

ATTACHMENT E

Treatment by Generator Request
204-AR Waste Unloading StationI. Treatment by Generator for the 204-AR Waste Unloading StationA. Generator Waste Description

The 204-AR building consists of an unloading area, a mechanical equipment room, and personnel offices and facilities. Five waste streams can be received and treated at the 204-AR Waste Unloading Facility. They include sodium sulfate and phosphate/carbonate and sand filter wastes from decontamination operations in the 100 Area. In addition, fuel fabrication and laboratory waste from the 300 Area and 400 Area can be received. The fuel fabrication waste is a sodium-sulfate/nitrate based waste solution. Generation of this waste and phosphate waste from N-reactor (and subsequent treatment at 204-AR) ceased when the N-Reactor was placed on cold-standby over one year ago.

Four wastes are currently received and treated at the 204-AR Waste Unloading Facility:

- 1) Waste from sand filters used to screen fuel storage basin waste at the 100-N Area,
- 2) Sodium sulfate waste created by the regeneration of the ion exchange columns used to treat fuel storage basin waste at the 100-N Area,
- 3) Phosphate based laboratory waste from the 300 Area, and
- 4) Laboratory waste from the 400 Area.

In addition to the above wastes, the facility has also treated decontamination waste from the 100-N Area and fuel fabrication waste from the 300 Area. These last two waste types have not been received since N-Reactor was placed in cold standby over one year ago. No more receipts of fuel fabrication wastes are expected, however additional decontamination wastes may be generated during the final lay-up activities at N-Reactor.

B. Waste Treatment Process Description

The purpose of the treatment conducted at the 204-AR Waste Unloading Facility is to make the liquid wastes received at the facility amenable for storage in the double-shell tanks. In general, treatment consists of the in-line addition and mixing of sodium hydroxide and sodium nitrite to meet the double shell tank (DST) specifications. The caustic and nitrite additions are done to inhibit corrosion in transfer lines and double-shell tanks.

The 204-AR Waste Unloading Facility is a two-story, structural steel, reinforced concrete building that receives and treats liquid wastes. The facility is divided into three primary sections:

- 1) The unloading area which houses the railroad tank car, pumps, valves, piping, a 1,500-gallon catch tank, the vault in which the catch tank resides, and ventilation exhaust duct work;
- 2) The mechanical equipment room which houses the process equipment including the chemical storage tanks, the motor control center, building heating, ventilation, and air conditioning equipment, and the air compressor; and
- 3) The personnel offices and facilities including the operations room, and a locker and change room.

Prior to treatment in the 204-AR Waste Unloading Facility, two samples of the waste stream are collected. One sample is sent for analysis by the on-site generating facility and the analytical results are sent to the 204-AR Process Engineering group. The second sample is transported with the loaded tank car and analyzed by an on-site laboratory.

From the results of the waste stream sampling, the volume and concentration of treatment reagents needed to meet the DST storage specifications are calculated. The calculated volumes of sodium hydroxide (pH adjustment) and sodium nitrite (corrosion inhibitor) are added to the liquid waste through ancillary piping injection ports installed in the waste transfer line. The sodium hydroxide and sodium nitrite treated waste solutions are then directed to the appropriate DST through the 241-A-A valve pit. To ensure adequate mixing of the treatment reagents and the waste liquid, a STATFLO Motionless Mixer (in-line mixer described below) was installed in the transfer lines (located inside the 204-AR facility) in 1985.

The STATFLO Motionless Mixer consists of a four inch diameter, stainless steel piping assembly placed in line the suction line from the tank car. The mixture then passes two pH probes, and enters the pump which discharges to the 241-A-A valve pit. The mixer unit is a one-foot long pipe with internal baffles that cause the pipe contents to swirl as liquid proceeds through it. To verify adequate mixing and pH adjustment, two downstream, in-line, pH probes are constantly monitored during the treatment operations. The 204-AR Waste Unloading Facility procedures call for the pH of the final treated waste solution to range between 12.2 and 12.7, depending on which DST the solution will eventually be directed to.

