ATTACHMENT D

Treatment by Generator Request
PUREX Treatment Tanks

I. Treatment by Generator for Tanks E5, F15, F16, F18, G6A, G7, U3, U4, and F11 Concentrator, PUREX Facility

The following sections describe the waste to be treated, the waste treatment facility and processes.

A. Generator Waste Description

The PUREX Facility extracts plutonium and uranium from irradiated fuel rods. Various dangerous waste streams are produced during the extraction process. Waste descriptions are presented below.

Cladding Removal Wastes

Three types of solutions are generated during decladding operations. These three streams are collectively designated Cladding Removal Solutions (CRS):

- Decladding Solution - This solution is generated when the zirconium cladding is removed from the irradiated fuel elements. It consists of ammonium fluoride-ammonium nitrate (AFAN) which complexes the zirconium metal during the decladding process.

- Spent Metathesis Waste - After the zirconium has been removed from the fuel rods, residual fluorides are removed by metathesizing the solid uranium and plutonium fluoride to the hydrous uranium and plutonium oxides using a solution of potassium hydroxide (KOH). The spent potassium hydroxide/fluoride solution constitutes the spent metathesis solution.

- Metathesis Rinse - The decladded fuel rods are rinsed with demineralizer water to remove additional fluorides.

Prior to being jetted to the waste treatment tank, Tank E5, (TK-E5) the CRS streams are centrifuged to remove residual plutonium and uranium in two parallel centrifuges (E2 and E4) which are fed from the centrifuge feed tank (TK-E3) . This recovery process is intended solely to recover plutonium and uranium product and is not a waste treatment activity.

Cladding Removal Wastes (CRW) are generated each time a batch of fuel is decladded. The annual quantity of CRW generation depends on whether PUREX is operating and on the rate at which the process is being conducted. In 1987, 403,000 gallons of CRW were treated in TK-E5.

Declad waste and metathesis rinse waste are not normally corrosive dangerous wastes when received at TK-E5 (i.e., pH approximately 8). Metathesis waste has an average pH of over 13.7 when received at TK-E5. Spent metathesis waste is designated a corrosive dangerous waste (D002).

Declad waste and metathesis rinse waste contain EP Toxic levels of chromium (50 to 100 ppm) resulting from corrosion by fluoride on the stainless steel reaction tank during decladding operations. Thus, these two waste streams are regulated as EP Toxic dangerous wastes for chromium with the dangerous waste number D007.

Based on process data, the declad waste is an Extremely Hazardous Waste (EHW) for toxicity, after sodium hydroxide/sodium nitrate treatment due to the presence of sodium fluoride (NaF), sodium nitrate ($NaNO_3$), ammonium hydroxide (NH_4OH), sodium hydroxide (NaOH), sodium nitrite ($NaNO_2$), barium, and chromium. Thus, the treated declad waste stream would have the dangerous waste number WT01 in addition to D001, D002 and D007.

Spent metathesis waste, after NaNO2 treatment, is assumed to be designated as a toxic EHW due to the presence of potassium fluoride (KF), ammonium hydroxide, potassium hydroxide (KOH), and sodium nitrite. Thus, spent metathesis waste has the dangerous waste number WT01 in addition to D001 and D002.

Based on a process knowledge, metathesis rinse waste is designated as a toxic Dangerous Waste (DW) with the dangerous waste number WT02 due to the presence of sodium fluoride, sodium nitrate, ammonium hydroxide, sodium hydroxide, sodium nitrite, barium, and chromium. Thus, metathesis rinse waste has the dangerous waste number WT02 in addition to D001, D002, and Doo7.

The primary risk associated with CRW in TK-E5 is the radioactive nature of the materials in the tank. Chemical constituents in spent metathesis waste present a risk primarily due to corrosivity. All three waste streams are toxic.

Neutralized Zirflex Acid Waste

TKs F15 and F16 are used to treat high level acid solution known as Neutralized Zirflex Acid (NZA) solution, generated from the solvent extraction process. NZA contains most of the fission products that have been separated from the first decontamination cycle in the HA column. After leaving the HA column, the fission produce stream is concentrated in the F6 concentrator.

Concentrate from the F6 concentrator flows to TK-F26 and then is transferred into TK-F15 in 2,600-gallon batches where it is sampled and declared a waste if there are not recoverable quantities of product.

Generation rates for neutralized zirflex acid waste (NZAW) vary depending on the frequency and rate of operation at PUREX. In 1987, 137,000 gallons of NZAW waste were treated in TKs F15 and F16.

Waste in Tk-F15/16 is designated EHC (WT01) under the dangerous waste mixture regulations. Prior to treatment, NZAW is acidic due to the high levels of nitric acid causing the waste to be regulated as an ignitable waste (D001) and a corrosive dangerous waste (D002). Based on process knowledge, the waste contains EP toxic levels of cadmium, chromium, and lead (D006, D007, and D008).

The primary risk associated with NZAW waste is the radioactive nature of the material in the tank. The primary non-radioactive concern with the waste is corrosivity due to the low pH prior to treatment.

Miscellaneous Mixed Waste

TK-F18 receives miscellaneous mixed solutions from: PUREX canyon cell floor sumps; drainage from the vessel vent, condenser vent, and sampler headers; hot shop maintenance cell solutions; sample gallery floor drain solutions; and concentrate from the F11 concentrator. In TK-F18, the miscellaneous solutions are sampled and declared waste if there are not recoverable quantities of product.

Generation rates for wastes treated in TK-F18 vary considerably depending on PUREX operating rates. During 1987, 648,000 gallons of waste were treated. TK-F18 waste should be designated for regulation as EHW (WT01) under the dangerous waste mixture regulations. In addition, TK-F18 waste should be designated as characteristic of ignitability based on nitrate and nitrite ions which are oxidizers (D001), of corrosivity (D002) and of EP toxicity for cadmium (D006), chromium (D007), and lead (D008).

The primary risk associated with miscellaneous wastes in TK-F18 is due to the radioactive nature of the material. The primary non-radioactive concern with the miscellaneous waste is its corrosivity due to low pH prior to treatment.

Miscellaneous Headend Wastes

TKs U3 and U4 receive miscellaneous mixed wastes from throughout the headend portion of PUREX. Waste sources include:

- Laboratory wastes including decontamination solutions, samples after analyses, etc;
- Laboratory vacuum pump seal water;
- U Cell sumps (including rain water);

- Dilute ammonium nitrate from the main stack and filter flush water;
- Solutions from railroad car decontamination operations; and
- Low pH solutions from acid fractionator building sumps.

