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JUN 09 1992

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U. S. Environmental Protection Agency
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State of Washington
Department of Ecology
Post Office Box 47600
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RECEIVED JUN 15 1992 CORRESPONDENCE CONTROL

Dear Messrs. Day and Jansen:

SUBMITTAL OF "JUSTIFICATION FOR CONTINUATION OF LIQUID EFFLUENT DISCHARGES AT THE HANFORD SITE"

Reference: Letter, P. T. Day, EPA, to S. H. Wisness, RL, "Justification for Continued Liquid Discharges," dated April 14, 1992. 20456

Attached is the justification requested by Mr. Paul Day in his April 14, 1992, letter. The report contains the justification for continued discharge of the 33 Phase I and II liquid effluent streams addressed in Milestone M-17 of the Hanford Federal Facility Agreement and Consent Order, commonly called the Tri-Party Agreement (TPA).

If you have any questions, please contact Mr. Jim Rasmussen at (509) 376-5441.

Sincerely,

Steven H. Wisness
Hanford Project Manager

EAP:JER

Attachment

cc w/attach:
D. Nylander, Ecology
D. Sherwood, EPA
T. Veneziano, WHC

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JUSTIFICATION FOR CONTINUED LIQUID EFFLUENT DISCHARGES AT THE HANFORD SITE

June 4, 1992

JUSTIFICATION FOR CONTINUED LIQUID EFFLUENT DISCHARGES AT THE HANFORD SITE

June 4, 1992

Acronym List

ALARA -	As Low As Reasonably Achievable
ASD -	PUREX Ammonia Scrubber Condensate
BAT/AKART -	Best Available Technology/ All Known, Available, and Reasonable Methods of Prevention, Control and Treatment
BCE -	B Plant Chemical Sewer
BCS -	B Plant Steam Condensate
BCP -	B Plant Process Condensate
CSL -	PUREX Chemical Sewer
CWL -	PUREX Cooling Water
DOE -	Department of Energy
DST -	Double Shell Tanks
Ecology -	Washington State Department of Ecology
EIS -	Environmental Impact Statement
EPA -	Environmental Protection Agency
GPM -	gallons per minute
HEPA -	High Efficiency Particulate Air-filter
HVAC -	Heating, Ventilation, and Air Conditioning system
LWDF -	Liquid Waste Disposal Facility
NPDES -	National Pollutant Discharge Elimination System. A permitting program, implemented by EPA for Hanford, that addresses discharges of liquid effluents to surface waters.
PDD -	PUREX Process Condensate
PFP -	Plutonium Finishing Plant
PNL -	Pacific Northwest Laboratory
PRF -	Plutonium Reclamation Facility (in PFP)
PUREX -	Plutonium/Uranium Extraction Facility
RMC -	Remote Mechanical C Line (in PFP)
SAP -	Sampling and Analysis Plan
SCD -	PUREX Steam Condensate
TPA -	Tri-Party Agreement, the common name for the Hanford Federal Facility Agreement and Consent Order
UNH -	Uranyl Nitrate Hexahydrate
WAC -	Washington Administrative Code
WESF -	Waste Encapsulation and Storage Facility

JUSTIFICATION FOR CONTINUED
LIQUID EFFLUENT DISCHARGES AT THE
HANFORD SITE
June 4, 1992

General Justification

Liquid effluent discharges at the Hanford Site come from facilities necessary to support the restoration and remediation programs and from facilities that are deactivated but not yet decommissioned, decontaminated or dismantled. Typical liquid discharges may originate from:

- Cooling water systems - play an important role in keeping facilities and equipment operating within acceptable safety margins. Cooling water is necessary to protect equipment and workers by removing heat from the system being cooled. Cooling water is used to cool process vessels; condense hazardous vapors before they can escape into the air; provide building air conditioning; cool tanks containing self-heating radioactive liquids; cool air compressors which supply instrument air and other control systems; cool heating ventilation and cooling systems (HVAC) that contribute to negative air pressure gradients that manage potential airborne contamination; cool transfer pumps; and fans that cool vacuum pumps integral to air monitoring systems.

- Heating, ventilation, and air conditioning (HVAC) systems - play a crucial role in preventing the spread of contamination by maintaining airflow from uncontaminated regions into contaminated regions, and exhausting these contaminated regions through high efficiency particulate air (HEPA) filters which trap the airborne contamination. Failure would cause a loss of carefully adjusted, staged negative pressure gradients which ensure confinement of the radioactive materials within the process areas. Without this confinement system, radioactive materials could become airborne and escape into the environment, as well as to the occupied areas of the building.

- Air monitoring systems - are required to collect samples of air for radionuclide analysis. They are used to monitor the air quality in the facility in order to protect worker health and to monitor environmental releases of airborne radionuclides. These air monitoring systems provide documentation of the extent of radioactive airborne releases to the environment, and warn personnel of dangerous air conditions in the plant. Air monitoring systems have vacuum pumps, which require cooling and seal water. If the vacuum pump seal water were turned off, improper vacuum system operation would preclude accurate sampling of the air within the plant for radionuclide contamination.

- Steam condensates - must continue to be generated to maintain appropriate temperatures in bulk chemical storage tanks, process vessels, instrument air lines, and occupied buildings.

- Process condensates - must be generated at UO3/U Plant in order to process the remainder of uranyl nitrate hexahydrate remaining from the Plutonium/Uranium Extraction Facility (PUREX) operation and to assist in facility decontamination.

- Laundry waste water - must continue to be generated to provide radiation workers with clean clothing to work safely in radiation areas.

- Miscellaneous streams - for the most part consists of raw water, filter backwash, water softener regenerate, and domestic water (i.e., potable water used for drinking, showers, lunchrooms). Raw water must continue to be generated to provide make-up water for decontamination activities and fire suppression water in case of an emergency. Filter Backwash water must continue to be generated to clean the filters that remove suspended solids in the preparation of potable and process water. Water softener regenerate must continue to be generated to provide demineralized water for boiler feed. Potable water must be supplied and sanitary waste water generated by certain facilities. For example, water must be provided for showers to be used by personnel who work in potentially contaminated areas.

The 33 major liquid effluent streams on the Hanford Site are regulated jointly under the Hanford Federal Facility Agreement and Consent Order (commonly called the Tri-Party Agreement) and a Consent Order between Ecology and DOE regarding liquid effluents. The Liquid Effluent Consent Order contains commitments that are consistent with those in the TPA, contains additional commitments for these 33 major liquid effluents, and contains commitments for other liquid effluents at the Hanford Site.

Since the signing of the Tri-Party Agreement in May 1989, 12 of the 33 liquid effluent streams will be discontinued by June 1992 and flows have been greatly reduced by application of source controls. The remaining effluent discharges, that will continue to be generated after June 1992 and before the implementation of Best Available Technology (BAT), are required in order to maintain the present level of protection of human health and the environment. If these streams were discontinued, this level of protection would significantly decrease.

Surface and ground water on and near the Hanford Site is monitored to determine the potential effects of operations. Surface water sample results from the Columbia River and off-site water systems (the two possible pathways to members of the public) for radiological and chemical constituents have remained well below Drinking Water Standards.

Table 1 lists the liquid effluent streams included in TPA Milestone M-17, their current or most recent soil column disposal sites, flow restrictions, and commitment dates for BAT/AKART implementation and, where applicable, cease discharge. Dates included in Table 1 for ceasing discharge refer to ceasing discharge to the identified disposal site in accordance with the appropriate interim milestone for that stream.