Residual tank car precipitates are rinsed with a high pressure internal tank cleaner and flushed out of the tank car with approximately 1,000 gallons of clean water. Concentrated sodium

nitrite solution is then added in-line and mixed through the use of the in-line mixer as the reinstatement is being transferred to the 241-A-A valve pit and eventually to the appropriate double shell tank. The empty tank car is monitored for radiological dose rates, and, if required, cleaned externally with approximately 1000 gallons of clean water before being returned to the shipper for reloading.

The 204-AR waste unloading area, process and ancillary piping, are protected with secondary containment consisting of floor drains, and a catch tank housed within a concrete vault. In addition, the vault and sump surrounding the catch tank has a leak detection device that activates alarms at three different locations if the liquid level exceeds one inch in depth. Administrative procedures will be in place requiring that this containment system be checked periodically for leakage, minimizing potential for undetected leakage from the drainage system.

Facility floors are sloped toward centrally located floor drains. Floor drains throughout the facility are directed to the catch tank located in the vault. The in-floor drain system is comprised of stainless steel. All drain line plumbing utilizes gravity-flow and is equipped with seal loops to prevent backflow of undesirable gases.

The catch tank is a 1,500-gallon steel tank equipped with high and low level monitoring alarms. The vault and sump are constructed of reinforced concrete. The sump in the vault floor is equipped with automatic leak detection via a conductance probe and alarm. The sump also acts as a collection device for waste which may accumulate in the bottom of the vault. The amounts of sodium hydroxide added are small, and the addition pumps are low capacity positive displacement type which precludes heat generation from the dilution of the sodium hydroxide solution. Differential Thermal Analysis (DTA) is also performed on the waste prior to treatment to determine the presence of compounds which would cause exothermic reactions when the caustic and sodium nitrite solutions are added to the waste. Collected wastes are pumped directly to the 241-A-A valve pit for subsequent transfer to the DST.

II. Comparison with State Treatment by Generator Criteria

The criteria established by Ecology in TIM No. 86-3, as presented in page 1 of this attachment, were reviewed with respect to the 204-AR Waste Unloading Facility treatment process. Although the in-line STATFLO Motionless Mixer is not a tank by definition, the treatment process and resultant solution most closely match the treatment by generator requirements for accumulation tanks. The treatment procedures and overall processes involved are in compliance with 40 CFR 262.34 and Subparts J or I of Part 265 as mentioned in page 1 of this Treatment by Generator request. Following is a discussion of how the 204-AR treatment process satisfies each of Ecology's criteria.

A. Inherent Risk of the Treatment Process.

Treatment in the 204-AR Waste Unloading Facility is a low risk process. The major risk during treatment is the potential for generation of heat during the addition of the caustic solution to the wastes. However, the treatment and unloading process incorporates a dynamic mixing/transferring procedure at high flow rates and low pressure allowing generated heat to be dissipated quickly and transferred along with the treated waste. Other risks associated with treatment procedures, including gas or fume generation, are minimal in this type of process.

All treatment and transference is remotely accomplished, thereby reducing human contact with the waste. After the waste stream is treated and transferred to the appropriate DST, the transfer and chemical addition lines are flushed with clean water to prevent the buildup of precipitates or scale in the lines. Additional concerns include reduced flow rates or plugging and system leaks. In the case of plugging or reduced flow, the system is monitored constantly during treatment and the operators would immediately detect a decrease in system flow rate. The system would either be monitored further or corrective action procedures would be implemented dependent on the circumstances. In the case of system leaks, liquids are collected in a catch tank and cell sump for subsequent pumping through the 241 A-A valve pit into the receiving DST.

The treatment process occurs in a contained vessel and is managed in accordance with all applicable requirements and presents a low risk to public health and the environment.

