize control and starter panels
Pad Operator	o Have the electrical technician deenergize all the main circuits and P-02, P-04 starter panels.
	o Close seal water to Pump P-04

TITLE: (B) OPERATING PROCEDURE FOR TRANSFERRING WATER FROM BUILDING 411 TO BUILDING 434 POND

Equipment Required:

System Equipment:

- o Pumps - P-01, P-07
- o Piping, Valves - Shown on Figures 1, 2, 3, 4
- o Electrical - Starter Panel for P-01
- o Instrumentation - Pressure Reading (PI-1013), Flow Reading (FI-1009)

Support Equipment:

- o Diesel Driven Electrical Generator with Primary Connections for Power
- o Communication System

Operational Constraints:

- o System components and sub systems are installed and serviced (lubrication, fuel, etc.)

- o System components and sub systems have operated in all mechanical, electrical and instrument check-out (C/O) modes

- o Health and Safety Requirements implemented

- o Communications system on the line with an assistant operator stationed as follows:

  Assistant Operator at the pond, Building 434

  Operator at Pump P-01, Building 411

- o Water volumes in Bays A and B are sufficient for the run to the Pond, Building 434

- o Operator and Assistant Operator have been qualified in the Operators Training Class

Building 411 to 434 Operation: The following start-up, run and shutdown procedures are typical.

START-UP

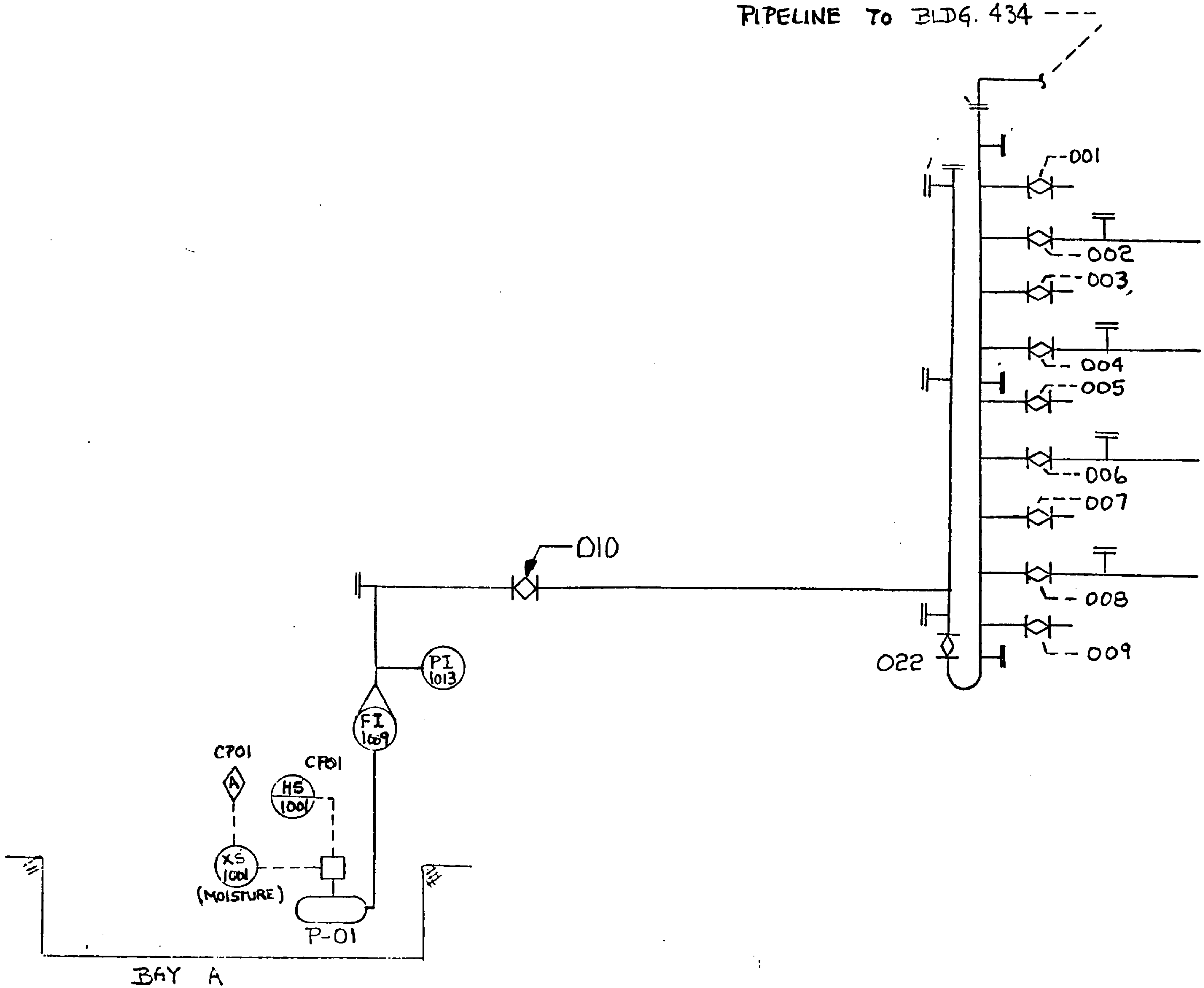
Pond Operator	o (Figure 3) verify valve 011 is open and pond working volume is sufficient for an 8 hour run.
Pump Operator	o (Figure 1, 2) verify valves 001, 002, 003, 004, 005, 006, 007, 008, 009 and 010 are closed and valve 022 is open. Verify Pump P-01 is covered with water
Pump Operator	o Have the electrical technician start the diesel generator start Pump PO-1, open valve 010 to the second detent position, monitor (PI-1013), (FI-1009) when the flow stabilizes start pumping from Bay B to Bay A with Pump P-07

RUN

Pump Operator	o Will record on the operation log sheets start and stop times of all pumping units, steady state instrumentation readings and valve throttled positions by detent notch.
Pump Operator	o Will verify with the electrical support technician on acceptable operation of the emergency diesel generator
	o Will monitor the Pump P-07 pumping capacity
	o Will monitor the water levels in Bays B and A
	o Will record on an hourly basis (PI-1013), (FI-1009)
	o Will record results on pipe line walk-downs (2 hour intervals)
Pond Operator	o Will monitor pond level
	o Obtain at least three or four samples each 8 hour shift to monitor water flow conditions

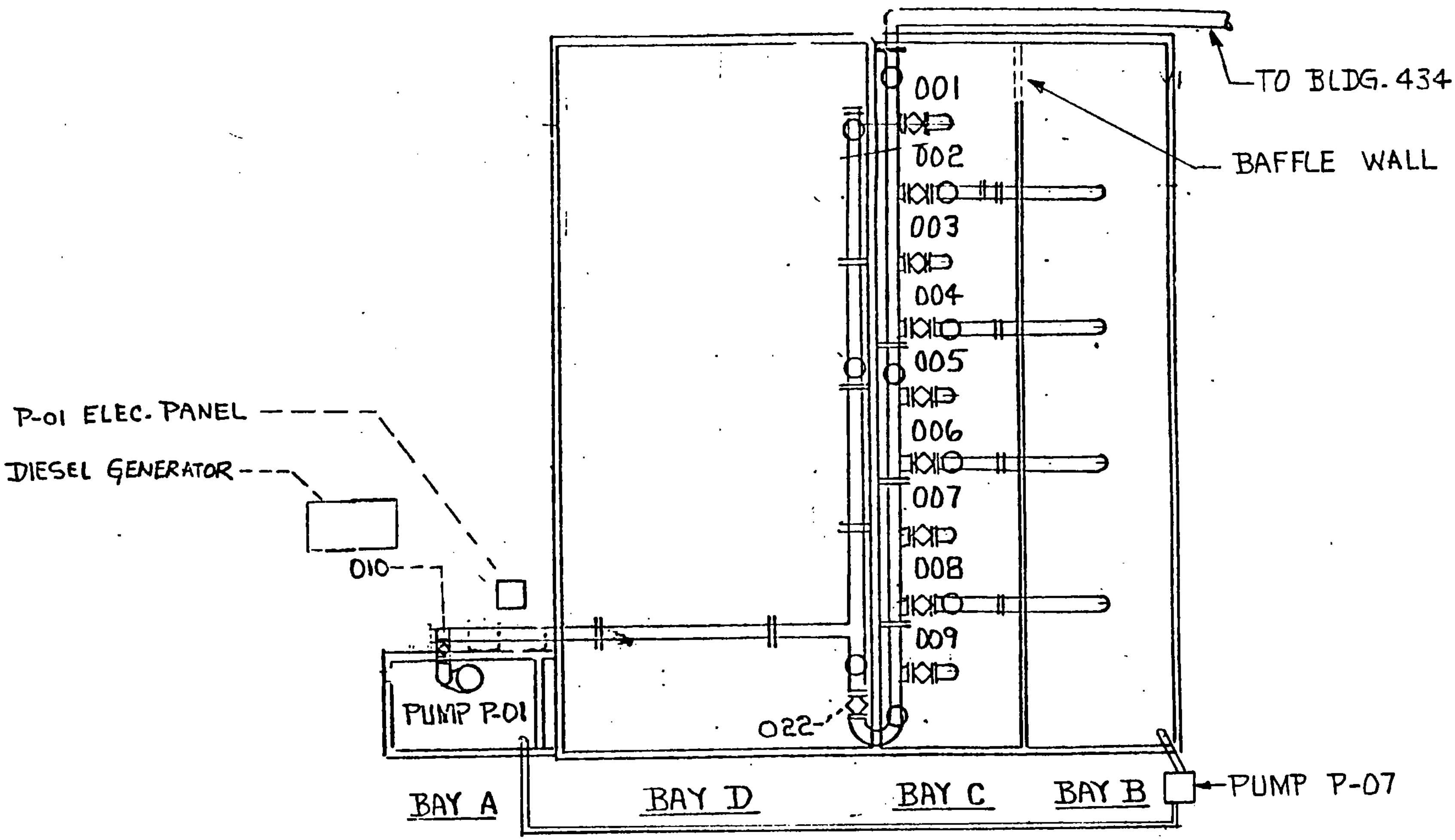
SHUT DOWN

Pump Operator	o Stop Pumps P-01, P-07, close valves 022, 010, have the electrical technician deenergize the main circuit and stop diesel generator, record final water levels in Bay A and B.
Pond Operator	o Close valve 011, record final water level in the pond.



P&ID BLDG. 411

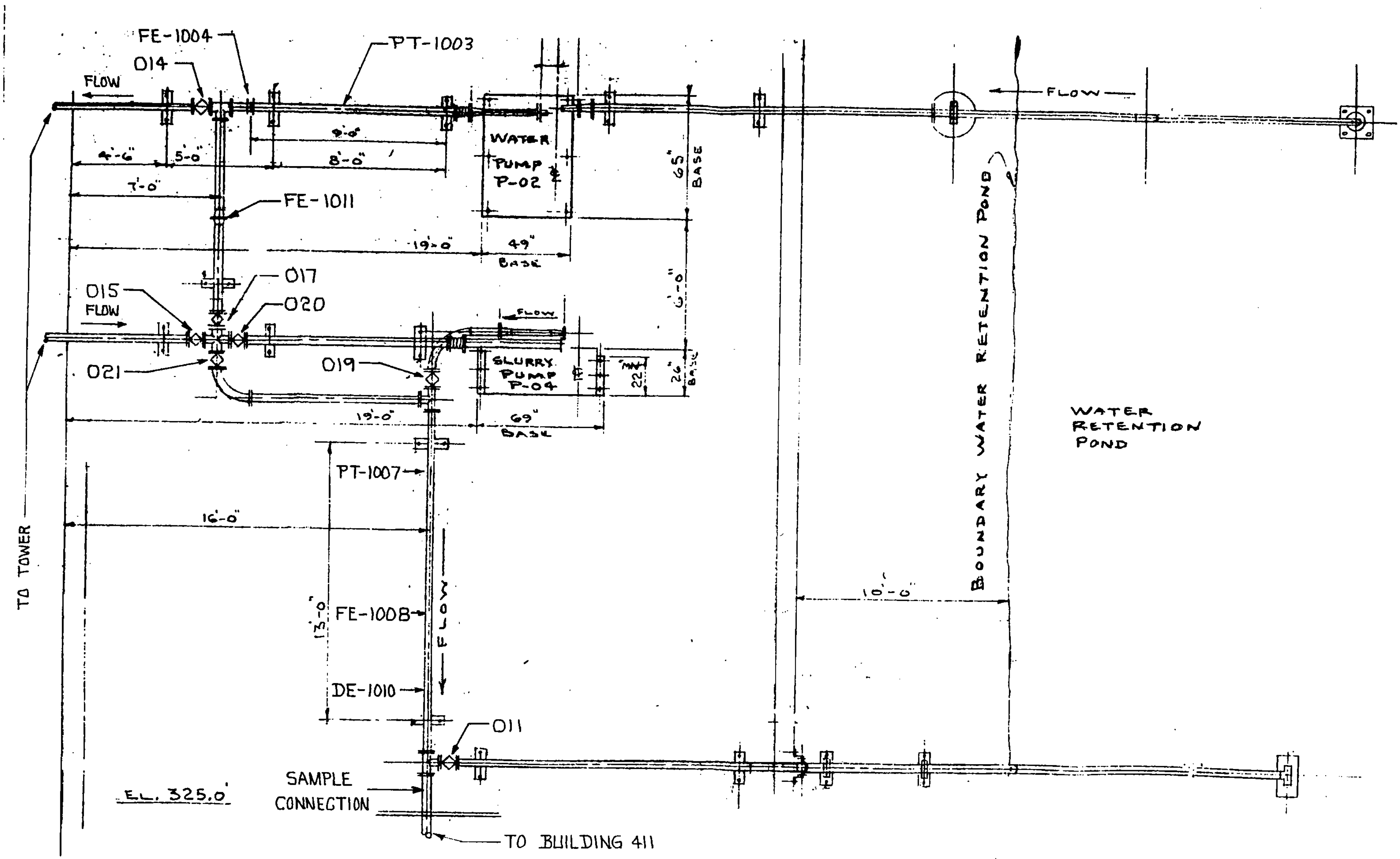
FIGURE - 1



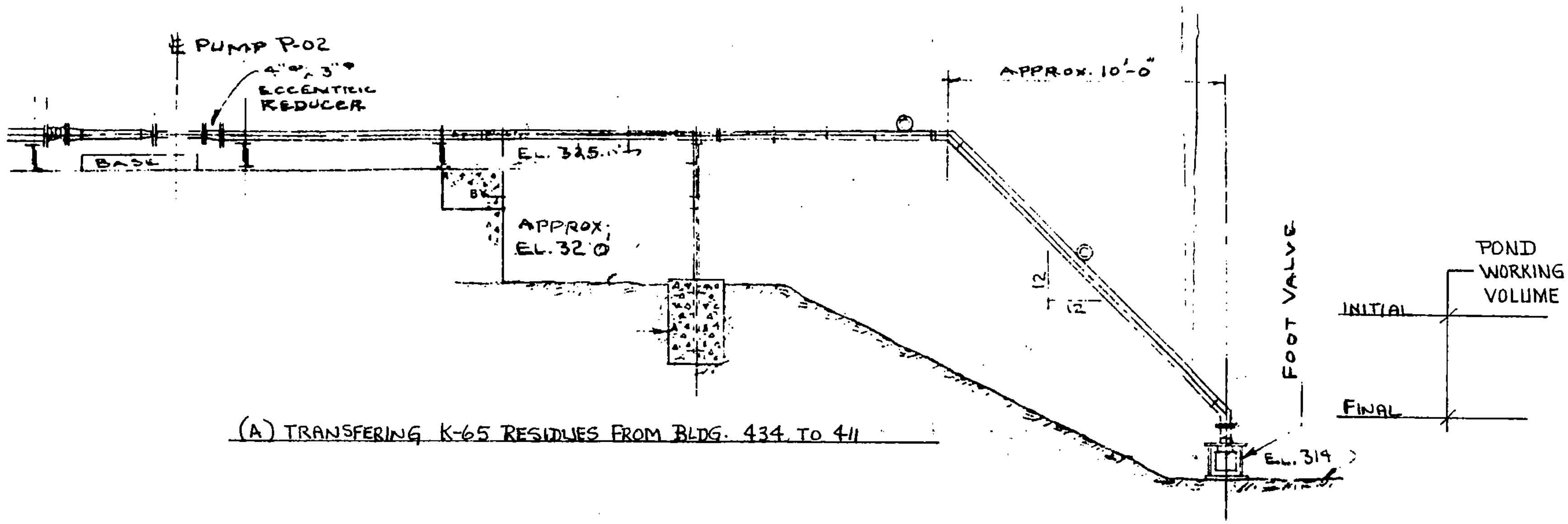
BUILDING 411 (L-30)

PIPING ARRANGEMENT BLDG. 411

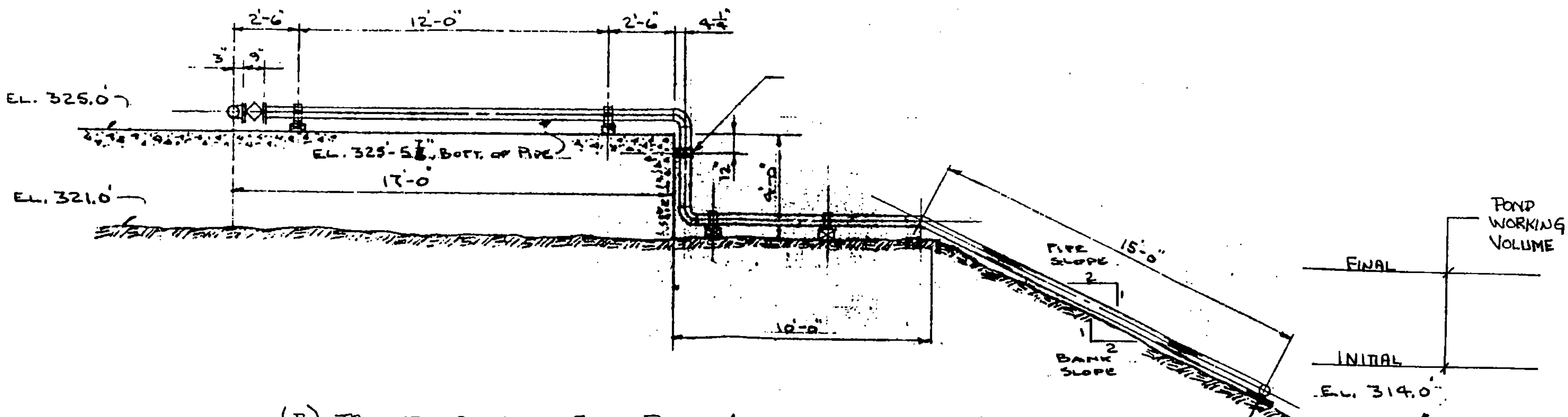
FIGURE - 2



BUILDING 434 PIPING ARRANGEMENT FIGURE - 3



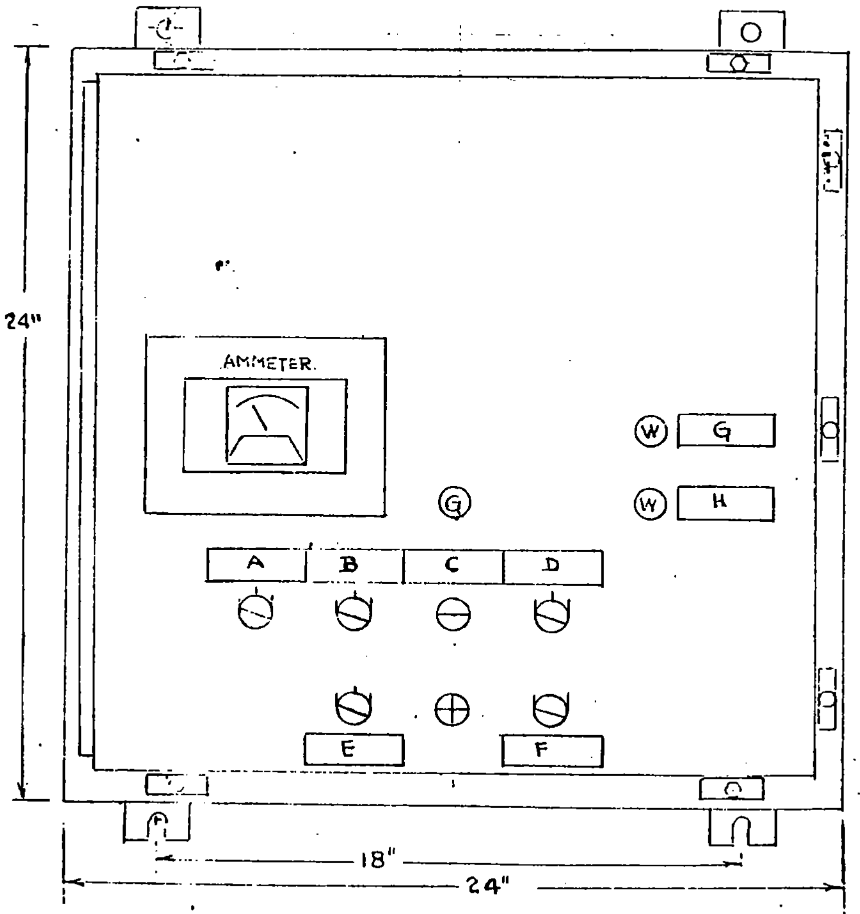
(A) TRANSFERING K-65 RESIDUES FROM BLDG. 434 TO 411



(B) TRANSFERING WATER FROM BLDG. 411 TO 434

BUILDING 434 PIPING ARRANGEMENT

FIGURE - 4



CONTROL PANEL FRONT VIEW

REF. DWGS. KVS (7-4B610 SHT 1 OF 2), (7-4E609)

A		HOIST, SPRING RETURN SW., 3 POS.
B		SINK VLV., SPRING RETURN SW., 3 POS.
C	⊖	SLURRY PUMP, PUSH BUTTON SW. (START)
D		JET VLV., SPRING RETURN SW., 3 POS.
E		EDUCTOR VLV., SPRING RETURN SW., 3 POS
F		JET ROTATE, MAINTAINED, 2 POS
G	Ⓦ	WHITE LIGHT, DEEP IMMERSION
H	Ⓦ	WHITE LIGHT, LOW IMMERSION
	⊕	SLURRY PUMP, PUSH BUTTON SW. (STOP)
	Ⓖ	SLURRY PUMP (RUN), GREEN LIGHT

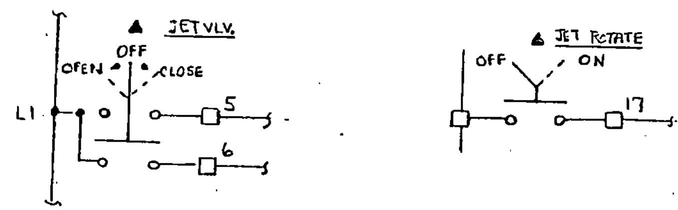


FIGURE 3. CP-03 (MINING UNIT)

FIGURE -5

PUMP P-02 PRIMING AND START

III—A. PRIMING.

The pump must always be fully primed and the suction pipe full of liquid before pump is started.

If pump is run dry, the rotating parts within the pump may seize to the stationary parts as they depend on the liquid being pumped for lubrication.

Several different methods of priming can be used, depending on the type of installation and service involved.

Note: If the pump is being used to pump potable or drinking water, the priming line should be protected against back-siphonage by the installation of a check valve and an approved type vacuum breaker.

2. Priming With Foot Valve:

With pump installed on suction lift, and with foot valve at end of suction line, priming can be done any of the following three ways:

(a) *From Some Outside Supply* (See Fig. 11).

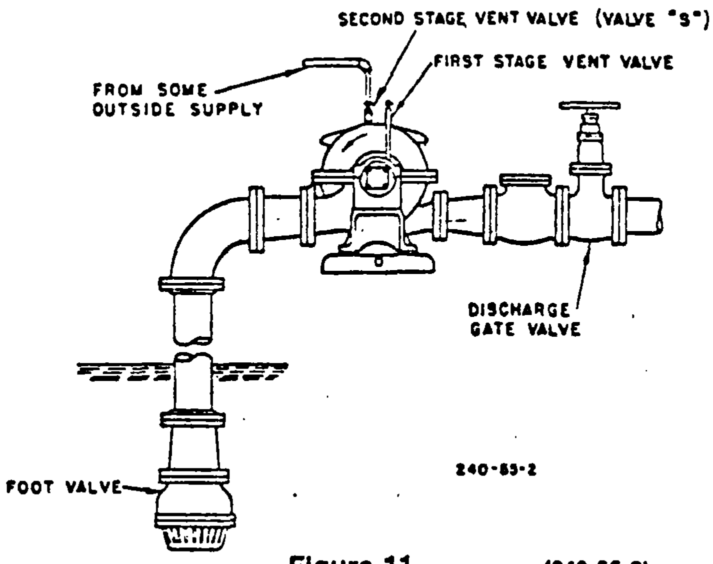


Figure 11 (240-55-2)

Close discharge gate valve, open 1st stage vent valve and open valve "S" in priming supply line until all air is expelled and water issues from vent opening. Close valve "S", close 1st stage air vent valve and start pump; then open discharge gate valve.

