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DPSTPH-776-A-2

PROCESS HAZARDS REVIEW OF THE 904-A TRENCH (U)

by

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SAVANNAH RIVER LABORATORY

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PROCESS HAZARDS REVIEW

OF THE

904-A TRENCH

July 21, 1988

By: Process Hazards Review Committee

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PROCESS HAZARDS REVIEW
904-A TRENCH

A. INTRODUCTION

1. General Description of Process

The 904-A trench is an enclosed underground concrete containment for high level and low level radioactive waste lines between the main Laboratory Building 773-A and waste storage and shipping Building 776-A. The waste generated in laboratories and other facilities in 773-A flows by gravity into the high level and low level drain lines, which proceed from 773-A to 776-A through the 904-A trench. The trench ends at 776-2A, where the underground waste handling tanks for both high level and low level liquids are located.

The trench consists of five branches from sections of 773-A: B wing, C wing, D wing, E wing, and F wing. These branches join into a single conduit east of 773-A for conductance to 776-A. The trench is about one ft high with varying widths.

The trench serves to contain any leaks originating in the drain lines. The trench is sloped downward toward the Building 776-2A pipe gallery. Any liquid collected from the sump can be pumped automatically to a waste tank and sampled.

The 904-A trench system formerly included a branch originating at 735-A and joining the main trench northeast of 735-A. This branch, however, was disconnected, and all waste from the building is now collected in a separate handling tank located above ground at 735-A.

2. Scope of Review

The review of the 904-A trench system included a study of the trench and piping itself, as well as a study of the high level and low level drain lines from the laboratories to the trench. Previously the process hazards review of the Liquid Waste Collection System, 776-A, DPSTPH-776-A-1 included a study of the 776-A complex, as well as criticality considerations for the trench and the high level and low level piping in 773-A.

The present review emphasized an examination of the hazards involved in chemical reactions in the drain lines, misuse of the drains, and criticality.

The following items were examined:

- Process Hazards Review of the Liquid Waste Collection System, DPSTPH-776-A-1.
- Nuclear Criticality Review of the High Level Drain System -- DPST-76-292.
- Improvements in the 904-A Trench System.
- Operating Procedures.
- Unusual Incidents.

3. Reason for Process Hazards Review

The review of the 904-A trench was conducted to determine if hazards existed that might result in onsite radiation exposure to personnel in excess of annual guides. (Process Hazards onsite criterion #3).

4. Summary of Recommendations

No specific Process Hazard was identified. Several recommendations are made to improve the general safety, operability and reliability of the 904-A trench. A complete listing is found in Section D. Recommendations include more complete review of drain usage for chemical compatibility and the addition of shielding in U-loops.

5. Hazards Classification

There are no process hazards recommendations as a result of the review of the 904-A trench system. The committee believes that future process hazards reviews of the system are not necessary. The periodic review of the 776-A Liquid Waste Collection system should include any interim design changes occurring in the 904-A trench. Reviews of individual facilities within the laboratories should identify hazards involving the liquid waste from the particular facilities.

6. Process Hazards Review Committee

The members of the review committee were:

D. E. Snyder, TNX Operations, Experimental Operations, Chairperson
B. F. Fowler, LSD, Operations Studies
B. B. Looney, Environmental Sciences Division, Geotechnical
J. A. Lown, LSD, Occupational Health Protection
A. B. Osteen, LSD, Area Waste Coordinator
H. K. Raines, LSD, Area Operations
J. E. Young, SRP, Laboratories (formerly SRL, LSD Area Operations Supervisor)

B. PROCESS REVIEW

1. Process Description

The 904-A Trench is an underground box that contains the piping that carries the high level (HL) and low level (LL) radioactive liquid waste from Building 773-A to the tanks at 776-A.