B. Waste Toxicity.

Wastes treated in PUREX treatment tanks are dangerous primarily due to their radioactive nature. The waste mixtures are also corrosive and contain low concentrations of toxic and/or EP toxic constituents. These wastes have been treated to meet Tank Farm acceptance criteria. Acceptance of the waste by Tank Farms facilitates further treatment activities in the Grout Treatment Facility and/or the Hanford Waste Vitrification Plant which will immobilize the toxic constituents, therefore this criteria is met.

C. Risk and Probability of Release.

The principal avenues of release from the 204-AR facility would be to the air and the secondary containment system in the treatment unit area. The air does not pose a risk because it is withdrawn and filtered prior to discharge to the atmosphere through High Efficiency Particulate Air (HEPA) filters. A filter management program is in place to maintain filter efficiency and detect failures of the filter system.

Releases to the cell containment system and sump immediately trigger sump monitoring alarms in the control room and the 242-A Evaporator building. The sump contents can be pumped through the 241-A-A valve pit to the receiving DST following completion of the solution treatment or before further treatment occurs. No potential exists

for human or environmental contact with the wastes in the cell containment system or sump.

The design of the 204-AR Waste Unloading Facility reduces the risk and probability of a release to the environment so therefore meets this criterion.

D. Relative Benefit to the Environment.

Treatment of wastes at the 204-AR Station makes the waste amenable for storage in the 200 East Area DST Farms. If treatment was not performed, the waste could not be stored in the DST and other methods of storage would need to be considered. Alternate storage options do not exist at this time.

Treatment of the waste has a increased benefit to the environment by making the waste amenable for storage and therefore meets this criterion.

III. Compliance with Generator Accumulation Requirements.

The following information presents the measures taken toward meeting the applicable generator accumulation requirements set forth in WAC 173-303-200(1), and ensuring compliance for the 204-AR Waste Unloading Facility and the treatment processes conducted in the facility.

General Requirements

A. Transfer of Dangerous Wastes to a Permitted Facility within Ninety Days of Generation, WAC 173-303-200(1)(a)

As discussed above in Section I.A., wastes that are received in 204-AR Waste Unloading Facility are treated and transferred immediately after treatment to the 200 East Area Tank Farms. Thus, the wastes never accumulate in the 204-AR facility for more than ninety days after they are received.

B. Labeling, WAC 173-303-200(1)(d)

The tank cars and active portions of the facility are marked with labels identifying the risk associated with the wastes. This labeling is in accordance with federal regulations under the Atomic Energy Act.

In addition, personnel rarely have physical access to the unloading area while wastes are present. The general public never has access to the facility or the treatment system. Activities and procedures clearly recognize the contents of and hazards associated with the treatment unit and facility, and personnel are trained accordingly.

Addition of hazardous waste and major risk labels to tanks is currently being evaluated. It may not be possible to place labels directly on tanks without excessive radiation exposure to personnel.

However, the existing systems for marking and labeling TSD units provides an equivalent level protection. In addition, warning signs are present on the entrance to the facility.

C. Personnel Training, WAC 173-303-330

A personnel training plan has been prepared and is being implemented. Facility personnel attend the Generator Hazards Safety Course (Course Number 006G). Dangerous waste on-the-job training (Course Number 006H) is provided to personnel who manage the waste at the facility. The training is presented annually to facility personnel. Training records for facility personnel are maintained and updated regularly.

D. Preparedness and Prevention, WAC 173-303-340

Emergency communication devices are available at the 204-AR Waste Unloading Facility. They include both internal PA systems, external alarms, and outside-line telephones. In addition, a protective glass window is utilized to visually observe facility treatment procedures during the unloading process.

The 204-AR facility is equipped with fire alarms, fire extinguishers, and fire deluge systems. In the event of an emergency, emergency response via on-site fire departments, Hanford patrol, and hazardous material response teams would occur as necessary.

Spill control and secondary containment includes a 1,500-gallon catch tank with high and low level monitoring alarms. The catch tank resides within a concrete-lined vault. Leak detection devices are present in the vault and alarms are activated in three separate locations if liquid greater than one inch accumulates. Spillage within the facility is directed to the catch tank or the vault sump where it is directed through the 241-A-A valve pit to the appropriate DST.