Generation rates for miscellaneous wastes received at TKs U3/U4 vary depending on the magnitude and frequency of operations at PUREX. 392,000 gallons of waste were treated in TKs U3/U4 in 1987.

Water makes up the majority of the waste stream received at TKs U3/U4. The average pH of batch wastes collected in TKs U3/U4 is 4.51 based on analytical data. On occasion, these data indicate that the pH can fall below 2.0. Thus, wastes received at TKs U3/U4 are, periodically, ignitable waste (D001) and corrosive dangerous wastes (D002). Miscellaneous headend wastes also have the characteristic of EP Toxicity for chromium (D007) and lead (D008). Additional evaluation of laboratory waste discharged to TK-U3/U4 is being performed to verify waste characteristics.

The primary risk associated with miscellaneous wastes in TKs U3/U4 is due to the radioactive nature of the material. The primary non-radioactive concern with the miscellaneous waste in its occasional highly corrosive nature due to periodic low pH values.

Headend Ammonia Waste

A solution of Ammonium Fluoride-Ammonium Nitrate (AFAN) is used in the PUREX Plant dissolvers to chemically declad zirconium-clad fuel. During the decladding operation, ammonia is scrubbed from the off-gasses and treatment of the aqueous ammonia solutions are described below:

AMMONIA SCRUBBER FEED (ASF) - The ASF stream is generated when off-gasses area scrubbed during the decladding and metathesis operations. The majority of the total volume of this stream is generated when the ammonia-laden off gasses are absorbed in dissolver condensate or scrubbed form the dissolver off-gas with raw water. A smaller volume of ASF is generated when the CRW is treated in TK-E5 and ammonia is scrubbed from the off-gas.

ASF has an ammonia concentration of between 0 and 1.4 M, and averages 0.4 M. This solution has a pH range of 7 to 12.3. The ASF is assumed to be a DW due to the toxicity of ammonium hydroxide and would be designated WT02.

Currently, ASF is treated to meet Tank Farm acceptance criteria. After treatment, the waste will have ignitible (D001) and corrosive (D002).

In the future, there are plans to treat ASF waste to destroy the ammonia. The planned treatment activity will occur in TK-G6A, TK-G7, and concentrator F11. The ASF solution will be neutralized in TK-G6A to a pH of 6.0 to 7.0 and collected in TK-G7 prior to being jetted to concentrator F11. Sodium nitrite will be added to the concentrator causing the ammonia to disassociate to nitrogen and water. The concentrator concentrate is expected to be dangerous waste (WT02) and have waste characteristics of ignitability (D001) and corrosivity (D002).

The vapor from the concentration of the ASF will be condensed and discharged to the 216-A-45 Crib. The condensate pH will range from 8 to 9 and will not be a dangerous waste.

B. Waste Treatment Facility Description

PUREX is located in the 200 East Area of the Hanford Site. Building 202-A is the main canyon building where the plutonium and uranium extraction process takes place.

Within building 202-A, Cells E, F, and G, and the sampling gallery are sites of dangerous waste treatment activities at PUREX. Dangerous waste is also treated in U Cell which is located at the northeast end of building 202-A.

PUREX cells are fully enclosed reinforced concrete structures and provide secondary containment in the event of a leak or spill from one of the process or treatment tanks. The floors are sloped so that liquids are accumulated by a leak collection system consisting of sumps, liquid detection instrumentation, solution transfer equipment, and a collection vessel (TK-F18). G Cell will provide secondary containment for TK-G6A via a floor drain in the sampling gallery.

All dangerous waste treatment tanks and ancillary equipment are constructed of 304-L stainless-steel. The approximate volume of each dangerous waste treatment tank is:

- TK-E5 5,000 gallons
- TK-F15 5,000 gallons
- TK-F16 5,000 gallons
- TK-F18 5,000 gallons
- TK-G6A 1,100 gallons (proposed)
- TK-G7 13,400 gallons
- TK-U3 8,000 gallons
- TK-U4 8,000 gallons
- E-F11 2,600 gallons

CRW Waste Treatment Process

Declad waste is treated by adding sodium hydroxide and sodium nitrite to the waste in TK-E5 before being transferred to the 200 East Area Tank Farms. The line to the Tank Farms is flushed with 500 gallons of water after transferring the waste.

Spent metathesis waste normally arrives at TK-E5 with a pH greater than 12 which meets Tank Farm pH specifications. The waste is sampled and sodium nitrite is added. Sodium hydroxide is added only if the pH is below Tank Farm specifications. The transfer of the waste to Tank Farms is followed by a 500-gallon water flush.

Metathesis rinse waste is treated with sodium hydroxide and sodium nitrite in TK-E5. The treated waste is sampled prior to being transferred to Tank Farms. After which, the line is flushed with a 500-gallon water rinse.

NZAW Waste Treatment Process

After the NZA is sampled and determined to have less than recoverable amounts of plutonium, the NZAW is heated, and a sugar solution is added to the tank over a 16- to 24-hour period. After initial treatment in TK-F15, the NZAW waste is transferred to TK-F16 where sodium hydroxide and sodium nitrite are added to achieve Tank Farm corrosion protection specifications before transfer to Tank Farms.

Miscellaneous Mixed Waste Treatment Process

Prior to receiving waste in TK-F18, the heel must be acidified in order to prevent plutonium and uranium nitrates from precipitating. Keeping these compounds in suspension is necessary to allow for representative sampling for nuclear material accountability and to preclude criticality concerns.

Once the heel has been acidified, wastes can be received in TK-F18. Samples of miscellaneous wastes are taken when the level in TK-F18 reaches 3,500 to 4,000 gallons. Sodium hydroxide and sodium nitrite are added to meet Tank Farm specifications and the waste is transferred if the contents of TK-F18 do not have to be reworked back into the process to recover Pu or U.

Miscellaneous Headend Waste Treatment Process

TKs U3 and U4 are used to treat miscellaneous wastes received from the headend of PUREX. The TKs U3/U4 treatment process is identical, regardless of the tank being used.

TKs U3/U4 is sampled when it contains approximately 7,000 gallons of miscellaneous wastes. Sodium hydroxide and sodium nitrite are added to TKs U3/U4 as necessary to meet Tank Farm acceptance criteria.

Headend Ammonia Waste Treatment Process

Current Treatment Process

ASF waste from the headend decladding process is transferred to TK-F12 prior to being transferred to TK-G7 on a semi-continuous basis for treatment. Within TK-G7, the ASF waste is treated to meet Tank Farm specifications by adding sodium hydroxide and sodium nitrite. The treated waste is then transferred to Tank Farms.