The liquid that enters the piping in the 904 Trench originates in hood or glove box cups and sinks that are located in labs. The liquid from B & C wings flows down through stainless steel piping, encased with nylobraid hose, into the HL and LL headers in C-005 and B-005. The liquid in F wing flows from cells and floor drains into headers, through F-080 and into the 904 Trench piping. Liquid in E wing flows from cells and floor drains, through the E separator pit and into the

904 Trench piping. Liquid from D wing flows either into the trade waste system or into the LL piping in the 904 Trench.

The trench box is constructed of concrete with a concrete cover that is intended to be watertight. The outer surface of the box is covered with a membrane made of hot asphalt, several layers of fabric and another layer of hot asphalt. The box varies in size depending on the piping and junction of piping inside.

Junction boxes are located at six locations where piping from different wings joins the main trench on its way to 776-A.

The piping in the trench is stainless steel, all welded joints. There are two (2) 6-in. low level pipes and two (2) 3-in. high level pipes. The 3-in. HL piping is increased to a 4-in. pipe after Junction Box D, where 735-A originally entered the system. The lines from 735-A were blanked off when the ultra-low level counting room was installed underground north of 735-A.

The piping was hydrostatically tested in 1986 and is to be tested periodically to determine if there are any leaks.

Monitor points have been installed at all junction boxes. This will make it possible to see and measure any liquid that might be in the 904 Trench.

2. Background

The 904-A trench was designed and constructed as part of the original project in the Technical Division Area. Construction was completed and operations began in 1953. The system has been in service since that time. The Building 735-A branch to the 904-A trench was removed from the system in 1984. The Process Hazards Review of the 776-A Liquid Waste collection System included a recommendation to restore the high level and low level radioactive waste drains. Through Project S-2598 recent improvements to restore/upgrade the system have been made.

The trench system is operated by the Area Services and Operations Group of the Laboratory Services Division. The SRL Procedures Manual contains procedures and guidelines for disposal of liquid wastes in laboratory drains. There are also procedures for the operation of the high level drain flushing system. The 904-A trench system normally does not require attendance of an operator.

3. Alterations

- Trench from F-wing was added 20 years ago. Approximately 425 ft. of trench was added with four (4) 3-in. lines, HL normal and spare and LL normal.and spare.

- In 1981 two (2) 2-in. HLD headers running down each side of B-005 and C-005 were replaced with one (1) 2-1/2-in. 304L schedule 40 stainless steel header down the middle of the shielded area. The two old lines were abandoned in place.

- All welds on the HL and LL drain lines in trench were radiographed when originally installed.

Project S-2598

- The 2-1/2-in. 304L schedule 40 high level stainless steel header was removed and a new 3-in. 316L schedule 80 stainless steel header was installed. The two original headers down each side of B-005 and C-005 were removed.

- The 304L schedule 40 HL drain lines from the labs to the headers in B-005 and C-005 were replaced with 316L schedule 80 stainless steel.

- The 304L schedule 40 HL drain lines and valves from the headers to the point the lines enter the B-002 and C-002 trench were replaced with 316L schedule 80 stainless steel.

- All piping in B-002 and C-002 (304L) were replaced up to the U-loops with 316L stainless steel.

- Block and bleed valves were added in F-080, B-001, B-002, C-001 and C-002 to hydrostatically test lines in trench.

- HLD U-loops (304L) in B-002, C-002, and F pit were replaced with 316L stainless steel U-loops.

- A LLD U-loop (304L) in F pit was replaced with a 316L U-loop.

- A LLD U-loop (304L) in B-002 was replaced with a glass U-loop. There is a constant problem with this U-loop becoming clogged with solids and sediment.

- The drain lines from the HLD cup sinks are a standardized design and drop straight down to the service floor instead of having bends.

- A standard location for cup sinks within hoods and gloveboxes was provided.

- Secondary containment was provided from each hood and glovebox to the header in the service floor. Secondary containment will be SST tubing in the labs and nylobraid hose in the service floor.

- A monel screen was installed in the cup sinks to prevent solids from entering the drains.

- A trough has been added below the HLD header in B-005 and C-005 and runs to the first valve where the piping exits from the building into the trench. Liquid detectors have been installed in the trough to detect any leaks. If a leak exists, the liquid drains down the trough to a closed valve. If liquid is detected, the valve will be opened and the liquid will be collected in a bucket.