Arrangements and mutual aid agreements have been made with non-Hanford Site parties who might be expected to respond in the event of emergencies, and these arrangements are documented in Memorandums of Understanding.

E. Contingency Plan and Emergency Procedures, WAC 173-303-350

An overall Hanford Site emergency plan exists and addresses emergencies that may occur at the Hanford Site. In addition, a contingency plan specific to the 204-AR Waste Unloading Facility exists (WHC-IP-0263-ETF Appendix C, 9/88). The Hanford Site emergency plan and the facility-specific contingency plan will be available and maintained at the 204-AR Waste Unloading Facility. The 204-AR facility contingency plan is amended as needed to ensure that it is kept current and accurate.

F. Emergencies, WAC 173-303-360

The appropriate procedures, as described in the Hanford Site emergency plan and the 204-AR Waste Unloading Facility contingency plan will be followed in the event of emergencies. Emergencies associated with the waste treatment activities in the 204-AR facility that require implementation of the Hanford Site emergency plan or the facility-specific contingency plan will be reported as soon as they are detected to appropriate state and/or local agencies who have response roles. In such cases, follow-up written reports will be submitted to Ecology within fifteen days after emergencies that require implementation of the emergency plan.

Emergencies that could threaten human health or the environment outside the 204-AR Waste Unloading Facility will be reported as soon as detected to Ecology and the National Response Center. In addition, reports of releases from the 204-AR facility will be submitted as described under Section III.L., below.

Requirements for Tank Systems

G. Applicability, WAC 173-303-640(1)

The 204-AR Waste Unloading Facility in-line treatment system, including its ancillary components, is permitted as "other treatment". The treatment process, equipment, ancillary components, and resultant end product most closely match and therefore were compared to, the tank system definitions and tank treatment. The overall facility procedures, equipment, training, emergency preparedness and prevention, benefit to the environment, and administrative requirements meet the intent of the treatment by generator requirements. Therefore, this TBG request is being compared to appropriate tank and tank system regulations for which TBG status is directly applicable.

The requirements of WAC 173-303-640 apply to the accumulation and treatment of dangerous wastes in tank systems by generators; Except that, WAC 173-303-640(8)(c) does not apply, and in lieu of WAC 173-303-640(5)(b)(iii) for uncovered tanks, a minimum freeboard of two feet must be maintained.

The 204-AR Waste Unloading and Treatment Facility meets the intent of the an existing tank system as defined in WAC 173-303-040. Thus, the requirements of WAC 173-303-640 applicable only to new tank systems or components are not relevant to the 204-AR facility.

WAC 173-303-640 (2), assessment of existing tank system's integrity, require that an assessment of the system be conducted by January 12, 1990.

WAC 173-303-640 (4), containment and detection of releases, will be applicable to the 204-AR Waste Unloading Facility containment system on January 12, 1991.

H. Integrity Assessment, WAC 173-303-640(2)

A tank system integrity assessment will be performed and will be certified by an independent, qualified, registered professional engineer. The assessment of the integrity of the treatment system will be based on existing structural, design, construction, materials, and other information.

Tank integrity assessments are in addition to normal procedural inspection of the system occurring at least once per treatment shift. To date, there is no evidence of integrity failure for the tank system. Furthermore, a secondary containment system is in place (see Section II.I., below) in the event that leaks develop. It will represent the best available assessment, consistent with protection and safety of Hanford Site personnel and the environment.

The schedule for performance a tank system integrity assessment will be determined as part of a concentrated effort to assess and attain compliance on the Hanford Site with WAC-173-303-640. In addition, schedules will be negotiated with regulatory agencies to meet Hanford Federal Facility Agreement and Consent Order M-22-00 by December 31, 1989.