Off-gases from TKs G7 and F12 are transferred to concentrator F11 where tower spray water is used to scrub ammonia if the concentration of ammonia in the off-gases is excessive.

Proposed Ammonia Treatment Process

The proposed treatment of ASF will occur in TKs G6A and G7 and concentrator F11. The purpose of the treatment will be to destroy ammonia in ASF waste thereby reducing the toxicity of the liquid waste. The condensate from the process will no longer be a dangerous waste and will be routed to the 216-A-45 Crib for disposal. The concentrator concentrate will still be a dangerous waste and will be treated and routed to Tank Farms for storage.

TK-G6A will be approximately 1,100-gallons in size and will have three compartments. The tank will be located in the PUREX sampling gallery. The tank is being designed to efficiently mix and accurately monitor pH adjustments. ASF waste will enter each mixing chamber at the bottom and will exit via a rectangular weir at the top. Nitric acid will be injected near the bottom of each chamber and directly below the mixers, so that complete mixing occurs. The pH will be monitored at each weir and the final outlet so that the solution pH can be adjusted to between 5 and 7. Each chamber will be equipped with process feed solution flow control, measurement and recording, radiation and temperature measurement, and pH recording and alarm systems.

The neutralized ASF solution will overflow from TK-G6A to TK-G7 which will feed concentrator F11. Concentrator F11 is located in F Cell in the PUREX canyon. Sodium nitrite will be added to E-F11 which will react with the ammonium nitrate in the ASF to produce nitrogen gas and water. Off-gases will pass through condenser F11-2, where the water vapor will be condensed.

As sodium nitrite is consumed in the reaction, sodium nitrate waste will be generated. The sodium nitrate waste will be discharged to TK-F18 and treated and disposed as described previously.

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 treatment processes occurring in TKs E5, F15, F16, F18, G6A, G7, U3, U4, and E-F11. Following is a discussion of how the above PUREX treatment tank processes satisfies each of Ecology's criteria.

A. Inherent Risk of the Treatment Process.

The treatments conducted in PUREX treatment tanks are low risk treatment processes. Waste treatment processes at PUREX are primarily simple acid/base reactions and the addition of sodium nitrite to meet Tank Farm specifications. Once operational, the ammonia destruction process occurring in TK-G6A and E-F11 will simply remove water and ammonia, thus reducing the toxicity and volume of the hazardous waste to be managed.

The risk associated with treatment in PUREX tanks is primarily due to the radiation and secondarily by the potential for generation of gases and fumes during the addition of reagents and during waste concentration activities in concentrator F11.

Off-gases generated from TKs F15, F16, and F18 are passed through the canyon off-gas handling system prior to being discharged out the main stack. The canyon off-gas handling system includes a condenser (condensates are recycled to H4 concentrator) and a multiple stage High Efficiency Particulate Filter (HEPA) to remove radionuclides and particulates.

Off-gases generated in TK-E5 are routed to the T-E3-1 ammonia scrubber (scrubber bottoms go to Tank Farms) and then through a HEPA filter prior to being discharged out the ammonia stack.

Off-gases from TKs U3 and U4 are routed to the air tunnel where they are passed through a HEPA filter system prior to being discharged out the main stack.

Off-gases generated from TKs G7 and G6A (when it is on line) and the F11 concentrator system are treated as described in Section I.B., above.

All waste treatment is conducted remotely at PUREX due to the radioactive nature of the wastes. This reduces the potential of human contact with the wastes. Off-gases have been evaluated and scrubber and filter systems have been installed to protect the off-site population and environment. Because of the simple nature of these treatment processes and the extensive protective systems, the treatment processes present low risk to the public health or 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 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 PUREX treatment tanks would be to the air and the secondary containment system. Off-gases are treated as described above, monitored, sampled, and filtered prior to discharge which reduces the potential risk of an unacceptable release. Releases to the cell containment areas and the sampling gallery are continuously monitored, collected, and transferred for treatment prior to being discharged to Tank Farms for storage.

All activities in the PUREX canyon, including spill response, are accomplished remotely. Thus, there is no potential for human contact with the wastes in the containment system. Additionally, cell containment areas are designed to preclude waste contact with the environment.

Spills resulting from TK-G6A would flow to a floor drain located in the sampling gallery. If there is a spill from TK-G6A, there could be a potential for contact of the waste with individuals located in the sampling gallery. However, the likelihood of such a release is remote because of the tank design and operating conditions; and the likelihood of contact with personnel is remote because of the relative unoccupancy of the area.

The design of the PUREX facility and the monitoring systems minimize the risk of a release to the environment or to human health and therefore meets the criterion for TBG.

D. Relative Benefit to the Environment.

Treatment of the wastes accumulated in PUREX treatment tanks reduces corrosivity of the wastes in the double shell tanks in which they are stored. Reducing the corrosivity of the waste to the tanks reduces the potential of a leak to the environment and the risk to public health.

After the ammonia destruction process begins operation, treatment of wastes in F11 concentrator system will reduce waste toxicity through ammonia destruction and the volume of hazardous waste that must be stored.

If treatment was not performed, the wastes could not be stored in double shell tanks safely which would effect the environment. In the case of the ammonia destruction system, without treatment, the volume of waste that would need to be managed as dangerous waste would increase. Alternative storage options dc not exist at this time.

Treatment of the waste has an increased benefit to the environment and the public health by making the waste amenable for storage. Therefore, these treatment processes meet this criterion for TBG.

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 PUREX tank systems and the treatment processes conducted in the tanks.

General Requirements

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

Wastes generated at PUREX are treated on a batch or semi-batch basis. Treatment processes normally occur within a few days of generation and, in all cases, wastes are never accumulated in excess of 90 days prior to treatment. Treated dangerous wastes are sent to Tank Farms immediately after they are treated.

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

PUREX personnel do not have access to canyon cells due to the high radiologic concerns. The general public never has access to PUREX unless they have specific business in the plant, receive permission and clearances from WHC, and are constantly escorted by a PUREX employee. Access to PUREX is strictly controlled by a sophisticated security system at all times. Even Hanford Site personnel must have special authorization to enter the PUREX Facility. PUREX personnel must have specific authorization and training to enter areas where treatment tanks are located.

Activities and procedures at PUREX recognize the contents of PUREX treatment tanks and personnel are trained accordingly. Federal Atomic Energy Act labeling requirements are currently satisfied at PUREX.