FIGURE-6

OPERATION LOG SHEETS

DATE ______ ______________ CONSTRUCTION SUPERV. ______________

SHIFT ______ ______________

CREW ______ BECHTEL ______ S/C ______ EBERLINE ______

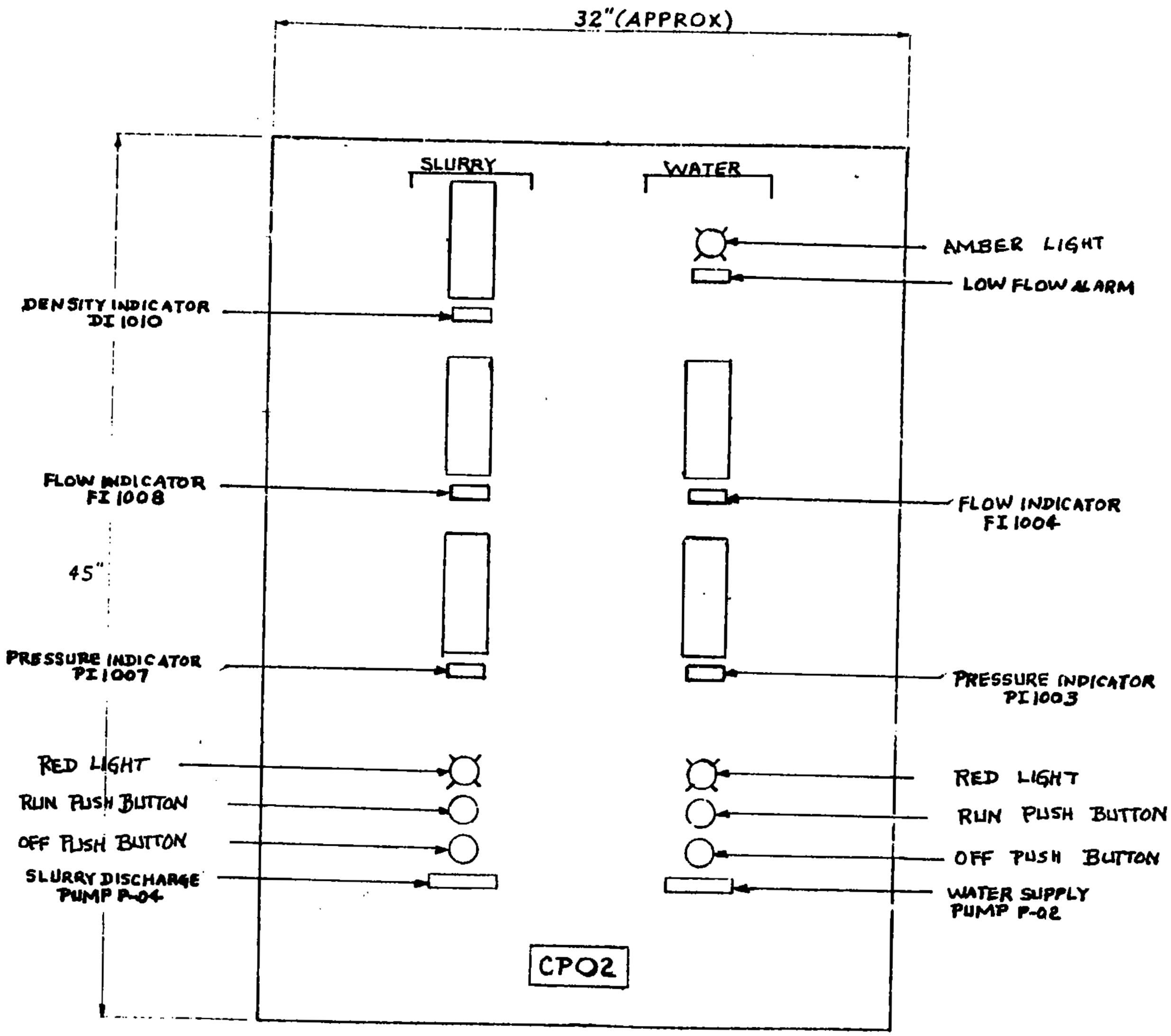
OPERATION	TIME STARTED	TIME COMPLETED	REMARKS

FIGURE-7

OPERATION LOG SHEETS
CONTINUATION SHEET

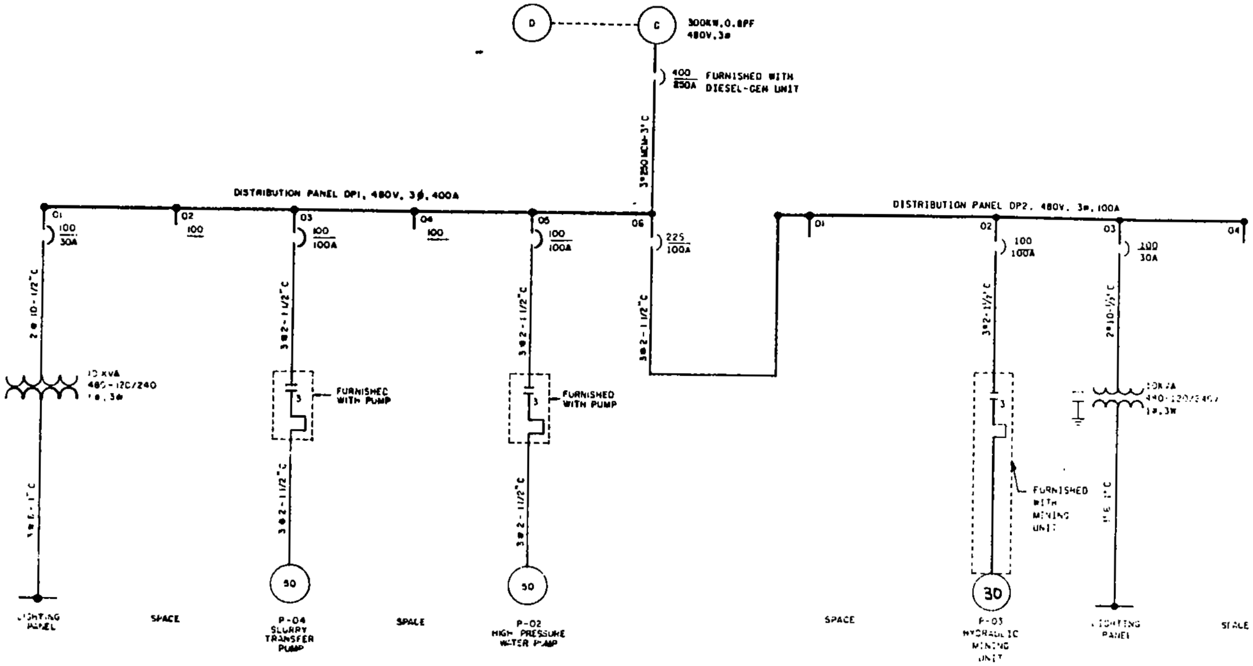
OPERATION	TIME STARTED	TIME COMPLETED	REMARKS

FIGURE - B

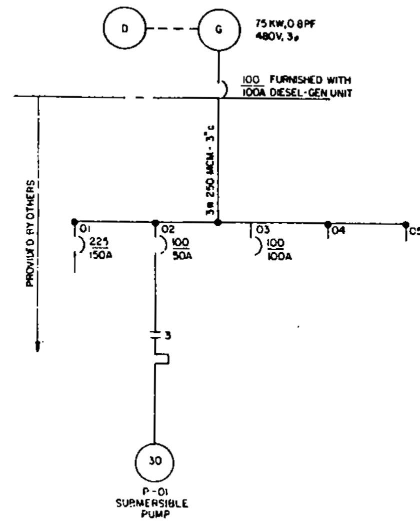


32"(APPROX)
45"
SLURRY
WATER
AMBER LIGHT
LOW FLOW ALARM
DENSITY INDICATOR
DI 1010
FLOW INDICATOR
FI 1008
FLOW INDICATOR
FI 1004
PRESSURE INDICATOR
PI 1007
PRESSURE INDICATOR
PI 1003
RED LIGHT
RUN PUSH BUTTON
OFF PUSH BUTTON
SLURRY DISCHARGE
PUMP P-04
RED LIGHT
RUN PUSH BUTTON
OFF PUSH BUTTON
WATER SUPPLY
PUMP P-02
CP02

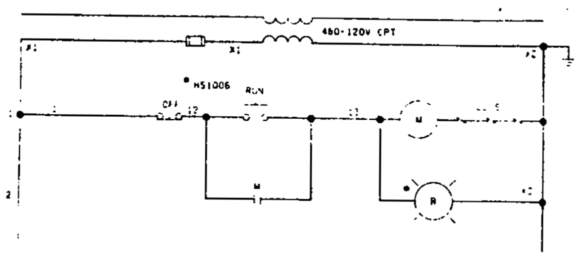
FIGURE 9



BUILDING 434

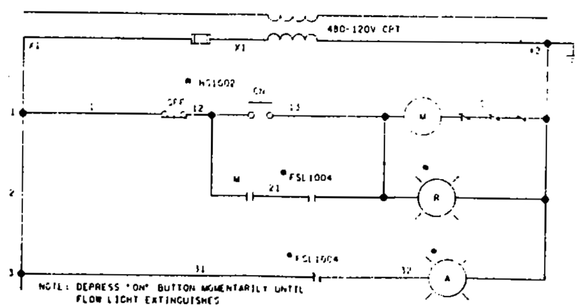


BUILDING 411



SLURRY TRANSFER PUMP P-04

* INTEGRAL WITH CP02



HIGH PRESSURE WATER PUMP P-02

* INTEGRAL WITH CP02

FIGURE - 10

NIAGARA FALLS STORAGE SITE
K-65 RESIDUE TRANSFER
CONTINGENCY PLAN

K-65 RESIDUE TRANSFER
CONTINGENCY PLAN

Activity 1	Hydraulic Mining Unit Repair
Activity 2	Pump Repair/Replacement
Activity 3	Valve Repair
Activity 4	Instrument Repair
Activity 5	Electrical System Repair
Activity 6	Pipeline Repair
Activity 7	Pipe Removal Inside Building 434
Activity 8	Work Platform Modifications
Activity 9	Hose Repairs
Activity 10	Pipeline Plug Recovery
Activity 11	CCTV System Repair
Activity 12	434 Pond Liner Repair

NFSS RESIDUE TRANSFER
CONTINGENCY PLAN

Activity 1 - Hydraulic Mining Unit Repair

1.0 OBJECTIVE

To make minor repairs to the hydraulic mining unit (HMU).

2.0 ASSUMPTIONS

The repairs required are minor such as a hose fitting, seals, electrical or instrument connection.

When major repairs are required, replacement of the unit will be considered. There is a Japanese unit with a shorter delivery time than the Dynajet.

Assume electrical and/or instrument connections can be repaired without removing the HMU from Building 434.

Assume repairs on the seals, hose fittings, etc., will require removal of the HMU from Building 434 to the laydown area.

3.0 INITIAL CONDITION

Materials and equipment for radiological and safety protection area available

Radiation control zones have been established for the work to be performed

Radiological and safety training of all involved personnel has been completed

Industrial safety requirements for the job have been determined and are understood by all personnel

Emergency personnel safety plan in place

RWP's for the work to be performed are prepared

All tools, materials, and equipment required for the work to be performed are available at the position where work is to be performed.

Mining operations have been stopped and mining unit and hoses have been flushed.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this work shall have received radiological and industrial safety training

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

5.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment and materials listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station

Task 1 - Repair of instruments and/or electrical components on mining unit to be performed on top of the tower

1 - set of spare electrical switches, relays for the electrical and/or instruments installed on the HMU

1 - set of wrenches, screwdrivers, etc., required to remove and repair the instrument and electrical components

1 - man lift to the top of Building 434 dome

Task 2 - Repair of seals, fittings, etc. on HMU, in HMU laydown area

1 - set of tools required for disconnecting hoses and electrical connections

1 - 15 ft length of 5 ft diameter plastic sleeving for HMU encasement

4 - 24 ft lengths of 8 inch plastic sleeving for encasing the hoses

1 - set of spare fittings, seals, packing, etc.

6.0 PROCEDURE

The procedure set forth covers only one method for performing this task.

Task 1 - Electrical and Instrument Repairs on HMU, on top of Building 434

Step 1 - The operator and observer on top of the tower, when operations are stopped, will raise the mining through the hole in the top dome of

Building 434. The mining unit and the hose will be thoroughly washed as they are raised through the hole, allowing the water to fall into the tower. The operator and worker will then return to the ground.

Step 2 - Two electricians or instrument technicians will dress out and be raised to the top of Building 434 along with materials, equipment and tools required for repair. After repairs have been made workers will return to the ground.

Step 3 - Mining unit operator and the observer after dress out will return to the tower work platform and test the mining unit to determine if repairs are complete. If tests are satisfactory mining will be resumed.

Task 2 - Repair of seals, fittings, etc. on mining unit, to be performed in HMU laydown area.

Step 1 - The operator and observer on top of the tower, when operations are stopped, will raise the mining unit up through the hole in the top of the dome. The mining unit and the hose will be thoroughly washed as they are raised through the hole, allowing the water to fall into the tower. The operator and observer will return to the ground.

Step 2 - Two workers, after dress out, will be raised to the tower work platform along with tools for disconnecting hose and the instruments and electrical connection to the mining unit. The workers will disconnect the electrical and instrument cables from the mining unit. The workers will break the connection nearest to the hose saddle on the other side of the saddle from the mining unit. The two hose ends will be sleeved with plastic sleeving and sealed with duct tape. The loose end of hose still attached to the tower piping will be tied off to the work platform. The mining unit will be encased in plastic and sealed. The mining unit and hose saddle, with hose attached, will be moved from the top of the tower and placed in the lay-down area using the crane. The workers will return to the ground.

Step 3 - Two workers will dress out and perform the repairs on the mining unit.

Step 4 - Two workers will dress out and be raised to the top of the tower and reconnect the hose and the electrical and instrument cables and return to the ground.

Activity 2 Pump Repair/Replacement

1.0 OBJECTIVE

To repair or replace any pump in the K-65 residue transfer system.

2.0 ASSUMPTIONS

- o It is assumed that with the limited time the pump will operate, failure will not be catastrophic and will allow flushing the residues from the pump and pipe lines before shut down
- o Repairs will be limited to replacement of seal packing glands, or bearings
- o Replacement of the pump will be performed if the drive shaft or impeller fails.

3.0 INITIAL CONDITIONS

- o Radiological and safety training of all involved personnel has been completed.
- o Radiation control zones have been established
- o Radiation control procedures are in place
- o Materials and equipment for radiological and safety protection are available
- o Emergency personnel safety plan is in place
- o RWP for the task has been prepared
- o All tools, materials, spare parts, and equipment required for the task are available
- o All valves are closed on each side of the pump.

4.0 HEALTH AND SAFETY REQUIREMENTS

- o All personnel involved in this work shall have received radiological and industrial safety training

- All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

5.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment and materials are available at the work station.

The following equipment is required for this task:

1 - Drip collection bag or drum capable of holding 50 gallons of liquid

1 - Spare packing gland for specific pump

1 - Lot of packing

1 - Spare replacement bearing for specific pump to be repaired

2 - Flange gaskets for inlet and outlet of pump

1 - Set of tools as required for repair

1 - Plastic enclosure with glove ports

5 - 30 gallon plastic bags

6.0 PROCEDURE

Step 1 Two workers will dress out as required by the radiological and safety supervisor. The workers will install a drip collector to collect any liquid from inside the pump or pipes. If the radiological supervisor requires, a plastic enclosure with glove ports will be placed around the work position on the pump.

Step 2 - The work will be performed to repair or replace the pump. Any liquid collected will be dumped into the Building 434 retention pond. Any parts removed from the pump and not reused will be placed in plastic bags and sealed. The enclosure will be removed and placed in a plastic bag and sealed.

NFSS K-65 Residue Transfer

CONTINGENCY PLANS

Activity Plan #3 - Valve Repair

1.0 Objective

The objective of this plan is to identify the actions which are to be taken to repair or replace any valve in the K-65 Residue Transfer System.

2.0 Assumptions

All repairs or replacements of valves can be completed in a glove bag, if required, to minimize the exposure to the workers and minimize any spread of contamination.

All valve repairs and replacement can be delayed until the pipeline has been flushed out and drained (between pumping sequences)

Repairs shall be limited to replacement of the packing seal on the stem, replacement of the flange seal, or repair of a stuck or hard to operate valve.

Replacement of a valve shall be performed if the casing fails or if the valve cannot be operated due to a cracked stem or wear inside of the valve.

3.0 Initial Conditions

Radiological and safety training of all involved personnel has been completed.

Radiation control zones have been established.

Radiation control procedures are in place.

Materials and equipment for radiological and safety protection are available.

Emergency Personnel Safety Plan is in place.

RWP's for the task have been prepared.

All tools, materials, equipment and replacement parts are available.

The slurry pipeline has been flushed out and drained or depressurized prior to the start of the task.

Any contamination of the surrounding area caused by the valve to be repaired has been cleaned up to reduce the exposure to the workers.

4.0 <u>Health and Safety Requirements</u>

All personnel involved in the work shall have been received radiological and industrial safety training.

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all required devices for the task and be certified as being qualified.

5.0 <u>Equipment and Materials Required</u>

This equipment listing may not be all inclusive. The Subcontractor is responsible for assuring that all required equipment and materials are available at the work station.

The following equipment is required for the task:

1 - Set of tools as required for the repair

1 - Glove Bag or Drip Collection Pan.

2 - Flange Gasket for the inlet and outlet of the valve.

1 - Replacement valve

1 - Lot of packing for the valve stem

6.0 Procedure

Step 1 - Two workers will dress out as as required by the radiological and safety supervisor. The workers will install the glove bag or the drip pan as required by the RWP.

Step 2 - The workers shall perform the required repair or replacement as per the manufacturer's specifications.

Step 3 - Following the completion of the repair and testing, the tools, parts, and waste are to be segregated and bagged up for surveying and disposal. The glove bag or the drip pan is to be removed and the general area decontaminated.

NFSS K-65 RESIDUE TRANSFER

CONTINGENCY PLAN

Activity 4 - Instrument Repair

1.0 OBJECTIVE

To repair the instrumentation located on the platform on top of Building 434.

2.0 ASSUMPTIONS

- It is assumed that the only repair required on instrument panel on Building 434 platform would be to change indicating lights.

3.0 INITIAL CONDITION

Materials and equipment for radiological and safety protection area are available.

Radiation control zones have been established for the work to be performed.

Radiological and safety training of all involved personnel has been completed.

Industrial safety requirements for the job have been determined and are understood by all personnel.

Emergency personnel safety plan is in place.

RWPs for the work to be performed are prepared.

All tools, materials, and equipment required for the work to be performed are available at the position where work is to be performed.

Mining operations have been stopped and mining unit and hoses have been flushed.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this work shall have received radiological and industrial safety training.

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

5.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment and materials listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

1 Set of light bulbs for indicator or panelboard
1 Set of tools required for repair

6.0 PROCEDURES

Step 1 Two workers after dressout will be raised to the Building 434 platform along with tools and materials. The instruments will be repaired and the workers returned to the ground.

NFSS K-65 RESIDUE TRANSFER
CONTINGENCY PLAN

Activity 5 - Electrical System Repair

1.0 OBJECTIVE

To repair the electrical panel located on the platform on top of Building 434.

2.0 ASSUMPTIONS

- It is assumed that the only repair required at this location would be to replace lighting or check wiring connections.

3.0 INITIAL CONDITION

Materials and equipment for radiological and safety protection area are available.

Radiation control zones have been established for the work to be performed.

Radiological and safety training of all involved personnel has been completed.

Industrial safety requirements for the job have been determined and are understood by all personnel.

Emergency personnel safety plan is in place.

RWPs for the work to be performed are prepared.

All tools, materials, and equipment required for the work to be performed are available at the position where work is to be performed.

Mining operations have been stopped and mining unit and hoses have been flushed.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this work shall have received radiological and industrial safety training.

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

5.0 EQUIPMENT AND MATERIALS REQUIRED

This materials and equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

1 Light bulb
1 Set tools for entry into electrical panel

6.0 PROCEDURES

Step 1 Two workers after dressout will will raised to the Building 434 platform along with tools and materials. The electrical panel will be repaired and the worker returned to the ground.

NFSS K-65 RESIDUE TRANSFER

CONTINGENCY PLAN

Activity 6 - Pipeline Repair

1.0 OBJECTIVE

To repair any leak in the residue transfer pipe line.

2.0 ASSUMPTIONS

The size of the leak in the pipeline will be small.

The size of the leak will be small enough that it can continue to leak until slurry transfer is stopped and line flushed with water from the Building 434 pond.

3.0 INITIAL CONDITIONS

Materials and equipment for radiological and safety protection area available.

Radiation control zones have been established for the work to be performed

Radiation control procedures are in place for the task to be performed

Radiological and safety training of all involved personnel has been completed

Industrial safety requirements for the job have been determined and are understood by all personnel

Emergency personnel safety plan is in place

RWP's for the task have been prepared

All tools, materials and equipment required for the task are available at the position where work is to be performed

A radiation background of the area where the leak occurred has been made by Health Physics Personnel.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this task shall have received radiological and industrial safety training

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

5.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment and materials listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station

1- Emergency pipe repair clamp for 4-inch schedule 40 pipe, operating pressure 500 psi, length 6 inches, number of bolts 2, material of construction cast iron.

1 - Heavy duty, 1/2" drive, ratchet wrench with sockets sized for nuts on pipe clamp.

1 - Yd^3 dry soil to add to the spilled liquid and dry it.

1 - Dump truck for hauling contaminated material

1 - Backhoe or front end loader.

6.0 PROCEDURES

Step 1 - When the inspector patrolling the pipe line for leaks detects a leak he shall notify the pump transfer operator of the leak, its location and approximate amount of leakage. If residue is being transferred, the operator will stop slurry transfer and immediately start flushing of the pipe line.

Step 2 - The pipe line inspector detecting the leak after notifying the operator will notify the Bechtel Site Superintendent or his representative and provide leak location, size, etc., as required. The Bechtel Site Superintendent will mobilize health physics support; and the Subcontractor, along with personnel, materials and equipment to repair the pipe line and clean up the spill.

Step 3 - After the pipe line has been 20
flushed and pumping operation stopped, two workers will dress out as required by

health physics and attach the pipe repair clamp over the leaking pipe and tighten the bolts.

Step 4 - After installation of the pipe clamp, the pipe line shall be pressure tested to determine if the leak has been repaired.

Step 5 - After it has been determined that the leak is repaired, the dry dirt shall be mixed with the liquid spill to dry up the spill. The non-contaminated soil will be removed by the backhoe or front end loader and placed in the dump truck. The material will be transported to the waste containment area. Eberline shall certify the area has been decontaminated.

Step 6 - Collect tools and have them cleaned at the decontamination pad.

NFSS K-65 RESIDUE TRANSFER
CONTINGENCY PLAN

Repair Activity 7 - Pipe Removal Inside Building 434

1.0 OBJECTIVE

Removal of any pipeline within Building 434 obstructing the operation of the HMU.

2.0 ASSUMPTION

- The most probable pipe obstruction will be a vertical 24" diameter, 3/8" wall thickness pipe penetrating the lower dome at the centerline of the tower. This will require cutting at one point above the lower dome and one or two locations below the lower dome.

- No pipe cutting will be required at locations other than directly below the 5 foot by 5 foot openings in the upper and lower domes.

- Pipes within this horizontal limit, if 15 feet or more below either of the domes, will not prevent insertion of the HMV through the domes and near-normal mining activity.

- Any pipe to be removed will have retained 75 percent or more of its wall thickness and structural integrity.

- Pipes do not contain large quantities of residue (are not filled).

- Heat resulting from oxy-acetylene or thermite cutting will have no significant effect on radiation levels.

3.0 INITIAL CONDITIONS

- Materials and equipment for radiological and safety protection are available.

- Radiation control zones have been established for the work to be performed.

- Radiation control procedures are in place for the task to be performed.

- Radiological and safety training of personnel has been completed.

- Industrial safety requirements for the job have been determined and are understood by all personnel.

- Emergency personnel safety plan is in place.

- RWPs for the task have been prepared.

- All tools, materials, and equipment required for the task are available at the position where work is to be peformed.

4.0 HEALTH AND SAFETY REQUIREMENTS

- All personnel involved in this task shall have received radiological and industrial safety training.

- All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

5.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

Alternate A

1	Cutting torch, with hoses sized for depth below platform, and 1 each oxygen/acetylene bottle.
2	Trouble lights, electric
1	Trouble light, battery powered
1	3/4 x 30" hand line, nylon
1	Man cage, 2-man
1	Breathing air manifold and hoses for two men
1	Winch with 100' of 3/8" wire rope, and bosun's chair
1	Crane
1	5/8" x 12' double eye choker, with clevises
1	Plate clamp

Alternate B

(Same as A, except):

1	Thermite dam with powder to fill, instead of gas torch outfit

Alternate C

(Same as A, except):

1	Thermite torch, with thermite/oxygen dispenser machine, instead of gas torch outfit

6.0 PROCEDURES

Alternate A: Torch Cut, Manual, at Pipe Location

Step 1 After dressout, three workers, including cutting torch, cutting gas, hand tools and breathing air bottles if required shall be lifted to the work platform using the man cage. Upon leaving the man cage, they shall connect their air lines to the platform air manifold.

Step 2 The workers shall secure the cutting gas bottles at the platform and connect and test the cutting torch; after connecting a length of gas hose sufficient to reach the pipe cutoff point.

Step 3 Two workers shall enter the man cage which remains connected to the crane. They shall have sufficient air hose to reach from the manifold to the point of work on the pipe. They shall also carry the torch, a 3/4" x 30' hand line, 2 "trouble lights", and an igniter. If the cutoff pipe section will be raised from the hole, they shall also take down with them a plate clamp or other hook capable of raising the pipe, attached to a length of cable suspended from the second crane hook. They shall be lowered to the point of work.

Step 4 The workers shall steady the man cage against the pipe to be cut off. (If a hook is used, a connecting hole for the hook shall be cut first, the hook inserted, and the crane load line made tight.) (Alternately, if using a plate clamp, secure it to the upper end of the pipe section.) The pipe shall then be marked and cut free. The two workers shall be raised to the platform. When all lines are free of the hole, the pipe section shall be raised, washed off, bagged, and hauled to the work containment areas.

Step 5 For succeeding cuts, the same procedure shall be followed.

Alternate B: Thermite Dam Cut, Remote

Step 1 Two workers, after dressout, including hand tools and breathing air bottles, shall be raised in the man cage to the work platform. Prior to entering the man cage, they shall have connected lifting sling to the thermite ring, remote applicator, plate clamp (or lifting hook) and 2 - 70' lengths of 5/8" cable.

Step 2 The above-listed equipment shall be raised to the platform and unhooked.

Step 3 The thermite ring dam shall be attached to a fuse and placed within the remote applicator, connected to a length of cable, and suspended from the crane hook. The plate hook shall be attached to the second length of cable, then attached to the second crane hook.

Step 4 The thermite dam shall be lowered around (or within) the 24" pipe to the cutoff point. The plate hook shall be dropped across the upper edge of the pipe, and a strain taken on the clamp load line, to fasten the clamp to the pipe.

Step 5 The fuse shall be ignited, with time allowed for the workers to disconnect air lines and descend the tower via the elevator.

Step 6 When the thermite ignites and burns the pipe free, the plate clamp line shall be given an additional strain to separate the pipe sections. The workers shall reascend the tower using the elevator. After examining the conditions, they shall extract the thermite dam load line, then the pipe section. The pipe section shall be washed, bagged and hauled to the waste containment area.

Alternate C: Thermite Torch Cut, Remote

Steps 1 & 2	Same as Steps 1 and 2 of Alternate B, but including thermite powder dispenser machine.
Step 3	The thermite torch extension pipe shall be assembled and suspended from a frame spanning the platform opening.
Step 4	A locator guide shall be fixed around the torch extension pipe and lowered by a hand line to the inside of the vertical pipe to be cut, centering the torch.
Step 5	The thermite powder dispenser shall be started, oxygen applied, and the torch head rotated within the 24" pipe to complete the cutoff.
Step 6	Same as Step 6, Alternate B.

Activity 8 - Building 434 Work Platform Modification

1.0 OBJECTIVE

To reinforce the Building 434 work platform in the event the platform anchors exhibit distress.

2.0 ASSUMPTIONS

- o The repairs required will be done by field fabrication of structural members.
- o The hydraulic mining operations have been stopped and the mining unit properly stored.
- o If specified structural member is not readily available a substitute of larger size will be acceptable.
- o The concrete around the platform base plates is showing signs of distress (spalling, cracking, etc.)

3.0 INITIAL CONDITIONS

- o Material and equipment for radiological and safety protection are available.
- o Radiation control zones have been established for the work to be performed.
- o Radiological and safety training of all involved personnel has been completed.
- o Industrial safety requirements for the job have been determined are are understood by all personnel.
- o Emergency personnel safety plan is in place.
- o RWPs for the work to be performed are prepared.
- o All tools, materials, and equipment required for the work to be performed are available at the position where work is to be performed.