JUSTIFICATION FOR CONTINUED
LIQUID EFFLUENT DISCHARGES AT THE
HANFORD SITE
June 4, 1992

TABLE 1

33 PHASE I AND II
EFFLUENT STREAMS
AND TPA MILESTONES

STREAM NAME	TPA MILE-STONE	FLOW LIMIT IN GPM AND EFFECTIVE DATE	DISPOSAL SITE	COMMITMENT DATES	
				IMPL BAT	CEASE DSCHRG*
300 Area Process Wastewater	M-17-06	400 in 12/91	300 Area Process Trenches	12/94	
N Reactor Effluent	M-17-15	2 in 9/91	1325-N LWDF	6/95	6/95
PFP Wastewater	M-17-16	160 in 9/91 75 in 1/94	216-Z-20 Crib	5/94	6/95
UO3/U Plant Wastewater	M-17-17	450 in 9/91 750 (STBL RUN) 250 in 12/92	216-U-14 Ditch	6/95	6/95
242-S Evaporator Steam Condensate	M-17-18	50 in 9/91	216-U-14 Ditch	6/95	6/95
UO3 Plant Process Condensate	M-17-19	10 in 9/91 2 (AFTER STABL RUN)	216-U-17 Crib	6/95	6/95
PUREX Process Condensate (PDD)	M-17-20	0 in 9/91	DST; most recently 216-A-45 Crib	6/95	9/91

JUSTIFICATION FOR CONTINUED
LIQUID EFFLUENT DISCHARGES AT THE
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PUREX Ammonia Scrubber Condensate (ASD)	M-17-21	0 in 9/91	DST; previously 216-A-36B Crib	6/95	9/91
PUREX Steam Condensate (SCD)	M-17-22	0 in 6/92	216-A-30 Crib 216-A-37-2 Crib	6/95	6/92
PUREX Cooling Water (CWL)	M-17-23	0 in 6/92	216-B-3 Pond	6/95	6/92
PUREX Chemical Sewer (CSL) (+SCD+CWL)	M-17-24	600 in 6/92	216-B-3 Pond System	6/95	6/95
B Plant Steam Condensate (BCS)	M-17-25	0 in 9/91	previously 216-B-55 Crib	6/95	9/91
B Plant Process Condensate (BCP)	M-17-26	0 in 9/91	previously 216-B-62 Crib	6/95	9/91
B Plant Chemical Sewer (BCE)	M-17-04	0 in 2/92 to 216-B-63	216-B-3 Pond; recently rerouted from 216-B-63 Trench	6/95	2/92 to 216-B-63 6/95 to B POND
B Plant Cooling Water	M-17-27	NS	216-B-3 Pond System	10/97	
241 AY/AZ Tank Farm Steam Condensate	M-17-28	0 in 9/91	DST; previously to 216-A-8 Crib	10/97	9/91
242-A Evaporator Process Condensate	M-17-29	0 in 9/91	previously 216-A-37-1 Crib	10/94	9/91
242-A Evaporator Cooling Water	M-17-30	Not Specified (NS)	216-B-3 Pond System	10/97	
242-A Evaporator Steam Condensate	M-17-31	NS	216-B-3 Pond System	10/97	

JUSTIFICATION FOR CONTINUED
LIQUID EFFLUENT DISCHARGES AT THE
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241-A Tank Farm Cooling Water	M-17-32	NS	216-B-3 Pond System	10/97	
244-AR Vault Cooling Water	M-17-33	NS	216-B-3 Pond System	10/97	
2724-W Laundry Wastewater	M-17-34	NS	216-W-LC Crib		1/95
183-D Filter Backwash Wastewater	M-17-36	NS	D Pond System	10/97	
284-E Powerplant Wastewater	M-17-37	NS	216-B-3 Pond System	10/97	
284-W Powerplant Wastewater	M-17-38	NS	284-W Powerhouse Pond	6/95	6/95
222-S Laboratory Wastewater	M-17-39	NS	216-S-26 Crib	6/95	6/95
S Plant Wastewater	M-17-40	0 in 10/91	Flow ceased; previously 216-S-10 Ditch		10/91
T-Plant Wastewater	M-17-41	NS	216-T-4-2 Ditch	6/95	6/95
T Plant Laboratory Wastewater	M-17-42	NS	216-T-1 Ditch	6/95	6/95
2101-M Laboratory Wastewater	M-17-43	NS	2101-M Pond	6/95	6/95
400 Area Secondary Cooling Water	M-17-44	NS	400 Area Pond System	10/97	
163-N Demineralizer Wastewater	NO MILESTONE, STREAM DISCONTINUED				
209-E Laboratory Wastewater	NO MILESTONE, STREAM DISCONTINUED				

* Cease discharge to the identified disposal site in accordance with the TPA interim milestone

JUSTIFICATION FOR CONTINUED
LIQUID EFFLUENT DISCHARGES AT THE
HANFORD SITE
June 4, 1992

<u>300 Area Process Waste Water</u> (M-17-06A-E)

The 300 Area Process Waste Water is disposed to 300 Area Process Trenches. Proposed milestone M-17-09 requires that the 300 Area Treated Effluent disposal facility (Project L-045H) become operational in December 1994. A continued discharge to the Trenches is planned until the effluent treatment facility becomes operational. Shutting down the facilities that generate flows that contribute the 300 Area Process waste water would require at least 3 years longer than the current Shut-down Plan (e.g., M-17-06C) which emphasizes flow reduction and early implementation of the treatment system.

Within the 300 Area facilities, much of the research, development, and demonstration activities which support the cleanup of the Hanford Site are conducted. Some of the work performed cannot be conducted at other locations of the national DOE complex. The 300 Area work which falls into this category includes analytical chemistry which supports characterization of the single and double shell tanks, and chemistry which supports the stabilization of the hydrogen and ferrocyanide containing storage tanks. In addition, high heat, highly radioactive material (i.e., highly radioactive materials which generate much heat due to radioactive decay) is stored in 300 Area facilities. The majority of flow to the 300 Area Process Trenches is attributable to the operation of the steam plant and heat exchangers for cooling.

Requiring 300 Area facilities to not generate waste water would shut-down the majority of 300 Area operations. The 300 Area would be largely uninhabitable due to lack of heating and cooling, as well as unsafe due to lack of fire suppression water, and HVAC systems. In addition to the safety impacts of shutting down the 300 Area, programs that support single shell tank and double shell tank safety would be shut down and 10 of the 31 TPA milestones associated with Hanford Site cleanup would be impacted significantly. A detailed discussion on these impacts is included within the 300 Area Process Trenches Shutdown Plan (Milestone M-17-06C).

Waste water minimization activities have been implemented and the flow rate limited to less than 400 gpm thereby meeting milestone M-17-06A. Waste water discharges to the Trenches have been reduced by greater than 1.7 million gallons a day from approximately 1471 gpm at the beginning of the flow reduction efforts in 1990 to the less than 400 gpm in 1991. An additional flow reduction to 300 gpm is planned for December 1992 as part of the Shut-down plan. Plan are under-way to develop a specific goal and facility modifications for the 1993 reductions. The 1993 reductions will minimize the quantity of effluent requiring processing by the treatment facility.

Most of the flow reductions to date have been achieved through modification of cooling systems to convert them to closed cycle systems. Further reductions planned for 1992 and under development for 1993 will rely on converting similar heat exchangers in other facilities to closed cycle systems.

The effluent treatment facility is scheduled to initiate operation by December 1994 with discharge under an NPDES permit of the treated effluent to the Columbia River. A characterization of the waste water has been submitted under Milestone M-17-06B and based on sampling results, it is anticipated the effluent will be designated a non-dangerous waste stream in accordance with WAC 173-303. Operation of the treatment facility will result in a cessation of discharge to the Trenches.

An Expedited Response Action (ERA) was implemented to remove contaminated soil from the trenches. The contaminated soil was removed to prevent migration of contamination to the groundwater. With the removal of most of the contaminated soils and the reduction of effluent discharge which drove some of the contaminants to the groundwater, contamination has been significantly diminished. The final report for the ERA is due by July 1992 (Milestone M-17-06D).

In addition, an updated assessment will be provided in July 1992 (Milestone M-16-06E) on potential environmental impacts from the interim discharge of the waste water to the Trenches.

Other constraints to an immediate shutdown of the waste water includes federal and state requirements regarding: fire safety, potable water, facility heating, and safety cooling requirements for specialized equipment and materials. These requirements would constrain the time allowed for the shut-down of the process trenches.

The fire protection system in the 300 Area requires a storage capacity of 1.3 million gallons of water due to the close proximity of the 300 Area facilities. The fire protection in the 300 Area runs off of the potable water grid. Clean water is pumped from the 315 facility to three water storage tanks near the steam plant. The water is stored in the three above ground storage tanks which utilize steam heat to prevent freezing. In order to maintain clean water chlorination requirements, water from the storage tanks is drained directly into the process sewer so that the water may be replenished with fresh chlorinated water.

