Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

06-ESD-0134

JUL 7 2006

Ms. Greta P. Davis
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99352

Dear Ms. Davis:

CLASS 1 MODIFICATIONS TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT (QUARTER ENDING JUNE 30, 2006)

This letter updates you, in accordance with Hanford Facility Resource Conservation and Recovery Act Permit (Permit) Condition I.C.3, enclosed for your notification are the Class 1 modifications for the quarter ending June 30, 2006. These modifications update information in the List of Attachments and Part III of the Permit. The List of Attachments Class 1 modifications pertain to Attachment 4. Part III Class 1 modifications pertain to the 305-B Storage Facility and Waste Treatment and Immobilization Plant. The Class 1 modifications are being made to ensure that activities are conducted in compliance with the Permit. A record of these modifications is maintained in the Hanford Facility Operating Record. If you have any questions, you may contact me, or your staff may contact Doug S. Shoop, Assistant Manager for Safety and Engineering, on (509) 376-0108.

Sincerely,

for Keith A. Klein
Manager

ESD:ACM

Enclosure

cc: See Page 2

cc w/encl:
T. Z. Smith, ORP
Administrative Record, HF RCRA Permit, H6-08
Environmental Portal, LMSI
Ecology NWP Library
HF Operating Record (S. A. Thompson, FH)

cc w/o encl:
R. Bond, Ecology
L. J. Cusack, Ecology
S. L. Dahl-Crumpler, Ecology
L. L. Fritz, FH
J. Hedges, Ecology
J. P. Henschel, BNI
A. K. Ikenberry, PNNL
M. N. Jaraysi, CH2M
R. J. Landon, WCH
E. Van Mason, Ecology

Hanford Facility RCRA Permit Modification Notification Forms

Permit Attachment 4
DOE/RL-94-02, Hanford Emergency Management Plan

Index

Submitted by Co-Operator:

Anthony M. Umek — 5/31/06 Date

Reviewed by RL Program Office:

Doug S. Shoop — 6/5/06 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Hanford Emergency Management Plan, DOE/RL-94-02	**Permit Attachment 4**

Description of Modification:

Remove and replace Section 2.0 with the attached Section 2.0.
Section 2.0, §2.2:

2.2 EMERGENCY RESPONSE ORGANIZATION STRUCTURE

Emergency response on the Hanford Site is modeled after the ~~NFPA Incident Command~~ National Incident Management System. As such, the Hanford Incident Command System is an integrated emergency management system with clearly defined responsibilities and communication pathways that allows predesignated and trained individuals to jointly determine and implement incident mitigation strategies.

• • •

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.8
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.8. Changes to remove permit conditions that are no longer applicable (i.e., because the standards upon which they are based are no longer applicable to the facility).

Modification Approved: ☐ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:

G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Hanford Emergency Management Plan, DOE/RL-94-02	**Permit Attachment 4**

Description of Modification:

Remove and replace Section 3.0 with the attached Section 3.0.
Section 3.0, Table 3-1:

Table 3-1. Memorandums of Understanding

PARTIES	SERVICES/AREAS OF COOPERATION	POINTS OF CONTACT	CONSTRAINTS	DATE	EXPIRATION DATE	WHERE ON FILE
...	...	...	...	...	...	...
AREVA NP, Inc. ~~Framatome ANP~~ (formerly ~~Siemens Power Corporation~~ Framatome ANP)	Establishes means by which RL can ~~provide consequence assessment and meteorological information to~~ assist ~~Framatome ANP~~ AREVA NP through use of RL facilities during an emergency at the ~~Framatome ANP~~ AREVA NP plant in Richland, Washington	~~Framatome ANP~~ AREVA NP	Emergencies affecting the Hanford Site or Hanford facilities takes precedence over all other uses of the ~~UDAC~~ RL facilities ~~and/or staff~~.	01/19/00 11/21/05	Remain in effect for five years from effective date, at which time it shall be reviewed and renegotiated, reissued, or terminated. Either party may withdraw upon 30 days written notice. Continue until canceled by either of the parties upon 30 days written notice to the other party.	RL SES
...	...	...	...	...	...	...