4.0 HEALTH AND SAFETY REQUIREMENTS

All personnel involved in this work shall have received radiological and industrial safety training.

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

5.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment and materials listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available at the work station.

4	3/4" x 16" x 16" steel base plates
4	1-inch WEJ-IT or equal anchor bolts (per leg)
1	6-foot 8 x 20 wide flange (per leg)
1	Heavy-duty electrically operated drill with 1-inch concrete drill bit
1	Crane capable of lifting the required loads
1	Set of wrenches and miscellaneous hand tools
2	Radios for communication
1	24-inch carpenter's level
1	Set of chokers for wide flange rigging
1	25 lb. bucket quick set mortar cement
1	Pointing trowel
1	Concrete bush hammer
1	Electric arc (consumable electrode with coated rod) welding rig

6.0 PROCEDURES

Step 1 The operator and observer atop Building 434, when operations are stopped, will return to the ground.

Step 2 After dressout of personnel, three workers, along with breathing air supply cylinders (if required) and all necessary equipment and tools required to perform the work will be raised to the top of Building 434. The workers will locate the center(s) of the shim stack(s) for the platform outrigger leg(s). The concrete at the footing locations will be roughened; the 16" x 16" x 3/4" steel base plates set on shim stacks; and the 4 anchor bolts per plate drilled, installed and tightened. The pre-cut 8 x 20 wide flange beam(s) will be aligned and welded to the base plate(s) and platform steel. The base plate(s) will be grouted with quick-set mortar.

Step 3 The equipment and materials will be stowed on the man cage. The workers and the man cage will then be lowered to the ground.

ACTIVITY #9 - HOSE REPAIRS

1.0 Objective

The objective of this activity is to identify the actions to be taken to repair or replace any section of HMU hose which leaks or is damaged.

2.0 Assumptions

All temporary repairs or replacement of hose sections will take place after the hose has been flushed and drained.

Repairs shall be limited to the replacement of the couplers or the gaskets in the couplers. This includes the couplers and gaskets at either end of the hose.

Any hose section which is damaged either on the metal end pieces or in the rubber section is to be replaced.

3.0 Initial Conditions

Radiological and safety training of all involved personnel has been completed.

Radiation control zones have been established.

Radiation control procedures are in place.

Materials and equipment for radiological and safety protection are available.

Emergency Personnel safety plan is in place

RWP's for the task have been prepared.

All tools, materials, equipment, and replacement parts are available.

The hoses have been drained and flushed out if possible.

4.0 Health and Safety Requirements

All personnel involved in the work shall have received radiological and industrial safety training.

All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required for the task and be certified as being qualified.

5.0 Equipment and Materials Required

This equipment listing may not be all inclusive. The Subcontractor is responsible for assuring that all required equipment and materials are available at the work station.

1 - Set of tools as required for the repair

2 - Spare gasket

2 - Spare coupling

1 - Replacement hose

3 - 10' pieces of 3/4" rope for securing the ends of the hoses

6 - Drip collection bags for wrapping up the ends of a replaced hose and catching any water remaining in the hose.

1 - Roll of Duct tape

1 - Crane

1 - Mancage, equipped with breathing air

6.0 Procedure

Step 1 - Two workers will dress out as required by the radiological and safety supervisor. The workers shall proceed to the top of the tower via the mancage with all the required equipment. The workers shall follow the standard procedure for hooking up to the air supply.

Step 2 - The workers shall rinse the hose off as it is drawn out of the tower and secure the ends of the hoses on which they are to work to the platform.

Step 3 - The workers shall break the hose connections and direct any water remaining in the hose back into the tower or into a collection bag. If a hose section is to be removed, bag up the ends of the hose to control the contamination.

Step 4 - Perform the required repair or replacement of the coupling or hose and reconnect the ends of the hose. Remove the ropes used to secure the hose to the platform and guide the hose back into position.

If the hose repair or replacement is to be made on the side of the tower, the hoses shall be secured to the mancage and sufficient slack provided to allow the work to be performed.

Step 5 - Bag up all tools and spare parts for disposal, clean up the work area, and exit the top of the tower via the manlift.

NFSS K-65 RESIDUE TRANSFER
CONTINGENCY PLAN

Activity 10 - Pipeline Plug Recovery

1.0 OBJECTIVE

To unplug the slurry pipeline and restore residue transfer capability.

2.0 INITIAL CONDITIONS

- o Materials and equipment for radiological and safety protection are available
- o Radiation control zones have been established for the work to be performed
- o Radiological and safety training of all involved personnel has been completed
- o Industrial safety requirements for the work have been determined and are understood by all personnel
- o Emergency personnel safety plan is in place
- o RWPs for the work to be performed are prepared
- o All tools, materials, and equipment required for the work to be performed are available at the position where work is to be performed
- o Air compressor in working order is located adjacent to work station
- o Communication equipment is on hand and in working order.

3.0 HEALTH AND SAFETY REQUIREMENTS

- All personnel involved in this work shall have received radiological and industrial safety training

- All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

4.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment and materials listing may not be all-inclusive. The Subcontractor is responsible for assuring that all required equipment is available:

1 - Truck to move compressor

1 - Diesel or gasoline powered air compressor. 200 to 250 scfm @ 100 psi pressure capacity, with 1-50 foot length of hose

2 - 2 way radio

1 - 15 ft. length of 1 inch high pressure water hose, with Chicago couplings

1 - 50 length of 150 psi rated, 1-inch air hose, with Chicago couplings

1 - 55-gal. drum

5.0 PROCEDURE

Step 1 Finding the location of the plug in the pipeline is the first operation. A hose shall be connected to the Chicago coupling at the cleanout nearest to Bldg. 411. The other end of the hose shall be placed in a 55-gal drum. The pipe line shall be pressurized using pump P-04. After the line is pressurized, the valve at the clean out should be slowly cracked, while observing the hose discharge into the drum to see if there is any flow. The process will be repeated at the next easterly cleanout connection on the pipeline. When a test indicates flow, it indicates the line plug is between that cleanout and Building 411. Close the cleanout valve and depressurize the pipe line. Disconnect the water hose and drain to the barrel. Enclose the hose in plastic.

Step 2 - Valves 11, 14, and 19 shall be closed.

Step 3 - Connect the air hose to the cleanout connection at which water flow was detected. Make sure an outlet valve is open to Bay C in Building 411. Start the air compressor and pressurize hose to cleanout connection with air (caution-tie off both ends of the hose to prevent injury in case the hose comes loose). Open the valve on the cleanout slowly and let the air flow into the pipe. Check the outlet into Bay C of Building 411 for any air flow and if any air flow is detected, open valves 17 and 19, start pump P-04 and P-02 and dislodge the plug in the line; while maintaining air pressure. When fluid is flowing in the pipeline, close the valve on the cleanout. Shut off the compressor and disconnect the air hose.

Activity 11 CCTV System Repair

1.0 OBJECTIVE

To perform minor repair the CCTV system.

2.0 ASSUMPTIONS

- o The repairs required are minor such as flood light replacement, camera enclosure cleaning, cable replacement, electrical or instrument connection, etc.
- o When major repairs are required, replacement of the component will be considered (ADT Buffalo can provide replacement parts and technical assistance on short notice).
- o Repairs of the camera, camera enclosure, light and fixture, pan and tilt mechanism, etc., will require removal from the top of Building 434 for repair.

3.0 INITIAL CONDITIONS

- o Materials and equipment for radiological and safety protection are available
- o Radiation control zones have been established for the work to be performed
- o Radiological and safety training of all involved personnel has been completed
- o Industrial safety requirements for the job have been determined and are understood by all personnel
- o Emergency personnel safety plan is in place
- o RWP's for the work to be performed are prepared
- o All tools, materials, and equipment required for the work are available at the position where work is to be performed.

4.0 HEALTH AND SAFETY REQUIREMENTS

- o All personnel involved in this work shall have received radiological and industrial safety training

- All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and certified as being qualified.

5.0 EQUIPMENT AND MATERIAL REQUIRED

This equipment and material list may not be all-inclusive. The Subcontractor is responsible for assuring that all required material is available at the work station.

Alternate 1 - Repair of camera assembly and winch performed atop building 434

4 - replacement bulbs for the camera light fixture

1 - set of tools required to open camera enclosure and remove, repair or replace components

Alternate 2 - Replacement of parts at ground level

1 - lot of plastic wrap and tape for encasement of camera assembly and winch

1 - Crane

1 - Spare parts (on pickup service) local repair shop

6.0 PROCEDURE

Alternate 1 Repair of camera assembly and/or winch atop Building 434.

Step 1 - The operator and observer will raise the camera assembly through the hole in the top dome of Building 434. The camera assembly and cables will be thoroughly washed as they are raised through the hole.

Step 2 - The operator will examine and repair the camera assembly or winch.

Step 3 - The camera will be returned to service.

Alternate 2 Repair of camera assembly and winch in the laydown area.

Step 1 - The operator and observer, atop Building 434 will raise the camera assembly through the hole in the top dome of Building 434. The camera assembly and cables will be thoroughly washed as they are raised through the hole.

Step 2 - The operator will disconnect the camera assembly from its control cables and the winch cable.

Step 3 - The operator will examine and wrap the camera assembly.

Step 4 - The camera assembly will be moved from atop Building 434 and placed in the lay-down area. The operator and observer will return to the ground.

Step 5 - The operator will dress out and perform repairs on the camera assembly.

Step 6 - The operator and observer will dress out, return to the top of Building 434, reconnect the camera assembly to the control and winch cables and return the CCTV system to operation.

Repair Activity 12 - 434 Pond Liner Repair

1.0 OBJECTIVE

To repair the pond liner.

2.0 ASSUMPTIONS

- The repairs required are minor, such as a small breach of the liner fabric.

3.0 INITIAL CONDITIONS

- Materials and equipment for radiological and safety protection are available.
- Radiation control zones have been established for the work to be performed.
- Radiological and safety training of all involved personnel has been completed.
- Industrial safety requirements for the job have been determined and are understood by all involved personnel.
- Emergency personnel safety plan is in place.
- RWPs for the work to be performed are prepared.

- o All tools, materials, and equipment required for the work to be performed are available at the location where the work is to be performed

4.0 HEALTH AND SAFETY

- o All personnel involved in this work shall have received radiological and industrial safety training.

- o All personnel who are required to wear protective clothing for radiological or safety reasons shall be trained in the use of all devices required and are certified as being trained.

5.0 EQUIPMENT AND MATERIALS REQUIRED

This equipment and material list may not be all-inclusive. The Subcontractor is responsible for assuring that all required material is available at the work station.

1 gal	Hypalon Splice Adhesive WS-90 or equal
1	Wash pan, 16" dia. x 4" deep
1 gal	Detergent solution
1	Scrub brush
1 gal	Preparation solvent, trichlorethylene
1	Linoleum knife
1	Roller
2 lbs	Wiping rags
2	Life preservers
2	Safety belts with line length to reach from shore anchorage to the breach

6.0 PROCEDURE

Step 1 The operator shall align the slurry transfer line to pump down the Building 434 water retention pond.

Step 2 The operator will pump down the water retention pond until the fabric liner has been uncovered. (If on the side of the pond, require minimum of 12" free-board to the breach, above water level.

Step 3 After dress out of personnel, two workers will tie off to the shore anchorage and walk into the pond to the fabric breach. They will carry their tools and materials.

Step 4 The two workers will dry, clear off debris, solvent clean and repair the breach in the fabric liner.

Step 5 After repairs are completed the two workers will exit the pond carrying their tools and materials.

NFSS ENVIRONMENTAL MONITORING PLAN
FOR
K-65 RESIDUE TRANSFER

EXECUTIVE SUMMARY

Thirty offsite radon and direct radiation monitoring locations have been added to the existing onsite/offsite monitoring program. Each of these monitoring stations employs both a passive integrating radon monitoring device and a thermoluminescent dosimeter. In addition, two continuous particulate air samples will be collected in the predominantly "down-wind" direction.

The Building 434 discharge concentration (source term) will be characterized by using four passive integrating radon monitoring devices and daily air sampling for both radon and radon daughters at four locations in the discharge stream.

The potential for release of radon from Building 411 is considered to be small compared to that for Building 434, due to the fact that the residues will be kept covered with water. Nonetheless, a continuous radon air monitor will be employed in the "down-wind" direction, in addition to the existing 50 onsite passive radon monitoring devices.

MONITORING PLAN

This program, administered by the Monsanto Research Corporation for the U. S. Department of Energy, currently has 30 offsite radon monitoring stations located as shown in Figure 1. Each station employs a passive environmental radon monitor (PERM). The PERM device utilizes an electrostatic collection of radon daughters and is in the very near vicinity of a thermoluminescent detector (TLD) that is read out after the exposure period. The TLD response has been shown to be proportional to the exposure to radon (Ref. 1, 2). This program has been in place since 1980, hence it provides a substantial data base for background radon concentrations (e.g., overall 1983 average was 0.21 pCi/l (Ref. 3)).

Onsite monitoring consists of 36 stations located as shown in Figure 2. Each of these stations employs passive integrating radon monitors and external gamma detectors. The passive integrating radon monitor uses alpha track etch devices commercially marketed by the Terradex Corporation (Ref. 4). The environmental gamma detectors are a TLD service provided by the Eberline Division of Thermo Electron Corporation. In addition, 14 of these monitoring stations are equipped with PERMs.

To augment the current offsite radon monitoring program during residue transfer and building demolition, 30 additional monitoring locations have been established as shown in Figure 3. Each of these stations contains both a Terradex track etch detector and an Eberline TLD Environmental Gamma Detector.

The Building 434 radon/radon daughter leakage rate will be monitored at the point of release (i.e., at the hole created by the removal of a 5 ft x 5 ft section from the top center of the building). Monitoring will include four track etch detectors located around the perimeter of the hole and gas-particulate samples taken from the hole itself. The gas-particulate sample train will include a particulate filter, a cartridge containing a drying agent, cartridges containing activated charcoal, and a low volume air pump. The particulate filter will be evaluated for radon daughters and long-lived alpha emitters. The charcoal cartridges will be evaluated for radon in much the same manner as described by A. C. George (Ref. 5), except that much of the variability caused by moisture content in the air will be reduced by the use of the drying agent. This method involves allowing the radon daughters to equilibrate in the canister, then using gamma spectroscopy to quantify the radium-B/radium-C complex present, hence the radon, and computing a concentration using the total volume of air passed through the canisters.

It is anticipated that the radon release rate from Building 411 will be substantially less than that from Building 434, due primarily to the fact that the residues will be kept covered with water. It is expected, however, that agitation of the water (resulting from pumping K-65 residues into Bay C of Building 411) will de-emanate some of the solubilized radon into the atmosphere. Consequently, the discharge point will be sampled daily with a charcoal cartridge sample train similar to that described above. In addition, a continuous radon air monitor will be located in a position "down-wind" from Building 411. This device (Eberline Model RGM-2) records and prints hourly and daily averages in pCi/l. Since Building 411 represents a ground release condition, the ground level RGM-2 device will give adequate warning of an unacceptably high radon release rate. The onsite and offsite monitoring stations will effectively "see" dispersed radon concentrations.

All PERMs are changed and evaluated on a weekly basis. All track etch and offsite environmental gamma detectors are changed and evaluated on a monthly basis, and onsite environmental gamma detectors are changed and evaluated quarterly. The data generated by this program are evaluated upon receipt, and will be published monthly in an Interim Environmental Monitoring Status Report.

REFERENCES

1. George, A. C., Breslin, A. J. Measurements of Environmental Radon with Integrating Instruments. Workshop on Methods for Measuring Radiation in and Around Uranium Mills, Albuquerque, New Mexico, May 1977.

2. George, A. C. A Passive Environmental Radon Monitor. HASL-325, ERDA Health and Safety Laboratory, New York, New York, July 1977.

3. U. S. Department of Energy. Niagara Falls Storage Site Environmental Monitoring Report - Calendar Year 1983. DOE/OR/20722-18, May 1984.

4. Oswald, R. A., and Alter, H. W. Calibrations of Track Etch[R] Radon Detectors. Terradex Corporation, Walnut Creek, California, July 1983.

5. George, A. C. "Integrated Measurements on Indor Radon." Health Physics Vol. 46, No. 4, April 1984.

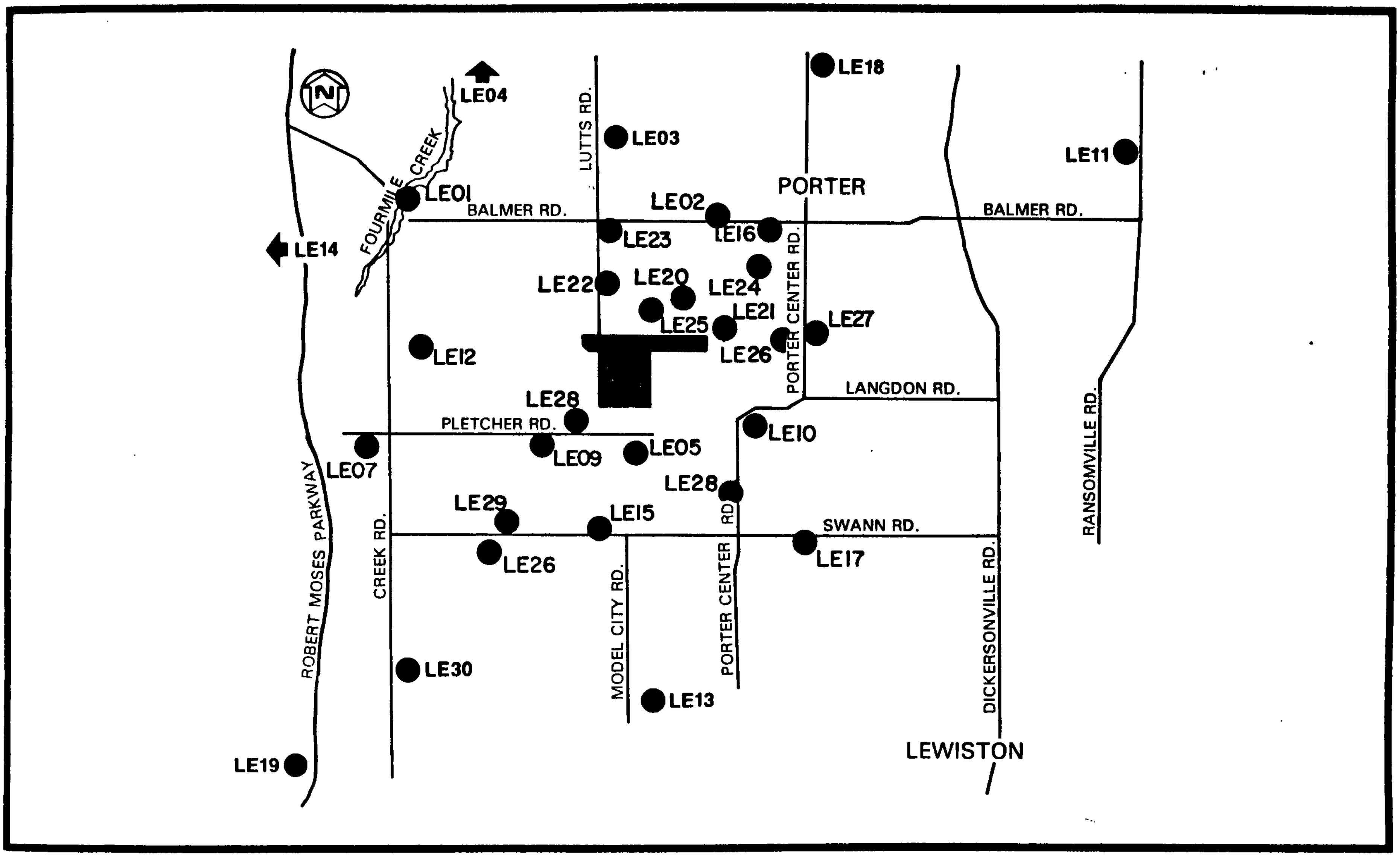


FIGURE 1 MONSANTO RESEARCH CORPORATION OFF-SITE MONITORING STATION LOCATIONS

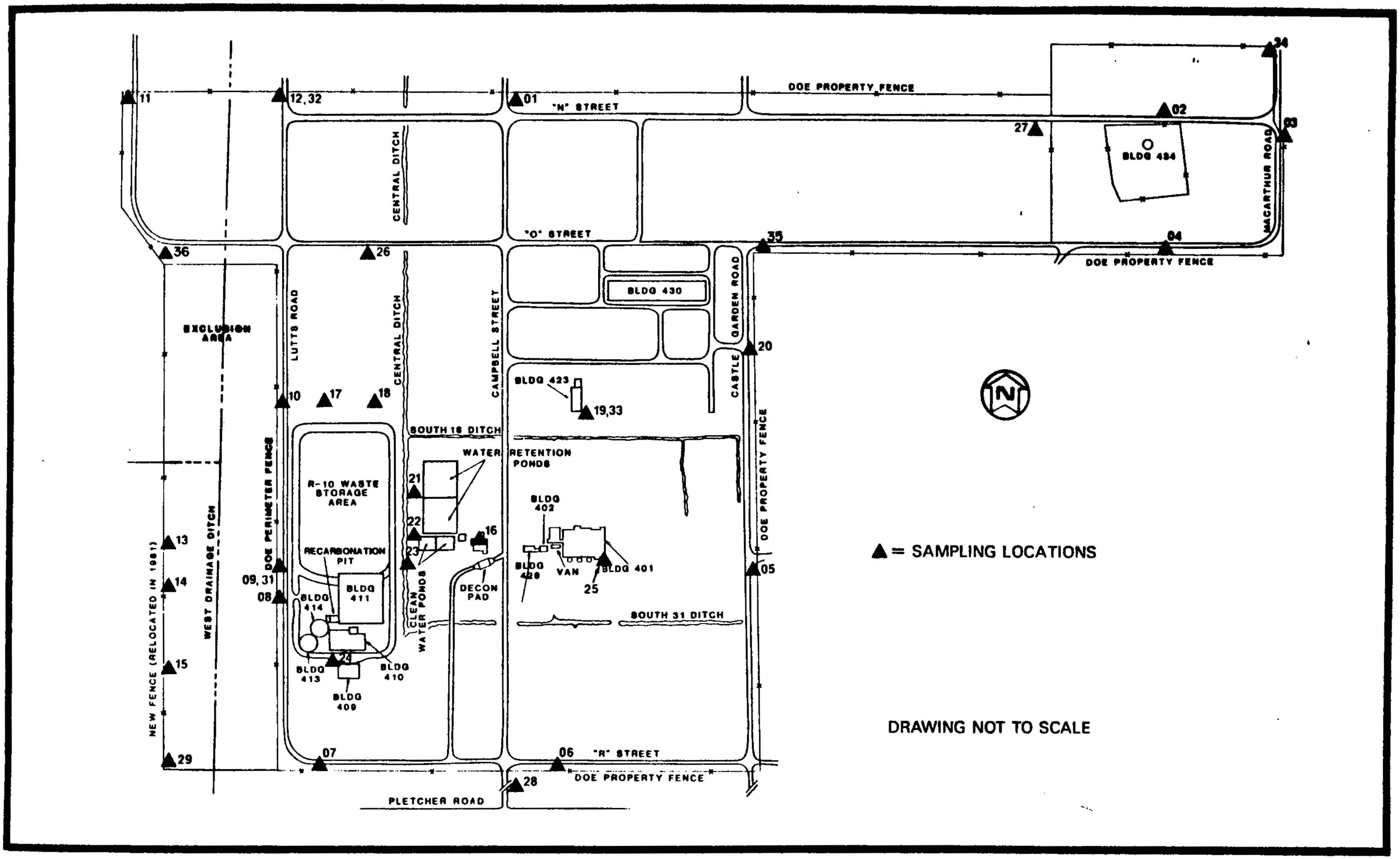


FIGURE 2 ON-SITE MONITORING STATION LOCATIONS

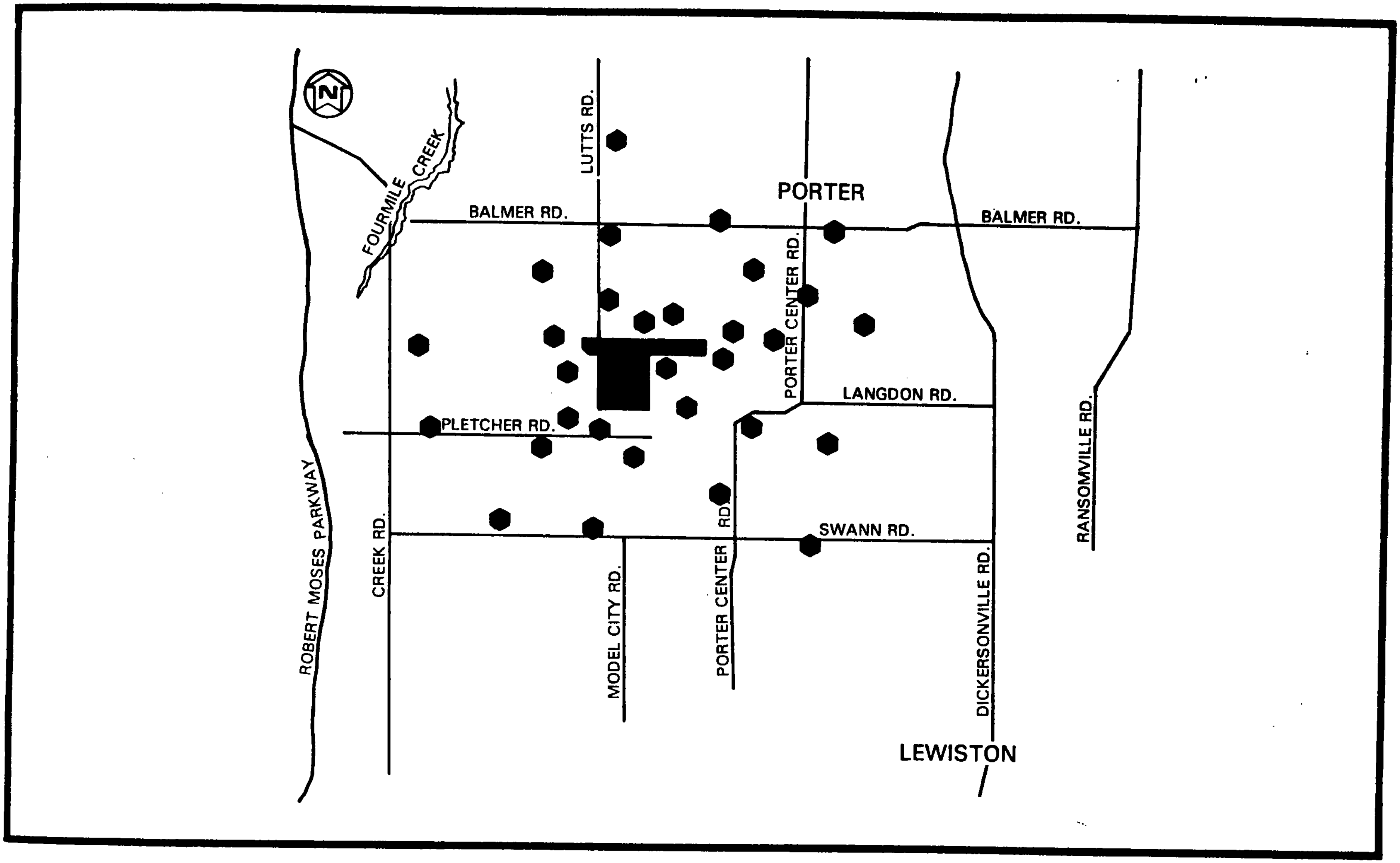


FIGURE 3 INTERIM OFF-SITE MONITORING STATION LOCATIONS

TITLE: NFSS Residue Transfer Operations Radiation Safety Training

DOCUMENT NUMBER: 21.57

REVISION NUMBER: 0

DATE: 05/03/84

PROJECT: FUSRAP

JOB NO: 14501

REVIEWED: CBRogers — Project Quality Assurance Supervisor — 5/31/84 Date

APPROVED: RD Glenn — Manager, Safety and Licensing — 5/31/84 Date

APPROVED: Robert L. Rudolph — Project Manager, Bechtel — 6-1-84 Date

NFSS RESIDUE TRANSFER OPERATIONS
RADIATION SAFETY TRAINING

1.0 Purpose

The purpose of this procedure is to provide guidelines for training individuals assigned to work in radiation and radioactive materials areas on the Niagara Falls Storage Site (NFSS) during residue transfer operations.