I. Containment and Detection of Releases, WAC 173-303-640(4)

As described in Section I.B., above, the 204-AR Waste Unloading Facility in-line treatment unit, ancillary piping, and connections, are protected with secondary containment consisting of a catch tank and sump housed within a concrete vault. Tank overflow and vault leak detection alarms exist. All secondary containment is sloped to drains and sumps designed to remove the waste. All other design and operation features of the 204-AR facility, catch tank, vault, and ancillary equipment associated with the treatment process satisfy the requirements for containment and detection of releases.

J. General Operation, WAC 173-303-640(5)

Dangerous wastes and treatment reagents are not injected into the treatment system if they could cause the system to leak, rupture, or otherwise fail. Spillage and overflows are prevented by monitoring the catch tank levels and leak detection equipment on a frequent basis during each operational shift.

Labeling of the 204-AR treatment system is in accordance with Section III.B., above. The 204-AR facility does not handle extremely hazardous waste that is toxic by inhalation. As described in Section III.C., above, treatment processes are operated to prevent the generation and release of emissions to the air.

K. Inspections, WAC 173-303-640(6) and 173-303-320(1), (2)(a), (b), and (d), and (3)

The inspection procedures at 204-AR address all emergency and monitoring equipment, as well as, all directly observable areas in the facility. Physical inspections of the specific portions of

the treatment system and catch tank may not be possible due to the radiation risks. The radiation hazardous associated with specific physical inspections is currently being investigation.

L. Response to Releases, WAC 173-303-640(7)

When a leak or spill from the 204-AR Waste Unloading Facility treatment system is detected, the flow or addition of dangerous wastes and/or treatment reagents to the system will be stopped. There are automatic systems in the tanks farms and at the facility to shut down the pumping at an indication of a leak. If necessary to prevent continued releases from the 204-AR facility system, the source of the solution (tank car) will be shut off. The cause of the leak or spill will be determined. Appropriate measures will be taken to correct the cause of the leak or spill before the treatment system is reintroduced to service. Releases to secondary containment systems are removed immediately by the floor drain and sump system, and are eventually routed through the 241-A-A valve pit and to the receiving DST. Any major repairs required as a result of a spill or leak from the 204-AR facility will be certified to Ecology by an independent, qualified, registered professional engineer.

If releases to the environment are detected as a result of a spill or leak from the treatment system, such releases will immediately be contained. Environmental releases, if they occur, will be removed and their impacts on the environment will be mitigated. Releases to the environment in excess of applicable Reportable Quantities (RQs), or 1 pound, whichever is less, will be reported to Ecology within 24 hours of detection. The National Response Center will be notified pursuant to 40 CFR Part 302. If a 24-hour report to Ecology is necessary, it will be followed up by a written report on the release from the 204-AR facility. In addition, spill reports to Ecology are being submitted on a monthly basis.

M. Closure and Post-Closure Care, WAC 173-303-640(8)

At closure, dangerous wastes, and contaminated equipment and structures (including underlying materials contaminated with dangerous wastes or dangerous waste constituents) will either be removed from the 204-AR Waste Unloading Facility and immediately surrounding area, decontaminated, or stabilized and closed as a landfill. A closure plan will be developed for the 204-AR facility.