The purpose of the labeling requirements is to warn the public of the hazards associated with the wastes and to alert emergency personnel as to the wastes' hazards. Since the public does not have access to the treatment tanks and PUREX personnel are familiar with the hazards associated with the wastes in PUREX treatment tanks, the intent of the labeling requirements are being met. In addition, access to the PUREX canyon is not allowed when wastes are in the cells. Thus, labeling inaccessible tanks would serve no purpose because there would not be an opportunity for anybody to read the labels.

U Cell is accessible to PUREX personnel and chemical hazard labels have been placed on the access door leading to TKs U3 and U4. Similarly, TK-G6A will be accessible in the sampling gallery and

a dangerous waste label will be placed on the shielding surrounding the tank in plain view of gallery personnel.

C. Personnel Training, WAC 173-303-330

A personnel training plan has been prepared and is implemented. General dangerous waste training (Course Number 006G) is accomplished within the first six months of employment. Annual updates consist of a facility specific on the job training course (Course Number 006H OJT). In addition, extensive training on the operation of PUREX treatment tanks is provided in an operator certification program which is renewed every two years. Training relative to ammonia destruction will be incorporated into the PUREX training plan prior to starting the planned treatment system.

The training records for facility personnel are maintained and updated regularly, and are available on-site. The training program has been upgraded to insure that emergency coordinators are intimately familiar with the contingency plan as it relates to PUREX treatment tanks.

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

Emergency equipment such as fire extinguishers, spill kits, and respirators are located throughout the PUREX Facility. However, due to the remote nature of the tankage and the radiologic concerns, this emergency equipment would not be used in the event of an emergency involving PUREX treatment tanks located in the canyon. Spill equipment, consisting of a sump and sump transfer system, is available in the event of a spill or leak from TKs U3 and U4. In addition, spill control equipment will be readily available in the sampling gallery in the event of a leak from TK-G6A.

Leak detection devices are present in all PUREX treatment tank containment area sumps. Spillage within the cells is routed remotely to TK-F18 or to TKs U3/U4 for treatment and discharge to Tank Farms.

All cells in PUREX are equipped with heat sensors and fire deluge systems. In addition, a foam suppression system is located in G Cell. The foam suppression system is automatically activated in the event of a fire. It can also be manually activated from the Pipe and Operating (P&O) gallery. Fire deluge systems are manually activated from the P&O gallery.

An internal phone and paging system is located throughout the PUREX Facility. The canyon crane operator maintains communications via a hand held radio, a telephone, and an internal plant phone.

Arrangement and mutual aid agreements have been made with off-site emergency response agencies. 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 has been prepared to specifically address PUREX treatment tanks. The new tank system, TK-G6A, will be included in the PUREX contingency plan when the tank is brought on-line. The Hanford Site emergency plan and the PUREX treatment tanks contingency plan are available and maintained at the PUREX Facility.

F. Emergencies, WAC 173-303-360
The appropriate procedures, as described in the Hanford Site emergency plan and the facility-specific emergency plan will be followed in the event of emergencies. Emergencies associated with PUREX treatment tanks that require implementation of the Hanford Site emergency plan or the PUREX treatment tanks 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 PUREX Facility will be reported as soon as detected to Ecology and the National Response Center. In addition, reports of releases from PUREX treatment tanks will be submitted as described under Section III.L., below.

Requirements for Tank Systems

G. Integrity Assessment, WAC 173-303-640(2)
A tank system integrity assessment for existing PUREX treatment tanks will be performed, and will be certified by an independent, qualified, registered professional engineer. The assessment of the integrity of existing PUREX treatment tank systems will be based on existing structural, design, construction, materials, and other information. A schedule for periodic assessment will be developed and will be implemented.

The integrity assessment for existing tank systems will not include data or physical inspections of the PUREX treatment tank systems. Due to the radioactive nature of the dangerous wastes treated in the tank, the level of worker radiation exposure that could occur while conducting leak tests and/or physical inspections would be inconsistent with the federal Atomic Energy Act and ALARA goals.

To date, there is no evidence of integrity failure for any PUREX treatment tank systems. In addition, a secondary containment system is in place (see section III.I., below) in the event that leaks do develop. The integrity assessment for existing treatment tank systems will be available at the PUREX Facility. It will represent the best available assessment, consistent with protection and safety of Hanford personnel and the environment.

H. Design and Installation of New Tank Systems or Components. WAC 173-303-640(3)

A tank assessment will be completed on TK-G6A prior to placing the tank into service. This assessment will include:

- A written assessment, reviewed and certified by an independent, qualified registered professional engineer, attesting to the tank systems structural integrity and that the system is acceptable for receiving and treating the ASF waste;
- Design standards used to construct the tank and
- Dangerous waste characteristics of the ASF waste.

A schedule will be developed for periodic integrity assessments throughout the life of tank G6A. This schedule will be based on tank age, construction materials, waste characteristics, the radioactive constituents in the tank.

TK-G6A system installation will be inspected by an independent, qualified professional engineer in accordance with WAC 173-303-640(3)(c) prior to placing the tank into service. TK-G6A and associated ancillary equipment will be tested to insure tightness prior to placing the tank into use. In addition, ancillary equipment will be adequately supported to prevent damage. Adequate corrosion protection will be provided for the tank system based on a corrosion analysis.

All professional engineer certifications and other documentation relevant to the design, construction, and installation of TK-G6A system will be kept on file at PUREX.

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

TKs E5, F15, F16, F18, G7, and E-F11 are located within the PUREX canyon cells. Ancillary equipment, such as piping, is located in the hot pipe trench. These structures provide secondary containment. TKs U3 and U4 and associated piping are located in U Cell which provides secondary containment.

U and F Cells contain low pH wastes that may not be compatible with the concrete containment areas. The floors of the canyon cells and hot pipe trench are constructed of a minimum of 5.5 feet of reinforced concrete. To reduce the potential for unacceptable corrosion due to acids, all canyon cell floors at PUREX have six inches of concrete lining overlying the 5.5-foot-thick containment structure which can be replaced if necessary. After exiting the PUREX Facility, secondary containment is provided for piping by a concrete trench that extends to the 241-A-151 diversion box.

U Cell has a concrete containment area that is 1.5 feet thick. It is sealed with Amercoat 55, an acid resistant paint. Because PUREX personnel often enter U Cell, the standard procedure is to keep the containment floor clean and dry at all times.

TK-G6A will be located in the sampling gallery which drains to Cell G and will provide secondary containment for TK-G6A. A spill from the tank system would be readily visible to gallery personnel. In addition, Cell G sump has a leak detection system. Leaks to Cell G from TK-G6A will be jetted to TK-F18.