2.0 Scope

The scope of this procedure includes all individuals who may be required to work in the residue transfer operation activities on the NFSS site.

3.0 References

3.1 Department of Energy Order 5480.1A, "Environmental Protection, Safety and Health Protection Program for DOE Operations," Chapter XI, "Requirements for Radiation Protection," as currently amended.

3.2 FUSRAP Project Instruction Number 20.01, "Radiation Protection Manual," dated 03/30/83, and associated procedures.

3.3 FUSRAP Project Instruction Number 21.51, "Radiation Safety Training for Project Staff," dated 05/09/83.

3.4 FUSRAP Project Instruction Number 21.52, "FUSRAP Site-Specific Radiological and Industrial Safety Orientation," dated 05/09/83.

3.5 FUSRAP Project Instruction Number 21.55, "NFSS Residue Transfer Respiratory Protection Training," dated 05/01/84.

4.0 Equipment:

4.1 Alpha, beta and gamma radiation sources.

4.2 An alpha scintillation detector/meter, preferably with an audio speaker.

4.3 A beta-gamma detector/meter, preferably a Geiger counter with an audio speaker.

4.4 A dose rate survey instrument.

4.5 A TLD badge that can be used for demonstration, i.e. that can be taken apart.

4.6 Irritant smoke generator - Stannic Chloride (Titanium Tetrachloride) smoke tubes and bulb

4.7 Various forms (i.e. RWP, bioassay log sheet, exposure log sheet, etc.).

4.8 Sufficient numbers and types of protective clothing and equipment to allow each trainee to practice dressing and undressing procedures.

4.9 Samples of barrier material (i.e., Radiation Area Signs, "Radiation" Rope, etc.).

5.0 Definitions:

None.

6.0 Procedure

6.1 Scheduling:

6.1.1 Individuals who may be required to work at the site or on contaminated equipment, shall receive orientation training prior to initial work, and refresher training annually thereafter.

6.1.2 Classes should be scheduled such that a minimum of 4 hours (7 1/2 to 8 hours, if respirator training is to be given concurrently) is available for training.

6.1.3 Classes should be limited to a maximum of 15 individuals.

6.2 Instruction Protocol:

6.2.1 Individuals shall sign Form 21.57-1 and Training Notice and Record Form before class starts. (Form 21.57-1 shall be used for Safety and Licensing record files and Training Notice and Record Form (Attachment 1) shall be used for Project Quality Assurance record files).

6.2.2 The instruction should be given as outlined in Attachment 2.

6.3 Respiratory Protection: If respiratory protection training is to be given concurrently with the radiation safety training, refer to PI.21.55 for requirements of documentation of fit testing results.

6.4 Completed individual training records (Form 21.57-1) shall be posted to the individual's radiation exposure history file. A copy of each individual training record shall be forwarded to the Supervisor of the Safety and Licensing Group within 5 working days.

Form 21.57-1

RADIATION SAFETY TRAINING
TRAINING ATTENDANCE RECORD

Type of Training:

_____Orientation
_____Reinforcement
_____Supervisory
_____Respiratory Protection

Date: ____________________ Time: ____________________

Instructor: ____________________

Name (PLEASE PRINT): Last	First	Middle Initial	Social Security Number:

ATTACHMENT 1

QUALITY ASSURANCE PROGRAM

TRAINING NOTICE AND RECORD FORM

QUALITY ASSURANCE PROGRAM

Training Notice & Record

Discipline ____________________ **Session No.** ______________

(1) Personnel listed below are required to receive the training indicated. Where an "X" is indicated, this requires attendance at a training session on Date: ____________ at ____________. In such cases, please come prepared to discuss these procedures.

Manager/Supervisor ______________________ Date ______________

Distribution: Project QA Supervisor, All Personnel indicated, and Project Admin.

(2) Training completed as indicated on date ____________________ .

Manager/Supervisor ______________________ Date ____________

Distribution: Project QA Supervisor, All Personnel indicated, and Project Admin.

LIST ALL PERSONNEL							SIGNATURE

APPLICABILITY CODES

O = No training required. I = Read for information.

X = Requires full comprehension and discussion with Manager/Supervisor.

M = Make-up required at later date.

QUALITY ASSURANCE PROGRAM

TRAINING NOTICE & RECORD

Session No. ______________

LIST ALL PERSONNEL							SIGNATURE

REMARKS:

ATTACHMENT 2

Instructor's Manual

For

Radiation Safety Training

PREFACE

Introduction

This manual contains guidelines for giving instruction in radiation safety, and if followed in its entirety, will qualify an inexperienced individual for radiation work during the Residue Transfer Operations.

Instructor Qualifications

The instructor should be thoroughly familiar with 10 CFR 19, 10CFR 20, Regulatory Guide 8.10, referenced DOE Guides and FUSRAP Procedures, and the radiation safety conditions at the site. The instructor should also have a general working knowledge of the principles of health physics. Useful radiation facts are presented in Appendix A and notes on effective presentation are discussed in Appendix B.

Class Room Environment

Training should be accomplished in a professional atmosphere. A room specifically designed for training, or a conference room, is recommended. The professional environment assures the employee that the instruction is seriously regarded by his employer. The room should be well lighted and ventilated, and should be kept slightly cool (64°F to 66°F) to discourage drowsiness.

Employee Attitude

Individual attitudes toward formalized instruction vary from eager acceptance to antagonistic distrust. The instructor should attempt to gain acceptance from all trainees. This can be accomplished by observing a few basic rules:

- Maintain an open and friendly, yet professional, attitude.
- Be polite. Use of the word "sir" boosts an individual's ego, making him more receptive to what you're saying.
- Be positive at all times. Negative statements by the instructor tend to provoke negative thinking by the trainee.
- Encourage the trainee to ask questions.
- Consider all questions seriously. NEVER laugh at, or shrug-off, any question seriously put forward by the trainee.
- Always be honest. If you don't know the answer to a question - say so. Promise to obtain the answer - then do it.

INSTRUCTION PROTOCOL

1.0 Introduction

Introduce yourself verbally

This is important. If you don't introduce yourself, or if you put your name on a blackboard and assume the trainee will make the connection, the trainee will feel ill-at-ease, making communication difficult.

Give the name and outline of the course

Radiation Safety:

- o Origin and characterization of radiation and radioactive decay.
- o Radiation hazards.
- o Sources of radiation at the site.
- o Federal standards and regulations.
- o Radiation and radioactive material monitoring programs.
- o Radiation protection programs.
- o Conduct of radiation workers.

State reason why training is necessary: to assure that the employee receives adequate protection while performing his job.

2.0 Radiation

Information and training aids found in P.I. 21.51 (Ref. 3) and P.I. 21..52 (Ref. 4) may be used to supplement the information contained herein.

Divide the subject matter into 3 groups: origin, types and radioactive decay.

Origin

To grasp the concept of radiation, the trainee should be made to understand that other types exist, besides "nuclear radiation," i.e.

- o Fire - heat is a form of radiation.
- o Radio-transmitter - radio waves are a form of radiation.
- o Microwave ovens - microwaves are a form of radiation.
- o Sun - ultra-violet rays are a form of radiation.
- o Even light from a light bulb is a form of radiation.

Point out that "nuclear radiation" is much the same as many other forms, except that instead of coming from a fire, radio station, oven, the sun, or a light bulb, it comes from the center or nucleus of an atom - hence nuclear radiation.

At this point it would be well to ask for questions. More than likely someone will ask about the safety of microwave ovens, color TV sets, or medical X-Rays. Although not particularly germane to this course of instruction, questions of this type are excellent stimulants to class participation and interest, and should be encouraged.

In order for the trainee to be able to "visualize" radiation, he must first understand the concept of the atom:

- o Atom comparable to solar system:
  - Sun is "nucleus."
  - Planets are orbital electrons.
- o Nucleus is composed of two basic elements:
  - Protons: +1 charge; mass = 1.673 x 10^{-24} grams or 0.0000000000000000000000000059 ounces.
  - Electron mass = 10^{-28} grams. The electron has a "-1" charge.
  - Neutrons: 0 charge; mass ~ 1.675 x 10^{-24} grams, are actually a combination of a proton and an electron, hence reason for 0 charge of neutron.

NOTE: Keep explanation simple. Do not attempt to explain electron shells, binding energy, etc.

Explain the three basic types of radiation:

- o <u>Beta</u>: A electron produced when a neutron disintegrates (comes apart), travels a few yards in air, will not penetrate to internal organs (can be stopped with approximately an inch of plastic).

- o <u>Gamma</u>: A bundle of energy (0 mass - 0 charge) and may be emitted from an atom's nucleus when it ejects an electron or alpha particle, travels several hundred meters in air, extremely penetrating.

NOTE: If trainee seems to have difficulty understanding the 0 mass - 0 charge concept, use visible light or medical X-Ray examples.

- o <u>Alpha</u>: A combination of 2 neutrons and 2 protons emitted from atoms' nucleus, +2 charge, travels a few centimeters in air, not very penetrating, will not penetrate dead layer of skin, etc.).

NOTE: In the foregoing explanation of the atom and radiation, it is extremely useful to use diagrams and demonstrations e.g., draw the atom, indicating individual nucleons - use simple atom - diagram each radiation type being ejected from atom, then demonstrate with a uranium source and radiation detector. Alternatively, use the overhead transparencies masters given in P.I. 21.51 and 21.52. It is particularly useful to demonstrate gamma penetration of a part of the body. This can be accomplished by placing a <u>small</u> gamma source on one side of your hand, and the probe of a Geiger counter on the other.

<u>Radiation Decay</u>

In order for the trainee to understand the concept of "daughter products," he must first understand the concept of radioactive decay:

- o When particulate radiation is ejected from the nucleus, the atom changes because it has lost mass. Use alpha particle example, i.e.,

  92 Uranium - 238 has 92 protons and 146 neutrons in its nucleus. When an alpha particle is ejected from the nucleus, the atom loses 2 protons and 2 neutrons. Hence it is no longer 92-Uranium - 238.

- o Use isotopic designation (e.g., $^{238}_{92}U$) to help demonstrate what happens during nuclear decay, i.e.,

  238 nucleons - 4 nucleons = 234 nucleons.
  and 92 protons - 2 protons = 90 protons, i.e.

  $^{238}_{92}U \rightarrow ^{4}_{2}He + ^{234}_{90}X$ where X = Th.

  In other words Uranium has now "transformed" to Thorium through alpha decay.

- o If necessary (trainee asks) explain beta particle decay, i.e.,

  - Neutron breaks up in nucleus into a proton and an electron.

  - The electron produced is ejected from nucleus, proton remains, therefore total mass is not changed significantly, but atom gains a proton in nucleus.

  - Again use isotopic designation to demonstrate. 90 Thorium -234 emits a beta particle: i.e.,

    $^{234}_{90}Th \rightarrow \beta^{0}_{-1} + ^{234}_{91}X$ where X = Pa

    and gains a proton. The result is: 90 + 1 (proton); 234 + 0 (mass), or $^{234}_{90}Th - \beta^{0}_{-1} = ^{234}_{91}Pa$

  Through beta decay therefore, Thorium has decayed to Protoactinium.

NOTE: It may be necessary to explain that the total mass is not changed appreciably (i.e., electron mass is 1/1836 of the proton mass, therefore, mass change of atom during beta decay is insignificant, just the number of protons has changed!).

Although nuclear decay explained in terms of nucleon balance is relatively simple and straight forward, the trainee may have difficulty understanding it simply because it is "nuclear". Repeat the explanation until you are confident that the trainee(s) grasp the concept.

3.0 Radiation Hazards

Describe the basic mechanism of radiation damage:

Simple explanation of ionization, i.e., radiation interacts with atoms in tissue cells, stripping away orbital electrons. If necessary, make comparison with runaway planet (e.g., radiation) interacting with solar system (e.g., atom).

- Sufficient ionization will result in changes in molecular structure of cell.

- Sufficient molecular (chemical) change will result in cell death or mutation.

- Cell death OK, if held to reasonable levels, i.e., cell death is a normal body function, body is equipped to handle cell death, etc. Massive radiation doses result in massive cell death, results in necrosis and even fatality if a total body dose.

- Cell mutation is also OK if held to minimal occurrence. Body is not equipped to handle cell mutation as easily as cell death. Tumors are the result of proliferation of certain mutant cell lines. Hence, cancer and potential fatality.

Describe areas of human experience with radiation:

- Early radiation workers, i.e., Roentgen, Curie, etc., dying from excessive exposure.

- Early radiation industry, i.e., radium dial painters dying from bone cancers, etc.

- Victims of atomic bombs.

- Radiation accidents.

- Human experiments. Injections of uranium in blood to study toxic effects on kidney.

- Animal experiments. Dose tolerance studies, chronic exposure experiments, inhalation studies, etc.

Results of all the above have given us a good idea of the short term doses necessary to produce physiological damage:

- o 100 rem/few days: some blood changes - no injury
- o 100 - 300 rem/few days: injury with recovery
- o 400 - 500 rem/few days: 50% death in 30 days
- o 600 rem/few days: 100% death

Genetic damage and tumor induction are much harder to predict than acute exposure effects. Predictions of such injury are made with massive numbers, just like insurance companies predicting mortality rates. The basic conclusion of most studies is that a working life time (45 years) of exposure to the maximum permissible annual dose will have a life shortening effect of about 6 months, or about the same as smoking one package of cigarettes a day.

4.0 Sources of Radiation at the Site

Before the trainee can fully appreciate the site's hazards, he must first completely understand the differences between the terms: "radiation," "radioactive material," and "contamination."

- o Radioactive material: is simply that material which emits radiation (e.g. uranium).
- o Radiation: was previously defined in detail.
- o Contamination: is simply radioactive material that is someplace where it isn't supposed to be, i.e., on the floor (surface contamination), on skin (personnel contamination), etc.

NOTE: It is helpful to use chalk dust to physically demonstrate the contamination concept. The use of an analogy is also helpful, i.e., "If a cow pasture contains manure, it might be likened to a radioactive material because it gives off an odor (radiation), and it is located where it belongs. If the farmer walks through the pasture and gets some of the manure on his boots, he has become contaminated, because the material is now in a location where it doesn't belong, or isn't wanted."

Explain that radiation hazards at the site stem from two different sources:

- o Direct radiation: Radium and its daughter (decay) products emit all three types of radiation (alpha, beta, gamma). Alpha, beta and gamma radiations are emitted from material throughout the entire process.

  NOTE: The instructor should explain which "decay products" are of primary concern, and a few examples of the dose rates from radium.

- o Airborne contamination: The primary concern is the inhalation and deposition of radium, radon and its daughters.

  - Radiation exposure to the lung for insoluble forms of radium.
  - Radiation exposure to the bronchial epithelium for radon daughters.
  - Chemical damage to the kidney (Nephrotoxicity) for soluble forms of uranium.

NOTE: A few practical examples of each source should be given.

Break:

Give the trainee(s) a short 10 to 15 minute break. Casual conversation with a few of the trainees during the break will help stimulate interest and participation when the class resumes.

5.0 Federal Standards and Regulations

Explain standard setting process - Individual research - ICRP recommendations - NCRP recommendations and DOE regulations and finally to specific licenses, permits, contracts, etc.

- o Maximum permissible radiation exposures.

  - 3 rem/qtr.

  NOTE: Administrative limits will impose weekly and lower quarterly limits to provide better control of employee's exposure.

- 5(N-18) rem accumulated dose (up to 3 rem/qtr.).
- 0.5 rem to fetus/9 months for pregnant women.

o Maximum permissible exposures.

- 520 MPC - hrs per quarter (radium).
- 40 MPC - hrs per week (soluble uranium).
- 4 WL - months/year (radon and radon progeny).

NOTE: A brief explanation of the working level (W.L.) may be required (see Appendix A for detailed explanation of W.L.)

o Maximum permissible concentrations:

- For release of effluents to the environment.
- For levels at which employees may be exposed to.

NOTE: Emphasize these levels in comparison with levels necessary to produce damage, i.e. 5 rem/yr vs 300 - 400 rem over a very short period of time. Continuous exposure to MPC for soluble uranium (1×10^{-10} uCi/ml) vs exposure to a concentration of about 1.4×10^{-8} uCi/ml for 8 hours to cause severe damage to the kidneys. Also compare 0.3 WL MPC for radon daughters to bronchial epithelium dose rate of about 6 rem/WL-month.

6.0 Radiation and Radioactive Material Monitoring Programs

Explain reasons for monitoring programs:

o Document actual exposures received.

o Monitor trends.

o Confirm limits/guides not exceeded.

o Provide legal record.

Give a basic explanation of each monitoring program:

- TLD Badge Program
  - Purpose: To record the amount of external radiation received by an individual.
  - Method: Show TLD badge and TL material. State requirements for wearing badge.
  - Limits: Reiterate dose limits.
- Area Dose Rate Surveys
  - Purpose: To assess radiation levels to which individuals are exposed.
  - Method: Briefly demonstrate RO2 and its use, or how TLD badges might be used.
  - Limits: No absolute limits exist. There are requirements for posting areas with radiation levels greater than 5 mrem/hr as radiation area and greater than 100 mrem/hr as a high radiation area.
- Bioassay Program
  - Purpose: To assess the amount of radioactive material deposited in the body.
  - Method: Urine sampling for soluble uranium and radium and nasal smears for radon daughters.
  - Limits: 30 ug/l for uranium in urine, 16.0 nanoCuries (25 mg) of uranium in pulmonary lung, and 0.1 uCi of radium in the bone.
- Air Sampling
  - Purpose: To assess the concentrations of airborne radioactive materials to which employees are exposed.
  - Method: Demonstrate function and use of lapel air sampler, bag sampler, etc.

NOTE: If time and conditions permit, demonstrate "counting" of filter paper and calculation of concentration (A PRS-1/AC-3 or SPA-1 may be used for demonstration if necessary).

- Limits: 520 hours of exposure to MPC in any calendar quarter.

o Work Habits

The do's and don'ts include:

DO's	DONT's
Practice Time, Distance, Shielding	Loiter in radiation areas
Obey all signs and procedures	Eat, drink, chew or smoke
Report all wounds immediately to HP	Move shielding
Leave area if protective clothing is torn	Touch face
Report unexpected exposures	Fight fires
Avoid unnecessary contact with contaminated surfaces	Take unnecessary tools and/or equipment into contaminated areas
Practice good housekeeping	
Use common sense	

o Contamination Surveys

- Purpose: To assess the amount of contamination on facility equipment and personal surfaces.

- Method: Using PRS-1 or RM-19 and AC-3 probe, demonstrate how surveys are performed.

- Limits: Assume all activity is radium-226 and/or lead-210 with a limit of 100 dpm/100 cm^2.

o Other programs not directly related to occupational exposure (environmental monitoring, ambient air samples, etc.) may be reviewed at the instructors discretion.

7.0 Radiation Protection Program

Explain that protection programs are, in some cases, extensions of monitoring program, i.e.

o TLD Badges

Badge results are entered into the individual's exposure history file, summed over the appropriate period, and compared with DOE limits (show a typical, or dummy exposure history file with NRC Form 5 equivalent). Individuals may be restricted from radiation work if recorded exposures threaten to exceed pertinent limits.

o Bioassay Program

Bioassay results (urinary excretion rates, and nasal smears, etc.) are posted to individual exposure history files (show a typical bioassay record form). Individuals who exceed limits will be rotated to areas of lesser exposure.

o Exposure Assignment

Records are kept of individual's time spent in various site areas. These times (in hours) are multiplied by measured concentrations. The results (MPC-hours) are summed over pertinent periods, and compared to DOE limits (show exposure log sheet).

8.0 Radiation Controls

o Respiratory Protection

In areas that have, or have the potential for, concentrations greater than MPC values, employees are afforded the use of respirators.

o Protective Clothing

Demonstrate the proper procedures for donning and removing the various types of protective clothing as well as the use of step off pads (Appendix-C contains recommended procedures).

After completion of the demonstration, have each trainee don each type of protective clothing. Assure that the donning procedure is correct, and that tape has been applied correctly. Help the trainee when necessary, demonstrating the correct way, not pointing out what he is doing wrong.

After the trainee has correctly donned a particular dress mode, direct him to undress using the step off pad.

NOTE: It is useful to put chalk dust on the trainees' "outer-set" to demonstrate the need to undress carefully.

o Time

Explain how unnecessary time spent out of the shielded area on top of Building-434 could result in increased exposure.

o Distance

Explain how keeping away from the opening on top of Building-434 can help reduce exposures.

o Shielding

Explain how the shielding provided at the top of Building-434 can help reduce exposures.

o Exclusion Areas & Residue Transfer Work

Give a brief but clear explanation of the tasks to be completed during the residue transfer work. Clearly delineate the exclusion area boundaries for both Building 411 and Building 434. Explain the necessity for multiple exclusion areas around Buildings 434 & 411 (e.g., higher levels of contamination).

9.0 ALARA Program

o Discussion

Control of radiation exposure is based on the assumption that any exposure involves some risk. However, occupational exposure within accepted limits represent a small risk compared to the voluntarily accepted hazards of normal life. The policy of BNI Management is to maintain occupational exposures of individuals to within administrative control levels and the total work force to levels as low as reasonably achievable (ALARA).

o Responsibilities

The ALARA Coordinator is responsible for implementing the ALARA program consistent with management policy.

Support of and participation in the ALARA Program by management and personnel at all levels is important.

- Cost Benefit Analysis

  Implicit in the implementation of ALARA to a work process are trade-offs involving exposure and work techniques, training specific tools, shielding installation and contamination control. Trade-offs involve a cost benefit analysis.

- Tracking Exposure

  Controls and records are maintained to track exposure.

- ALARA Planning

  Radiological controls and ALARA techniques are incorporated into work procedures.

  Radiation Safety and ALARA hold points are incorporated in procedures to ensure adequate controls are implemented prior to continuation of the work process.

- Job Control

  Pre-task training will be provided as necessary, to enable the workers to minimize radiation exposure.

10.0 RWP's

- Discussion

  Radiation Work Permits (RWP) will be required for work in controlled access areas, i.e., radiation contamination and airborne radioactivity areas. The RWP provides an evaluation of the radiological conditions under which work will be accomplished and specifies radiation safety requirements.

- Information Required: The RWP should provide the following as a minimum:

  1. Job description

  2. Names

  3. Anticipated radiation contamination and airborne radioactivity levels based on current surveys and the date/time of the surveys

  4. Monitoring requirements during the job such as constant air monitoring

5. Estimated time to complete the job that will involve exposure to radiation and the estimated doses

6. Special instructions and equipment to minimize exposure of personnel to radiation and contamination

7. Anticontamination clothing and respiratory protection requirements

8. Personnel dosimetry requirements

9. Authorization to perform the job

10. Actual exposure time, doses, and other information obtained during the operation.

- <u>RWP Control</u>

  An RWP log should be maintained.

- <u>Initiating an RWP</u>

  Radiation work permits will normally be initiated by site supervisor or contractor or their designees.

- <u>RWP Classification</u>

  (A) Routine or non-routine

  (B) Non-routine
  Expiration period
  24 hours in advance of work

  All personnel working on the job shall read the RWP and sign the RWP signature page attachment, thus verifying that they have read and will comply with the RWP.

  A copy of the RWP will be posted at the access control point for the work to be performed

  Records of entries are maintained on a daily basis.

APPENDIX A

Useful Facts and Data for
Respiratory Protection Training

1. 100 dpm/100 cm^2=0.00000015 oz U_3O_8/in^2.

2. 1 rad = 100 ergs/gm. For gamma and beta radiation, 1 rem = 100 ergs/gm.

   It would require a received dose (to 1 gram of tissue) of 100,000 rad in 1 second to equal 1 watt.

3. If a man were eliminating uranium at a constant concentration of 30 ug/l, in one year he would eliminate a total of 0.005 oz.

4. The radiation (beta + gamma) dose rate in contact with the surface of an infinite U_3O_8 is 203 mrad/hr.

5. Total lung capacity of the adult male averages 5.6 liters, or 6 quarts of air, but vital capacity is much less.

6. The total volume of air breathed by a person in one 24 hour period is greater than 6,000 gallons.

7. If a man were exposed to the MPC for uranium for an entire 8 hour period, the total amount retained in the body would not exceed 0.000013 oz.

8. The maximum permissible lung burden for natural uranium is 24.0 mg. or about 0.00078 oz. (about 60 times the amount allowed for deposition for one day).

9. Source and rates of background radiation:

Source	Rate mrem/yr
Natural occurring radioisotopes in earth (U, Th, Ra, etc.)	40

Source	Rate mrem/yr
Solar (cosmic) radiation	50
Inhabited structures (from Rn, etc.)	60
Total average background	150 mrem/yr

10. Some typical received doses from various types of X-Rays:

X-Ray Type	Dose (rem)
Prenatal examination	18 to 16
Fluoroscopic abdominal examination	12
Dental - full series	5
G. I. Series	3
General fluoroscopic examination	up to 70
Chest films (depends on type and age of machine)	0.05 to 1.2

11. The filter media in an "approved" cartridge is 99.97% efficient for 0.3 micron DiOctyl phthalate (D.O.P.) aerosol.

1 micron (um) = 10^{-6} meter

0.3 um = 3×10^{-7} meter

= 3×10^{-5} cm

= 0.0000118 inches

or about the same as cigarette smoke.

12. Receiving 5 rem/yr (the maximum permissible) for 50 years (total working life time) will have a life shortening effect the same as smoking one package of cigarettes a day over the same period of time - or about 6 months.

13. The maximum permissible concentration for uranium in air is:

$= 1 \times 10^{-6}$ uCi/ml = 2.8×10^{-6} uCi/ft^3.

= 4.2 ug/ft^3 = 0.00000015 oz/ft^3

This is approximately equivalent to a pound evenly dispersed in a volume equivalent to a room 12 feet high by 3,000 feet long, by 3,000 feet wide.