The fire department also renews the water supply in the wet fire protection system by draining the lines and hydrants. The water drained from the wet system generally flows into process sewer due to access from storm sewer drains. The water volume requirement to adequately protect the 300 Area is larger than the capacity of both the Hanford and Richland Fire Departments pumper and tanker trucks. In order to maintain proper fire protection an alternative heating source would be required to be designed and fabricated due to the size of the water storage tanks.

The steam plant provides heat, compressed air, and vacuum lines to the 300 Area facilities. The steam plant and potable water systems are the largest contributors to the process sewer. The steam plant provides heat for facilities to ensure the pipes in the facilities will not freeze and cause flooding, the steam plant also heats the firewater storage tanks, and pipe freezing would also impair the fire protection system.

<u>N Reactor Effluent</u> (M-17-15)

The N Reactor Effluent stream is currently being discharged to the 1325 N Liquid Waste Disposal Facility (LWDF). Proposed milestone M-17-15 requires that discharge of this effluent to the 1325 N LWDF be ceased no later than June 1995. Proposed milestone M-17-15A imposed a flow restriction of 2 gpm on the N Reactor effluent in September 1991 that will remain in effect until flow is rerouted from the LWDF. A plan to reroute this effluent to the Columbia River after EPA approval of a modification of the Hanford Site NPDES permit and implementation of BAT/AKART was submitted in January 1992, in accordance with proposed milestone M-17-15C. A request for modification of the Hanford Site NPDES permit is being prepared and will be submitted in June 1992, in accordance with proposed milestone M-17-15D.

Continued discharge of plant effluents to the 1325N Liquid Waste Disposal Facility can be categorized as originating from either "normal" or "upset" conditions.

Normal operating conditions:

The normal conditions which contribute effluents being discharged to the 1325N LWDF are those attributed to:

(a) decontamination activities using high pressure water jets

(b) draining of water from the fuel storage basin

(c) draining of rain water from the 109N/D Reactor roof drains

Contributors (a) and (b) are an integral part of the mission's objective to place N Reactor in a configuration requiring the least amount of monitoring and surveillance which will result in radiation and contamination levels As Low as Reasonable Achievable (ALARA). Contributor (c) is a low occurrence event.

Upset operating conditions:

The upset conditions which would cause effluents to be discharged to the soil column are those attributed to:

(a) pressurized pipe break or rupture in an area draining into the radioactive drain system

(b) fire protection system activation in an area draining into the radioactive drain system

These conditions are very unlikely to occur. Not draining this effluent from within the facility could compromise worker safety, spread radiological contamination to areas which are not contaminated, short circuit electrical switch-gear providing power to essential services to building occupants (i.e. HVAC) and environmental monitoring systems.

<u>163-N Demineralizer Waste Water</u>

This stream has been eliminated and has no proposed milestones.

<u>Plutonium Finishing Plant (PFP) Waste Water</u> (M-17-16)

Waste water from the PFP is currently discharged to the 216-Z-20 crib. Proposed milestone M-17-16 requires that discharge of the PFP waste water to the 216-Z-20 Crib be discontinued in June 1995. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this effluent stream by June 1995 and flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H).

Proposed milestone M-17-16A imposed a flow restriction on the PFP waste water stream of less than or equal to 160 gpm in September 1991. Proposed milestone M-17-16D requires implementation of closed loop cooling for Buildings 291-Z, 234-5Z, and 236-Z (as provided by Project C-040), implementation of the PFP liquid low-level waste system (Project B-680H), and limitation of flow rate of the PFP waste water to the 216-Z-20 Crib to less than 75 gpm by January 1994.

Although many steps have been taken to reduce the flow to the 216-Z-20 crib, the generation of some waste water is necessary for the safe and normal operation of the facility. The majority of the waste water consists of air compressor cooling water and vacuum pump seal water. If the water serving the air compressors were turned off, ventilation control instruments throughout the plant would cease to function, causing a loss of control of ventilation equipment such as fans and dampers.

This in turn would cause a loss of carefully adjusted staged negative pressure gradients which ensure confinement of the radioactive materials within the process areas. Without this confinement system, radioactive materials could be released from the plant into the environment. Similarly, if the vacuum pump seal water were turned off, improper vacuum system operation would preclude accurate sampling of the air within the plant for radionuclide contamination, increasing the risk to plant personnel.

Additional sources of waste water comes from two of the PFP process areas, the Plutonium Reclamation Facility (PRF) and the Remote Mechanical C Line (RMC). Operation of the PRF will temporarily increase the waste water flow to the crib by an average of 13 GPM during the planned 40 week PRF campaign. All of the PRF streams are predominately non-contact equipment cooling water that have a very low potential for being contaminated. The RMC Line will be modified so as to not produce any additional waste water during the planned 35 week RMC campaign. Upon completion of the stabilization and clean out activities to improve plant safety, processing will be suspended.

Both PRF and RMC processes are necessary for stabilization and clean out activities to improve the long term safety of the plant, its personnel, and the environment. Plutonium bearing materials, nitrate solution and process scrap will be converted to the more stable plutonium oxide form instead of the weapon grade metal once produced at the plant.

Failure to process materials stored in the PRF tankage will most likely result in the material leaking onto the process canyon floor due to the long term corrosivity of the solutions. Material clean up requires manned entry into the process canyon and increased exposure to personnel. Process sludges that are not stabilized may vent radioactive off-gases into the plant and increase safety risks to personnel. Material leakage also loses the first level of confinement for preventing airborne and liquid releases which increases the risk to the environment.

<u>UO_3/U Plant Waste Water</u> (M-17-17)

Waste water from the UO3/U Plant is currently discharged to the 216-U-14 ditch. Proposed milestone M-17-17 requires that discharge of the UO3/U Plant Waste Water to the 216-U-14 ditch be discontinued in June 1995. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this effluent stream by June 1995 and flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H).

Discharge of the UO3/U Plant Waste Water to the 216-U-14 ditch was limited to less than 450 gpm in September 1991 in accordance with proposed milestone M-17-17A. During the Stabilization run the discharge of the waste water will be limited to 750 gpm with the limit reverting to 450 gpm after the run is completed. The final discharge limit for this waste water stream will occur in December 1992 when the flow will be limited to 250 gpm in accordance with proposed milestone M-17-17D.

The UO_3/U Plant waste water is generated from the cooling water and steam heating utility systems and is needed to support the operations and safe standby configuration of the UO_3 Plant.

The upcoming operation of the UO_3 Plant (i.e, the Stabilization Run), scheduled for August/ September 1992, is necessary to stabilize and prepare materials for long-term storage and to support material clean-out activities needed to improve the safety posture of the PUREX and UO_3 facilities. The remaining inventory of corrosive uranyl nitrate hexahydrate (UNH) solution (liquid), currently stored at PUREX and UO_3 Plants, will be concentrated and calcined at UO_3 Plant to produce uranium trioxide (UO_3) powder. Uranium trioxide is a stable form (solid) suitable for extended storage.

After the stabilization run, the facility will be placed into a standby condition until a decision is made on the future operations at PUREX. The facility will be maintained with a minimum staff.

The primary systems that need to remain in operation after the stabilization run are the building ventilation, vessel vent system, and liquid waste processing system. The past processing of uranium has left some areas in the buildings with minor contamination problems. Uranium from dust and uranyl nitrate hexahydrate has permeated into concrete pores, building joints, and other crevices; in addition, while the building is in standby condition prior to the future plans decision, tanks and piping will contain residual uranium from processing. Radon gas, a daughter product from the uranium radioisotope decay, would build up in non-ventilated areas, creating a potential health risk to the plant operators. The building ventilation fans must continuously operate to keep the radon gas concentrations down within air quality limits. Waste water sources in the ventilation systems at the UO_3 Plant are air washers for cooling, condensate from heating coils, and water seals on some rotating equipment. The ventilation systems are partially controlled by air actuated dampers and other control devices.

The UO_3 Plant has outdoor paved areas over which material, supplies, and equipment are moved between processing cells. Some of the paved areas are considered to be potentially contaminated. The rain runoff from the paved areas is collected in sumps and may become slightly contaminated with uranium residual from prior plant operations. Periodically, the accumulated liquid is processed through a recycle concentrator which employs steam as a heat source. The resultant steam condensate (from the concentrator's heat exchange coil) becomes a waste water stream source. The vessel vent system utilizes a steam jet to support the concentration process. Cooling water is used to condense water vapor and steam produced during the process. The cooling water and condensed steam also become waste water.