All canyon containment cell floors have sumps to collect leaks or spills. Each sump is equipped with a leak detection system including liquid level sensors with recorders and alarms in the control rooms. Sump accumulations are jetted to TK-F18.

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

Dangerous wastes and treatment reagents are not placed in PUREX treatment tanks if they could cause the tank to leak, rupture, or otherwise fail. Spillage and overflows are prevented by continuous monitoring of the tank levels during each operational shift.

The levels in PUREX treatment tanks are controlled so as not to exceed their operational design capacities. Labeling of PUREX treatment tanks is in accordance with Section III.B., above. The PUREX treatment tanks which handle extremely hazardous waste that is toxic by inhalation are operated to prevent the uncontrolled 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)

A written inspection plan and schedule (General Surveillance Procedure) for PUREX Facility is being prepared and implemented. Inspections of PUREX treatment tank systems will address monitoring devices for the tanks and secondary containment systems. Due to the radioactive nature of the dangerous wastes treated in PUREX treatment tanks, physical observation of the tank system during its operation would be inconsistent with the federal Atomic Energy Act and ALARA goals. ALARA hazards associated with physical inspection of tank systems is being evaluated further.

Inspection of directly observable equipment (e.g., monitoring devices) is performed daily, while the physical portions of the tank systems cannot be inspected daily. Inspection of the physical portions of the PUREX treatment tank systems will be addressed in the inspection plan and schedule.

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

If a leak or spill from PUREX treatment tanks is detected, the flow or addition of dangerous wastes and/or treatment reagents to the tank will be stopped. If necessary to prevent continued releases, the tank will be emptied to an upstream accumulation tank. 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 PUREX treatment tank system is reintroduced to service. The leak or overflow will be returned to the tank after the tank level has been reduced or the tank has been repaired.

Releases to secondary containment systems are removed usually within a 24-hour period for treatment in TK-F18 or TKs U3/U4, depending on the source. Any major repairs required as a result of a spill or leak from PUREX treatment tanks will be certified to the Department of Ecology by an independent, qualified, registered professional engineer.

If releases to the environment are detected as a result of a spill or leak from PUREX treatment tanks, such releases will 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 in accordance with 40 CFR Part 302. If a 24-hour report to Ecology is necessary, it will be followed up by a written report.

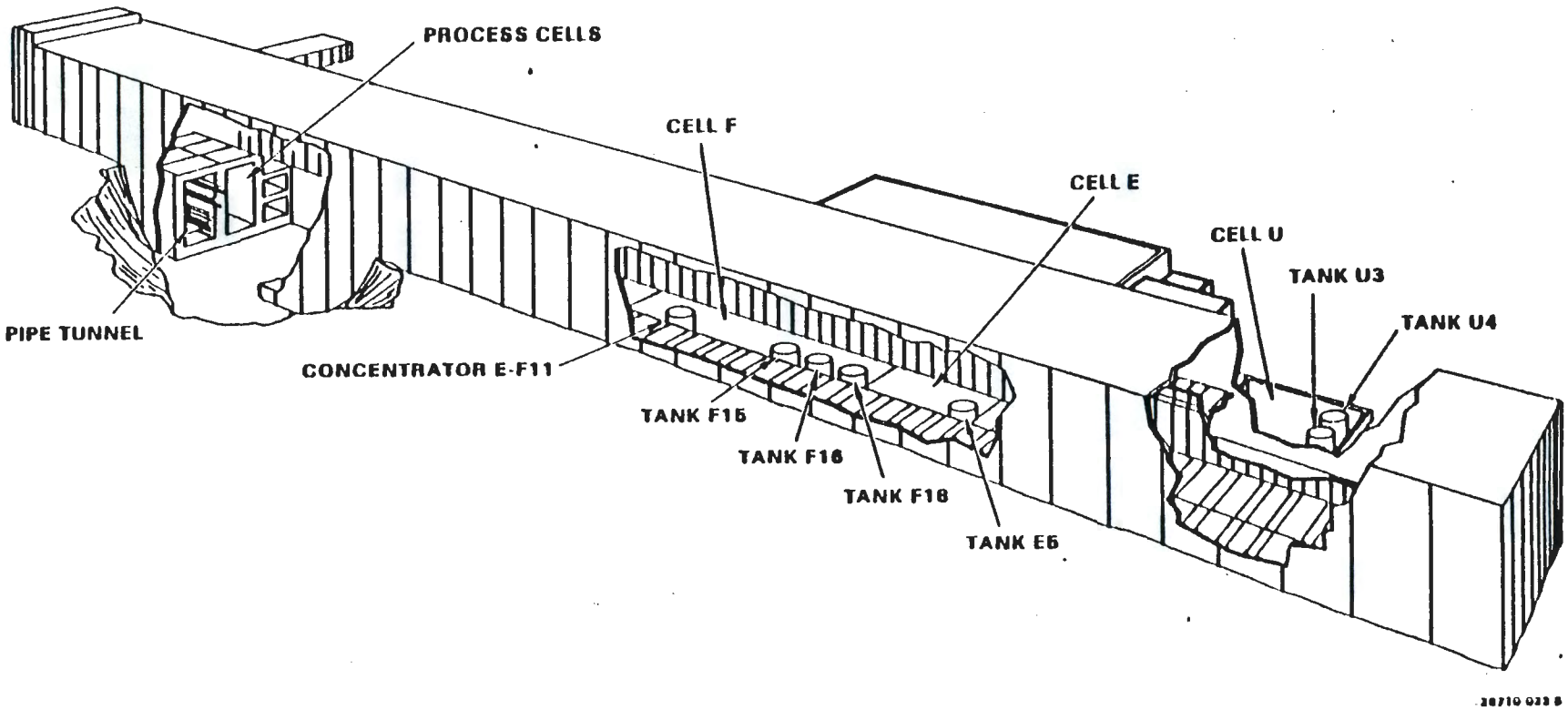
M. Closure and Post-Closure Care, WAC 173-303-640(8)

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 PUREX treatment tanks and the surrounding area, decontaminated, or stabilized and closed as a landfill. Closure of PUREX treatment tanks 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 federal Atomic Energy Act and ALARA goals.