14. 1.0 curie = 3.7×10^{10} d/s

1.0 curie of uranium (that quantity of uranium required to emit 3.7×10^{10} dps) = 3.256 lbs.

1.0 curie of radium = 1 gram = 0.0353 oz.

15. The alphas from RaC' (Po-214) have enough energy to penetrate the protective layer of skin.

16. During its decay, uranium-238 will go through 17 isotopic changes and 9 elements before reaching stable lead-206. The elements are Th, Pa, Ra, Rn, Po, Pb, At, Bi, and Tl.

17. The mean range (in air) for natural uranium alphas is 1.2 inches.

18. About 1/2 inch of water (1/3 inch of lucite) is required to totally shield natural uranium beta radiation. This is equivalent to about 0.004 inches of lead.

19. 1 gram of radium will result in an exposure rate of:

$$\text{mR/hr} = \frac{8{,}400 \times 1{,}000 \text{ mg}}{d^2}$$

where d = distance from small point source in centimeters

=84,000 @ 10 cm

= 840 @ 1 meter

20. The K65 tower contains a total of about 760 grams of radium-226.

21. Exposure rates expected during the residue transfer will vary from 1 to 2 mr/hr at a meter from the slurry pipeline to as much as 900 to 1,000 mr/hr in contact with bare K65 residues.

22. 1 WL is defined as any combination of short lived radon daughters in a liter of air that produces a total of 1.3 x 10^5 MeV of alpha energy. The numerical value of the WL is derived from the alpha energy released by the total decay of the short-lived radon daughter products at radioactive equilibrium with 100 pCi radon-222 per liter of air, as follows:

Nuclide	Half Life	Atoms Per 100 pCi	Ultimate MeV/Atom	Ultimate MeV per 100 pCi
Radon-222	3,824D	1.77×10^6	Excluded	-
Polonium-218	3.05M	977	6.00+7.68	0.134×10^5
Lead-214	26.8M	8,580	7.68	0.659×10^5
Bismuth-214	19.7M	6,310	7.68	0.485×10^5
Polonium-214	1.6×10^{-4}S	8.5×10^{-4}	7.68	0.00×10^5
				1.278×10^5

D = Days
M = Minutes
S = Seconds

APPENDIX B

Notes on Effective Presentation

1. Physical Appearance and Behavior

   A. Always dress neatly and cleanly. To some this may sound a little trite and old fashioned. The appearance of an instructor's dress, however, will have a considerable impact during the first few minutes of a class. A sloppy dresser, with an unkempt appearance, tends to diminish his credibility before he ever utters a word.

   B. Always maintain an erect posture. Poor posture tends to distract the trainee from what the instructor is saying.

   C. Avoid over-active hands. An abundance of hand movement will provide the trainee with an alternate point of attention, i.e., complete distraction. Make a determined effort to keep your hands at your sides, or anchored to a podium or chair back.

   D. Do not continually refer to large quantities of notes. The resultant rustle of paper, and interruption of your delivery, will provide yet another irritating distraction. Learn the subject material well enough so that the use of notes is kept at an absolute minimum, or done away with entirely.

   E. Maintain a cheerful attitude. The instructor's attitude toward his material and the class is quite often reflected in the trainees' attitude towards, and acceptance of, the subject material.

   F. Try to appear relaxed and comfortable in your role as an instructor. An instructor who is obviously nervous or tense will keep his class ill-at-ease, making it difficult for them to concentrate on the subject material.

2. Effective Presentation

   Effective presentation of a body of material depends on a number of factors, including most of those given above. The techniques listed below require practice to master. Such practice can be accomplished in front of a mirror, or a listener (spouse, friend, etc.) who is willing to render an objective critique.

A. Learn the subject, not the words. Literal memorization of a speech or presentation is the usual down-fall of a lot of novice speakers. A forgotten key-word will often create a mental block prohibiting the speaker from finishing the sentence, the paragraph, and sometimes the rest of the speech. It is far better to thoroughly know the subject material, memorize only the major outline, and use a very brief set of notes for specifics.

B. Use the voice properly. Someone once said, "We all have tongues, why is it that so few of us can use them properly?" While few of us will ever be eloquent speakers, there are a few things that can be done to improve the way we speak.

- o Avoid the use of slang. Don't try to be one of the "good ole boys" and put everything in the vernacular. Slang can be used to make a point, but it should be the exception to the rule of your speech.

- o Keep the vocabulary simple. Never use a big word where a small one can be used instead.

- o Avoid the use of "Ah" and "Uh". It is much better to pause for a little bit to think of a word, than to fill the space with the dreaded "Ah".

- o Use voice inflection to emphasize key-words or phrases. Extra emphasis on a key-word or phrase can often assure that trainees retain the desired information.

- o Use repetition, as an alternative to, or in conjunction with voice inflection, to emphasize key-words, or thoughts. This is an effective tool if its use is held to a minimum. Too much use of repetition becomes obvious and boring.

- o Use pauses to emphasize points. This also is an effective tool if its use if held to a minimum.

- o Vary tonal patterns as you speak. A monotone "drone" can create more disinterest than almost any other fault.

- o Finally, practice voice projection along with clear and distinct pronunciation of every uttered word.

C. Eye Contact. The instructor who looks his student straight in the eye as he speaks is much more effective than the instructor who stares down at his table, or blindly out into space.

Once you have caught a trainee's eye, hold the contact for about 5 seconds, then move to a person across the room, or opposite from him. Do this continually as you talk.

When vocally emphasizing a point, via repetition or pause, rapidly move your focal point from one trainee's face to the next. You will not necessarily have time for eye contact but you will give that impression. The overall impact of a pause after an important point while you glance fleetingly but seriously from trainee to trainee is devastating.

3. Lecture Organization and Content

All the speech and delivery aids in the world will be of little use if the lecture is disorganized and boring. The following suggestions represent a minimum guide to organization of a lecture.

Any lecture should be divided into three segments:

A. The opening "attention getting". Individuals approach mandatory, formal instruction with a variety of emotions. This could vary from eager anticipation, to indifference, to open hostility. An opening statement designed to mildly shock the trainees will quite often dispel indifference and quell hostility. This statement should be used like the proverbial two by four to "get their attention". This "attention getter" should be phrased in a positive manner, i.e., "What you learn here today may literally save your life!" Avoid using the negative approach ("If you don't pay attention today, it may cost you your life."), as it will meet with a negative reaction.

Follow the "attention getter" with a quick outline of the course. It is wise to, at some point during presentation of the outline, backup the attention getter, i.e., "...we will also learn how the improper choice of respirators can endanger your life!"

B. The body of the lecture. The main portion of the lecture should be well structured, starting with the basics of the subject and progressing logically to the conclusion. The following points should be adhered to:

- Do not advance from one subject to the next until you are reasonably sure that everyone understands the subject material just covered. This can be done by asking questions and asking for questions.

- o Make a clear distinction between subjects.
- o Use training aids whenever possible. An individual can understand a concept much better if it is physically demonstrated.
- o Interject interesting facts or comparisons (i.e., 1×10^{-10} uCi/ml = 0.00000015 oz/ft^3) at reasonable intervals to maintain interest, emphasize a point, or to explain unfamiliar units.
- o Plan breaks carefully to alleviate sleepiness and drowsiness.

C. Conclusion of the lecture. The conclusion of any lecture should be a concise emphasis on the points of major concern.

APPENDIX C

PROCEDURES FOR DONNING AND REMOVING PROTECTIVE CLOTHING

1.0 Dressing Procedure

1.1 The following apply in general.

- 1.1.1 Additional dosimetry may be required by health physics technician.
- 1.1.2 When taping, use only duct tape and leave a tab.

1.2 The following apply to the "outer" exclusion area.

- 1.2.1 Inspect all protective clothing prior to use. Do not blow into gloves to check for leaks, as they may contain residual contamination. Instead roll gloves up, trapping air inside.
- 1.2.2 Remove all outer personal clothing and jewelry except underwear, socks and shoes. Put on modesty garmet (greens).
- 1.2.3 Don cloth coveralls, secure zipper and seal zipper with duct tape, being sure to leave a tab on tape.
- 1.2.4 Don a pair of cloth booties and secure with duct tape, being sure to leave a tab on the tape..
- 1.2.5 Don rubber overshoes.
- 1.2.6 Attach dosimetry (TLD) to tab (left front breast of coveralls).
- 1.2.7 Don cotton glove liners and tuck under coveralls.
- 1.2.8 Don surgeon's rubber gloves, tuck inside sleeves and tape to coveralls with duct tape, being sure to leave a tab.
- 1.2.9 Don hard hat.
- 1.2.10 Don work gloves, if desired.

1.2.11 Inspect yourself to make sure that you have properly donned all required protective clothing.

1.3 The following apply to the "inner" exclusion area.

1.3.1 Inspect all protective clothing prior to use. Do not blow into gloves to check for leaks as they may contain residual contamination. Instead, roll gloves up, trapping air inside.

1.3.2 Remove all outer personal clothing and jewelry except underwear, socks and shoes. Put on modesty garmet (greens).

1.3.3 Don cloth coveralls, secure zipper and seal zipper with a strip of duct tape.

1.3.4 Don a pair of cloth booties, and tape to coverall legs.

1.3.5 Don rubber overshoes.

1.3.6 Attach dosimetry (TLD and SRD) to tab (left front breast of coveralls).

1.3.7 Don cotton glove liners and tuck under coveralls.

1.3.8 Don disposable vinyl gloves and tape to coveralls.

1.3.9 Don outer Tyvek coveralls.

1.3.10 Don hood, and secure to coveralls with duct tape.

1.3.11 Don surgeon's rubber gloves and tape to coveralls.

1.3.12 Don work gloves if desired.

1.3.13 Inspect yourself to make sure that you have properly donned all required protective clothing.

1.4 The following apply to the "tower" exclusion area.

1.4.1 Inspect all protective clothing prior to use. Do not blow into gloves to check for leaks as they may contain residual contamination. Instead, roll gloves up, trapping air inside.

1.4.2 Remove all outer personal clothing and jewelry except underwear, socks and shoes. Put on modesty garment (greens).

1.4.3 Don cloth coveralls, secure zipper and seal zipper with a strip of duct tape.

1.4.4 Don a pair of cloth booties. Tape to coveralls.

1.4.5 Attach dosimeters (TLD, and radon badge SRD).

1.4.6 Don cotton glove liners and tuck under coveralls.

1.4.7 Don disposable vinyl gloves and tape to coveralls.

NOTE: H. P. Technician may attach lapel air sampler at this point.

1.4.8 Don outer top entry bag suit.

1.4.9 Don disposable shoe covers and tape to bag suit.

1.4.10 Don rubber overshoes.

1.4.11 At tower exclusion area step off pad (SOP), don supplied air respirator/hood.

1.4.12 Insert inner flap of bib under vinyl bag suit. Secure drawstring of bag suit and insert in neck closure. Lay-out flap of bib over top of bag suit and tape edge of bib to bag suit.

NOTE: H. P. Technician will attach outer radon badges and lapel air sampler (if required) at this point.

1.4.13 Don airline/belt loop assembly.

1.4.14 Don surgeon's rubber gloves and tape to coveralls.

1.4.15 Don work gloves if desired.

1.4.16 Inspect yourself to make sure that you have properly donned all required protective clothing.

2.0 Undressing Procedure

2.1 The following apply in general.

2.1.1 Remove the outer layer of foot protection before stepping onto a SOP separating less contaminated from a higher contaminated area.

2.1.2 Removal of protective clothing is done while standing on the contaminated side of but not on the SOP.

2.1.3 Removal is done slowly and carefully to minimize the spread of contamination.

2.1.4 Touch contamination surfaces only with contaminated surfaces and clean surfaces with clean surfaces. The outer layer of protective clothing is always considered to be contaminated and the inner surface should be clean. Gloves, cloth booties and coveralls should be turned inside out as they are taken off to contain the contamination.

2.1.5 Properly segregate items and place, do not throw, them in the appropriately labeled 55-gallon drums (cloth vs. rubber vs. trash vs. respirator).

2.1.6 At all times, the SOP shall be free of contamination. If you believe that you have contaminated a SOP, notify the HP technician so that it can be changed.

2.1.7 If any problems develop, obtain help from an HP technician.

2.2 The following apply to the "outer" exclusion area.

2.2.1 Stand before SOP.

2.2.2 Remove work gloves if worn and place in drum labelled "cloth."

2.2.3 Remove tape, roll up and place, not throw, in drum marked "trash."

2.2.4 Remove rubber overshoes without positioning foot above SOP and without grabbing bottom of overshoe. Place in drum marked "rubber."

2.2.5 Slip off surgeon's rubber gloves without touching outside surface and place gloves in container marked "rubber."

2.2.6 Remove hard hat and place on stand.

2.2.7 Remove dosimetry (TLD) and place on stand.

2.2.8 Remove coveralls by unzipping and peeling off, being careful to touch only the inside of the cloth coveralls. Place in drum marked "cloth."

2.2.9 Remove cloth booties by removing one bootie, placing it in the drum marked "cloth" stepping onto SOP with clean shoe, removing remaining bootie, placing in drum and stepping onto SOP..

2.2.10 Without touching the outside surface, slip off cotton gloves and place in drum marked "trash."

2.2.11 Proceed to frisking station and frisk yourself, hard hat and TLD.

2.2.12 Get dressed and sign out on RWP.

2.3 The following apply to the "inner" exclusion area.

2.3.1 Stand before first SOP.

2.3.2 Remove work gloves if worn and place in drum marked "cloth."

2.3.3 Remove all exterior tape, roll it up and place, not throw, into drum marked "trash."

2.3.4 Slip off surgeon's rubber gloves without touching outside surface and place in the drum marked "rubber."

2.3.5 Take the hood off behind the head while the head is tilted backwards. Be careful not to drag the hood over the shoulders.

2.3.6 Remove the outer Tyvek coveralls, by untaping, unzipping and peeling off, being careful to touch only the inside of the outer coveralls. Step out of coveralls and rubber overshoes without touching the outside of the coveralls or overshoes and step onto first SOP. Place Tyvek coveralls in drum marked "trash" and the overshoes in drum marked "rubber."

2.3.7 Remove all exterior tape and place in drum for trash.

2.3.8 Remove cloth booties by removing one bootie, placing it in the drum marked "cloth" and stepping onto the second SOP with clean shoe, removing remaining bootie, dropping into drum and stepping onto SOP.

2.3.9 Without touching the outside surface, slip off disposable vinyl gloves and place in drum marked "trash."

2.3.10 Remove dosimetry (TLD and SRD) and place on stand.

2.3.11 Remove cloth coveralls by peeling off, being careful to touch only the inside of the cloth coveralls. Place in drum marked "cloth."

2.3.12 Without touching the outside surface, slip off cotton gloves and place in drum marked "trash."

2.3.13 Proceed to frisking station and frisk yourself, TLD and SRD.

2.3.14 Turn in SRD at access control point.

2.3.15 Get dressed and sign out on RWP.

2.4 The following apply to the "tower" exclusion area.

2.4.1 Stand before first SOP while HP technician assesses the extent of contamination. If warranted, outer layer of clothing will be washed down before any protective clothing, including respirator, is removed.

2.4.2 No attempt should be made to remove protective clothing without the aid of HP technicians.

2.4.3 Remove work gloves, if worn and place in drum marked "cloth."

2.4.4 Remove all exterior tape, roll it up and place, not throw, into drum marked "trash."

2.4.5. Remove outer radon badge and lapel air sampler (if worn) and hand to H.P. technician.

2.4.6 Remove airline/belt loop assembly and supplied air respirator/hood being careful to keep contaminated side of hood away from head. Do not drag hood over head or shoulders. Place airline/belt loop assembly, respirator/hood and airline in drum labelled "respirators."

2.4.7 Slip off surgeon's rubber gloves without touching outside surface and place in the drum marked "rubber."

2.4.8 Without reaching into neck closure, pull out drawstring, loosen, and peel off bag suit being careful to touch only the inside of the suit. Step out of bag suit and rubber overshoes without touching the outside of the coveralls or overshoes and step onto first SOP. Place coveralls in drum marked "trash" and the overshoes in drum marked "rubber."

2.4.9 Remove all exterior tape and place in drum for trash.

2.4.10 Remove disposable booties by removing one bootie, placing it in the drum marked "trash" and stepping onto the second SOP with clean shoe, removing remaining bootie, dropping into drum and stepping onto SOP.

2.4.11 Without touching the outside surface, slip off disposable vinyl gloves and place in drum marked "trash."

2.4.12 Remove dosimetry (TLD, SRD, radon badge and lapel air sampler) and place on stand.

NOTE: Do Not turn off lapel air sampler.

2.4.13 Remove cloth coveralls by peeling off, being careful to touch only the inside of the cloth coveralls. Place in drum marked "cloth."

2.4.14 Remove cloth booties by removing one bootie, placing it in the drum marked "cloth" and stepping onto the third SOP with clean shoe, removing remaining bootie, dropping into drum and stepping onto SOP.

2.4.15 Without touching the outside surface, slip off cotton gloves and place in drum marked "trash."

2.4.16 Proceed to frisking station and frisk yourself, TLD, SRD, radon badge and lapel air sampler.

2.4.17 Turn in SRD, radon badge and lapel air sampler at access control point.

2.4.18 Get dressed and sign out on RWP.

TITLE: NFSS Residue Transfer Respiratory Protection Training Program

DOCUMENT NUMBER: 21.55

REVISION NUMBER: 0

DATE: 05/31/84

PROJECT: FUSRAP

JOB NO: 14501

REVIEWED: CB Rogers — 5/31/84
Project Quality Assurance Supervisor — Date

APPROVED: RD Glenn — 5/31/84
Manager, Safety and Licensing — Date

APPROVED: Robert L. Rudolph — 5-31-84
Project Manager, Bechtel — Date

NFSS RESIDUE TRANSFER RESPIRATORY PROTECTION TRAINING PROGRAM

1.0 Purpose:

The purpose of this procedure is to provide guidelines for training respirator users.

2.0 Scope:

The scope of this procedure includes all individuals who may be required to use respiratory protective devices at NFSS during the residue transfer operations. The scope does not include training in the use of emergency or rescue devices.

This instruction shall be followed in addition to PI.21.15, "Radiation Protection Program," and PI.27.15, "Respiratory Protection Program," which describe the radiological respiratory protection requirements. Where conflicting criteria exists in relation to radiological or non-radiological hazards, the more stringent requirements shall be followed, as directed by the FUSRAP Safety and Licensing Group Supervisor, or his designee.

3.0 References:

3.1 Department of Energy Order 5480.1A, "Environmental Protection, Safety and Health Protection Program for DOE Operations," Chapter XI, "Requirements for Radiation Protection," as currently amended.

3.2 FUSRAP Project Instruction Number 27.15, "Respiratory Protection Program," dated 05/03/83.

3.3 FUSRAP Project Instruction Number 21.15, "Use of Respiratory Protection Devices," dated 12/28/82.

3.4 U.S. Department of Labor Occupational Safety and Health Standards 29 CFR 1926.1910 Revised October 1, 1979.

3.5 U.S. Nuclear Regulatory Commission, Office of Standards Development, Manual of Respiratory Protection Against Airborne Radioactive Materials, NUREG-0041, 10/76.

3.6 FUSRAP Project Instruction Number 20.01, "Radiation Protection Manual," dated 03/30/83.

3.7 FUSRAP Project Instruction Number 20.02, "Project Safety and Health Manual," dated 03/26/82.

3.8 FUSRAP Project Instruction Number 21.57, "NFSS Residue Transfer Operations Radiation Safety Training," dated 05/03/84.

4.0 Equipment:

4.1 At least one respirator of every type used at the site, including air hoods, SCBA's, etc.

4.2 Alpha, beta and gamma radiation sources

4.3 An alpha scintillation detector/meter, preferably with an audio speaker

4.4 A beta-gamma detector/meter, preferably a Geiger counter with an audio speaker

4.5 Stannic Chloride generator (Titanium Tetrachloride) smoke tubes and bulb, and Iso-Amyl Acetate

4.6 A cleaning/sanitizing solution (e.g., alcohol)

4.7 Paper towels

4.8 A lapel air sampler

4.10 Miscellaneous components (valves, gaskets, filter cartridges, filter media, airlines, regulators, etc.).

5.0 Definitions:

None.

6.0 Procedure:

6.1 Scheduling:

6.1.1 Individuals who may be required to use respiratory protection devices, for protection against airborne radioactive materials, shall receive orientation training prior to initial use, and refresher training as required by the NFSS Safety and Licensing Representative.

6.1.2 Classes should be scheduled to allow a minimum of 4 hours for training and fitting.

6.1.3 Classes should be limited to a maximum of 15 individuals.

6.2 Instruction Protocol:

6.2.1 Individuals shall sign Form 21.55-1 and the Training Notice and Record Form in Attachment 1 before class starts. Form 21.55-1 shall be used for Safety and Licensing record files and the Training Notice and Record Form shall be used for Project Quality Assurance record files.

6.2.2 The instruction should be given as outlined in Attachment 2.

Note: The trainee shall be informed of the hazards associated with the work he is expected to perform. Consequently, the Radiation Safety Training, specified in PI 21.57 (Ref. 8), shall be conducted for all trainees prior to administering respiratory protection training.

6.3 Fit Testing Methodology:

6.3.1 Fit testing shall be performed for each individual, with each type of respirator (except bubble suit respirator hood) in common usage at the site.

6.3.2 Results of each individual's fit test shall be entered on the individual training record.

6.3.3 Individual training records shall be posted to the individual's radiation exposure history file.

Form 21.55-1

NFSS RESPIRATORY PROTECTION
TRAINING ATTENDANCE RECORD

Type of Training:

_____Orientation
_____Reinforcement
_____Supervisory
_____Respiratory Protection

Date: ______________________ Time: ______________________

Instructor: ______________________

Name (Please Print): Last	First	Middle Initial	Social Security Number:

ATTACHMENT 1

Quality Assurance Program
Training Notice and Record Form

QUALITY ASSURANCE PROGRAM

Training Notice & Record

Discipline ______________________ **Session No.** _______________

(1) Personnel listed below are required to receive the training indicated. Where an "X" is indicated, this requires attendance at a training session on Date: ______________ at ______________. In such cases, please come prepared to discuss these procedures.

Manager/Supervisor ______________________________ Date ____________________

Distribution: Project QA Supervisor, All Personnel Indicated, and Project Admin.

(2) Training completed as indicated on date ________________________.

Manager/Supervisor ______________________________ Date ______________

Distribution: Project QA Supervisor, All Personnel Indicated, and Project Admin.

LIST ALL PERSONNEL						SIGNATURE

APPLICABILITY CODES

O=No training required. I=Read for information.
X=Requires full comprehension and discussion with Manager/Supervisor.
M=Make-up required at later date.

QUALITY ASSURANCE PROGRAM

TRAINING NOTICE & RECORD

Session No. ____________

LIST ALL PERSONNEL							SIGNATURE

REMARKS:

ATTACHMENT 2

Instructor's Manual

For

NFSS Residue Transfer Respiratory
Protection Training Program

PREFACE

Introduction

This manual contains guidelines for giving instruction in respiratory protection, and if followed in its entirety, will meet the training and testing requirements recommended in PI 27.15, OSHA 29 CFR 1910.134, and NUREG-0041.

Instructor Qualifications

The instructor should be thoroughly familiar with PI 21.15, PI 27.15, OSHA 29 CFR 1910.134, and NUREG-0041, the respiratory protective devices to be used during the residue transfer operation, and the radiation safety conditions at the NFSS. The instructor should also have a general working knowledge of 10 CFR 19, 10 CFR 20, DOE Order 5480.1A and the principles of health physics and respiratory protection. Notes on effective presentation are discussed in Appendix A.

Class Room Environment

Training should be accomplished in a professional atmosphere. A room specifically designed for training, or a conference room, is recommended. The professional environment assures the employee that the instruction is seriously regarded by his employer. The room should be well lighted and ventilated, and should be kept slightly cool (64°F to 66°F) to discourage drowsiness.

Employee Attitude

Individual attitudes toward formalized instruction vary from eager acceptance, to antagonistic distrust. The instructor should attempt to gain acceptance from all trainees. This can be accomplished by observing a few basic rules:

- o Maintain an open and friendly, yet professional, attitude.
- o Be polite. Use of the word "sir" boosts an individual's ego, making him more receptive to what you're saying.
- o Be positive at all times. Negative statements by the instructor tend to provoke negative thinking by the trainee.
- o Encourage the trainee to ask questions.
- o Consider all questions seriously. NEVER laugh at, or shrug-off, any question seriously put forward by the trainee.

- Always be honest. If you don't know the answer to a question - say so. Promise to obtain the answer - then do it.

INSTRUCTION PROTOCOL

1.0 Introduction

Introduce yourself verbally

This is important. If you don't introduce yourself, or if you put your name on a blackboard and assume the trainee will make the connection, the trainee will feel ill-at-ease, making communication difficult.

Give the name and outline of the course

Respiratory Protection:

- Airborne Hazards
- Air Sampling Program
- Bioassay Program
- Medical Examinations
- Use of Respirators
- Written Examination
- Fit Testing

State reason why training is necessary: to assure that employee receives adequate protection in the performance of his job.

NOTE: Avoid developing the impression that training is administered only because the DOE requires it.

2.0 Airborne Hazards

Briefly explain why respirators are required.

- Explain how radon (a noble gas) emanates out of the residues.

- Explain that some work (Buildings 434 and 411) may require the trainee to be in concentrations of radon and radon daughters in excess of MPC.

- Explain how resuspension in contaminated areas may require use of respirators.

3.0 Air Sampling

Demonstrate how an air sampler works: (Again, "seeing" a device operate is preferable to just having it explained.)

- Show major components: pump, air flow meter, filter and filter cartridge.

- Turn sampler on. Demonstrate suction by discharging the stannic chloride close to sample head, and letting it draw the smoke in.

Explain computation of concentration:

- Counting of filter paper, or derivation of activity. Use uCi only.

- Total flow computation, or liters per minute (lpm) times time.

- Concentration = Activity/total flow or uCi/l.

Explain how lapel samplers are used to arrive at concentration values for activities performed by the worker and that this information is part of his/her legal record.

Explain how airborne radioactive materials exposures are arrived at:

- Time spent in each Job Function Area (JFA).

- Exposure by JFA = (Time in JFA) times (measured concentration).

- Define M.P.C.

  o Maximum Permissible Concentration

  o Maximum activity in a unit volume of air that an individual is allowed to breathe.

- All exposures are summed and compared to limits:

  o 40 MPC-hours per week (soluble uranium)

  o 520 MPC-hours per quarter (insoluble uranium and radium)

  o 0.3 WLM (Radon Daughters)

Explain record availability:

- All radiation and radioactive material exposures are maintained in the individual's exposure history file.

- Individual has right to request his exposure history.
  - o Request must be in writing.
  - o Company is obliged to reply in writing within 30 days of the receipt of the request or within 30 days after the exposure has been determined, whichever is later.
- An individual that has been exposed to radiation or to radioactive material in excess of applicable limits will be provided a report of his exposure data within 30 days.