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class '1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:

G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class '1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Hanford Emergency Management Plan, DOE/RL-94-02	**Permit Attachment 4**

Description of Modification:

Remove and replace Appendix C with the attached Appendix C.
Appendix C, Page 1 of 2:

EQUIPMENT[1]	DESCRIPTION	NORMALLY LOCATED[2]
...	...	...
Brush Fire Trucks 6 each	Examples of equipment contained on brush fire trucks: • 500 gal/min (1,892.7 L/min) pump; • ~~1,500 gal (5,678.1 L)~~ 2,500 gal (9463.5 L) water tank; • 6x6 with ~~2,000 gal (7,570.8 L)~~ 2,500 gal (9463.5 L) porti-tank; and • hose, nozzles, fittings, and tools.	1 at Station 91 2 at Station 92 2 at Station 93 1 at Station 94
...	...	...
Ambulances 6 each	Examples of equipment contained on ambulances: • life support systems; and • medical and emergency response supplies.	1 at Station 91 2 at Station 92 ~~1~~ 2 at Station 93 ~~2~~ 1 at Station 94
...	...	...

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: (d)(i) Other modifications.
Enter wording of WAC 173-303-830, Appendix I Modification citation:
d.i. Review and approve as a Class 1 modification

Modification Approved: ☐ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:

G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Hanford Emergency Management Plan, DOE/RL-94-02	**Permit Attachment 4**

Description of Modification:

Remove and replace Appendix C with the attached Appendix C.
Appendix C, Page 2 of 2:

EQUIPMENT[1]	DESCRIPTION	*NORMALLY LOCATED[2]
...	...	...
Hazardous Materials Vehicle 2 each	Examples of equipment contained on hazardous materials vehicle: • protective clothing for Hazardous Materials Response Team; • breathing apparatus for Hazardous Materials Response Team; • diking, plugging, and damming equipment; • detection instruments for Hazardous Materials Response Team; • tools for plugging and repairing leaking containers; • overpack containers for leaking containers; • command module with material safety data sheets, software, and portable meteorological station; and • tools and communications devices necessary to provide communications during emergency response activities.	~~1~~ 2 at Station 92 ~~1 at Station 93~~
...	...	...
Rescue Truck ~~1~~ 2 each	Examples of equipment contained on rescue truck: • heavy and light rescue; • water rescue; • hi/lo angle rescue; and • trench rescue.	1 at Station 92 1 at Station 93

[1]Emergency response vehicles identified in this table shall be serviced and maintained to keep them in safe operating condition and ready for response at all times. Should a unit be out of service for more than 30 days, written justification shall be provided to the Hanford Fire Department for review and approval. The written justification, when approved, will be maintained by the Hanford Fire Department until the equipment is returned to service.

*[2]The Hanford Fire Department Chief has the authority to: 1) direct the placement of equipment as needed to control emergency events; and 2) take proactive action and assign different vehicle locations based on conditions such as fuel moisture content, area fire history, work in progress, or other conditions that could arise.

WAC 173-303-830 Modification Class [1 2]	Class 1	Class '1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: (d)(i) Other modifications.
Enter wording of WAC 173-303-830, Appendix I Modification citation:
d.i. Review and approve as a Class '1 modification

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class '1, if appropriate.

Hanford Facility RCRA Permit Modification Notification

Permit Attachment 4
DOE/RL-94-02, Hanford Emergency Management Plan

Replacement Index

DOE/RL-94-02, Section 2.0
DOE/RL-94-02, Section 3.0
DOE/RL-94-02, Appendix C

2.0 EMERGENCY RESPONSE ORGANIZATION (INTERNAL)

The mission of the Hanford Site ERO is to ensure that, in the event of an emergency, actions will be taken to prevent or minimize impacts to workers, the public, site, facilities, and the environment. The Hanford Site ERO shall be structured and staffed with adequate, trained personnel, including designated alternates, to enable the timeliest and most effective response possible, while meeting the requirements as set forth in DOE O 151.1 and other applicable Federal and state regulations. Hanford facilities and response organizations such as the Hanford Fire Department are governed by the standards and regulations of the National Fire Protection Association (NFPA) and Code of Federal Regulations, as well as the Washington Administrative Code and Revised Code of Washington for emergency response, training, and on-scene emergency management. Responsibilities and tasks shall be assigned to individuals identified by name, title, or position.