Air compressors that supply the instrument air for ventilation control and instrumentation necessary for essential plant monitoring systems require cooling water for removal of compression heat to prevent thermal damage to the piston rings and seals. The cooling water and regeneration of the desiccant that removes moisture from the air both become waste water sources.

In addition, the 224-U and 224-UA building complex, liquid containing tanks, and outdoor piping require steam heat during the winter. The steam condensate from these sources becomes waste water. Other contributors include rain runoff from the 211-U tank area and building heating/ventilation for the 271-U office area.

The plan to eliminate the ground discharge of this stream is to reroute the flow to the Treated Effluent Disposal Facility in June 1995. Other options for rerouting or eliminating this stream are being considered in a study that will be complete at the end of May, 1992 (proposed milestone M-17-17C). Implementation of the rerouting options during the interim period do not appear feasible because of cost and time constraints imposed by required Federal budget authorization schedules.

Other options that are still being considered include replacing the compressors, replacing some of the air instrumentation, re-piping the cooling water for two overhead condensers to reduce flow, and diverting rain from the outside radiation zone areas. The cost effectiveness of these options will be compared in the study to the current plan. The current plan will be modified to include any recommended options which are implemented.

The facility will need to continue discharging some water until a solution is found to eliminate the need for processing accumulated rainwater and the building has been decontaminated. The water required to operate the ventilation system and vessel vent systems is a personnel safety issue and would require a suitable alternative prior to reduction/elimination of these flows.

<u>242-S Evaporator Steam Condensate</u> (M-17-18)

The 242-S Evaporator Steam Condensate is currently disposed to 216-U-14 ditch. Proposed milestone M-17-18 requires that discharge of this effluent stream to the 216-U-14 ditch be discontinued in June 1995. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this effluent stream by June 1995 and flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H). Proposed milestone M-17-18A imposed a flow restriction of

50 gpm on this effluent effective September 1991. Proposed milestone M-17-18B requires replacement of the air sample pump and elimination of the seal water contribution to the 242-S Evaporator Steam Condensate by September 1992.

The 242-S Evaporator is a shutdown tank waste evaporator facility that also serves significant control and support functions to the 200 West Area Tank Farms. A manned control room is located at the facility that serves the overall tank farms, including significant alarm and control circuitry associated with the 241-SY Tank Farm (including Tank 241-SY-101). The facility also provides support services to the tank farms including steam and control air. These needs are essential to safe operation of tank farm control and indication instrumentation.

The steam condensate effluent from this facility consists of several non-contact cooling water and steam condensate contributors. These include air compressor cooling water, air sample pump seal water, and HVAC system steam condensate. Safety and environmental implications of these streams include:

> The compressed air is essential for safe operation of tank farm indication instrumentation (including level and pressure measurement). Loss of compressed air would result in loss of instrumentation that has been designated "Operational Safety Requirement" Instrumentation from a nuclear safety perspective. The lost instrumentation would effect the 242-S Evaporator, along with 241-SY and other tank farms. These compressors require cooling water (currently in a once through fashion) to maintain the equipment operational. The compressors will be replaced with compressors that utilize a closed loop cooling system.
>
> Air sample pump seal water is generated as part of the 242-S Evaporator atmosphere control system. A sample pump is used to draw air from the various rooms in the facility through monitoring and control equipment. The indications from this system are used to track the exposure conditions in each part of the facility, as there are radioactive materials still present. If this pump were not utilized, then facility conditions would not be known, and a potential release to the HVAC system would go unnoticed. This pump will be replaced with a vacuum pump that does not utilize seal water, as agreed to in TPA milestone M-17.
>
> The HVAC system is also a contributor to this stream when steam heating or evaporative cooling is used for building temperature controls. The use of heating and cooling equipment is seasonally based on the outside ambient air temperature. Maintenance of adequate temperature control is essential for safety and health reasons, as well as to prevent broken water pipes and other equipment failures. No activities are carried out

in the HVAC room that would cause the introduction of contaminants to the streams.

The 242-S Evaporator Steam Condensate is currently disposed to 216-U-14 ditch. The current nominal flow rate is between 10 and 15 gallons per minute (gpm). This flow has been reduced by the installation of alternate air compressors using closed loop cooling (currently in final testing) and the elimination of contamination control water. This is significantly below the 50 gpm proposed for the stream in milestone M-17-18A.

Continued use of the 242-S Evaporator Steam Condensate stream is required for safe operation of the Tank Farms for the reasons discussed above. The overall continued operation of the 242-S Evaporator steam condensate stream is essential for safe Tank Farm operations. Significant actions are being taken to reduce the stream until final treatment is in place.

<u>UO_3 Plant Process Condensate</u> (M-17-19)

Process Condensate from the UO3 Plant is currently discharged to the 216-U-17 crib. Proposed milestone M-17-19 requires that discharge of this effluent stream to the 216-U-17 crib be discontinued in June 1995. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this effluent stream by June 1995 and flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H).

Discharge of the UO3 Plant Process Condensate was limited to less than or equal to 10 gpm in September 1991 in accordance with proposed milestone M-17-19A. After the completion of the UO3/U Plant Stabilization Run, the discharge of the process condensate will be limited to 10 gpm with the limit becoming 2 gpm after the run is completed.

The UO_3 Plant Process Condensate stream is generated from two sources: a.) the collection of water vapor resulting from the processing of uranyl nitrate hexahydrate (UNH) solution, which will be generated during the stabilization run; and b.) the condensate from the reprocessing of water that is collected in sumps within the designated radiation zones. The water vapor from these two sources is then condensed, sampled, analyzed, neutralized, and discharged to the 216-U-17 Crib.

During processing, the UNH solution is concentrated by evaporation of water to 100% UNH and calcined to denitrate the material into uranium trioxide, nitrogen oxides, and water vapor. The water vapor is removed from the process equipment with vacuum from steam jets. The process water vapor and steam are condensed in heat exchangers to become the primary source of water to the crib during the plant operation.

The UNH solution is a residual by-product from the processing of irradiated nuclear fuel elements. The uranium that is recovered in the PUREX process is normally transported to the UO_3 plant for conversion to the oxide (UO_3) form.

The UNH solution is acidic and is a corrosive liquid material. The nitrate ion in the solution is a strong oxidizer that is reactive with organic materials. The uranium isotopes emit alpha particles and one of the daughter products is radon gas.

UO_3 powder is a valuable commodity that is mined and consumed worldwide for electrical power. The wasting of this mineral would require the eventual replacement by mining from a natural deposit.

The water collected in the sumps is from rain water runoff from paved areas around the UO_3 Plant, wash down water, steam condensate from tank heating and piping heat trace, fire protection system testing water, and other miscellaneous sources in the radiation protection zones. The water is pumped from the sumps to a recycle concentrator. The recycle concentrator is steam heated and the overhead water vapor is condensed, neutralized, and discharged to the crib. The processing and disposal of the UO3 Plant Process Condensate needs to continue until June 1995, when Project W-049H will be constructed and in operation.

The Hanford Site has five options for the handling and storage of the liquid UNH solution. These options are:

1. Leave in the current storage tanks.
2. Ship to another site for recycling.
3. Bury in concrete grout.
4. Store in Double Shell Tanks.
5. Convert the UNH to solid UO_3 and nitric acid.

The first option is not acceptable. The solution will eventually corrode the storage tanks and become a dangerous waste spill. In addition, the material would be classified as solid waste being accumulated speculatively (WAC 173-303-016). The DOE could be required to apply annually for a variance to the storage requirements in the Washington State Dangerous Waste Code.

At the present time no other facility within the United States is authorized to process the UNH solution which negates the second option. The Savannah River Facility is not operating and could require an upgrading program and an Environmental Impact Statement (EIS) to restart the process. Three commercial companies in the United States (Illinois, Oklahoma, and New Mexico) have the process capability to recover the uranium, but are not licensed to process slightly enriched uranium. The licensing process may take several years and the profits may not be sufficient to attract commercial interest.

For the third option, the UNH solution can be neutralized, mixed with concrete, and buried at Hanford with current government authorization. It is the only immediate viable disposal alternative for the UO_3 powder without operating the plant. The amount of concrete would be large in volume and have a high content of nitrate ion. Nitrates make concrete more leachable and entombing the uranium on-site would create a permanent additional source for radon gas at Hanford. The grouting of the UNH solution would create an additional disposal site that would require long term monitoring.