4.0 <u>Bioassay Program</u>

State the purpose of the bioassay program:

- To evaluate the individual's uptake. That is, to verify that the individual's internal exposure is within appropriate guidelines.
- To evaluate the effectiveness of respirator usage. Explain, using uranium example and ratios:
  - o Several weeks of continuous exposure to 100 MPC - hours would result in a urinary excretion rate of 3000 ug/l.
  - o Proper use of air line full face mask would reduce exposure to 1.0 MPC-hours, resulting in a urinary excretion rate of 30 ug/l.
  - o If full face-mask was used in 10 MPC-hour atmosphere but excretion rate was 100 ug/l, improper use of mask, inadequate air sampling program, or contamination of sample would be suspected.

Give the types and frequencies of bioassays:

- Urine samples for NFSS workers: once every month or more often as directed by the Safety and Licensing Representative.
- Define "Over-Exposure"
  - o Exposure to concentrations of airborne radioactive material, such that the concentration of radioactive materials deposited in the body results in a committed dose equivalent that exceeds, or threatens to exceed, DOE Guides.

Detail typical procedure for over-exposures:

- Immediate removal from exposure to airborne radioactive materials.

- Intensive sampling program to establish elimination rate.

- Referral to a physician if levels are high enough.

- Restriction from further exposure until excretion rates are undetectable, and/or until a release has been obtained from a physician.

5.0 Medical Program

Briefly review protocols for initial and periodic evaluations:

- Anthropometric measurements: weight, height, blood pressure, pulse, etc.

- Pulmonary function test

- Urine sample

- Further studies if physician orders.

Discuss reasons for medical evaluations:

- Respirators put additional strain on cardiopulmonary system.

- Heat stress.

- Individuals with chronic heart and lung disorders may have their health endangered.

- Medical evaluations will identify problem areas, and impose restrictions and limitations on use of respirators.

6.0 Respirator Maintenance Program

Discussion of this subject should be kept brief, as it is an information only item. If a trainee shows concern about the effectiveness of the program, however, it would be best to enter into a fair amount of detail.

Respirator cleaning and sanitizing:

- Laboratory grade cleaning solution used in conjunction with a recommended sanitizing solution.

- Radiation measurements made to assure that no contamination remains on respirator. Give limits if necessary to allay individual's concern.

Respirator Maintenance:

- Briefly cover which components are checked and the standards used. If necessary, pass around the component check list, and the inspection quality standards. Again, the instructor should gauge the amount of detail necessary, by the level of concerned interest demonstrated by the trainees.

8.0 Respirators

Demonstrate components and operating characteristics of a negative pressure respirator:

- Cartridge holders
- Cartridges
- Exhaust valves
- Intake valves
- Head bands
- Regulators
- Inhalation causes small negative pressure. Negative pressure causes intake valves to open and exhaust valves to close, forcing air through filter.
- Exhalation causes small positive pressure. Positive pressure causes intake valves to close, and exhaust valves to open, forcing air out through exhaust valves.

Detail limitation of the various types of respirators:

- Half-Masks: Wide variances in nose and chin structures preclude obtaining a good fit in a large percentage of the population. Poor protection is also attributed to the ease with which the mask can be shifted about, or removed from, the face.

  NOTE: The "protection factor" (P.F.) has been alluded to in the above, as well as in the bioassay section. It might be advisable at this point to explain just what the PF is, i.e., PF = Concentration in ambient air/concentration inside mask.

Protection factor for half-mask = 10. Stress that protection factor applies only if fit test (with irritant smoke) is performed each time the mask is donned.

- Full Face Masks: Negative pressure mode: These types of masks fit 95% of the population - 5% cannot obtain a good fit with full-face respirators. A fit test with irritant smoke or odorous vapor is good for a one year period. The protection factor is 50.

- All negative pressure mode respirators have the disadvantage that air, like water, will follow the path of least resistance. Thus, if a breach in the seal occurs, air will pass through that breach before going through the filter media.

- Full Face Masks: Demand pressure mode: Face piece same as negative pressure mode face piece. This respirator has the advantage of providing fresh air upon negative pressure created inside face piece (see above), rather than depending upon air being pulled through a filter. Explain both SCBA and airline modes.

- Bubble suits: Explain differences between negative pressure devices and the continuous flow (Type "C") hood and bag suit combination (Bubble suit), i.e., does not require fit test, higher protection factor (10,000), may be used with beards (see below), more comfortable, etc.

- General restrictions that apply to all respirator types:

  o Medical limitations: Chronic restrictive lung diseases, high blood pressure, etc.

  o Facial hair: Surprisingly, a good fit can often be obtained on individuals with full beards while in the class room. When the individual starts to sweat under actual work conditions, however, the perspiration will cause a "channeling" effect that will result in a breach of the seal. This will always reduce the P.F. to "0".

NOTE: It should be emphatically stated that there can be no "partial" seal. Either the user obtains a proper seal, or he does not.

Any facial hair (side burns, whisker stubble, etc.) may destroy the seal.

- o Eye Glasses: Temple bars on glasses will interrupt the seal on full face masks, and cannot be worn without special lens adapted to the respirator.

- o Contact Lens: Contact lens may not be worn with respirators. Pressure differentials under arduous work conditions will cause the lens to slip, or become dislodged.

- o Facial abnormalities: Changes in facial structures (absence of dentures, scars, etc.) may often destroy the seal.

- o Head gear: A cap worn under the respirator head bands will destroy the seal.

Review proper and improper usage:

- Do not remove respirator while in the area, e.g., to talk to someone. This rule is rather obvious, but the practice is quite common with half-mask respirators.

- Do not wear respirator around the neck while not in use. Contamination present on clothing may contaminate the inside surfaces of the respirator.

- When not in use, return respirator to access control trailer. Do not lay respirator down on any handy surface.

- Do not loosen head bands, or make any other fit adjustment while in the area.

- Immediately report respirator defects and malfunctions to the Bechtel Health Physics Representative.

Detail proper methods for inspection and donning of various respirator types:

- Selection criteria:

  - o Bechtel Health Physics Representative will specify respirator type to be used for a specific job, including cartridge types, if applicable.

- o Respirator must be in a plastic or paper bag.
- o The bag must be closed (sealed).
- o The bag must bear the word "Inspected" with the inspection date clearly marked on it.
- o The above rules apply to cartridges as well, if they are stored separately from the face pieces.

- Inspection Criteria: Even though each respirator has been cleaned, sanitized, and inspected by the Bechtel Health Physics Representative, the trainee should be told to inspect his own, using the following criteria:

  - o All flexible components must be supple, showing no sign of stiffness or brittleness.
  - o All flexible components must be free of any indication of significant wear or aging (cracks, thinning of the rubber, etc.).
  - o All sealing surfaces (gaskets, filter and/or hose connections, surfaces which mate with the face, etc.) must fit properly, and be in excellent repair.
  - o All valves, and other moving parts must be in excellent condition. Such moving parts should be tested (connections made and tightened, etc.) to assure proper operability.
  - o Lens should be well seated with tight seals, and should be relatively free of scratches, marring, etc.
  - o Head bands should show uniform elasticity, lack of wear and aging.
  - o Airline connections are in good condition, i.e., connections free of rust and pitting, snap tight fittings work well without undue resistance, etc.
  - o Head band fasteners should be tight when fastened, and be free of physical defects (dents, cracks, etc.).
  - o Filter cartridges should be free of cracks, chipping, and visible damage to the filter media.

NOTE: It is helpful to demonstrate the inspection process for a full face piece.

- Emphasize to the trainee(s) that any of the criteria in this section that cannot be met are cause for rejection of the device. Rejected face pieces, cartridges and air line equipment must be turned in to the access control trailer.

- Donning procedures: Use an assistant or select a trainee for demonstration of the following general rules using a full face piece, air line device.

  o Pull head band straps out to the full extended position.

  o Reverse the head bands so that the entire harness lies in front of the face piece.

  o Enter the face piece, chin first. Place chin <u>in</u> chin cup. Warn against placing chin forward of chin cup.

  o Reaching from the top of the head to the front of the face piece, grasp the head band harness by the body of the "spider".

  o Sharply, pull the harness up and back.

  o Starting with the bottom straps of the harness, pull both straps at the same time until the face piece is just barely snug. Continue until all straps have been snugged-up in this manner.

  o Settle the face piece until it fits squarely and comfortably on the face. The spider should now be located squarely in the upper back of the head.

  o Again, starting at the bottom, snug-up two straps at a time so that a uniform pressure can be felt at all points on the face.

  o Negative pressure fit test the respirator by closing off the inlet (close off the air hose for supplied-air respirator; cover cartridge for air-purifying respirator), taking a deep breath and holding it for 8 to 10 seconds. The face piece should collapse slightly toward the face, and stay collapsed until exhalation. If the face piece does not stay collapsed, then a seal has not been obtained.

NOTE: The trainee should be warned to not inhale too sharply, as eardrum damage may occur.

- o Warn the trainee about too much tension on head band straps. Localized pain points, restricting blood circulation, etc.
- o Emphasize that the negative pressure fit test must be performed each time the respirator is donned.

- Removal procedure:

  - o Lean slightly forward.
  - o Grasp the respirator by a rigid part of the face piece (e.g., nose piece).
  - o Pull the face piece forward and slightly up, at the same time, moving the head downward.

NOTE: Point out how contamination may occur if the head band straps are loosened first, or the respirator is pulled off back over the head.

Relief from respirator usage:

Emphasize that anyone may leave the area for relief from respirator use, for any one of the following reasons:

- Equipment malfunction - give a few examples:

  - o Head band breaks.
  - o Low air alarm sounds. Reassure trainees that sufficient air remains to exit area, if they hurry, but do not panic!
  - o Sticky inhalation/exhalation valves.
  - o Loss of seal.

- Physical discomfort:

  - o Perspiration in eyes.
  - o Localized pain from over tightened head band straps.
  - o Increased difficulty in breathing due to filter plugging, etc.

- Vision impairments due to lens fogging.

- Loss of communications, such as with a back-up (standby) man.

- Deterioration of operating conditions such as loss of lighting in Bldg. 434, etc.

- Psychological distress, or any other condition that would require relief.

NOTE: Make a special point of telling the trainee that any time he has reason to believe that his respirator seal has been breached, he should leave the area immediately, and report to the Access Control Trailer. At this point, you may wish to explain nasal smear and special bioassay procedures.

9.0 Fit Testing:

Fit testing of 15 individuals in two respirator types will require 45 to 60 minutes. Before beginning the test, explain exactly what the test(s) consists of, then proceed in the following manner:

- Hand out blank individual training record forms (Form 21.55-2).

- Instruct the trainees to fill in all required information above the dotted line (PRINT), then sign the form.

- Have two trainees bring their completed Individual Training Records to the testing area.

- Instruct the trainees to disinfect a respirator with the provided supplies - one with a half-mask and one with a full face unit.

- While the trainees are disinfecting the respirators, note which type each has chosen, then print the make and model information under the "Type of Respirator Fitted" heading.

- Observe the trainee as he dons the respirator. Assure that it is done correctly, and that the straps are not pulled up too tight.

- Ask each trainee to demonstrate the negative pressure fit test. If a leak occurs, the first place to check is the bands - assure that the inhalation valves have been completely closed off. Otherwise check the overall fit of the respirator on the trainee's face.

- Watch the trainee's eyes. Severe pupil dilation would be indicative of fear (claustrophobia).

- Have the individual stand still with the head in the normal position. Use the irritant smoke generator or Iso Amyl acetate to check all points where a leak may occur:

  - o Filter cartridges
  - o Lens
  - o Exhalation valves, during inhalation
  - o Around all areas of the face piece that mate with the face

  WARNING: Warn trainees in half-masks to close their eyes during the test, and not open them until told to do so, to avoid irritation.

- The first test (as described above) ascertains whether or not there are any gross breaches of the seal.

- Have each individual in turn perform a number of facial stress exercises:

  - o Frown (full face pieces only)
  - o Smile
  - o Head Movement - both up and down, and side to side
  - o Talk and/or laugh
  - o Wrinkle the nose and/or knit the eyebrows (half-masks only)

  Check for seal breaches with the irritant smoke or Iso Amyl Acetate during each of the required stress tests.

- Have the medically qualified trainee run (trot) in place until he is breathing hard, then repeat the irritant smoke test.

- While the first two trainees are running in place, start two more.

- Once the individual successfully passes the fit test, fill in the appropriate protection factor on the training record.

NOTE: A trainee failing any portion of the fit test, as observed by a negative reaction to the irritant smoke (attempting to remove the head from the smoke cloud, involuntarily coughing, etc.), should be re-examined. If, upon re-examination, there is no obvious defect in the respirator, have the trainee re-don the respirator. Then repeat all steps of the fit test. If the trainee fails the fit test a second time, enter a "0" under "protection factor assigned" heading on the training record. Concurrently, in the "Limitations" blanks, print - "Failed qualitative fit test - cannot wear X (Brand Name) Y (Model) respirator".

- Continue as outlined above until all trainees have been fit tested.

Form 21.55-2

INDIVIDUAL RESPIRATORY PROTECTION
TRAINING RECORD

Date: ____________ Name: ________________________________

Time: ____________ Social Security Number: ________________

Company: ____________________________

I certify that I have attended ______ hours of the following type(s) of training:

______ Orientation ______ Reinforcement, or ______Supervisory

in: ______ Radiation Safety ______ Respiratory Protection

I thoroughly understand the usage and benefits of wearing a respirator and will utilize what I have learned when a respirator is necessary for my job.

____
Individual's Signature

Type of Respirator Fitted:	Protection Factor Assigned:

Limitations: ____

____

Trained by: ______________________ Date: ________________

Fitted by: ______________________ Date: ________________

APPENDIX A

Notes on Effective Presentation

1. Physical Appearance and Behavior

   A. Always dress neatly and cleanly. To some this may sound a little trite and old fashioned. The appearance of an instructor's dress, however, will have a considerable impact during the first few minutes of a class. A sloppy dresser, with an unkempt appearance, tends to diminish his credibility before he ever utters a word.

   B. Always maintain an erect posture. Poor posture tends to distract the trainee from what the instructor is saying.

   C. Avoid over-active hands. An abundance of hand movement will provide the trainee with an alternate point of attention, i.e., complete distraction. Make a determined effort to keep your hands at your sides, or anchored to a podium or chair back.

   D. Do not continually refer to large quantities of notes. The resultant rustle of paper, and interruption of your delivery, will provide yet another irritating distraction. Learn the subject material well enough so that the use of notes is kept at an absolute minimum, or done away with entirely.

   E. Maintain a cheerful attitude. The instructor's attitude toward his material and the class, is quite often reflected in the trainees' attitude towards, and acceptance of, the subject material.

   F. Try to appear relaxed and comfortable in your role as an instructor. An instructor who is obviously nervous or tense will keep his class ill-at-ease, making it difficult for them to concentrate on the subject material.

2. Effective Presentation

   Effective presentation of a body of material depends on a number of factors, including most of those given above. The techniques listed below require practice to master. Such practice can be accomplished in front of a mirror, or a listener (spouse, friend, etc.) who is willing to render an objective critique.

A. Learn the subject, not the words. Literal memorization of a speech or presentation is the usual downfall of a lot of novice speakers. A forgotten key-word will often create a mental block prohibiting the speaker from finishing the sentence, the paragraph, and sometimes the rest of the speech. It is far better to thoroughly know the subject material, memorize only the major outline, and use a very brief set of notes for specifics.

B. Use the voice properly. Someone once said, "We all have tongues, why is it that so few of us can use them properly?" While few of us will ever be eloquent speakers, there are a few things that can be done to improve the way we speak.

- Avoid the use of slang. Don't try to be one of the "good ole boys" and put everything in the vernacular. Slang can be used to make a point, but it should be the exception to the rule of your speech.

- Keep the vocabulary simple. Never use a big word where a small one can be used instead.

- Avoid the use of "Ah" and "Uh". It is much better to pause for a little bit to think of a word, than to fill the space with the dreaded "Ah".

- Use voice inflection to emphasize key-words or phrases. Extra emphasis on a key-word or phrase can often assure that trainees retain the desired information.

- Use repetition, as an alternative to, or in conjunction with voice inflection, to emphasize key-words, or thoughts. This is an effective tool if its use is held to a minimum. Too much use of repetition becomes obvious and boring.

- Use pauses to emphasize a point. This also is an effective tool if its use if held to a minimum.

- Vary tonal patterns as you speak. A monotone "drone" can create more disinterest than almost any other fault.

- Finally, practice voice projection along with clear and distinct pronunciation of every uttered word.

C. Eye Contact. The instructor who looks his student straight in the eye as he speaks is much more effective than the instructor who stares down at his table, or blindly out into space.

Once you have caught a trainee's eye, hold the contact for about 5 seconds, then move to a person across the room, or opposite from him. Do this continually as you talk.

When vocally emphasizing a point, via repetition or pause, rapidly move your focal point from one trainee's face to the next. You will not necessarily have time for eye contact but you will give that impression. The overall impact of a pause after an important point while you glance fleetingly but seriously from trainee to trainee is devastating.

3. Lecture Organization and Content

All the speech and delivery aids in the world will be of little use if the lecture is disorganized and boring. The following suggestions represent a minimum guide to organization of a lecture.

Any lecture should be divided into three segments:

A. The opening "attention getting". Individuals approach mandatory, formal instruction with a variety of emotions. This could vary from eager anticipation, to indifference, to open hostility. An opening statement designed to mildly shock the trainees will quite often dispel indifference and quell hostility. This statement should be used like the proverbial two by four to "get their attention". This "attention getter" should be phrased in a positive manner, i.e., "What you learn here today may literally save your life!" Avoid using the negative approach ("If you don't pay attention today, it may cost you your life."), as it will meet with a negative reaction.

   Follow the "attention getter" with a quick outline of the course. It is wise to, at some point during presentation of the outline, back-up the attention getter, i.e., "...we will also learn how the improper choice of respirators can endanger your life!"

B. The body of the lecture. The main portion of the lecture should be well structured, starting with the basics of the subject and progressing logically to the conclusion. The following points should be adhered to:

   o Do not advance from one subject to the next until you are reasonably sure that everyone understands the subject material just covered. This can be done by asking questions and asking for questions.

   o Make a clear distinction between subjects.

- Use training aids whenever possible. An individual can understand a concept much better if it is physically demonstrated.
- Interject interesting facts or comparisons (i.e., 1×10^{-10} uCi/ml = 0.00000015 oz/ft^3) at reasonable intervals to maintain interest, emphasize a point, or to explain unfamiliar units.
- Plan breaks carefully to alleviate sleepiness and drowsiness.

C. Conclusion of the lecture. The conclusion of any lecture should be a concise emphasis on the points of major concern.

TITLE: NFSS Residue Transfer Operations Industrial Safety Training

DOCUMENT NO.: 27.12.1

REVISION NO.: 0

DATE: 05/31/84

FUSRAP PROJECT

JOB NO. 14501

REVIEWED:	N/A	
	Project Quality Assurance Supervisor	Date
APPROVED:	[illegible]	5/31/84
	Safety and Licensing Supervisor	Date
APPROVED:	Robert L. Rudolph	6-1-84
	Project Manager, Bechtel	Date

NFSS Residue Transfer Operations
Industrial Safety Training

1.0 PURPOSE

The purpose of this instruction is to provide guidelines for the training of individuals that will be involved in the Building 434 (K-65 Tower) residue transfer operations, which includes; opertion of the Mining Unit, working on the Work Platform, Entry inside the K-65 Tower, Support Operations at the Base of the K-65 Tower and Building 411.

The topics in this instruction are detailed and required the assigned safety instructor to be familiar with the scope of operations for K-65 Residue Transfer, K-65 Tower Demolition and associated subcontractor activities.

2.0 SCOPE

This instruction applies to all individuals who may be required to work in the areas noted in 1.0 above. This instruction is applicable to Bechtel and Subcontractor personnel and visitors to the areas noted at the Niagara Falls Storage Site (NFSS).

3.0 REFERENCES

3.1 Bechtel Safety Procedures Manual (Corporate Safety Program)

3.2 U. S. Department of Labor
Occupational Safety and Health Standards, 29 CFR 1910/1926

3.3 Department of Energy Order 5480.1A, "Environmental Protection, Safety and Health Protection Program for DOE Operations."

4.0 DEFINITIONS

5.0 PROCEDURE

5.1 Introduction and Description of Operations

5.1.1 Discuss the site organization; Bechtel, Eberline and Subcontractors, and their responsibilities.

5.1.2 Introduce the workers to the relationship between safety concerns for injury and the concept of an accident with radiological contamination.

5.1.3 Briefly note that the Emergency Assistance Plan (PI 27.18.1) for the NFSS is in place and that the Lewiston Volunteer Fire Department will be providing emergency response to the site. Treatment for non-contaminated injuries will be at the Mt. St. Mary's Hospital, with radiologically contaminated injuries treated at the Niagara Falls Memorial Medical Center, both by formal arrangements for all activities on site.

5.1.4 Note that many subcontractors will be interfacing their operations on the site and that Bechtel is the overall manager for these activities. Operations at the site include; Central Drainage Ditch Excavation, Buildings 410 and 415 Demolition, Residue Transfer and the Demolition of the K-65 Tower.

5.1.5 Emphasize the importance of following planned work operations to avoid interrupting other subcontractor's work and increasing the potential for an accident due to unfamiliarity with all operations.

5.1.6 Briefly review the specific work tasks in which this group will be involved and relate them to other subcontractors' personnel wandering through area and increasing the possibility of accidents.

5.1.7 Discuss the specific scope of the subcontract(s) in which this group of individuals will be involved as noted in the following sections.

5.1.8 It is always important to discuss the practical aspects of related accident you personally are aware of and to solicit descripton on the incidents of which the trainees may have knowledge. This has the potential to make them feel a part of the training.

5.2 Building 411 and Residue Transfer Pipeline

5.2.1 Operations around 411 can expose the workers to the possibility of falls into the subgrade structure. Safety belts and flotation devices are required if guard rails cannot be provided for fall protection when working over water. Again, relate radiological contamination and personal injury.

5.2.2 Note that the pipeline will be "pressurized" and that eye protection is always required. Relate the seriousness of radiological contamination in the eyes as well as eye injury itself.

5.2.3 Stress the importance of following procedures when opening or closing valves and switches to avoid injury potential.

5.2.4 Discuss the concept of inspecting the tools they plan to use for the task assigned; the wrong tool can cause injury and possibly get them contaminated.

5.2.5 Have the trainees discuss the types of mobile equipment they will be moving around the work area near them and the importance of being alert for such movements.

5.3 Work at the Base of the K-65 Tower

5.3.1 Note to the trainees that there is a serious hazard if an object falls from the tower Work Platform. Relate that an object falling 170 feet has the potential to seriously injure them. Note that they also keep back from the base of the tower for radiological concerns.

5.3.2 Stress to the workers that they should only go near the base of the tower when assigned a specific task and then only when the Control Station is knowledgeable of and in concurrence with the operation.

5.4 Operations on the Work Platform

5.4.1 Briefly relate to the trainees the height of the tower and the configuration of the Work Platform and what tasks are involved overall on the tower (i.e., 170 feet, structural steel deck, mining unit, slurry hose, electrical control panels and the hole in the dome).

5.4.2 Access method to the tower should be reviewed and note the individual's requirements to be aware of how the system works.

5.4.3 In addition the radiological protective clothing they will wear, state that safety belts are required whenever they are outside the confines of an approved guard rail system.

5.4.4 Stress the importance of keeping tools tied off to a tether line to avoid creating a hazard to individuals working below.

5.4.5 Note that radio communications systems are available and those working on the tower must be aware of how to use these radios properly.

5.4.6 Describe the access method to the top of the K-65 Tower. Daily inspection of the apparatus is required by the Subcontractor, and Bechtel shall review all procedures.

5.4.6.1 Mancages: The support cables, connections, hooks, clips, and structural components will inspected daily.

5.4.6.2 Cranes: (for lifting mancages) Shall be inspected daily and shave have received an annual inspection as required by OSHA.

5.4.6.3 Elevators: All working parts and the overall structure must comply with the applicable OSHA/ANSI standards, as outlines in the Subcontractor's inspection procedures.

5.4.6.4 Caged Ladder on K-65: Instruct the trainees that the ladder has a "grab-lock" fall protection device on it and requires safety belts hooked to the cable device to prevent falls when used as an access mode to/from the tower in case of emergency only. Demonstrate its use.

5.4.6.5 All individuals must be instructed, by the Subcontractor, in the safe methods for using the access devices and of their limitations.

5.4.6.6 The individuals shall be instructed to report any deficiencies to the Control Station for evaluation and action at once.

5.5 Safety Meetings

5.5.1 Note to the craftsmen that weekly safety meetings will be conducted by the Subcontractor and monitored by Bechtel. A sign-off sheet is required for attendance.

5.5.1.1 Encourage the craftsmen to bring up topics that are safety related and pertain to the current operations.

5.5.1.2 Note to the individuals that topics will be documented for follow-up actions by the Subcontractor.

5.5.2 During critical operations (such as entry into the tower), a special safety meeting will be conducted to discuss the operation and to brief individuals in the exact procedures required for the task.

5.6 Documentation of Training

5.6.1 Attendance of the trainees shall be recorded on the attached Form 27.12-1, NFSS Industrial Safety Training Attendance Record.

5.6.2 Distribution of Form 27.12-1 shall be the responsibility of the Site Superintendent and shall be as follows:

Site Copy
Safety and Licensing Supervisor, Oak Ridge

Note: The Safety and Licensing Supervisor is responsible for internal distribution for the Records Management System.

Form 27.12-1

NFSS INDUSTRIAL SAFETY TRAINING
ATTENDANCE RECORD

DATE: ______________________ TIME: ______________________

INSTRUCTOR: ______________________ PAGE ____ of ____

NAME (PRINTED & SIGNATURE) LAST FIRST MIDDLE	SOCIAL SECURITY NUMBER

19584

TITLE: EMERGENCY ASSISTANCE PLAN - NIAGARA FALLS STORAGE SITE

DOCUMENT NUMBER: P.I. 27.18.1

REVISION NUMBER: 0

DATE: MARCH 18, 1983

PROJECT: FUSRAP

JOB NO. 14501

REVIEWED:	NA Project Quality Assurance Supervisor	 Date
APPROVED:	Edward Walker Safety and Licensing Manager	5-12-83 Date
APPROVED:	Robert L. Rudolph Project Manager, Bechtel	5-17-83 Date

EMERGENCY ASSISTANCE PLAN
NIAGARA FALLS STORAGE SITE
(NFSS)

1.0 PURPOSE

This instruction identifies possible emergency situations that could arise at NFSS and establishes the primary source for emergency assistance information.

2.0 SCOPE

This instruction applies to all personnel on the NFSS, during construction, maintenance or surveillance activities.

3.0 REFERENCE

- U.S. Department of Labor
  Occupational Safety and Health Standards,
  29 CFR 1926/1910

- FUSRAP Health and Safety Program Manual
  Project Procedure 20.01
  Section 4.4, Medical Program.