2.1 U.S. DEPARTMENT OF ENERGY, RICHLAND OPERATIONS OFFICE/ OFFICE OF RIVER PROTECTION AND HANFORD SITE CONTRACTOR ROLES AND RESPONSIBILITIES

The Hanford Site ERO has been developed to allow RL/ORP to maintain the option to assume overall management, direction, and control of site emergencies while the site contractors continue their management and operational roles. Contractor and RL/ORP roles and responsibilities are delineated below.

2.1.1 Hanford Site Contractors

Hanford Site contractors with responsibilities for facility operations/activities or for providing site services shall coordinate with one another and participate in the development and maintenance of a comprehensive Hanford Site emergency management program that meets the mission of the Hanford Site ERO. Such programs shall contribute to DOE's comprehensive Emergency Management System by promoting effective and efficient integration of applicable requirements, including those promulgated by other agencies.

2.1.1.1 Event Contractor. The site contractor that maintains responsibility for the facility or activity with the emergency is designated as the event contractor. The event contractor responsibilities include:

- prompt and accurate categorizing of occurrences in accordance with this plan and DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information*;
- initially classifying the emergency, if warranted;
- assisting, as necessary, in mitigating the emergency situation;
- initiating actions to protect workers within their geographic area of responsibility;
- contacting the POC and providing initial emergency information;

- requesting support from nonevent site contractors as necessary;
- establishing an initial Incident Command Post (ICP) and, as applicable, assigning other Incident Command Organization functions as delineated in Table 2-1, and other supporting entities such as radiological control technicians and industrial hygienists as available;
- arranging for employer notification (if not an event contractor employee), decontamination, and transport of a contaminated corpse;
- providing personnel to staff the Hanford EOC to include senior management staff and technical representatives;
- providing event status information to the Hanford EOC;
- ensuring proper cleanup, transportation, and storage of hazardous materials generated as a result of the event; and
- providing funding for performance of emergency response and recovery duties and replacement of supplies used by other contractors for event response.

Other site contractors shall provide support to the event contractor for actions related to the services they provide on the site, such as notifications, fire, security, or medical services.

2.1.1.2 Fluor Hanford, Inc. In addition to event contractor responsibilities for the Hanford Site facilities it operates, FHI emergency responsibilities include:

- fire suppression, emergency rescue, emergency medical, hazardous materials response, fire protection services, and incident response provided by the Hanford Fire Department;
- site security, access control, emergency service call answering and dispatching, and transportation emergency response contact provided through the Hanford Patrol;
- emergency communications including onsite and offsite notifications provided by the ONC;
- staffing of a 24-hour Emergency Duty Officer (EDO) position;
- management and staffing of the Hanford EOC;
- onsite radiation monitoring;
- environmental radiation sampling and monitoring;
- transportation;
- services in support of reentry and recovery operations, such as decontamination, engineering, equipment maintenance, utilities, procurement, and waste disposal;
- radio, telecommunications, computer, and audio/visual services; and

- managing site-wide radiological tasks which includes plume assessment and tracking; large group personnel survey, sort, and decontamination; survey of individuals evacuated from the Columbia River at the Vernita bridge and White Bluffs; and radiological control support (e.g., radiological control technicians, supervisory personnel, exposure evaluators as agreed upon by PNNL) during medical care of radiation accident patients at the local hospitals.

2.1.1.3 Pacific Northwest National Laboratory. In addition to event contractor responsibilities for the Hanford Site facilities it operates, PNNL emergency responsibilities include:

- weather information from the Hanford Site meteorology station;
- health physics technical support;
- evaluation of radiological doses to personnel in the event of a criticality emergency; and
- senior management and technical staff support to the Hanford EOC.

2.1.1.4 Washington Closure Hanford, Inc. In addition to event contractor responsibilities for the Hanford Site facilities it manages, WCH emergency responsibilities include:

- senior management and technical staff support to the Hanford EOC; and
- radiological control technician support.