Finally, the existing Double Shell Tanks (DST) do not have sufficient storage capacity, except under emergency conditions, for receiving the current inventory of UNH. An additional tank would be required. Several years would be needed for design and construction. This storage option would only delay the eventual disposal of the material.

The operation of the plant would recover both UO_3 powder and nitric acid as usable and salable products. The uranium would be in a stable solid form that would have a low probability of being released to the environment. The radiation levels can be more easily surveyed as a solid. The total weight of "Dangerous Waste" material would be reduced. Less energy and natural resources would be consumed. The processing of UNH at Hanford would be the lowest cost alternative.

The UNH must be processed to stabilize a corrosive liquid. The UO_3 powder is the safest and most cost effective method of stabilization. The stabilization provides a usable raw material that can be sold. It also eliminates a buried source of radon gas at the Hanford site.

In addition, the facility will need to continue discharging some water until a solution is found to eliminate the need for processing accumulated rainwater. Any system or method to reduce or eliminate rainwater processing will likely require more than two years to design and construct. The UO3 Process Condensate will be re-routed to Project W-049H in 1995.

<u>PUREX Process Condensate (PDD)</u> (M-17-20)

Disposal of the PDD into the 216-A-45 Crib was ceased in 1989 and flow was re-routed to the Double Shell Tanks. Proposed milestone M-17-20 requires implementation of BAT/AKART for this effluent stream by June 1995. Proposed milestone M-17-20 also precludes disposal of this effluent to the soil column until after BAT/AKART is implemented as part of 242-A Evaporator/PUREX Plant Condensate Treatment Facility (Project C-018H). The cease discharge date of September 1991 was included as an M-17 interim milestone in order to provide assurances that discharge would not resume to the 216-A-45 Crib. The PDD is not generated in the current operational status of PUREX.

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PUREX Ammonia Scrubber Condensate (ASD) (M-17-21)

The disposal of this stream into the 216-A-36B Crib was ceased in 1987 and flow was re-routed to Double Shell Tanks. Proposed milestone M-17-21 precludes disposal of this effluent to the soil column until after BAT/AKART is implemented as part of 242-A Evaporator/PUREX Plant Condensate Treatment Facility (Project C-018H). The cease discharge date of September 1991 was included as an M-17 interim milestone in order to provide assurances that discharge would not resume to the 216-A-36B Crib. The ASD is not generated in the current operational status of PUREX.

PUREX Steam Condensate (SCD) (M-17-22)

This effluent stream previously discharged to the 216-A-30 and 216-A-37-2 Cribs. Discharge to these disposal sites is required to be ceased and re-routed to the 216-B-3 Pond system via the PUREX Chemical Sewer in June 1992.

The SCD has elimated all major waste water contributors, but two intermittent contributors to the SCD remain. The first contributor is steam condensate from the HEPA filter building. During the winter, steam is used to heat the final HEPA filter bank for the Main Stack exhaust. As the steam cools, it condenses into water (i.e., steam condensate). This source of steam condensate will generate about 100,000 gallons per year. The filters are heated to prevent condensation of the warm moist air from the building onto the filter media. If HEPA filters become moistened, their filtration efficiency is degraded, thereby, potentially resulting in an increase of radionuclides being released into the environment and increasing personnel exposure by requiring more frequent filter change-outs. The second (potential) contributor is steam condensate from a nonhazardous waste concentrator. This concentrator would reduce the volume of waste being sent to underground storage and save the space for other uses.

The diversion valve has been set in the divert position and any flow in the line will be diverted to the 216-A-42 Retention Basin for discharge to the 216-B-3 Pond system via the PUREX Chemical Sewer (CSL).

PUREX Cooling Water (CWL) (M-17-23)

Cooling Water from the PUREX Plant is currently being discharged to the 216-B-3 Pond system. This effluent stream will be re-routed to the PUREX Chemical Sewer (CSL) no later than June 1992 in accordance with proposed milestone M-17-23A.

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The CWL has been reduced to approximately 40 gpm from two sources: the seal and cooling water for the PUREX canyon building (i.e., the 202-A Building) sample vacuum pump and the cooling water for the 292-AB Building (Main Stack) sample vacuum pump. The PUREX canyon building vacuum pump provides for radiation monitoring for personnel protection and required environmental samples, and the Main Stack vacuum pump also provides for required environmental samples.

The first contributor will be rerouted to the CSL and the second will be eliminated by the installation of a closed-loop cooling system on the 292-AB Building sample vacuum pump by June 1992. Two potential intermittent contributors are cooling water for the 2711-A Building air dryers and seal/cooling water for the N-Cell transfer vacuum pumps. These pieces of equipment will be operated occasionally to maintain their operability and to make solution transfers between tanks within the PUREX facility if necessary.

The CWL must continue because it cools crucial equipment in the air monitoring system that is used to monitor the air quality in the facility in order to protect worker health and to monitor environmental releases of airborne radionuclides. The air monitoring system provides documentation of the extent of radioactive airborne releases to the environment, and warns personnel of dangerous air conditions in the plant.

<u>PUREX Chemical Sewer (CSL)</u> (M-17-24)

The CSL is currently disposed to 216-B-3 Pond system. Proposed milestone M-17-24 requires that discharge of the CSL to the 216-B-3 Pond system be discontinued in June 1995. Proposed milestone M-17-08 requires that BAT/AKART be implemented on the CSL by June 1995 and flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H). Proposed milestone M-17-24A imposes a flow restriction of 600 gpm on the combined CSL, SCD, and CWL stream in June 1992.

Although steps have been taken to decrease the flow rate of the CSL, generation of this stream must continue for a variety of reasons, including safety and environmental protection.

One of the contributors to the CSL is the overflow effluent from the 2901-A Sanitary Water High Tank. This tank must remain full to provide an adequate supply of fire fighting water. The method of keeping the tank full produces an overflow stream of clean water, suitable for drinking.

The PUREX canyon building contains significant quantities of radioactive contamination which can easily become airborne and thereby escape into the environment, as well as the occupied areas of the building. The heating, ventilation, and air conditioning (HVAC) system in the PUREX canyon building plays a crucial role in preventing contamination spreads by maintaining airflow from uncontaminated regions into contaminated regions, and exhausting these contaminated regions through high efficiency particulate air (HEPA) filters, which trap the airborne contamination.

The ventilation air supply system generates a low-volume effluent which feeds the CSL. Condensed steam from heating the air also flows into the CSL. Air compressors provide the instrument air which controls the dampers necessary for ventilation control. The non-contact cooling water from the air compressors is another contributor to the CSL.

The PUREX plant has extensive air monitoring systems, which require vacuum pumps. These pumps require cooling and seal water, which does or will flow to the CSL. (Much of this water currently flows to the CWL, which will to be routed to the CSL no later than June 1992.) These air monitoring systems provide documentation of the extent of radioactive airborne releases to the environment, and warn personnel of dangerous air conditions in the plant.

Like any safe chemical plant, PUREX has many safety showers, which must be tested to assure operability. The test water from many of these safety showers drains into the CSL.

Therefore, discontinuing the CSL would greatly increase the hazards posed to the PUREX plant personnel.

PUREX Liquid Effluent Streams			
	Chemical Sewer	Cooling Water	Steam Condensate
Flow rates in 1990 (gpm) (WHC-EP-0342)	470	3200	260
Combined Flow Limit in M-17 (gpm) (Effective June 30, 1992)	600		

B Plant Steam Condensate (BCS) (M-17-25)

Disposal of the BCS into the 216-B-55 Crib was ceased in 1990. Proposed milestone M-17-25 requires implementation of BAT/AKART for this effluent stream by June 1995. The BCS is contained within the scope of the 200 Area Treated Effluent Disposal Facility (Project W-049H). Proposed milestone M-17-25 also precludes disposal of the BCS to the soil column after BAT/AKART is implemented. The cease discharge date of August 1991 was included as an M-17 interim milestone in order to provide assurances that discharge would not resume to the 216-B-55 Crib until after BAT/AKART is approved by the EPA and Ecology and implemented, the Sampling and Analysis Plan (SAP) is approved, and if EPA and Ecology agree that the discharge is supported by an environmental impact assessment.