- FUSRAP Project Instruction 27.17; Emergency Notification Plan

4.0 DEFINITIONS

None

EMERGENCY ASSISTANCE AGENCIES

Area Code (716)

POLICE

TOWN OF LEWISTON (State Police)	754-8213
COUNTY SHERIFF	285-5355
STATE POLICE	297-0755

AMBULANCE

LEWISTON VOLUNTEER FIRE DEPARTMENT	754-4211

FIRE

LEWISTON VOLUNTEER FIRE DEPARTMENT	754-4211

HOSPITAL

MOUNT ST. MARY'S OF NIAGARA FALLS	297-4800
NIAGARA FALLS MEMORIAL MEDICAL CENTER	278-4000
(See attached Radiation Emergency Plan)	

DOCTOR

DR. ANTHONY SCHIAVI	285-1133	(Not 24 hr.
CLINIC	278-4622	phone numbers)

NOTE: All telephones answer 24 hours unless otherwise indicated.

5.0 PROCEDURE

5.1 OCCUPATIONAL INJURIES

5.1.1 Minor Injuries to employees on site may be treated by individuals utilizing the first aid kits located in Bechtel's Construction Office, Bldg. #402 and in the Operations Office, Bldg. #403.

5.1.2 Non-Serious Medical Injuries that require a physician's attention should be driven to, or if able, drive themselves to:

Dr. Anthony Schiavi
620 10th Street
(Niagara Falls Memorial Medical Center)
Niagara Falls, New York 14302
(716) 285-1133

5.1.3 Emergency Injuries require that the individuals be stabilized to reduce the possibility of shock, and an ambulance be summoned by calling the town of Lewiston Volunteer Fire Department at 754-4211.

Prior to ambulance arrival, a radiological survey must be conducted to ascertain if radiological contamination is present. If contamination is detectable on the injured individual, steps outlined in 5.2 shall be followed.

Emergency Injuries/Illnesses will be handled at either local hospital listed below, if contamination is not present:

- o Mount St. Mary's Hospital
- o Niagara Falls Memorial Medical Center

5.2 OCCUPATIONAL INJURIES WITH RADIOLOGICAL CONTAMINATION

5.2.1 First aid care and response shall take precedence over radiological considerations. Monitoring for radiological contamination, decontamination activities and first aid care can all be administered simultaneously, in most cases.

5.2.2 Upon notification of an injury on-site, the Health Physics Supervisor, or his designated representative, shall be summoned to the location of the injured individual to supervise the radiological monitoring, and decontamination if necessary.

5.2.3 Individuals that are contaminated and require emergency treatment will be transported to the Niagara Falls Memorial Medical Center, by the Lewiston Volunteer Fire Department (See Appendix A).

5.2.4 A Health Physics Technician shall accompany the injured individual to the hospital to survey and relay first-hand information to the Radiation Safety Officer at the hospital.

5.2.5 "Contamination measurements must be taken of the injured individual and the hospital notified prior to the ambulance arrival at the Medical Facility. If this is not possible, the accident scene should be checked and an estimate of the contamination severity relayed to the Medical Facility". [FUSRAP P.P 20.02, Section 4.4.4]

5.2.6 Instruments for use in radiologically related aspects of emergencies will be the same as the standard field health physics instruments used for site operations.

5.2.7 Decontamination Guidelines - See Appendix A, FUSRAP P.I. 21.14.

5.3 FIRE

5.3.1 Should a fire be observed that appears to be controllable by persons initially locating it, attempts should be made to extinguish such a fire. Fire extinguishers are located in occupied buildings and in several vehicles on site.

5.3.2 Fire that is observed that does not appear to be extinguishable or controllable by persons initially locating the fire shall be reported to the Lewiston Volunteer Fire Department by calling 754-4211.

5.3.3 As emergency response vehicles arrive on site, they should be directed to the fire scene, and firemen advised of the locations of the nearest fire hydrants (see Appendix B). Any radiological considerations should be noted to the fire fighters.

5.4 EMERGENCY NOTIFICATION

5.4.1 The FUSRAP Project Instruction 27.17, Emergency Notification Plan, should be reviewed immediately following any emergency situation for procedures to follow in the notification "chain of command."

5.4.2 Be sure all persons of authority on site are notified; this includes, but is not limited to:

- o Site Superintendent
- o Health Physics Supervisor
- o Site Operations Supervisor

APPENDIX A

niagara falls memorial medical center

621 Tenth Street Niagara Falls, New York 14302 Telephone (716) 278-4000

Department of Nuclear Medicine

April 26th. 1982

Bechtel National Inc.
P.O. Box #306
Lewiston, New York 14092

ATT: Joseph P. Kirchue

Dear Sir:

It has been agreed that if a worker is injured at the Lewiston facility the amount of contamination (if any) will be determined on site. After the determination is made, please notify the Emergency Dept. (278-4394), and the Department of Nuclear Medicine (278-4346), before transporting the patient.

If the contamination is found to be low-level, the patient will be brought to the Pine Avenue emergency entrance. If it is found to be high-level, then the Walnut Avenue entrance is to be used.

If I can be of further assistance please contact me at (716) 297-7657.

Sincerely yours,
Stacey A. Sardina
Stacey A. Sardina

RADIATION EMERGENCY PLAN

NIAGARA FALLS MEMORIAL MEDICAL CENTER

5 August, 1980

THE NATURE OF RADIATION ACCIDENTS

A radiation accident may be defined as an unforseen occurence, either actual or suspected, involving exposure of, or contamination on, or within humans and the environment by ionizing radiation. The accident will be considered as occuring within a short period of seconds, up to several days.

SOURCES OF CONTAMINATION

External, the source of contamination may be outside the body, so that the radiation strikes the individual and is absorbed, depending upon its physical characteristics, (eg., sealed sources of radionuclides, generators, accelerators etc.)

Internal, contamination by radioactive nuclides. These radionuclides can be deposited on the skin, inhaled, ingested, or enter through wounds. Radioactive nuclides may also be formed within the body to an external source of neutrons.

The single error of commission to be avoided at all costs in handling contaminated patients in the hospital is that of bringing them into the admitting room and further into the hospital, spreading high levels of radioactivity along the route. Such an act would result in contamination not only of the rooms and corridors traversed, but also of the air, air-conditioning ducts, and other patients. To handle this problem a special admission route is necessary.

The Hospital Radiation Team is comprised of the Radiation Safety Officer, Dr. Robert J. Kirby, M.D. ext. 4498 or 754-8679 (home), or the Radiologist on call. Also Stacey A. Sardina, Senior Nuclear Medicine Technologist ext. 4346 or 297-7657 (home), or the nuclear medicine tehh-nologist on call.

CARE OF RADIATION ACCIDENT PATIENTS AT THE HOSPITAL

Patients exposed only to external radiation present no unusual admission problem, since they are not radioactive. The hospital should be notified before a contaminated patient is sent for admission. The location of the accident, number of people involved , an estimate of the amount and kind of radioactivity, and an estimate of the extent of injury of patients should be furnished to the hospital. The person at the hospital should instruct the caller exactly where to bring the patients. See Figure 8-2.

MATERIALS AND SUPPLIES

A supply kit for radiological first aid is maintained by the Nuclear Medicine Department. It contains the following supplies (or where to find the specific items).

FOR TEAM PERSONNEL

Coveralls or surgical scrub suits (extra available in surgery).

Surgical caps

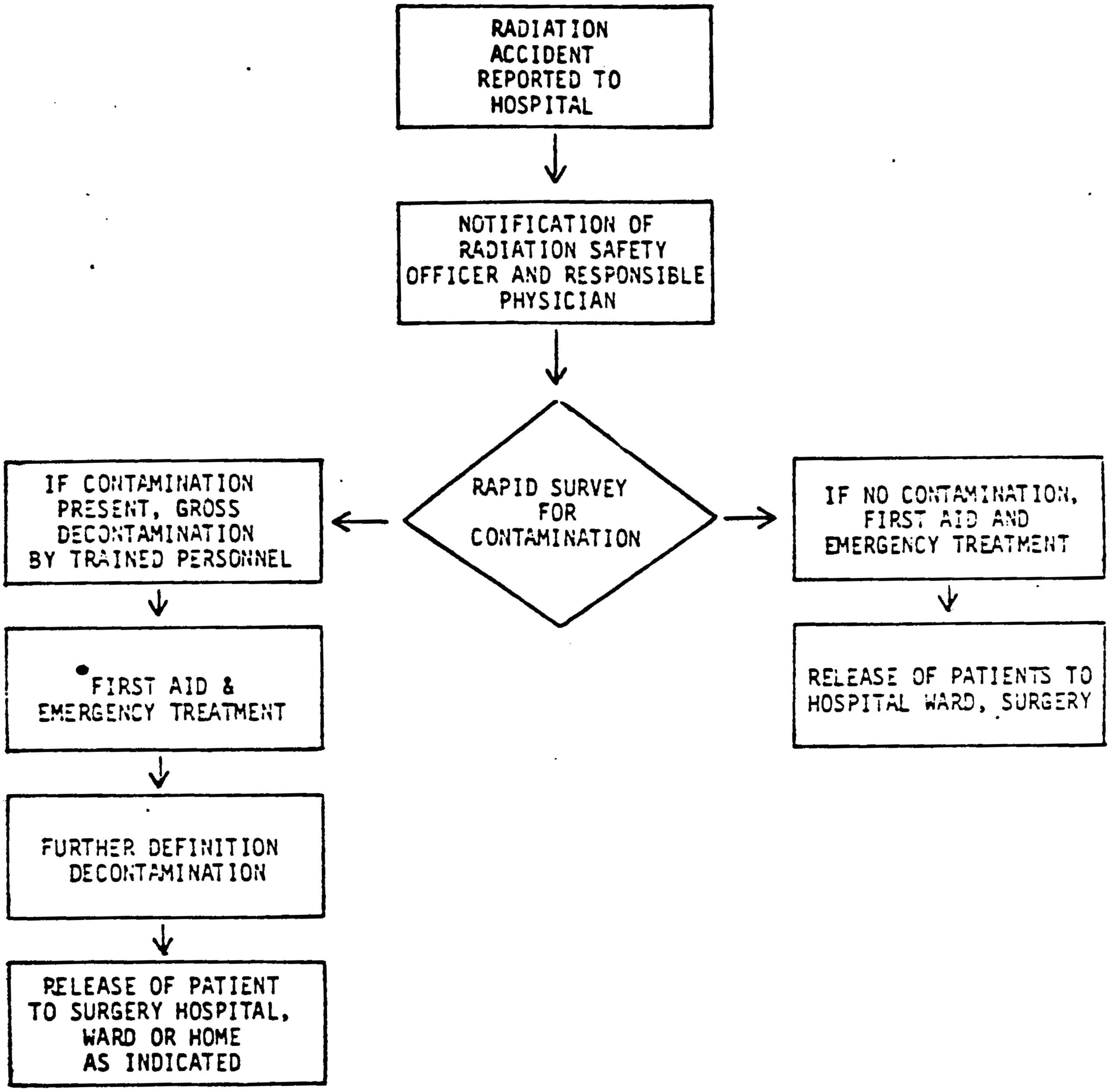
Rubber Gloves

Surgical Rubber Gloves

Masking Tape 2" wide

Radiation Signs: CAUTION: HIGH RADIATION AREA
CAUTION: RADIATION AREA
CAUTION: RADIOACTIVE MATERIALS
CAUTION: AIRBORNE RADIOACTIVITY

Radiation Tags for Attachment to Patients:
Danger: Radioactivity (a tag to be tied to patients)
Caution: Radioactive Material (a roll of gummed tape which can be affixed to the patient).



These emergency procedures are aimed at efficient patient treatment while simultaneously holding radiation exposure in the hospital to a minimum.

*Medical emergencies are always treated first, patients must be triaged for medical emergencies before any decontamination may take place.

Figure 8-2. Triage Procedures

Dust respirators with filters to remove particles larger than 1_u.
500 hundred foot rope for restricting contaminated areas.
Flashlights and batteries.
Pocket knife, scissors, pliers and screwdrivers.

FOR PATIENTS

Scissors

Long Patient Gowns or Coveralls (laundry)

Blankets (laundry)

Foot covers

Plastic bags

Tags and Gummed Labels

Notebooks

Containers for Collection of Urine and Feces

Cotton Swabs and Envelopes

FOR TRANSPORTATION

Rolls of Plastic (40" x 10 ft.)

Masking Tape 2" wide

Blankets

PROCEDURES FOR PROTECTION OF HOSPITAL PERSONNEL

Contamination can be transferred by direct contact with radioactive materials on skin, clothing, or in the process of decontamination with aqueous solutions; the radionuclides may dry and become airborne particles. The environment may become contaminated in the same way as personnel.

In order to protect personnel and the hospital environment, certain procedures are recommended.

(1) Personnel shall wear surgical scrub suits, surgical caps and gowns, and rubber gloves either surgical or household, or industrial, depending upon their duties). (2) Masks, respirators, or supplied air packs may be required, depending upon the type of radionuclide and amount. (3) Rubber or plastic shoe covers are desirable. Those individuals who perform actual decontamination with water should wear plastic or rubber laboratory aprons. Good temporary shoe covers for dry areas can be improvised from brown paper bags held on with adhesive tape. (4) Air conditioning and forced air heating systems should be turned off, so that radioactivity is not carried onto ducts or to other rooms. (5) The floors should be protected with removable covering which confines radioactivity. Plastic sheets should be used where spillage of liquids is a problem. (6) All contaminated clothing should be placed in plastic bags as quickly as possible. (7) Splashing of solutions should be avoided. (8) Patients and personnel should go to areas of low level of radioactivity only after surveys show satisfactory decontamination. If a highly contaminated patient or material is brought into a low-level area, the low-level area then becomes useless. (9) All passage between high and low-level areas of radioactivity must be regulated by monitoring teams. (10) Individuals

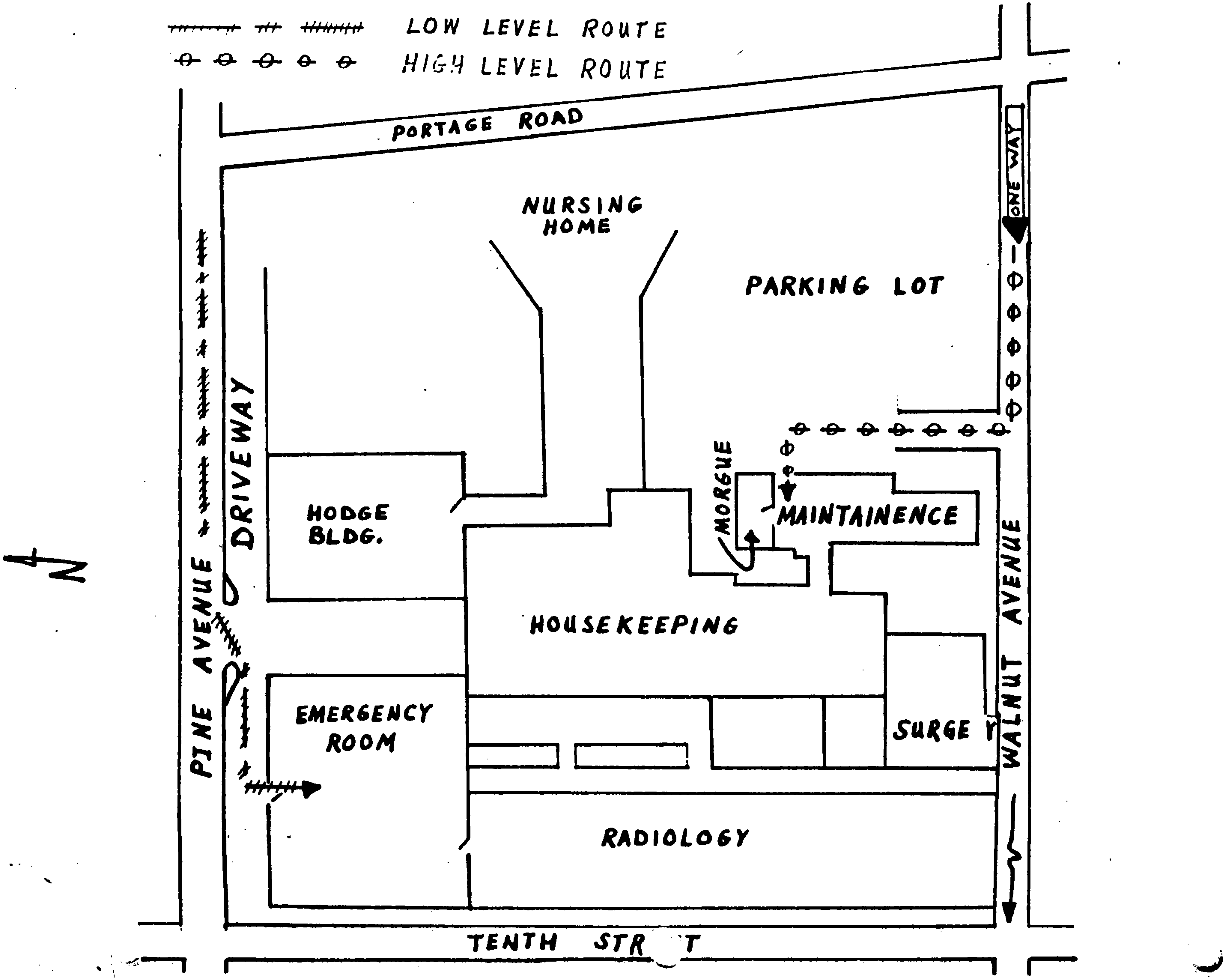
who are untrained in radiation techniques and who do not have specific duties should be excluded from these areas. (11) Supplies must be passed through monitoring stations from lower to higher level areas of contamination. Reverse flow should not be allowed. (12) Fiberboard or steel drums with tight-fitting tops should be obtained as soon as possible for contaminated materials. Labels describing the contents should be affixed, so that proper disposal can be carried out without opening reopening drums. They may be sealed with stripping plastics. Drums also should be provided and labeled for noncontaminated waste. This step will minimize disposal problems. Only if there are mass casualties under unusual circumstances should individual doses to 25 rad be permitted. (14) All personnel in contact with contaminated patients must be surveyed by the Radiological Safety Officer before leaving or working with other patients.

ADMISSION ROUTE

Admission route for contaminated patients shall be through the morgue. A shower is available for ambulatory patients. Patients unable to decontaminate themselves will be decontaminated on the autopsy tables. Even minor emergency surgery may be performed on these tables. When the patients have been suitably decontaminated they can be moved to regular patient areas.

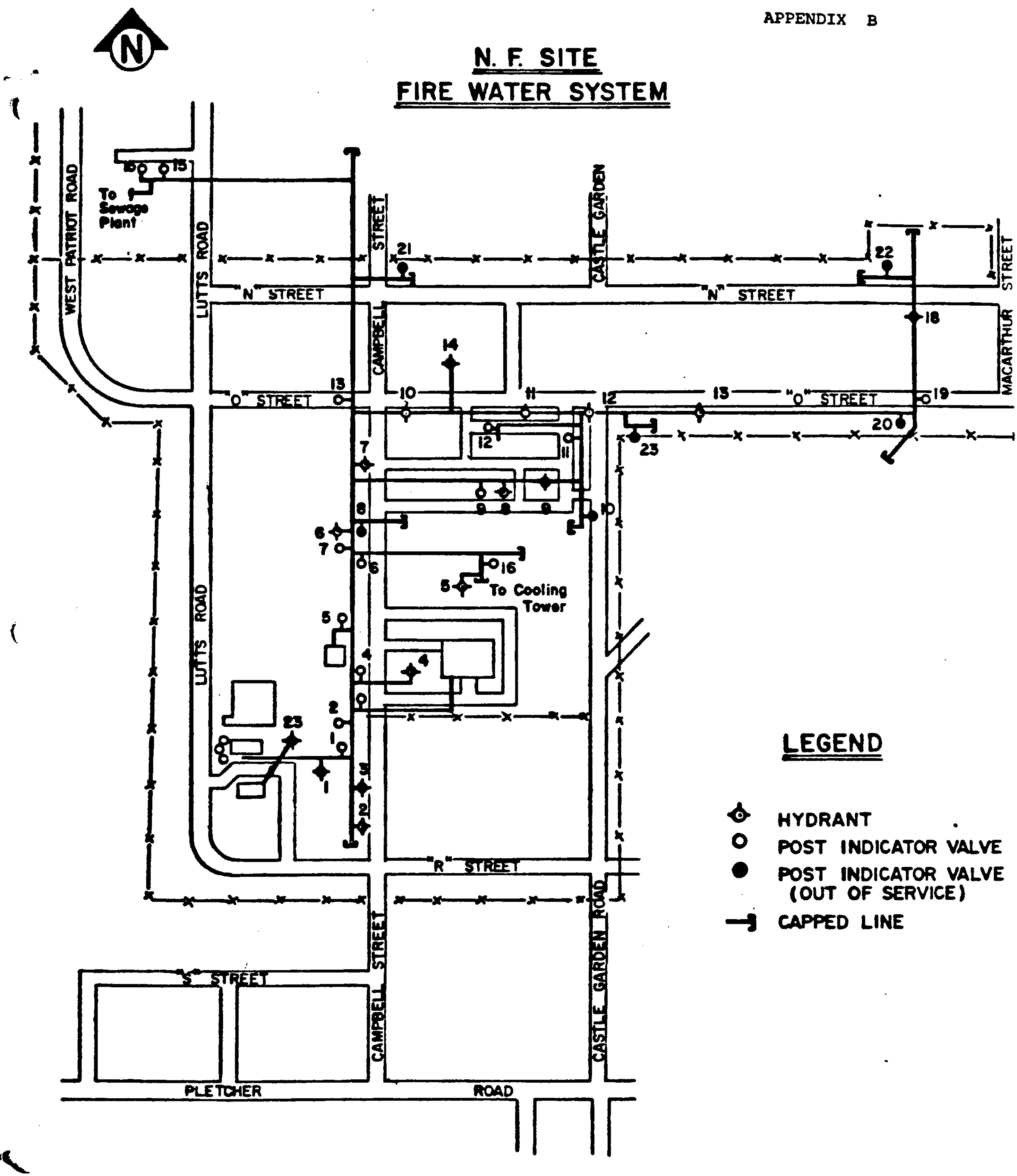
Until decontamination is complete, all hospital areas through which these patients pass must be monitored.

Monitoring stations must be set up at the doorways to the decontamination room. No materials shall leave the room until they have been monitored. The room should not be used for other purposes until a survey shows it to be free of significant contamination.



LOW LEVEL ROUTE
HIGH LEVEL ROUTE
PORTAGE ROAD
NURSING HOME
PARKING LOT
ONE WAY
HODGE BLDG.
DRIVEWAY
PINE AVENUE
MORGUE
MAINTAINENCE
HOUSEKEEPING
EMERGENCY ROOM
SURGE Y
WALNUT AVENUE
RADIOLOGY
TENTH STR T

N. F. SITE
FIRE WATER SYSTEM



NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ASSURANCE ASSESSMENT

SITE IDENTIFICATION Niagara Falls Storage Site, Lewiston, New York, K-65 Residue Transfer **QAA #** 115-D-06

SUMMARY DESCRIPTION This assessment covers the transfer of K-65 residues from Building 434 to Building 411 by hydraulic mining and slurry pumping.

1. Preliminary inspection of conditions on top inside and on top Building 434 dome.
2. Refurbish existing Building 434 ladder.
3. Set platform pads and remove vent cap to prepare for placing work platform.
4. Install work platform on top Building 434. man lift [illegible] ?
5. Install electrical power, instrumentation, cable climber, and breathing air supply hose on Building 434.
6. Install breathing air manifold and air supply hose on top of pipe erection manifold.
7. Cut 5 feet x 5 feet hole through concrete at the center of the Building 434 dome top.
8. Transfer water from Building 411 to Building 434 water retention pond.

Install hydraulic mining unit P-03 in the top of building and startup mining operations.

ASSESSMENT RECOMMENDATIONS (see attachment(s)) Meeting 05-18-84

yes no

☒ ☐ A Quality Action Plan (QAP) is required. If yes, by 6/8/84

☐ ☐ A Revised QAP is required. If yes, by

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE
0	RE[illegible]	[illegible]	[illegible]	RN[illegible]	[illegible]					

*IF DESIGN IS LESS THAN 100%, ENTER % COMPLETE.

NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ASSURANCE ASSESSMENT

SITE IDENTIFICATION Niagara Falls Storage Site, Lewiston, New York, K-65 Residue Transfer **QAA #** 115-D-06

SUMMARY DESCRIPTION

10. Transfer K-65 residues from Building 434 to Building 411 Bay C.
11. Flushing slurry transfer lines.
12. Flushing mining unit and hoses and removal from Building 434.
13. Remove residue trapped by lower convex dome by core drilling and washing.
14. Cut and remove concrete section of Building 434 lower dome.
15. Cut and remove concrete section from side of Building 434 side.
16. Reattach hoses to hydraulic mining unit and resume mining operation in the lower compartment.
17. Clean out residues remaining in bottom of Building 434 lower compartment.

ASSESSMENT RECOMMENDATIONS (see attachment(s))

yes no
☐ ☐ A Quality Action Plan (QAP) is required. If yes, by ____________
☐ ☐ A Revised QAP is required. If yes, by ____________

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE

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QUALITY ASSURANCE ASSESSMENT WORKSHEET

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, NY

QA ASSESSMENT NO.: 115-D-06

ITEM NAME and NUMBER	FAILURE MODE	FAILURE EFFECT	CONSEQUENCES OF FAILURE 1,2: INSIGNIFICANT	SIGNIFICANT	UNKNOWN	UNACCEPTABLE	PROBABILITY OF FAILURE: LOW	HIGH	UNKNOWN	RATIONALE 3	ASSESSMENT CLASSIFICATION 4: ROUTINE	SPECIAL	POSSIBLE CAUSES	COMMENTS
GENERAL CONSIDERATIONS														
1. Any work performed on top of or otherwise above grade on the tower.	Worker on tower fails to tie off properly and falls.	Injury or death of worker.		x			x			F	x			
	Failure of protective clothing.	Personnel contamination.		x			x			F	x			
WORK PLAN TASKS														
1. Preliminary inspection of conditions on top and inside Building 434 top dome.	Unable to remove wooden plug in access opening.	Unable to do sampling from inside dome. Must obtain sample by other means which increases dose to workers.	x							6	x			
	Gas sampler fails to operate.	Must obtain new sampler. Task takes longer thus increasing exposure to workers.	x							6	x			Spare sampler will be carried.
	Radiation survey instrument fails.	Must obtain new survey instrument. Task takes longer thus increased exposure.	x							6	x			Spare survey instrument will be carried.
2. Refurbish existing ladder on Building 434.	Worker does not have correct tools or equipment.	Must obtain tools and/or equipment from ground thus increasing task time and subsequent increased exposure.	x							6	x			
	Attachment of cable to tower fails.	Ladder user could fall from ladder. Safety hazard.		x			x			F	x			

NOTES

1. Consider: Personnel and Public Health and Safety, Environmental Insult, Program Objectives, Monetary Loss, Public Reaction Per Section 5.2.1 of Procedure.
2. If consequences of failure are "insignificant" or "unacceptable" go directly to Assessment Classification.
3. Provide rationale for elements having insignificant consequences of failure or low probability of failure occurrence. See rationale codes for Routine Classification.
4. See Section 5.2.1 of procedure for guidance on basis for classification.