2.1.1.5 AdvanceMed Hanford. AMH has no event contractor responsibilities as delineated in subsection 2.1.1.1. However, emergency services provided by AMH include:

- minor emergency medical care and consultation;
- medical support for chemically, biologically, and radiologically contaminated patients;
- hostage negotiation and critical stress debriefing support;
- coordination with and support to community medical services;
- senior management and technical staff support to the Hanford EOC; and
- support to the Hanford Fire Department in the event of a large-scale mass casualty event on the Hanford Site as requested.

2.1.1.6 CH2M Hill Hanford Group, Inc. In addition to event contractor responsibilities for the Hanford Site facilities it manages, CH2M Hill emergency responsibilities include:

- senior management and technical staff support to the Hanford EOC;
- radiological control technician support; and
- health technician support.

2.1.1.7 Advanced Technologies and Laboratories, Inc. ATL emergency responsibilities include:

- senior management and technical staff support to the Hanford EOC; and
- laboratory services.

2.1.2 U.S. Department of Energy, Richland Operations Office/Office of River Protection

RL/ORP shall have a trained emergency response staff and shall provide facilities/activities under their cognizance with:

- direction to implement emergency management policy and requirements;
- direction in emergency planning and preparedness activities;
- support and assistance (e.g., legal, financial, procurement, engineering, human resources) during emergencies; and
- support and assistance in resolving issues in site/facility/activity emergency management programs, as well as assessments of site/facility/activity emergency management programs.

2.1.2.1 RL/ORP Manager. The RL/ORP Manager (or designee) is the senior official who serves as the RL/ORP Emergency Manager with decision-making responsibilities, and has the ultimate responsibility and authority for Hanford Site emergency response activities to ensure that effective management is provided for response to emergencies. If the event involves an ORP facility, the ORP Manager (or designee) will serve as the Emergency Manager. The RL Manager (or designee) will serve as the Emergency Manager in all other events.

The RL/ORP Manager is further responsible for overseeing the performance of onsite activities necessary to place the site in a safe condition and to minimize or terminate uncontrolled releases of hazardous materials, and for interfacing with offsite agencies and the public.

The RL/ORP Manager shall be supported by personnel with communications, technical, and liaison and public affairs expertise and shall ensure fulfillment of his or her responsibilities through direction of the Policy Team and RL/ORP representatives assigned to offsite emergency centers. The responsibilities and staffing of the Policy Team are described in subsection 2.2.2.1.1.

2.1.2.2 RL/ORP Senior Management. As designated by the RL/ORP Manager, senior management personnel or their designees shall fill ERO positions that include:

- members of the Policy Team;
- representatives to the Site Management Team and JIC;
- representatives to state EOCs; and
- representatives to DOE Headquarters (HQ), as requested.

2.1.2.3 DOE Facility Representative. The DOE Facility Representative serves in an oversight and liaison capacity at the ICP during declared emergencies. The primary function of the DOE Facility Representative is to observe ICP activities and, if required, report problems about facility conditions, event status, or mitigative actions to the Facility Representative Liaison in the Hanford EOC.

2.2 EMERGENCY RESPONSE ORGANIZATION STRUCTURE

Emergency response on the Hanford Site is modeled after the National Incident Management System. As such, the Hanford Incident Command System is an integrated emergency management system with clearly defined responsibilities and communication pathways that allows predesignated and trained individuals to jointly determine and implement incident mitigation strategies.

The Hanford Site ERO has two distinct components – the Incident Command Organization and the DOE Hanford EOC – each with emergency direction and control responsibilities.

The Incident Command Organization consists of the Facility/Building Emergency Response Organization with responsibility for implementing emergency response activities at the event facility, and site contractor emergency response personnel (i.e., Hanford Fire Department, Hanford Patrol) with the responsibility for on-scene mitigation.