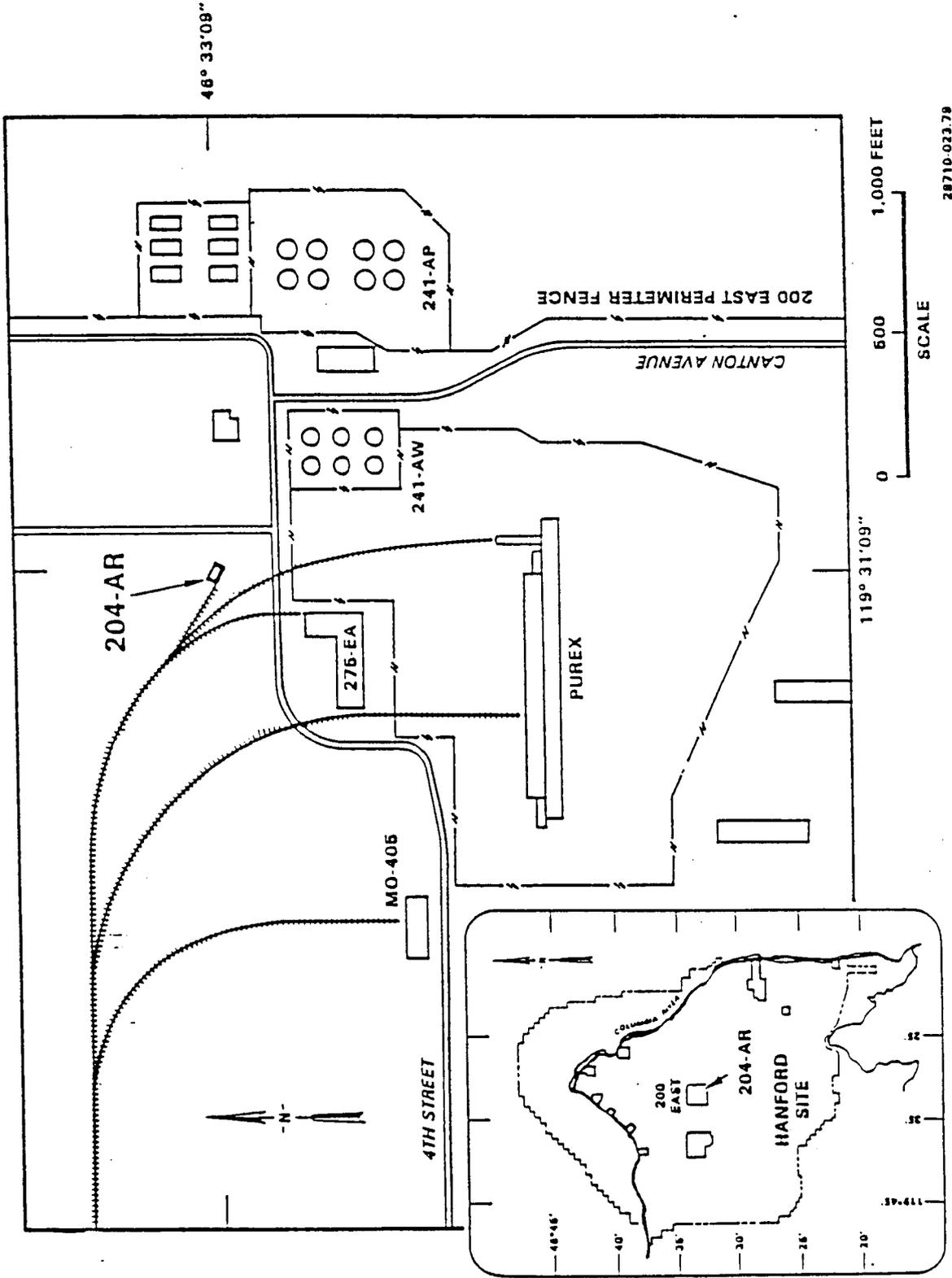
Closure of the treatment system and area will be performed in a manner that will: minimize the need for further maintenance; control, minimize, or eliminate post-closure releases that could threaten human health or the environment; achieve the removal and decontamination criteria of WAC 173-303-610(2)(b); and be consistent with the requirements of the Atomic Energy Act and ALARA goals.