- Where possible, hoods and gloveboxes are being relocated over the shielded area of the service floor. All hoods have been relocated and approximately 2-6 gloveboxes will remain outside of the shielded area.

- Exhaust for the trench was installed at 776-A to provide a positive air sweep through the trench.

- Monitor ports were installed in ten locations. This requires that a hole be drilled (12 in. diameter) in the top of the trench slab at each location. A dike,

weir and liquid level detector are being placed in the trench at each location to detect liquid and to help determine the location of leaks.

Project S-3219

- Two 25-ft lengths of 2-in-diameter 316L schedule 80 LLD line were added to allow the discharge of solutions containing depleted uranium from D-Wing. The pipe was jacketed with 4-in. 304L schedule 10 pipe and included liquid detectors in the bottom of the jacket. The line was run from the lab to the existing trench where the lines were tied into existing pipe. Installation required removal of 2 or 3 trench covers. After work is completed, Volclay will be used to reseal the trench.

General

- Recommendation has been made in DPSTP-2.10 that caps be placed on HLD cup sinks in gloveboxes.
- Hydrostatic testing facilities will be installed in C and E pits under separate funding. This should be complete by mid-1988.
- Approximately 50 ft of HL and LL drain lines from 735-A were removed for the installation of the Underground Counting Facility. The trench was removed to within 50 ft of junction box D. The ends of the lines in the trench were covered with a jacket and pipe cap and the end of the trench was enclosed with concrete.
- When an area is excavated, the trench is being sealed with the Volclay Waterproofing System instead of tar..
- A leak in the trench in C-courtyard has been sealed with the Volclay system.
- HLD piping in E and C auxiliary pits will be replaced with 316L schedule 80 stainless steel at a later date.
- Block and bleed valves will be added to E-Separator Pit and C-Auxiliary Pit.
- A HLD and LLD U-loop in C auxiliary pit will be replaced with 316L U-loops in the future.
- Double block and bleed valves were added upstream of HLD U-loops so hydrostatic tests of the lines can be performed.
- Block and bleed valves were added downstream of the LLD U-loops. Block and bleed valves were already in place upstream of the U-loops.
- Leaking drum traps in LLD are being replaced.
- LLD piping from the sinks to the stub ups in the service strip of each lab are being replaced with 316L schedule 40 stainless steel pipe.

- Service floor LLD piping will be replaced if corrosion is found, otherwise it will remain as is. No LLD lines have been replaced to date.

- All U-loops have been removed, cleaned, inspected and reinstalled. Biological growth has been found in the LLD U-loops and the piping adjacent to the U-loops.

- HLD lines in E and F wings will not be replaced. There is no evidence of a need to replace the lines.

- Some HLD piping in F auxiliary pit has been replaced with 316L schedule 80 stainless steel.

- New pipe specification has been written (P252) for HL drain piping.

- Vent at end of HLD lines that was used when P-traps were in the HLD lines underneath the cup sinks has been removed.

4. Required Review Topics

a. Changes of design that were examined as part of the review included elimination of the high level U-loop in E wing, elimination of the 735-A branch trench, replacement of high level drain headers, installation of monitor ports and dikes in the trench, and addition of a low level drain line from D wing. These were reviewed to determine if any effects on overall safety were created.

b. Incident Report Review

All available files were searched for incident reports involving the waste lines or the 904-A trench. Only one documented incident, reported January 26, 1972 as DPST-72-210, was found as a result of this search. The incident involved the release of radioactive wash water into the 904-A trench as well as the ground, Tim's Branch, and the SRL seepage basins. Of the six recommendations in the report, all were determined to be completed.

c. Relief Protection Review

There are no relief protection devices in the 904-A trench system and none are required.

d. Previous Safety Analysis Reports

There are no safety analysis reports of the 904-A trench system.

e. Previous Process Hazards Review

There is no previous process hazards review of the 904-A trench system.

f. Modes of Operation

The modes of operation reviewed for the 904-A trench system included both normal shutdown and emergency. These were included as part of the review checklist items.

g. Quality Assurance Requirements

A Quality Assurance assessment is required for any replacement of high level or low level drain lines or components or the replacement or alteration of the trench.