Operation of the Low-Level Waste Concentrator generates both B Plant Steam Condensate (BCS) and Process Condensate (BCP). The BCS is not generated in the current plant operational status, and will not be generated until the Low-Level Waste Concentrator is operated. The BCS consists of spent steam used to supply heat to the E-23-3 Concentrator. Operation of the Concentrator itself is vital for waste minimization and continued safe storage of the WESF cesium and strontium capsules in the facility's pool cells. The Concentrator is a part of the WESF contingency plan in the event of a capsule leak in the pool cells and is operated to reduce the volume of low-level waste generated at B Plant and WESF due to on-going operations required just to support and manage the radiological inventory at WESF and B Plant. In addition, due to the current capacity issues of Double-Shell Tanks in the Tank Farms storage areas, operation of the Low-Level Waste Concentrator is even more essential to waste volume reductions.

B Plant Process Condensate (BCP) (M-17-26)

Disposal of the BCP into the 216-B-62 Crib was ceased in 1986 and routed to Double Shell Tanks. Proposed milestone M-17-08B requires implementation of BAT/AKART for this effluent stream by June 1995. The BCP is contained within the scope of the 200 Area Treated Effluent Disposal Facility (Project W-049H). Proposed milestone M-17-26 also precludes disposal of the BCP to the soil column until after BAT/AKART is implemented. The cease discharge date of September 1991 was included as an M-17 interim milestone in order to provide assurances that discharge would not resume to the 216-B-62 Crib until after BAT/AKART is approved by the EPA and Ecology and implemented, the Sampling and Analysis Plan (SAP) is approved, and if supported by an environmental impact assessment that has been approved by the EPA and Ecology.

Operation of the B Plant Low-Level Waste Concentrator generates BCP. When the B Plant concentrator is not in operation, the accumulated concentrator feed stream waste is transferred to the DSTs and the BCP is not generated. The Concentrator feed is composed of steam condensate from Heating, Ventilation, and Air Conditioning (HVAC) units and room heaters, sanitary water from safety showers, and general housekeeping activities in the B Plant/ WESF facility.

Operation of the Concentrator itself is vital for waste minimization and continued safe storage of the WESF cesium and strontium capsules in the facility's pool cells as well as existing inventory in B Plant. The Concentrator is a part of the WESF contingency plan in the event of a capsule leak in the pool cells and is operated to reduce the volume of low-level waste generated at B Plant and WESF due to on-going operations required to support and manage the radiological inventory at WESF and B Plant. In addition, due to the current capacity issues of the Double-Shell Tanks (DST) in the Tank Farms storage areas, operation of the Low-Level Waste Concentrator is even more essential to waste volume reductions.

<u>B-Plant Chemical Sewer (BCE)</u> (M-17-04)

The discharge of the BCE into the 216-B-63 Trench was ceased in February 1992 (proposed M-17-04B) and the effluent has been re-routed to the 216-B-3 Pond system via the B Plant Cooling Water. Proposed milestone M-17-04 requires that the discharge of the BCE to the 216-B-3 Pond system be ceased in June 1995. Proposed milestone M-17-08 requires that BAT/AKART be implemented on the BCE by June 1995 and BCE flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H).

The BCE is an active stream which supports operations at B Plant/WESF. A major portion of the stream is the discharge of water used to cool air compressors for process air at B Plant/WESF and instrument air at B Plant. In addition, a portion of this stream also results from the production of demineralized water for the safe handling and storage of radiological inventories in B Plant and WESF. This stream needs to continue to maintain operable systems used for containment of radionuclides to prevent uncontrolled releases to the environment and ensure worker safety.

The BCE stream is now combined with the B Plant Cooling Water stream as a result of the completion of TPA milestone M-17-04B. This combined stream is discharge to the 216-B-3 Pond during this interim period until the start-up of the Treated Effluent Disposal System planned by June 1995, as outlined in the TPA Consent Order.

<u>B Plant Cooling Water</u> (M-17-27)

The B Plant Cooling Water is currently being discharged to the 216-B-3 Pond System. Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations.

The B Plant Cooling Water stream is an active stream which supports operations at B Plant/ WESF. Continued discharge of this stream is necessary to protect equipment and workers by removing heat from process tanks in the 221-B Building and from cooling stored capsules in the WESF pool cells. This stream will continue to receive discharge from the B Plant Chemical Sewer stream as defined in TPA milestone M-17-04B until start-up of the Treated Effluent Disposal System planned by June 1995.

The current combined flow rate for the B Plant Cooling Water and B Plant Chemical Sewer streams is approximately 1600 to 1700 gallons per minute to the 216-B-3 Pond.

<u>AY/AZ Tank Farm Steam Condensate</u> (M-17-28)

The steam condensate from the steam heating coils in the AY/AZ Tank Farm is routed for discharge into the Double shell tanks and is not being discharged to the environment. This effluent stream was previously discharged to the 216-A-08 Crib. The cease discharge date of September 1991 was included as an M-17 interim milestone in order to provide assurances that discharge would not resume to the 216-A-08 Crib until after BAT/AKART is approved by the EPA and Ecology and implemented, the Sampling and Analysis Plan (SAP) is approved, and if supported by an environmental impact assessment agreed to by the EPA and Ecology.

The current stream flow rate is zero, with the stream being routed to the DSTs. Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations. The stream will continue to be routed to the DSTs until these conditions are met.

<u>242-A Evaporator Process Condensate</u> (M-17-29)

The process condensate from the 242-A Evaporator is not being generated because the 242-A Evaporator is undergoing life extension maintenance. Disposal of the 242-A Evaporator process condensate into the 216-A-37-1 Crib was discontinued in 1989 when the Evaporator was shutdown. The cease discharge date of September 1991 was included as an M-17 interim milestone in order to provide assurances that discharge would not resume to the 216-A-37-1 Crib.

Proposed milestone M-17-29 requires implementation of BAT/AKART for this effluent stream by October 1994 and precludes disposal to the soil column until after BAT/AKART is implemented. When the Evaporator resumes operations, this effluent will be routed to the Liquid Effluent Retention Facility (Project W-105) (LERF) for storage and eventual processing in the 242-A Evaporator/PUREX Plant Condensate Treatment Facility (Project C-018H).

Project C-018H will provide BAT/AKART treatment for this stream. When C-018H is completed and operational, it will treat the process condensate stored in LERF, as well as receiving newly produced process condensate directly from the 242-A Evaporator. The treatment facility will discharge into a land disposal facility after obtaining a State Waste Discharge Permit pursuant to the terms and conditions of WAC 173-216.

Operation of the 242-A Evaporator is critical to the overall Tank Waste Remediation System. The evaporator concentrates existing wastes that must be stored in the Double Shell Tanks (DSTs), and is necessary to alleviate the already critical storage shortage in the DSTs. Inability to operate this facility would lead to halting significant operations including Single-Shell Tank stabilization, 222-S Laboratory operations (including SST characterization work), and discontinuing safety system discharges from operational facilities (i.e. B-Plant, T-Plant, PUREX, PFP, and 340 Facilities).

<u>242-A Evaporator Cooling Water</u> (M-17-30)

The cooling water from the 242-A Evaporator is currently being discharged to the 216-B-3 Pond System. The current (shutdown/maintenance mode) stream flow rate is 10 to 12 gallons per minute. When the 242-A Evaporator is operational (concentrating waste), the combined flow rate of all the cooling water contributors is a approximately 2,700 gal/minute.

Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations. Continued discharge of this stream until BAT/AKART is implemented is essential to the operation of the DST system and overall tank waste remediation at Hanford.

The cooling water stream consists of several contributors, with the condenser cooling water being a majority of the flow. The condenser cooling water is a once-through, non-contact cooling water. Separate streams of cooling water exist for the main condenser and the secondary condensers (inner and outer condensers).

Additional contributors are non-contact raw water and steam condensates from support equipment. The condenser cooling water goes through a sampler and monitor, and then the combined flow is discharged to the 216-B-3 Pond. The cooling water is maintained at a higher pressure than the condensate in order to preclude contamination of the cooling water from tube leaks. However, in the unlikely event that the cooling water becomes contaminated, the evaporator is shut down.

Operation of the 242-A Evaporator is critical to the overall Tank Waste Remediation System. The evaporator concentrates existing wastes that must be stored in the Double Shell Tanks (DSTs), and is necessary to alleviate the already critical storage shortage in the DSTs. Inability to operate this facility would lead to halting significant operations including Single-Shell Tank stabilization, 222-S Laboratory operations (including SST characterization work), and discontinuing safety system discharges from operational facilities (i.e. B-Plant, T-Plant, PUREX, PFP, and 340 Facilities).