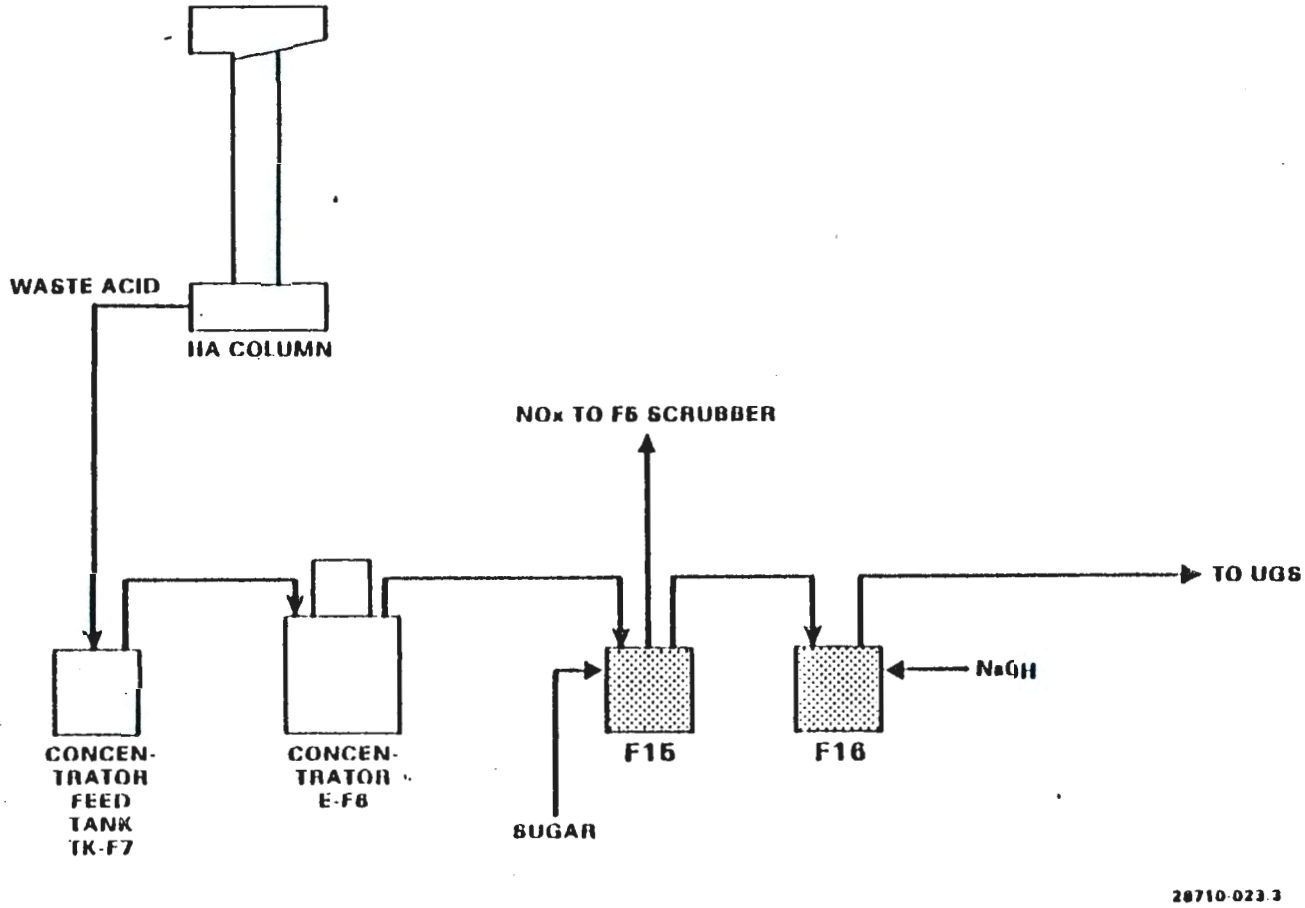
N. Special Requirements, WAC 173-303-640(9) and (10)

Treatment processes in the tanks are conducted to ensure that the wastes are protected from any material or condition which may cause the waste to ignite. Comingling of acids and bases is conducted in a manner that prevents uncontrolled reactions from occurring. The interiors of PUREX treatment tanks are compatible with all dangerous wastes and treatment reagents managed in the tanks.