RATIONALE CODES FOR ASSESSING PROBABILITY OF FAILURE

Insignificant Consequences of Failure

1. Contamination should be local and can be cleaned up
2. Entrance of small amount of water to waste will not cause spread of contamination
3. Amount of radioactive material would be small
4. Backup system provided to prevent or minimize release of radioactive material
5. Other - (identify in comments)

6. Failure will not impact Note 1

Low Probability of Failure

A. History of low failure frequency in similar application
B. Standard off-the-shelf hardware of proven application
C. Redundance or backup system is provided to maintain plant performance in event of failure
D. Design, test and operational experience will establish mature, reliable design
E. Part derating techniques used to provide low failure frequency
F. Normal use of proven and established standard practices (test, inspection, procedures, etc.) will assure adequate quality
G. Training program and standard operating procedures will provide adequate human reliability in operating and maintaining plant

QUALITY ASSURANCE ASSESSMENT WORKSHEET

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, NY

QA ASSESSMENT NO.: 115-D-06

ITEM NAME and NUMBER	FAILURE MODE	FAILURE EFFECT	CONSEQUENCES OF FAILURE 1,2: INSIGNIFICANT	SIGNIFICANT	UNKNOWN	UNACCEPTABLE	PROBABILITY OF FAILURE: LOW	HIGH	UNKNOWN	RATIONALE 3	ASSESSMENT CLASSIFICATION 4: ROUTINE	SPECIAL	POSSIBLE CAUSES	COMMENTS
3. Set platform pads and remove vent cap on Building 434 dome.	Pad placement does not match platform feet.	After platform is raised to dome, pad must be repositioned and allow pad to set, which will increase time for task and exposure.	x							6	x			
	Unable to remove cap.	Increased time required and increased exposure.		x			x			F	x			
4. Install platform on Building 434.	Platform is dropped on tower.	Rupture of the tower dome. Danger to personnel onsite and offsite. Bad public relations. Cost increase.		x			x			F	x			
	Platform anchors do not hold.	Platform is not stable and must be repositioned. Cost increase and schedule delay.		x			x			E	x			
5. Install electrical power, instrumentation, cable climber, and air hose on Building 434.	Prefab conduit does not match tower conduit.	Rework of conduit with increase of exposure caused by rework. Possible schedule delay.		x			x			D	x			
6. Install breathing air manifold and air supply hose on top of pipe erection scaffold.	Hose or manifold leaks when pressurized.	Loss of breathing air and repair required additional exposure for repair.		x			x			F	x			

NOTES

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FORMERLY [illegible]LIZED SITES
REMEDI[illegible]ION PROGRAM
BECHTE[illegible] 14501 (FUSRAP)

QUALITY ASSURANCE [illegible]SESSMENT WORKSHEET

PROJECT(SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, NY

QA ASSESSMENT NO.: 115-D-06

ITEM NAME and NUMBER	FAILURE MODE	FAILURE EFFECT	CONSEQUENCES OF FAILURE 1,2: INSIGNIFICANT	SIGNIFICANT	UNKNOWN	UNACCEPTABLE	PROBABILITY OF FAILURE: LOW	HIGH	UNKNOWN	RATIONALE 3: RATIONALE	ASSESSMENT CLASSIFICATION 4: ROUTINE	SPECIAL	POSSIBLE CAUSES	COMMENTS
7. Cut 5' x 5' hole through the center of the Building 434 dome top.	Saw hits vent or platform and unable to make cut.	Must remove vent or replace saw causing increased exposure and delay.		x			x			B	x			
	Concrete plug falls into tower.	Interference with hydraulic mining unit during mining.		x			x			F	x			
	Concrete plug caught on platform while being removed by crane.	Damages platform; cost increase, schedule delay, safety hazard.		x			x			D,F	x			
8. Transfer water from Building 411 to the Building 434 water retention pond.	Transfer pipe line leaks.	Contaminate grounds and cleanup and repair increases exposure and schedule delay.				x						x	1. Bad weld 2. Corrosion	Welds are radiographed. Short-time exposure to fluids.
	Retention pond 434 overflows.	Contaminate clean area and possible uncontrolled discharge. Bad public relations, schedule delay and environmental damage.				x						x	1. Pond not checked while filling 2. Dike is washed out	Provide observer to check pond during filling and other operations.

NOTES

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QUALITY ASSURANC ASSESSMENT WORKSHEET

PROJECT(SUBPRO[illegible]T): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, NY

QA ASSESSMENT NO.: 115-D-06

ITEM NAME and NUMBER	FAILURE MODE	FAILURE EFFECT	CONSEQUENCES OF FAILURE 1,2: INSIGNIFICANT	CONSEQUENCES OF FAILURE 1,2: SIGNIFICANT	CONSEQUENCES OF FAILURE 1,2: UNCERTAIN	CONSEQUENCES OF FAILURE 1,2: UNACCEPTABLE	PROBABILITY OF FAILURE: LOW	PROBABILITY OF FAILURE: HIGH	PROBABILITY OF FAILURE: UNKNOWN	RATIONALE 3	ASSESSMENT CLASSIFICATION 4: ROUTINE	ASSESSMENT CLASSIFICATION 4: SPECIAL	POSSIBLE CAUSES	COMMENTS
9. Install mining unit P-03 in Building 434 (includes startup).	Mining unit and hose won't go through dome hole.	Larger hole must be made, tower structure reanalyzed. Exposure increased. Schedule delay.		x			x			D	x			
	Mining unit and hose support lines from crane uncoordinated.	Rupture hose connection, safety hazard and schedule delay.				x						x	a) Poor operation coordination. b) Bad hose fittings.	a) Need support for operator. b) Double check hose fittings.
	Mining unit motor has wrong rotation direction.	Wiring must be corrected. Exposure time increased.	x							6	x			
	Jet valves won't operate.	Wiring must be corrected or repairs made, increasing exposure, increased cost and schedule delay.		x			x			D,F	x			
	Pump P-02 cannot supply water to mining unit.	Mining unit cannot operate; cost increase and delay in schedule while getting new pump. Failure to meet goals.		x			x			D,F	x			
	Pump P-03 cannot slurry residues.	Cost increase, schedule delay, bad public relations.		x			x			D	x			

NOTES

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5. Other - (identify in comments)
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G. Training program and standard operating procedures will provide adequate human reliability in operating and maintaining plant

QUALITY ASSURANC⁻ ASSESSMENT WORKSHEET

PROJECT(SUBJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewisto Y

QA ASSESSMENT NO.: 115-D-06

ITEM NAME and NUMBER	FAILURE MODE	FAILURE EFFECT	CONSEQUENCES OF FAILURE 1,2: INSIGNIFICANT	SIGNIFICANT	UNKNOWN	UNACCEPTABLE	PROBABILITY OF FAILURE: LOW	HIGH	UNKNOWN	RATIONALE 3: RATIONALE	ASSESSMENT CLASSIFICATION 4: ROUTINE	SPECIAL	POSSIBLE CAUSES	COMMENTS
10. Transfer K-65 residues to Building 411.	Power failure to pumps.	Operations stop and pipeline slurry settles out, cannot be flushed and residues plug pipeline. Delay and possible failure to meet goals.		x			x			D,F			Generator failure.	Backup power to be accessed.
	Pipeline leaks.	Contamination of clean ground, operations must be stopped and repairs made. Cleanup required for contamination, increased exposure.				x						x	1. Bad Weld 2. Corrosion	Welds radiographed and line pressure tested. Line patrolled.
	Pipeline leak at ditch.	Possible contaminated uncontrolled discharge offsite. Schedule delay and bad public relations.				x						x	1. Bad weld 2. Corrosion	Dam installed with gate collect leak. Welds radiographed and line pressure tested. Line patrolled.
	Open valve causes discharge of residues into Building 434 pond.	Residue reduces pond storage capacity. Increased background radiation near pond.		x			x			G	x			
	Incorrect valve setting on Building 411 discharge header. Discharge of residues into Bay B.	Mixes K-65 and L-30 residues. Failure to keep residues separate.	x				x			G	x			
	Mining unit hits an obstruction and damages mining unit.	Operation must be stopped, mining unit removed and repaired. Schedule and cost impact, goals may not be met.		x					x			x	a) Unknown obstruction b) Mining too fast.	Need special training for operator of crane and tower top operator with TV scanner.

NOTES

1. Consider: Personnel and Public Health and Safety, Environmental Insult, Program Objectives, Monetary Loss, Public Reaction Per Section 5.2.1 of Procedure.
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QUALITY ASSURANC⁻ ASSESSMENT WORKSHEET

PROJECT(SUBPR ⁻T): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston

QA ASSESSMENT NO.: 115-D-06

ITEM NAME and NUMBER	FAILURE MODE	FAILURE EFFECT	CONSEQUENCES OF FAILURE 1,2: INSIGNIFICANT	SIGNIFICANT	UNKNOWN	UNACCEPTABLE	PROBABILITY OF FAILURE: LOW	HIGH	UNKNOWN	RATIONALE 3: RATIONALE	ASSESSMENT CLASSIFICATION 4: ROUTINE	SPECIAL	POSSIBLE CAUSES	COMMENTS
11. Flushing slurry transfer lines.	Insufficient water available for flushing.	Possible plugging of mining unit and/or pipeline. Schedule delay.		x			x			G	x			
	Incorrect valve setting for flushing.	Possible plugging of pipeline. Schedule delay.		x			x			G	x			
12. Flush mining unit and hoses and remove from Building 434.	Failure to raise water level in tower and raising mining unit so it will pump water instead of residue for flushing.	Possible plugging of mining unit. Contamination of personnel when disconnecting unit and bases. Safety hazard.		x			x			G	x			
	Hose slips off saddle.	Hose fails with possible injury to personnel.		x			x			G	x			
	Insufficient water available in 434 pond for flushing.	Possible plugging of mining unit and hoses.		x			x			G	x			
13. Remove residue trapped by lower convex dome.	Core drill is deflected during drilling and drills hole in side of tower.	Loss of residue outside tower with contamination of environment.				x						x	Operator does not observe drill string deflection.	Need backup observer, BNI or EIC
	Drilled holes plug.	Residue cannot be washed to lower tower compartment. Delay in schedule.		x			x			C	x			

NOTES

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...MENT WORKSHEET

...Transfer, Lewiston, NY

QA ASSESSMENT NO.: 115-D-06

ITEM and NUMBER	FAILURE MODE	FAILURE EFFECT	CONSEQUENCES OF FAILURE 1,2				PROBABILITY OF FAILURE			RATIONALE 3	ASSESSMENT CLASSIFICATION 4		POSSIBLE CAUSES	COMMENTS
			INSIGNIFICANT	SIGNIFICANT	UNKNOWN	UNACCEPTABLE	LOW	HIGH	UNKNOWN	RATIONALE	ROUTINE	SPECIAL		
14. Cut and remove concrete section of lower dome.	24-inch pipe through lower dome is filled with residues or concrete with pipe still attached below dome.	After cutting concrete section cannot be removed. Sechedule delay and cost increase, failure to meet goals.		x			X			C	X			
	Concrete section falls into lower compartment.	Interference with mining unit during mining lower compartment. Delay and failure to meet goals.		x			x			C	x			
	Saw blade or core bit breaks.	Saw or bit must be removed and replaced increasing exposure. Schedule delay.	x							6	x			
15. Cut and remove concrete section from side of tower.	Failure of core drill anchors.	Core drill falls with possible injury to personnel.				x						x	a) Poor concrete. b) Poor practice.	a) Need observer to check quality of concrete and anchor setting.
	Core holes do not overlap.	Concrete section cannot be removed. Schedule delay.	x							6	x			
16. Reattach hoses to hydraulic mining unit and resume mining in lower section.	Hoses cannot be attached at opening in top dome.	Hose attachment scheme must be revised. Increased exposure, schedule delay.		x			x			D	x			
17. Clean out residues remaining in bottom of Building 434.	All residues are not cleaned out.	Possible dust hazard and contaminate spread during tower removal. Environment damage and bad public relations; safety hazard.		x			x			D	x			

NOTES

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NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ACTION PLAN

SITE IDENTIFICATION Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York **QAP #** 115-D-06-01

SUMMARY DESCRIPTION:

Quality Assurance Assessment No. 115-D-06, Item 8, identifies transfer pipeline leaks as a special item. The pipeline leaks during operation at some point along its length. The effect of a leak in the pipeline would be a loss of contaminated liquid on the ground around the pipe requiring cleanup of the ground around the leak and repair of the pipeline.

The pipeline welds shall be radiographed during installation and the line pressure tested before use. The pipeline shall be inspected frequently during pumping operations and if leaks are detected the inspector can notify the operator to shut down operations before large amounts of contaminated liquids are released.

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE
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*IF DESIGN IS LESS THAN 100% ENTER % COMPLETE

QUALITY ASSURANCE PLAN WORKSHEET

DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
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PAGE OF
REVISION NO.
ISSUE DATE

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York

QAP ASSESSMENT NO: 115-D-06-01

ACTIVITIES AND ACTION PLANS:

Description	ACTION Responsibility	ACTION Date	COMPLETION Signature	COMPLETION D
All the welds on the transfer pipeline shall have been radiographed and certified as satisfactory.	Dave Meehan	June 10, 1984		
The pipeline shall be pressure tested and checked for leaks under pressure.	Dave Meehan	June 18, 1984		
The Subcontractor shall provide a worker to patrol the pipeline during operations and inspect for leaks. Worker shall have communication with pumping operator available at all times.	Dave Meehan	June 10, 1984		

FOLLOW-UP AND CLOSE-OUT:

Description	Verification Signature	Verification Date
Verify that all the welds on the pipeline have been radiographed and certified as satisfactory.	Dave Meehan	
Verify that the pipeline has been pressure tested and did not leak.	Dave Meehan	
Assure the Subcontractor has a worker patrolling the pipeline and checking for leaks during any pumping operation and that the worker has means of communication with pumping operator.	Dave Meehan	

NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
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QUALITY ACTION PLAN

SITE IDENTIFICATION Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York **QAP #** 115-D-06-02

SUMMARY DESCRIPTION:

Quality Assurance Assessment No. 115-D-06, Item 8, identifies the overflowing of retention pond 434 as a special item. Retention pond 434 could overflow when filling by pumping from Building 411 if not checked during the final filling stage. The effect of overflowing the pond would be spread of contamination to a clean area, and a possible uncontrolled discharge event which could result in a schedule delay, environmental damage and bad public relations.

The Subcontractor shall provide an observer at the 434 retention pond during the final filling of the pond to notify the pumping operator at Building 411 to stop pumping when retention pond 434 is full and before it overflows. The observer shall have communication with the pumping operator.

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE
0	REL	MRG	HBM	EDB	JFit					

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QUALITY ASSURANCE PLAN WORKSHEET

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PAGE OF
REVISION NO.
ISSUE DATE

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York

QAP ASSESSMENT NO: 115-D-06-02

ACTIVITIES AND ACTION PLANS:

Description	ACTION Responsibility	Date	COMPLETION Signature	D
The subcontractor shall have an observer at the 434 retention pond during filling operations to notify the pumping operator at Building 411 when the 434 retention pond is full and to stop pumping operations before the pond overflows.	Dave Meehan	June 10, 1984 thru Sept. 21, 1984		

FOLLOW-UP AND CLOSE-OUT:

Description	Verification Signature	Date
Verify that the Subcontractor has an operator at the 434 retention pond during any filling operation to assure pumping operations are stopped before the pond overflows.	Dave Meehan	

NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ACTION PLAN

SITE IDENTIFICATION Niagara Falls Storage Site K-65 Residue Transfer, Lewiston, New York **QAP #** 115-D-06-03

SUMMARY DESCRIPTION:

Quality Assurance Assessment No. 115-D-06, Item 9, identifies uncoordination of the crane line supporting the hydraulic mining unit and the line supporting the hoses as a special item. The crane line coordination is required when installing the hydraulic mining unit in the dome of Building 434 and during the mining operation. The hydraulic mining unit and the water feed and discharge hoses attached to the mining unit are supported by two separate cables of a single crane. Initially and during operation it is required that the mining unit and hose be raised or lowered the same distance simultaneously to prevent strain being put on the hose connections and cause them to rupture. The crane operator will not be able to visually observe the movement of the mining unit or hose and must be directed by an operator stationed on top the dome using two-way radio communication. The effect of a connection rupture would be halting of operation, an increase in schedule and cost, a safety hazard and a possible failure to meet established goals.

The Subcontractor's crane operator shall demonstrate that under the direction of an observer using a two-way radio, without the crane operator being able to visually observe the crane lines, that the crane lines can be coordinated in their movement prior to attaching and operating the mining unit. When the hose connections are made they shall be double checked to assure they are correctly installed. When installing the mining unit in the tower and during operation when the mining unit and hoses are moved, the observer directing the operation on the tower shall have no other duty except to coordinate the line movement.

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE
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QUALITY ASSURANCE PLAN WORKSHEET

BECHTEL
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

PAGE OF
REVISION NO.
ISSUE DATE

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York

QAP ASSESSMENT NO: 115-D-06-03

ACTIVITIES AND ACTION PLANS:

Description	ACTION Responsibility	ACTION Date	COMPLETION Signature	COMPLETION D
The Subcontractor shall demonstrate that the crane operator can coordinate the operation of two crane lines he cannot see while being directed by an observer using radio communication.	Dave Meehan	June 10, 1984		
Assure that all hose connections involved in connecting the hydraulic mining unit (P-03) are double checked for correct fit and tightness.	Dave Meehan	June 08, 1984		
Assure that during the movement of the hydraulic mining unit and mining unit hoses that the direction of the crane operator during the operation is the only duty of the observer instructing the crane operator.	Dave Meehan	June 13, 1984		

FOLLOW-UP AND CLOSE-OUT:

Description	Verification Signature	Verification Date
Verify that the Subcontractor's crane operator and observer on top the tower can coordinate raising and lowering the crane lines holding the mining unit and hoses using radio communication.	Dave Meehan	
Verify that all hose connections for the mining unit are double checked for fit and tightness.	Dave Meehan	
Insure that the observer crane director on top the tower has no other duties when directing movement of the mining unit and hoses. Daily log will be kept.	Dave Meehan	

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NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ACTION PLAN

SITE IDENTIFICATION Niagara Falls Storage Site (NFSS) **QAP #** 115-D-06-04

SUMMARY DESCRIPTION:

Quality Assurance Assessment No. 115-D-06, Item 10-b, identifies pipeline leaks as a "special" item in the Transfer of the K-65 Residues to Bldg. 411. The impact of a pipe leak would be the contamination of clean ground, the stoppage of operations for clean-up and repairs, and the increased exposure of the workers to the residues. In addition, the delay could cause a failure to meet the scheduled goals.

The most probable cause for a pipe leak would be as a result of a faulty weld between the pipe sections. A certified inspection of the radiographs of the pipeline welds shall be conducted and a pressure test of the pipeline to 1.25 times the operating pressure is to be conducted prior to operation of the system with any contaminated material being transferred.

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE
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QUALITY ASSURANCE PLAN WORKSHEET

DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

PAGE OF
REVISION NO.
ISSUE DATE

PROJECT (SUBPROJECT): Niagara Falls Storage Site (NFSS)
K-65 Residue Transfer to Bldg.411

QAP ASSESSMENT NO: 115-D-06-04

ACTIVITIES AND ACTION PLANS:

Description	ACTION Responsibility	ACTION Date	COMPLETION Signature
A certified inspection of the radiograph records of the pipeline welds is to be conducted to verify that the welds meet the specified standards set forth in the subcontract. A pressure test of the completed pipeline is also to be conducted to a pressure of 1.25 times the estimated operating pressure to ensure that no other weaknesses are to be found in the pipeline prior to the start of the operation.	Dave Meehan	June 18, 1984	

FOLLOW-UP AND CLOSE-OUT:

Description	Verification Signature	Verification Date
Verify that the pressure test requirements are added to the pre-operation system check-out in the subcontract.	Dave Meehan	
Verify that a certified inspection of each weld radiogragh has been conducted and the records are in order and complete.	Dave Meehan	

NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ACTION PLAN

SITE IDENTIFICATION Niagara Falls Storage Site, K-65 **QAP #** 115-D-06-05

Residue Transfer, Lewiston, N.Y.

SUMMARY DESCRIPTION:

Quality Assurance Assessment No. 115-D-06, Item 10-C, identifies pipeline leaks as a "special" item in the transfer of the K-65 Residues to Building 411. The impact of a pipe leak would be the loss of contaminated material into a drainage ditch which could cause uncontrolled discharge offsite resulting in an environmental insult and bad public relations.

The most probable causes for a pipe leak is a weld failure or failure of the pipeline support over a ditch. A certified inspection of the radiographs of the pipeline welds shall be conducted and a pressure test of the pipeline to 1.25 times the operating pressure is to be conducted prior to operation of the system. The construction of dams in the ditch with a valve that can be closed to catch any possible leakage. The line shall be inspected frequently during operations to detect leaks and if leaks are detected the inspector can notify the operator to shut down operation and close valve in the dam to contain the leakage into the ditch.

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE
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DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

PAGE OF
REVISION NO.
ISSUE DATE

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, N.Y.

QAP ASSESSMENT NO: 115-D-06-05

ACTIVITIES AND ACTION PLANS:

Description	ACTION Responsibility	ACTION Date	COMPLETIC Signature
All the welds on the transfer pipeline shall have been radiographed and certified as satisfactory.	Dave Meehan	June 10, 1984	
The pipeline shall be pressure tested and checked for leaks under pressure.	Dave Meehan	June 10, 1984	
The Subcontractor shall provide worker to patrol the pipeline during operation and inspect for leaks and can communicate with operator.	Dave Meehan	June 10, 1984	
Provide dams in the ditches to contain leakage if it occurs.			

FOLLOW-UP AND CLOSE-OUT:

Description	Verification Signature	Verification Date
Verify that all the welds on the pipeline have been radiographed and certified as satisfactory.		
Verify that the pipeline has been pressure tested and did not leak.		
Assure the Subcontractor has a worker patrolling the pipeline and checking for leaks during operation and that the worker has means of communicating with the pumping operator.		
Verify that leakage containment dams are constructed in the ditches prior to start of operations.		

NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ACTION PLAN

SITE IDENTIFICATION Niagara Falls Storage Site, K-65 **QAP #** 115-D-06-06

SUMMARY DESCRIPTION: Residue Transfer, Lewiston, New York

Quality Assurance Assessment No. 115-D-06, Item No. 10-f, identifies the recognition of when the hydraulic mining unit (P-03) hits an obstruction, during mining operation, before there is damage to the mining unit as a special item. The effect of failure to recognize that an obstruction is blocking the mining unit could be damage to mining unit requiring repair or replacement which would increase cost and schedule and failure to meet established goals.

The most probable obstructions in the K-65 tower are original tower piping, 55-gallon steel drums, or plastic drum liners which could damage the hydraulic mining unit if not detected. The operators on the tower and the crane operator shall have special training in detection of obstructions and what shall be done when an obstruction is encountered.

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE
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QUALITY ASSURANCE PLAN WORKSHEET

DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

PAGE OF
REVISION NO.
ISSUE DATE

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York

QAP ASSESSMENT NO: 115-D-06-06

ACTIVITIES AND ACTION PLANS:

Description	ACTION Responsibility	Date	COMPLETION Signature	D
Provide the crane operator and observer crane director on top the dome of Building 434 with special training in detecting when the hydraulic mining unit hits an obstruction and what to do if an obstruction is encountered.	Dave Meehan June 06, 1984			

FOLLOW-UP AND CLOSE-OUT:

Description	Verification Signature	Date
Verify that the observer crane director stationed on top Building 434 and the crane operator have had special training in detection of obstructions in the tower and what to do if an obstruction is detected.	Dave Meehan	

QUALITY ASSURANCE PLAN WORKSHEET

DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

PAGE OF
REVISION NO.
ISSUE DATE

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York

QAP ASSESSMENT NO: 115-D-06-07

ACTIVITIES AND ACTION PLANS:

Description	ACTION Responsibility	ACTION Date	COMPLETION Signature	COMPLETION Date
The drill operator and Bechtel observer shall have practiced with the drilling equipment prior to the actual operation. The observer shall be present during the drilling to verify that the drilling string does not deflect, significantly, from the desired position. These observations may be made directly, if possible, or with assistance from the TV monitoring system.	Dave Meehan	July 06, 1984		

FOLLOW-UP AND CLOSE-OUT:

Description	Verification Signature	Verification Date
Verify that the drill operator and observer have practiced with equipment prior to actual operations. Verify that the observer is present during drilling operations.	Dave Meehan	

NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ACTION PLAN

SITE IDENTIFICATION Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York **QAP #** 115-D-06-07

SUMMARY DESCRIPTION:

Quality Assurance Assessment No. 115-D-06, Item 13, identifies a scenario where a hole could inadvertently be drilled through the side of the tower and result in a spread of contamination to the environment. The scenario identifies the possibility of the core drill being deflected to the outer wall and drilling through it while attempting to drill through the lower convex dome in order to allow the residues trapped in that area of the tower to drain into the lower portion of the tower. If this did occur, the residues would flow through the hole, down the side of the tower, and onto the ground resulting in additional work to plug the hole, clean up the area, and redrill the hole. This additional work would result in additional exposure to the workers.

The work shall be monitored by a back-up observer from Bechtel via the video system or from the top of the tower to ensure that any deflection of the drill string does not go unnoticed.

REV.*	COGN. ENG.	PROJECT ENG.	TECH. MAN.	S & L	F. CONST.	PQAS	TASK MANAGER	DEPUTY PROJ. MAN.	PROJECT MANAGER	DATE
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QUALITY ASSURANCE PLAN WORKSHEET

DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

PAGE OF
REVISION NO.
ISSUE DATE

PROJECT (SUBPROJECT): Niagara Falls Storage Site, K-65 Residue Transfer, Lewiston, New York

QAP ASSESSMENT NO: 115-D-06-08

ACTIVITIES AND ACTION PLANS:

Description	ACTION Responsibility	Date	COMPLETION Signature	Date
Provide a knowledgeable inspector to oversee the installation of core drill support anchors to assure they are correctly installed in sound concrete.	Dave Meehan	July 10, 1984		

FOLLOW-UP AND CLOSE-OUT:

Description	Verification Signature	Date
Verify that the anchor bolts that support the core drill on the side of Building 434 are installed correctly and in sound concrete.	Dave Meehan	

NUCLEAR FUEL OPERATIONS
DEPARTMENT OF ENERGY
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM
BECHTEL JOB 14501 (FUSRAP)

QUALITY ACTION PLAN

SITE IDENTIFICATION Niagara Falls Storage Site, K-65 **QAP #** 115-D-06-08

SUMMARY DESCRIPTION: Residue Transfer, Lewiston, New York

Quality Assurance Assessment No. 115-D-06, Item 15-a, identifies the quality of anchors placed in the side of Building 434 to support the core drills used in making an access opening as a special item. The effect of one or more support anchors failing could be damage to the drilling equipment (requiring replacement) and possible injury to personnel operating the core drill. In addition, the delay could cause failure to meet scheduled goals.

The most probable cause of anchor failure are poor concrete where the anchors are placed and failure to install the anchors correctly. An inspector shall oversee the installation of the anchors to assure they are installed in sound concrete and are correctly installed.

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