<u>242-A Evaporator Steam Condensate</u> (M-17-31)

The Steam Condensate from the 242-A Evaporator is discharged to the 216-B-3 Pond System. Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations. The current stream flow rate is zero, due to the 242-A Evaporator facility being shutdown for life extension upgrades. When the 242-A Evaporator is operational (concentrating waste), the steam condensate flow rate is approximately 60 to 70 gal/minute.

The steam condensate stream consists of several contributors, with the main contribution coming from the re-boiler steam condensate. The re-boiler utilizes low pressure steam to heat the tank waste. The waste is then introduced into the evaporator vessel, where a significant portion of the water and volatiles vaporize. These are then removed as process condensate, and the reduced volume of tank waste is returned to the DSTs. The 242-A Evaporator cannot operate without the re-boiler and its associated steam.

Additional contributors to this stream are non-contact streams that include steam strainer condensate, steam separator condensate and strainer blow down, pressure control valve seal water, water filter catch pan drainage, and sampler cooler raw water. The combined stream flow is sampled and monitored for radioactive contamination and is discharged to the 207-A Retention Basin. The steam condensate is then sampled at the 207-A basin and verified as acceptable prior to being discharged to the 216-B-3 Pond.

Operation of the 242-A Evaporator is critical to the overall Tank Waste Remediation System. The evaporator concentrates existing wastes that must be stored in the Double Shell Tanks (DSTs), and is necessary to alleviate the already critical storage shortage in the DSTs.

Inability to operate this facility would lead to halting significant operations including Single-Shell Tank stabilization, 222-S Laboratory operations (including SST characterization work), and discontinuing safety system discharges from operational facilities (i.e. B-Plant, T-Plant, PUREX, PFP, and 340 Facilities). Continued discharge of this stream until BAT/AKART is implemented is essential to the operation of the DST system and overall tank waste remediation at Hanford.

<u>241-A Tank Farm Cooling Water</u> (M-17-32)

The cooling water from the 241-A Tank Farm is disposed to the 216-B-3 Pond System. The current stream flow rate is 600 gallons per minute. Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations.

The 241-A Tank Farm cooling water stream is required to support the ventilation system for the 241-AY and 241-AZ Double Shell Tank Farms. The cooling water is used in once through condensers to condense contaminated vapors that come from the storage of high heat wastes in these DSTs.

Loss of this cooling water could lead to failure of the ventilation system control equipment (including HEPA filters). Operation of the ventilation system is an operational safety requirement, with the potential for an uncontrolled discharge to the environment if the system is not operated.

Continued discharge of this stream until BAT/AKART is implemented is essential to the operation of the Aging Waste Tanks in the DST system.

244-AR Vault Cooling Water (M-17-33)

The cooling water from the 244-AR Vault is disposed to the 216-B-3 Pond System. Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations. The current stream flow rate is 5 to 15 gallons per minute.

The 244-AR Vault is utilized for secondary containment for transfer lines serving B-Plant, along with the potential for future pre-treatment missions. The continued operation of the facility is essential to ensure that B-Plant waste transfers are being contained. The cooling water stream consists of two contributors, including HVAC system drainage and compressor cooling water.

Both of these contributors are required to keep instrumentation operational and for overall safety of the standby facility. Continued discharge of this stream until BAT/AKART is implemented is essential to maintain 244-AR Vault in a safe condition.

2724-W Laundry Waste Water (M-17-34)

The waste water from the 2724-W Laundry is disposed to the 216-W-LC Crib. Proposed milestone M-17-34 requires that discharge of this effluent be discontinued in January 1995, the date of initiation of operations of the new Decontamination Laundry (Project B-503).

The 2724-W Laundry Waste Water is the result of the operations at the 2724-W laundry facility. All soiled protective work clothing used on the Hanford site is cleaned at the facility. Protective clothing is required for worker safety during cleanup of the Hanford Site. This stream is discharged to the 216-W-LC Crib, which started operation in 1982.

183-D Filter Backwash (M-17-36)

The Filter Backwash water from the 183-D Water Treatment Facility is discharged to the 100-D Pond and averages approximately 2 gpm. Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations.

This effluent stream results from back-washing the sand filters which are used during the processing of raw water from the Columbia River prior to use as drinking water and fire protection water to the 100-D, 100-H and 100-F Areas.

At present, the 183D Building is the only plant capable of furnishing fire protection water and potable water to these areas. Thus, the effluent stream is required as long as the areas are maintained as habitable spaces.

<u>284-E Powerplant Waste Water</u> (M-17-37)

The 284-E Powerplant waste water discharges to the 216-B-3 Pond System. Discharge is anticipated to continue to the 216-B-Pond System provided such discharge is consistent with the closure schedule and strategy in any Ecology approved 216-B-3 Pond System Closure Plan. Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations.

There are three major contributors to this effluent stream. The first and largest is normal operations. The sources for it are waste waters from cooling operations within the powerplant and waste water from the 283-E Water Treatment Facility. Cooling water is used for such equipment as air compressors, turbines, generators, boiler water jackets, and feed pumps.

The other two contributors are discharges from batch processes. The softener regeneration contributor is associated with the use of a brine solution to recondition zeolite water softener units. Softener regeneration is the contributor with the highest concentration of dissolved solids. The third contributor is powerplant blow down, which is the discharge from the operation of blowing down the boilers to remove scaling.

Because the 284-E Powerplant provides steam for heat purposes to many buildings in the 200 Areas, there is some seasonal variance in the flow rates, with the winter flow rates being higher.

The basic requirement for heating and processing steam is determined by the mission requirement as defined by DOE. Potable water and fire protection water is a basic requirement as long as the site is habitable by people. Raw supplies are tied to basic mission requirements.

Elimination of the 284-E Powerplant Waste Water by discontinuing its generation would result in the elimination of processing steam, heating steam, steam for key safety back-up equipment, raw water, potable water, and fire protection water. Key safety back-up equipment includes items such as back-up source for fire protection water pressure and canyon exhaust fans for PUREX and other processing plants.

<u>284-W Powerplant Waste Water</u> (M-17-38)

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The 284-W Powerplant waste water is discharged to the 284-W Powerplant Pond. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this stream by June 1995 and the flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H). Proposed milestone M-17-38 requires that discharge to the 284-W Powerplant Pond be ceased by June 1995.

There are three major contributors to this effluent stream. The first and largest is normal operations. The source for it is waste water from cooling operations within the powerplant. Cooling water is used for such equipment as air compressors, turbines, generators, boiler water jackets, and feed pumps.

The other two contributors are discharges from batch processes. The softener regeneration contributor is associated with the use of a brine solution to recondition zeolite water softener units. Softener regeneration is the contributor with the highest concentration of dissolved solids. The third contributor is powerplant blow down, which is the discharge from the operation of blowing down the boilers to remove scaling.

Because the 284-W Powerplant provides steam for heat purposes to many buildings in the 200 Areas, there is some seasonal variance in the flow rates, with the winter flow rates being higher.

The basic requirement for heating and processing steam is determined by the mission requirement as defined by DOE. Potable water and fire protection water is a basic requirement as long as the site is habitable by people. Raw supplies are tied to basic mission requirements.

Elimination of the 284-W Powerplant Waste Water by discontinuing its generation would result in the elimination of processing steam, heating steam, steam for key safety back-up equipment, raw water, potable water, and fire protection water. Key safety back-up equipment includes items such as back-up source for fire protection water pressure , fire system pumps, ventilation fans, and temperature, moisture control for tank farms.

<u>222-S Laboratory Waste Water</u> (M-17-39)

Waste water from the 222-S Laboratory is discharged to the 216-S-26 Crib. Proposed milestone M-17-39 requires that all discharges to this crib be ceased by no later than June 1995. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this stream by June 1995 and the flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H).

The 222-S Laboratory Complex is the primary laboratory providing the Hanford site with analytical and chemical services. Continued operation of the laboratory is necessary to provide analytical elements of the Tri-Party Agreement and the remediation of Hanford.