5. Review Methodology

The "What If" method was used to analyze the 904-A trench system. "What If" questions were used against a review checklist developed by the committee. The questions, consequences, and recommendations are listed in Appendix A.

C. FINDINGS

1. General Comments

The 904-A Trench Process Hazards Review Committeee evaluated the potential for exposures or releases at the various entry points into the facility. Several scenarios including normal operation, shutdown, emergency operation and process upset were postulated and evaluated for each of the following locations/systems: pipelines, traps, U-Loops, separator pits, concrete trench, strainers, 776-A junction, exhaust system, and the flushing system. The process upset scenarios included: chemical reactions (fire, explosion, heat generation, gas generation), criticality, violation of procedures, line pluggage, and physical damage (heavy equipment, extreme weather). Existing documentation of facility operation (procedures, unusual incident reports, maintenance and training records) and interviews with individuals familiar with the facility were all considered in the process hazards review. Several recommendtions resulted from the review. These recommendations will help assure continued safe operation of the radioactive waste drain system.

The committee identified the potential for chemical reaction as the event with the highest probability for causing an exposure or release of material. Modification of the SRL waste handling procedures to include additional controls to assure compatibility of materials in the drains was recommended. Also, a task team to generate a screening method based on reactivity, corrosivity, etc. to assist in implementing the modified procedure was recommended. Several recommendations related to the operation of the exhaust system were made by the committee.

The facility has operated successfully since 1953. One unusual incident that resulted in a release of radioactive washwater to the trench and ground was documented (DPST-72-210). All of the recommendations resulting from this incident have been implemented. The committee determined that the liklihood of a nuclear incident is extremely low. Recent improvements to the 904-A Trench System (e.g., monitor ports), along with some of the review recommendations (e.g., additional shielding), will reduce this potential further.

2. Compliance with Procedures

Operating procedures for discharging waste to the high and low level lines contained in the 904-A trench are outlined in the SRL Waste Handling Procedure DPSTP 2.10 (4/87). Laboratory personnel are required to review this DPSTP as

part of the orientation process in the Savannah River Laboratory. Analysis of the discarded waste indicated adherence to these guides.

The operating procedure for the high level flush tanks (DPSTOM 32, 3.04) is no longer applicable and should be updated. Four procedures or other procedure modifications were recommended as a result of the process hazards review exhaust system operation, monitor port operation, pressure test procedure, and waste handling procedure (modification).

3. Work Practices

Additions to the high and low level drain lines are made in the laboratories via low level sinks and high level cup sinks by trained Technical Assistants. These Technical Assistants receive training on disposal methods for materials with which they are working from the first line supervisor or researcher to whom they are assigned.

The high level flush tanks are operated by 14 operators qualified through a thorough training program. Two operators on each of 4 shifts and 6 operators on days are assigned to the Building Operations function of the Technical Division Area, which includes 773-A, 904-A trench and the Waste Handling Facility, 776-A.

There are no procedures as yet for the trench monitor ports, which were recently installed as part of the S-2598 High and Low Level Radioactive Waste Drains Project. Because this project is not complete, these monitor ports have not been turned over to the operating group.

4. Facility Maintenance

The 904-A trench has been in service since 1953. All lines in the trench have been hydrostatically tested within the last two years. Testing will continue every three years.

5. Applicability to Other Safety and Quality Programs

The SRL Waste Handling Procedures (DPSTP-2.10), along with the process hazards and criticality reviews of related facilities, help to assure the safety and quality of the 904-A Trench System. A quality assurance assessment will be required for any replacement of high or low level drain lines, or for any engineered alteration to the 904-A trench system. Since the 904-A Trench System is essentially a passive containment structure, the several procedures (associated with the general operation of the drain system and with building 776-A) and recommendations listed above will assure continued high quality safe operation. No other quality assurance or safety programs are recommended.