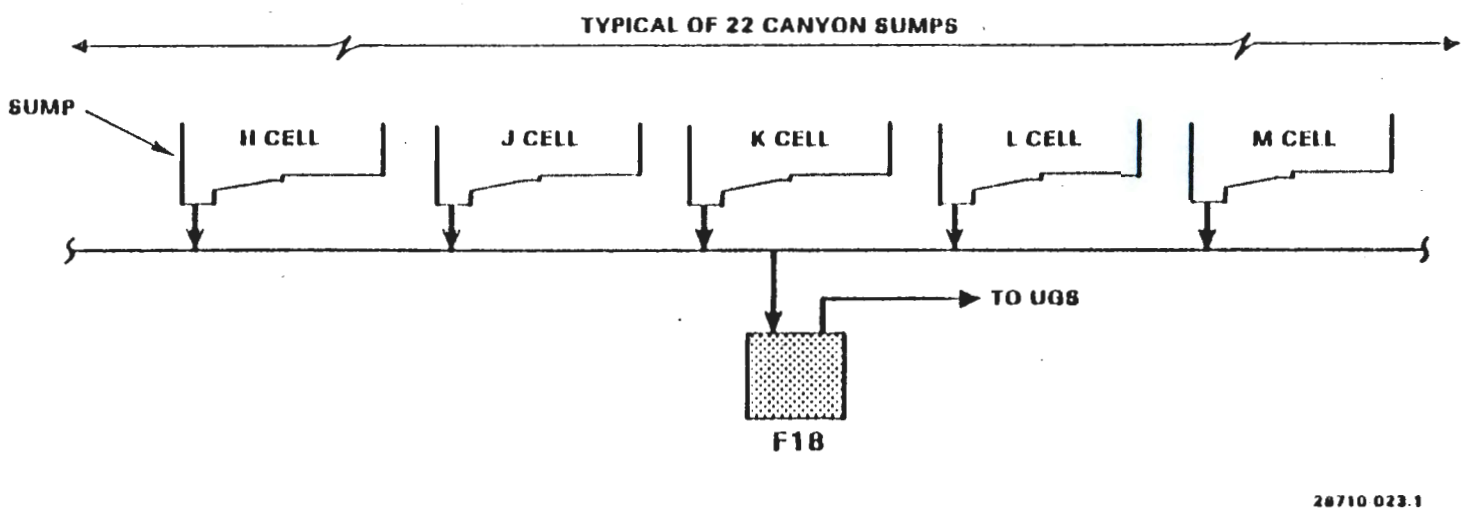
PUREX
CUTAWAY VIEW



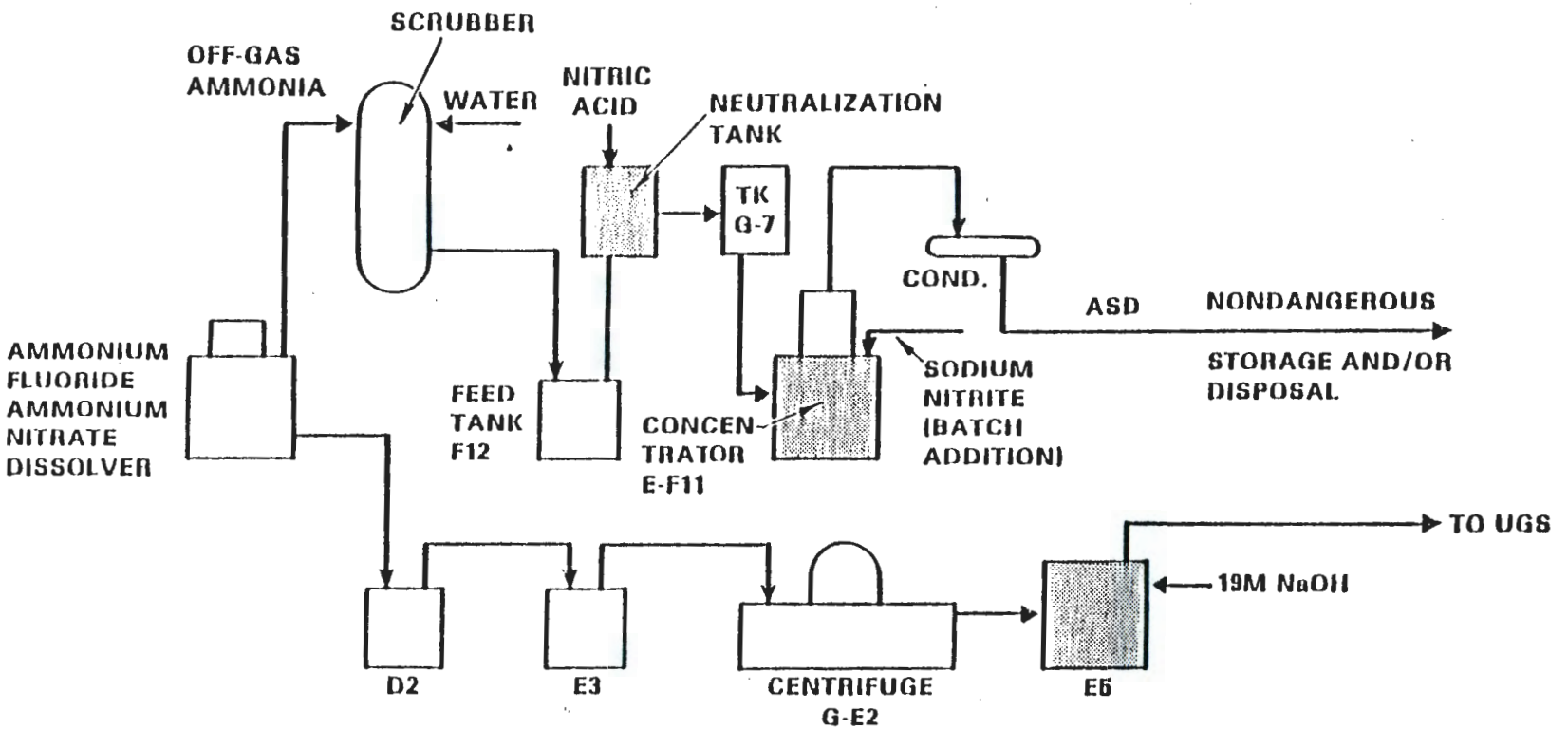
TK-F15/F16 WASTE STREAM FLOW DIAGRAM



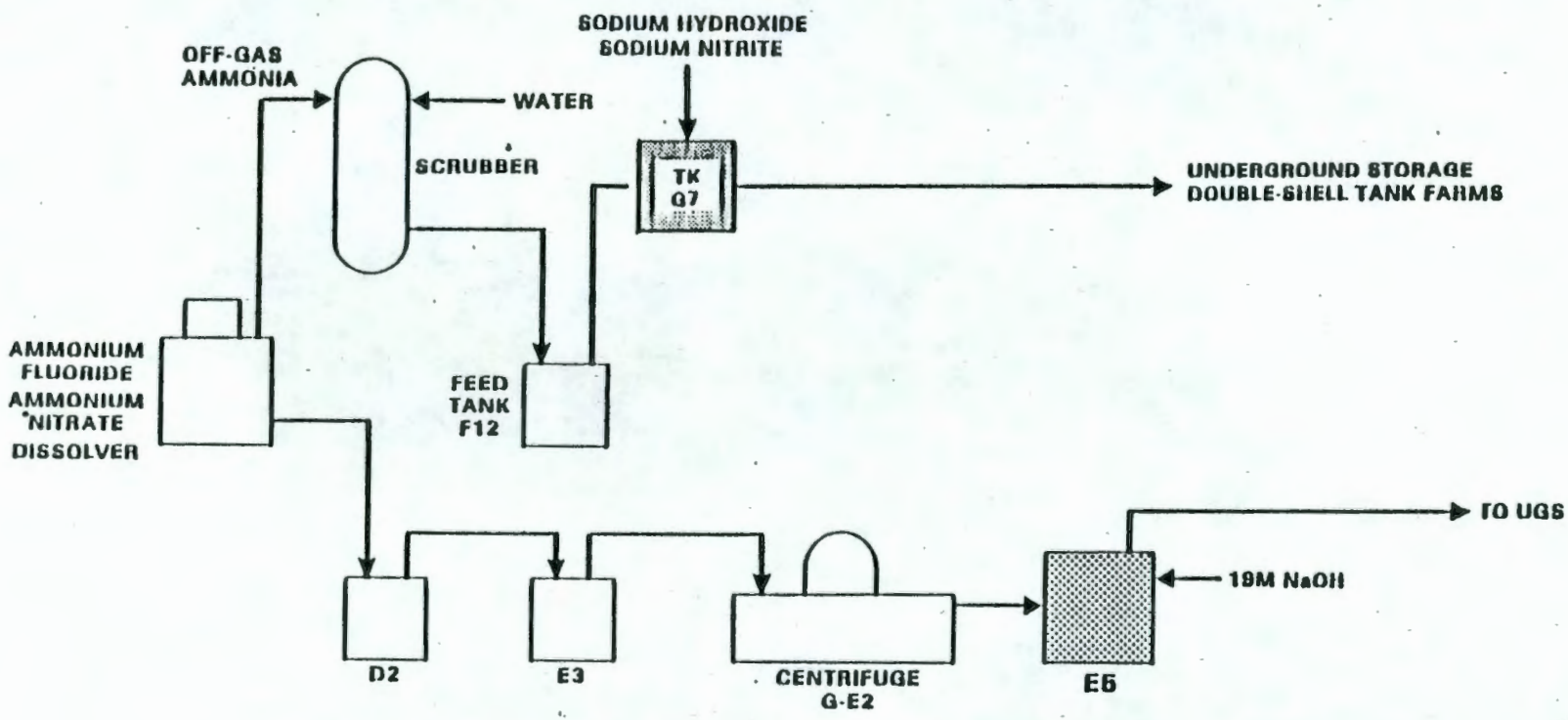
TK-F18 WASTE STREAM FLOW DIAGRAM



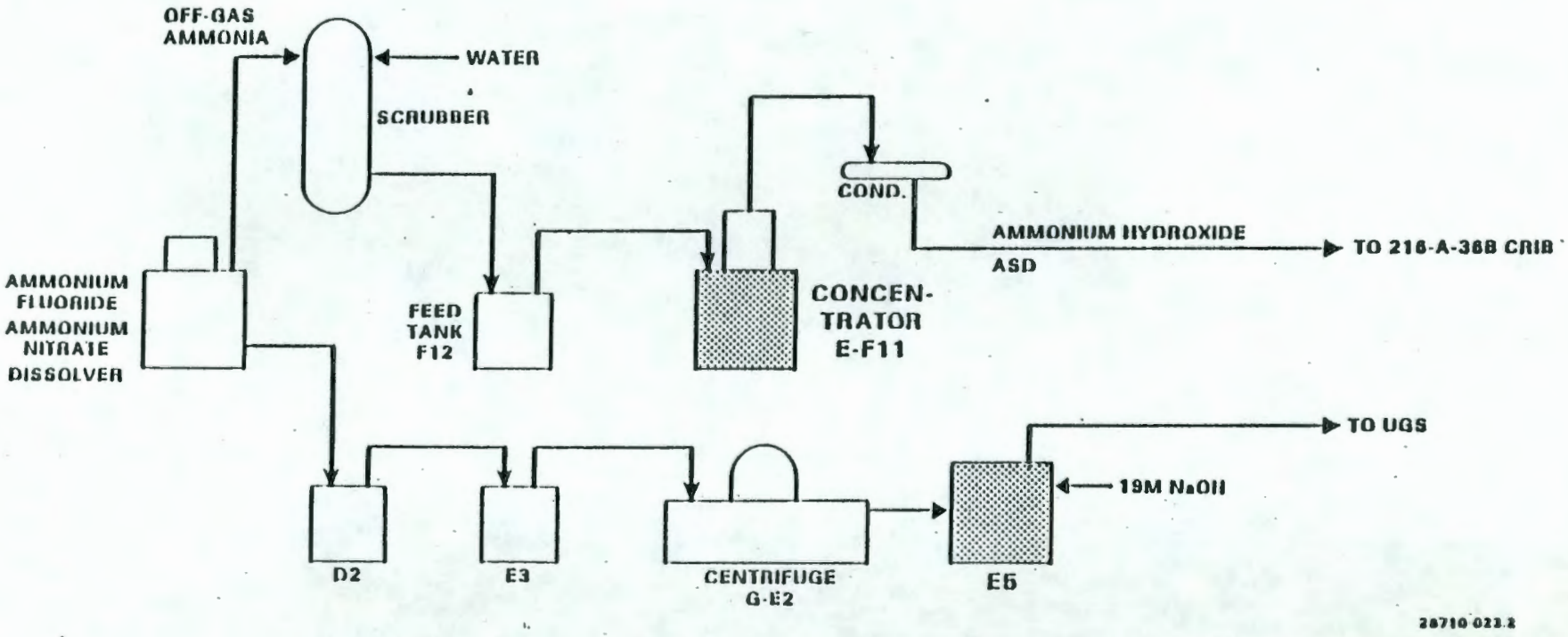