Waste water from the complex is sampled and analyzed to ensure that it meets discharge limits for chemical and radioactive constituents, before being released to the 216-S-26 crib. The effluent is mostly steam condensate from the building heating system and discharged cooling water from the building HVAC system. Substantial progress has been made to reduce this flow by installing recirculating vacuum pumps, the flow has been reduced by approximately 60%. However, as long as evaporative cooling is used and steam is the main heat source, the effluent stream will be necessary. The current discharge rate of waste water to the 216-S-26 crib is approximately 7,000 gallons per day in the summer to 15,000 gallons per day in the winter.

The 222-S Laboratory Complex provides essential compliance with analytical elements of the Tri-Party Agreement. In view of the important long-term mission 222-S will play in the remediation of Hanford, continued use of the 216-S-26 Crib is vital until an acceptable alternative for waste water treatment is operational.

<u>S Plant Waste Water</u> (M-17-40)

Disposal of S Plant Waste Water to the 216-S-10 Ditch was ceased in October 1991 in accordance with proposed milestone M-17-40. As a result of proposed TPA milestone M-17-40, ceasing disposal of this effluent stream to the soil column occurred two years earlier than schedule listed in the S Plant Waste Water Stream-Specific Report. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this stream by June 1995 and the flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H).

<u>T Plant Waste Water</u> (M-17-41)

The T Plant Waste Water is discharged to the 216-T-4-2 ditch. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this stream by June 1995 and the flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H). Proposed milestone M-17-41 requires that all discharges to the 216-T-4-2 Ditch be ceased by June 1995.

The T Plant waste water discharged to the 216-T-4-2 ditch has been sampled and does not contain dangerous waste. The major contributors to this stream are non-contact cooling water from heat exchangers for air compressors and a spent-fuel storage pool refrigeration system. Engineering studies underway are evaluating the potential for further modifying or replacing these systems and minimizing these contributors.

Raw water is used to remove heat from a refrigeration system which provides cooling to a fuel storage pool within the T Plant canyon. Currently this is the largest contributor to the T Plant effluent system, generating six gallons per minute. The water-cooled refrigeration system is anticipated to be replaced with an air-cooled unit next year.

Steam condensate contributes the majority of the T Plant waste water stream. Steam delivery piping must be periodically drained of condensate to maintain the system in good working order. Steam is the lifeblood of this 50-year old facility and is used for tank solution transfers during process operations. Steam serves as a primary medium for equipment decontamination, in support of T Plant's mission of providing decontamination services for the Hanford cleanup efforts. Steam provides the heat to T Plant during the colder months. Sufficient electrical power is not available to convert steam-powered systems to electrically operated ones. Shutting off the steam to T Plant would effectively shut down the facility. Swamp coolers contribute a portion of this stream and are necessary to provide a comfortable work atmosphere during the hot summer months.

Minor contributors to the T Plant waste water include blind sumps collecting storm water run-on, safety shower effluents, and floor drains collecting waste water generated during facility housekeeping and maintenance activities. Waste water derived from these sources has a remote potential for being contaminated from a spill of chemical products stored or used in T Plant. To mitigate environmental consequences from such a spill, an elementary neutralization system is being placed in the T Plant waste water system. This system will collect effluents and provides pH monitoring of the waste water. In the event the pH is outside of preset limits, the system will have the capability to neutralize it with either acid or caustic. Effluents within specification will be retained in the 207-T basin and batch discharged through existing piping to the 216-T-4-2 ditch. Out-of specification effluents will be isolated and sent to the appropriate disposal facility.

In addition to the elementary neutralization system, source control methods which minimize the potential for a spill of a hazardous material, are practiced at T Plant. These include double containment or isolation of chemical products from sewer drain areas, product substitution to less-hazardous materials, and blind sumps in chemical storage areas. Blind sumps are a source control method providing retention which can be analyzed prior to pumping to the waste water system. The source of waste water in these blind sumps is infrequent stormwater.

The waste water discharged by T Plant is necessary to support decontamination activities at T Plant. These activities support various waste management and environmental restoration milestones required by the Tri-Party Agreement.

<u>T Plant Laboratory Waste Water</u> (M-17-42)

JUSTIFICATION FOR CONTINUED
LIQUID EFFLUENT DISCHARGES AT THE
HANFORD SITE
June 4, 1992

The T Plant Laboratory Waste Water is discharged to the 216-T-1 Ditch. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this stream by June 1995 and the flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H). Proposed milestone M-17-42 requires that all discharges to the 216-T-1 Ditch be ceased by June 1995.

A major contributor to this stream was non-contact cooling water. This large volume contribution has been discontinued, significantly reducing the quantity of effluent from this facility. The head-end of T Plant, where the laboratory facility is located, now houses personnel performing support functions essential to the operation of T Plant.

Another major contributor, batch discharges of non-hazardous laboratory wastes, were generated during research activities. The laboratory operations have been permanently discontinued and the chemical inventory removed from T Plant.
Besides the minor effluents from emergency showers and eyewash stations, climate control systems contribute the majority of effluent from this facility today. Steam delivery piping must be periodically drained of condensate to maintain the system in good working order. Steam is the lifeblood of this 50-year old facility, providing heat to the Plant. Swamp coolers provide air-conditioning in the hot summer months. Sufficient electrical power is not available to convert these systems to electrically operated ones. Shutting off the steam to T Plant would effectively shut down the facility.

Planned projects include installation of a retention tank to collect all Laboratory waste water and pump it to the elementary neutralization unit. This will provide additional monitoring and spill-retention capability for better management of this waste stream. Combining this stream with the T Plant waste water will also eliminate the need for multiple delivery points to Project W-049H.

<u>2101-M Laboratory Waste Water</u> (M-17-43)

The 2101-M Laboratory Waste Water is discharged to the 2101-M Pond. Proposed milestone M-17-08 requires that BAT/AKART be implemented on this stream by June 1995 and the flow be re-routed to the 200 Area Treated Effluent Disposal Facility (Project W-049H). Proposed milestone M-17-43 requires that all discharges to the 2101-M Pond be ceased by June 1995. Effluent contributions to the waste water stream from 2 of 9 HVAC coolers were eliminated in January 1992, in accordance with proposed milestone M-17-43A.

There are two sources of discharge to the 2101M Pond from the 2101M facility. The 2101M facility HVAC system discharges cooling water and steam condensate to the 2101M Pond. The HVAC system provides cooling and heating to the facility for employee comfort. The discharges are necessary until the HVAC system is upgraded. The other source of discharge to the Pond is from three sinks which supply water for employee use. One sink is in the insulator shop and the other two are located in the labs. These sinks support normal facility operations.

The flow rate of the discharge varies from less than one to 12 gpm. During the winter months the peak flow reaches no more than 12 gpm. In the summer, the flow rate reduces to virtually zero.

Through process knowledge and administrative controls it is known that there are no dangerous wastes discharged to the 2101M Pond. Two of the nine HVAC cooling systems have been eliminated which decreased the flow rate to the pond. The remaining HVAC units will be terminated upon receiving funding and replacement equipment to upgrade the system. The remaining discharges from the sinks will be rerouted to the septic system.

<u>400 Area Secondary Cooling Water</u> (M-17-44)

The 400 Area Secondary Cooling Water is discharged to the 400 Area Pond System. Proposed milestone M-17-00B requires that BAT/AKART be implemented for this effluent stream by October 1997, unless the milestone is revised to accelerate or delay implementation of actions based on the BAT/AKART evaluations.

The 400 Area Secondary Cooling Water, also known as the 400 Area Process Sewer, is discharging between 6 and 56 gallons per minute to one of two percolation ponds. The flow rate is dependent on cooling demand. In general, peak flow occurs during the summer. About 85% of the effluent is from, or in support of, eleven non-contact evaporative cooling towers. These cooling towers provide cooling to various auxiliary systems such as building air conditioning. The balance of the effluent is from pump seal leakage (one is a fire pump; two are potable water pumps), air compressor cooling, and a computer room air conditioner. At no point in the 400 Area is hazardous, dangerous or radioactive material discharged to the process sewer. Any maintenance or operations activities in the 400 Area are rigorously controlled by Administrative Procedures.

The Process Sewer is essential to the habitability of the 400 Area. Without it, the fire suppression, plant instrumentation, and heating and ventilating systems could not be operated. The effluent stream contains only trace amounts of contaminants and the non-contact evaporative cooling tower technology used at the 400 Area is an industry standard.

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