D. RECOMMENDATIONS

The following recommendations are made to improve the general safety of the facility.

- Add to the General Provisions of the SRL Procedures Manual DPSTP-2.10 (4/87): Coordinate compatibility of chemicals disposed of down the drains. Use the reactivity and/or the corrosivity and the volume of the liquid: If the factors are above a certain number then check with Area Services before disposal.

- Add to the SRL Procedures Manual that materials incompatible with nitric acid must be reviewed before disposing of down the drains.

- A team of 4 or 5 chemists review reaction scenarios and make recommendations to further restrict the possibility of unwanted chemical reactions in the drain system.

- Investigate possibility of installing shielding between legs of U-loops.

- Continue quarterly monitoring (characterization) of discharge stream.

- Install U-loops in E-wing of building 773-A.

- Write a procedure for opening monitor ports and include that ports cannot be opened when trench exhaust is off or when radiation alarm sounds.

- Repair and seal trench as determined necessary by monitor port observation.

- Install signs as far as physically possible along length of trench stating that Area Services must be notified if excavation is done or heavy equipment is used in areas around the trench. Alternate suggestion: provide procedural control.

- Change automatic flushing system to manual flushing to ensure adequate flushing takes place.

- Write procedure to hydrostatically test lines in trench every three years.

- Revise procedures DPSTOM-33, DPSTP-2.10 and 3.04.

  DPSTOM-33, 2.08
  1. Remove 735-A from general description
  3. Change Building Operations to Area Operations

  DPSTOM 32, 3.04
  1. On page one change 8 water tanks to 4
  2. On page two eliminate reference to brass keys
  3. On page 3 change tanks to show 4 instead of 8
  4. On page 5 change operation of flushing tanks.

- Install start/stop switch and light for tank exhaust fans on the control panel in 776-A.

- Install neutron monitors in F-080 and E&C separator pits. (Reference DPSTPH-776-A-1).

- Restore operation of liquid level detectors in F-080 sump.

- Have OHP smear down each side of B-005 and C-005 in addition to the smear that is done down the center of these areas.

- Add to DPSTP-2.10 the additional criteria stated in Memorandum dated May 20, 1987.
- Write a procedure for exhaust system operation.
- Install conductivity meter upstream of HLD and LLD U-loops to detect standing water.
- Write procedure for operation of U-loops.
- Verify operation of neutron monitors U-loops periodically per written procedure.
- Install trench exhaust failure alarm in 776-A Control Room.

APPENDIX A

What If	1. An organic or solvent is disposed of down the drain?
Consequence	Flashing could occur in the pipe and any gas given off would be removed by exhaust system. Any fire inside pipe caused by a chemical reaction would not sustain itself.
Recommendation	Need more control on chemical disposal. Form a team of chemists to review chemical reaction scenarios. Use results of team to revise procedures to further restrict possibility of undesirable chemical reactions. Should investigate use of MSDS and chemical stickers. Add to procedure DPSTP-2.10 that materials incompatible with nitric acid the main waste constituent, must be reviewed before disposal.
What if	2. Chemical reaction occurred at a cup sink during disposal of chemicals?
Consequence	Chemicals could burp back up to the cup sink.
Recommendation	Same as #1.
What if	3. Flushing system does not work?
Consequence	Could have accumulation of fissile material in u-loops.
Recommendation	Investigate the possibility of Installing shielding between legs of U-loops. (Neutron monitors being installed per DPSTPH-776A-1).
What if	4. Exhaust system for 776A tanks fail?
Consequence	Exhaust on the HLD lines will provide exhaust of the drain lines from the cup sinks to the U-loops. The line to E-wing will be exhausted by the E-wing exhaust and pull fumes from the tanks at 776A back into the service area. The lines from the U-loops to 776A will be in a static condition.
Recommendation	Install U-loops in E-wing.