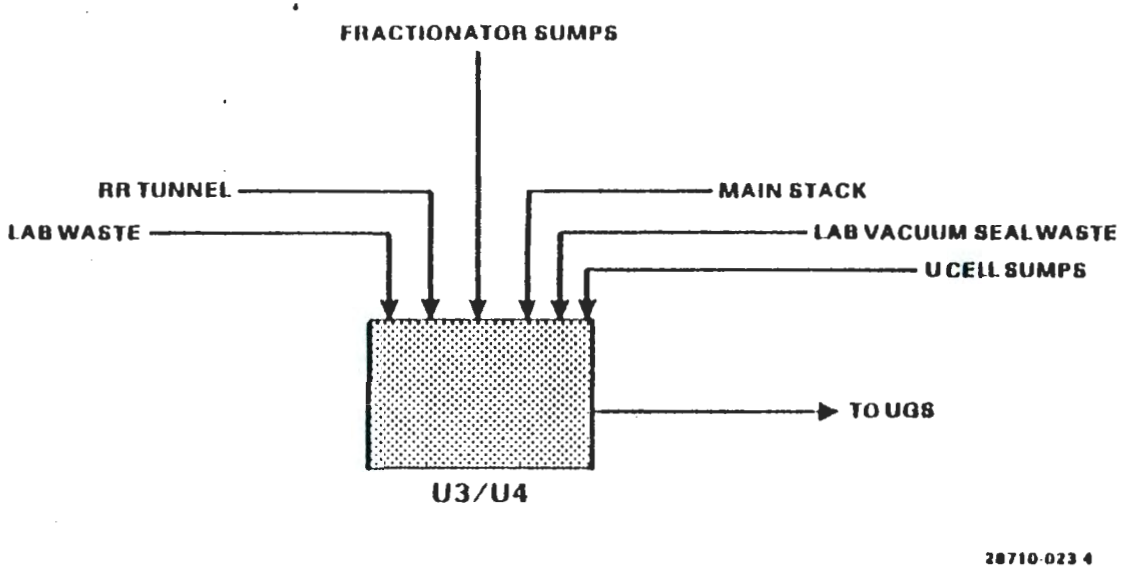
E-F11 AND TK-E5 WASTE STREAM FLOW DIAGRAMS PROPOSED PROCESS



E-F11 AND TK-E5 WASTE STREAM FLOW DIAGRAMS
PRESENT PROCESS



E-F11 AND TK-E5 WASTE STREAM FLOW DIAGRAMS
PAST PROCESS - PRIOR TO AUGUST 1987



TK-U3/U4 WASTE STREAM FLOW DIAGRAM