N. Special Requirements, WAC 173-303-640(9) and (10)

The 204-AR treatment system does not receive or handle ignitable, reactive, or incompatible dangerous wastes. Treatment processes in the system are conducted to prevent the introduction and

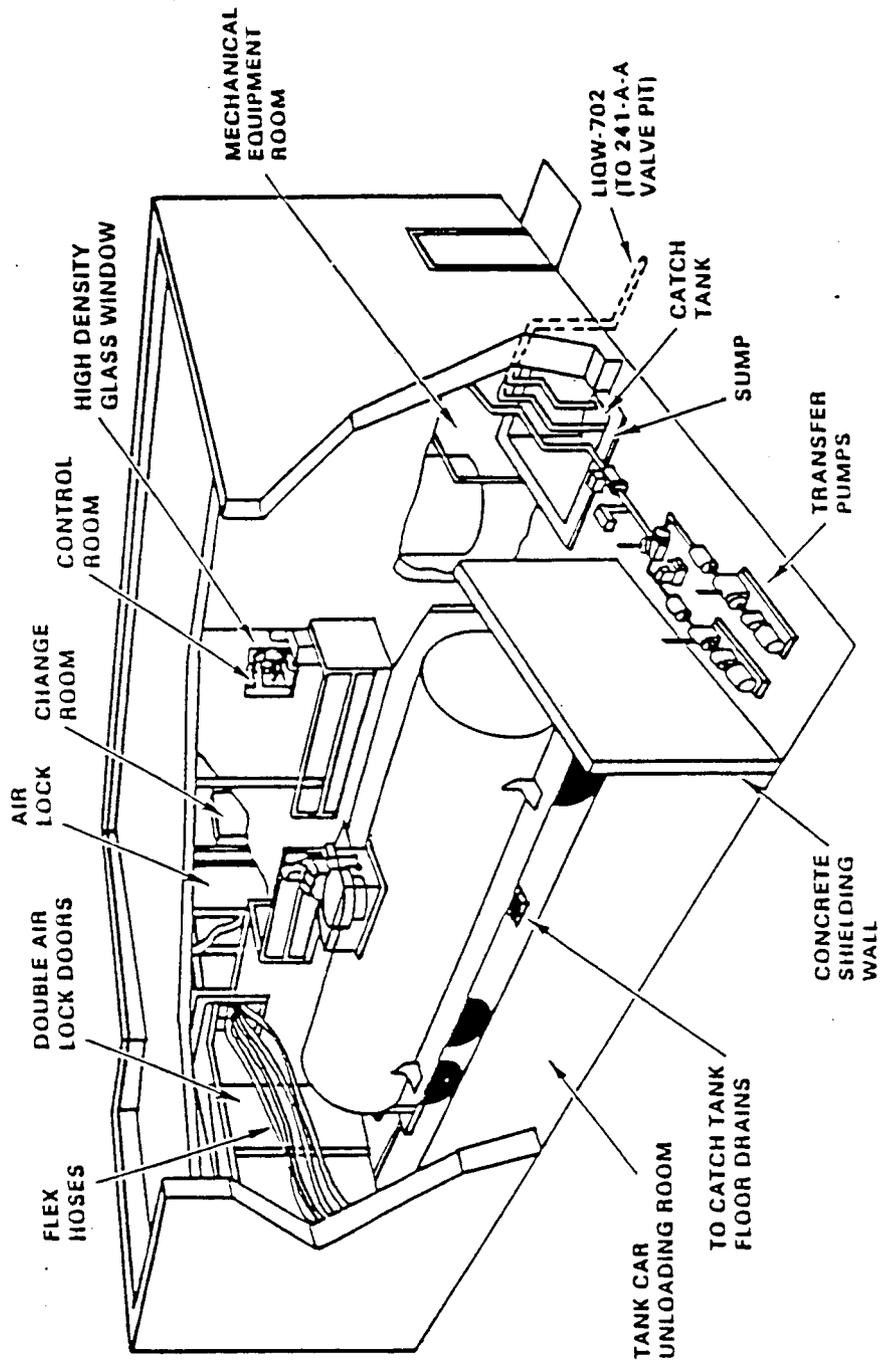
generation of ignitable, reactive, and incompatible wastes and materials. The interior of the ancillary piping is compatible with all dangerous wastes and treatment reagents managed in the system.

204-AR BUILDING WASTE UNLOADING STATION SITE PLAN



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204-AR WASTE UNLOADING STATION CUTAWAY VIEW



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