What if	5. HLD line exhaust fails?
Consequence	Tank exhaust at 776A would provide air sweep of the drain lines downstream of the U-loops. Upstream of the U-loops the fumes in the lines would be pulled into hood and gloveboxes and exhausted through hood exhaust and OGE. The HLD line to E-wing would be exhausted by the tank exhaust.
Recommendation	Install U-loop in E-wing.
What if	6. 776-A tank exhaust and the HLD line exhaust fails?
Consequence	Air from the tanks at 776A could be pulled back into high bay area of E-wing. Toxic fumes will not be detected in the high bay area.
Recommendation	Install U-loop in E-wing HLD line.
What if	7. Normal power and 776A diesel generator fails?
Consequence	776A is evacuated.
Recommendation	None
What if	8. Line in trench breaks?
Consequence	Majority of liquid would drain down the trench to 776A LL pipe gallery and would be pumped to tank C. Slow seepage out of trench at the joints will occur. Liquid level detectors in trench would detect the leak and alarm the 773A control room.
Recommendation	None
What if	9. U-loop leaks?
Consequence	Liquid drains to sump in B, C, and F wings and is pumped to appropriate place. The separator pits (C and E) have liquid level alarms. Liquid is pumped out with a jet line back to HLD.
Recommendation	None

What if	10.	Traps on LLD inside shielded area of service floor leak?
Consequence		Daily activity in shielded area on service floor may detect leaks. Smears are done daily down the middle of B-005 and C-005.
Recommendation		Smear down each side of B-005 and C-005
What if	11.	Traps on LLD outside of shielded area leak?
Consequence		LL waste will leak to offices and labs in service floor. Leaks are monitored.
Recommendation		None
What if	12.	Maintenance work needs to be done on HL or LL drain lines?
Consequence		No maintenance work is done without a special job plan or WCP.
Recommendation		None
What if	13.	Trench exhaust fails?
Consequence		Air would be pulled through 776A or 773A exhaust systems.
Recommendation		Install alarm in 776A control room that will alert operators if the trench exhaust fails.
What if	14.	Trench is pressurized?
Consequence		There is no place for pressurization to come from.
Recommendation		None
What if	15.	Heavy equipment is used in close proximity of trench?
Consequence		Possibility of cracking the trench or breaking a line.
Recommendation		Install signs as far as physically possible along length of trench stating that Area Services should be notified before using heavy equipment or excavating; or alternately, provide procedural control.

What if	16.	Freezing temperatures occur?
Consequence		Pipe is a mininum of 5 feet below grade and should not freeze at this depth.
Recommendation		None
What if	17.	Flooding conditions occur?
Consequence		Constant in-leakage will drain to 776-A and be pumped to appropriate tank.
Recommendation		None
What if	18.	Drain line plugs?
Consequence		This is a very low probability. Per procedures no solids are to be disposed of down the drains. Monel screens will be placed inside HLD cup sinks to help prevent disposal of solids down the HLD.
Recommendation		None
What if	19.	Strainers plug?
Consequence		Alarm would indicate to operations that the strainers are plugged and they would be replaced. Neutron monitor would indicate potential criticality problem.
Recommendations		None
What if	20.	HEPA Filters on the drain line exhaust plug?
Consequence		Would be detected by magnehelic gage and the filters would be replaced.
Recommendation		None
What if	21.	Flush system for drain lines fails?
Consequence		Corrosion will be accelerated
Recommendation		None

What if	22.	HLD U-loop plugs?
Consequence		HLD would back up into B and C-wing service floors.
Recommendation		Install conductivity meter upstream of HLD U-loops to detect standing water.
What if	23.	LLD U-loop plugs?
Consequence		LLD would back up onto service floors in B, C and F Wings.
Recommendation		Install conductivity meter upstream of LLD U-loops to detect standing water.
What if	24.	Hydrofluoric acid is not complexed with aluminum nitrate?
Consequence		Corrosion of lines will be accelerated. Any leaks will be contained by the jacket from the cup sink to the header or the trough underneath the header.
Recommendation		None
What if	25.	Liquids are not allowed to cool before disposal?
Consequence		Corrosion of lines will be accelerated.
Recommendation		None
What if	26.	Suspended solids are not separated prior to disposal into LLD.
Consequence		Could clog drain. Solids would be detected in samples from tanks at 776A and appropriate action could be taken by Area Services. Strainers at 776-A remove the larger solids.
Recommendation		None
What if	27.	HLD leaks inside the service strip?

Consequence — HLDs are jacketed with stainless steel tubing and the leak would drain to HLD Header.

Recommendation — None

What if — 28. HLD header in B-002, C-002 or C-005 leaks?

Consequence — The trough under the header will contain the leak. The trough drains to a closed valve. Liquid detectors will alarm in 773-A Control Room.

Recommendation — None

What if — 29. HLDs are not washed down after disposal of chemical in a cup sink?

Consequence — Radiation in the lines increases. Corrosion rate is accelerated.

Recommendation — None.

What if — 30. Fissile material is dumped without approval?

Consequence — Neutron monitors at the U-loops and 776A would detect fissile material. Each lab has controls on the amount of fissile material allowed in lab. To have a criticality, a large amount of fissile material would have to collect in the U-loops or strainers. This possibility is very remote.

Recommendation — None

What if — 31. Fissile material and organics are disposed of at the same time in the HLD?

Consequence — Organics would form layer and attract ^{239}PU. Could cause a flammability problem in F evaporator. Each tank is sampled for % oil before F-area accepts shipment.

Recommendation — None

What if — 32. HL waste is put down LLD?

Consequence		Does not affect trench. AS & O would have HL waste in their LL tank. After disposal of waste, an attempt could be made to decon the LL tank so it could be used for LL waste again.
Recommendation		None
What if	33.	Hazardous materials are put down LLD?
Consequence		Would have no affect on the trench. The material could be corrosive, ignitable or toxic but it would be diluted when it gets to the tanks at 776A.
Recommendation		None
What if	34.	Inspection or testing of the lines needs to be done?
Consequence		No work on the HL or LL drains is done without a job plan and WCP.
Recommendation		None.
What if	35.	Materials of construction of the trench fail (concrete, tar covering)?
Consequence		Any cracks in the concrete trench or failure of the tar seal will result in more inleakage of percolating rainwater and a slightly higher potential for liquids in the trench leaking out and contaminating the surrounding soil in the event of a pipe failure.
Recommendation		Repair and seal trench as determined necessary by monitor port observations.
What if	36.	LL waste from trench is drained to HL tank instead of LL overflows?
Consequence		Would be processed as if it were HL waste.
Recommendation		None
What if	37.	Steam is lost during a transfer between tanks at 776A?
Consequence		Transfer would be stopped.
Recommendation		None

What if	38.	Sump at 776A overflows?
Consequence		Floor would be contaminated and effort would be made to decon the floor.
Recommendation		None
What if	39.	Building sumps in 773A overflow?
Consequence		Same as #38.
Recommendation		None
What if	40.	Flushing tanks in 773-A fail and do not stop flushing?
Consequence		Would not affect trench. Could possibly fill up tanks at 776A.
Recommendation		None
What if	41.	Sight glass for flushing tanks breaks?
Consequence		Would lose flush water and lines would not get flushed. Could accelerate corrosion.
Recommendation		None
What if	42.	Float switches in flush tanks do not operate properly?
Consequence		Could eliminate flushing or could cause continuous flushing
Recommendation		Change automatic flushing system to manual flushing.
What if	43.	Procedures for dumping fissile materials are violated?
Consequence		Drain lines will not support a criticality. Neutron monitors in U-loops will pick up violation.
Recommendation		Write procedure for operation of U-loops.
What if	44.	Neutron monitors at U-loops fail?

Consequence	Because of restrictions on fissile materials in labs it would take a long time for enough material to accumulate to cause a criticality. If the material did accumulate, there would not be any warning for a criticality.
Recommendation	Monitors should be checked periodically per procedure referenced in #43.