For low-hazards and hazardous facilities with a Building Emergency Director (BED) or Building Warden (BW) on the premise at the time of the incident, the BED/BW shall be responsible for implementing appropriate emergency response procedures (e.g., protective actions, event classification, notification) until arrival of the IC. Upon arrival of the IC, the Facility/Building Emergency Response Organization becomes part of a consolidated Incident Command Organization. The BED/BW shall retain responsibility for direct configuration control over facility systems and components while the IC assumes the overall management strategy associated with the incident and ensures that all functional areas are appropriately staffed and working cohesively towards mitigation of the incident.

If the BED/BW is not present at the low-hazards or hazardous facility at the time of an incident (e.g., during off shift hours), the IC shall perform the duties of the BED/BW in addition to his/her own duties. The respective on-call BED/BW shall be summoned to the scene based upon the BED/BW listing located in the POC or PNNL Control Room. If necessary, the BED/BW will make the classification decision (i.e., Alert, Site Area Emergency, or General Emergency) and determine if the RCRA contingency plan implementation requirements have been met prior to responding to the scene. If the on-call BED/BW is not available and timely classification is necessary, the IC may direct the ONC Duty Officer to make the classification decision and determine if the RCRA contingency plan implementation requirements have been met. Upon arrival of the BED/BW at the scene, the IC will turn over the remaining BED/BW duties.

The Hanford EOC has the responsibility to monitor and provide support for the onsite response, assist with issue resolution, assess the offsite impacts, and interface with offsite agencies and the public.

Both components of the Hanford ERO are depicted on Figure 2-1 and further delineated in the respective subsections below.

For nonfacility events (e.g., onsite transportation incidents, wildland fires), the IC shall be responsible for coordinating and performing the response activities. The EDO shall have the responsibility for further classifying the event (i.e., as an Alert, Site Area Emergency, or General Emergency) and ensuring that the RCRA contingency plan implementation requirements have been met in accordance with subsection 4.2, if warranted. If the EDO is not available and timely classification is necessary, the IC may direct the ONC Duty Officer to make the classification decision and determine if the RCRA contingency plan implementation requirements have been met, if warranted. After the immediate threat of a release has been stabilized or eliminated, remaining duties will be delegated from the IC to the organization that offered the hazardous substance for transportation.

In all events, the Incident Command Organization shall have the authority to commit the resources needed to carry out the emergency response; and be thoroughly familiar with applicable plans and procedures, operations and activities at the facility, location and properties of all wastes handled, location of all records within the facility, and the layout of the facility.

2.2.1 Incident Command Organization

The Hanford Incident Command System provides a graduated response mechanism for unusual conditions and emergencies on the Hanford Site.

Depending on the severity of the event, the Incident Command Organization is comprised of two main groups — the Facility/Building Emergency Response Organization, and site contractor emergency response personnel (i.e., Hanford Fire Department, Hanford Patrol). Other emergency response support personnel may be called upon to assist in the mitigation of an event depending on the type of emergency, but are not considered part of the Hanford ERO. The appropriate personnel from each group may be located at either the event scene or ICP, or

staging area. A description of each group, including roles and responsibilities, is provided in the following subsections.

In its most basic form, the Incident Command Organization may be staffed in its entirety by facility or process personnel as deemed necessary by the BED or BW. In these instances, the BED or BW coordinates emergency response efforts at the scene to include oversight of mitigation efforts, use of appropriate personal protective equipment, facility protective actions, and relevant notifications. Examples of such events that do not require assistance from outside the facility (termed incidental responses) include small releases of known substances when mitigation can be accomplished by trained on-scene personnel, minor first aid cases, noninjury contamination incidents, and nonemergency plant responses.

As incidents escalate, the Hanford Incident Command System enables the use of additional site contractor emergency response personnel to mitigate the event. Requests for such additional site contractor emergency response personnel are made to the POC via the 911 emergency number (or 373-3800 for cellular telephones) and, where applicable, automated alarm systems. This level of response requires the designation of an IC. The IC is responsible for the overall management strategy and for ensuring that all incident scene actions are coordinated and conducted safely. The IC will make decisions regarding the level of response required to include responding to events that involve multiple facilities and/or multiple areas. The responding Hanford Fire Department senior officer for events involving fire, medical, hazardous materials, or rescue shall be the IC and also fulfill the role of the senior emergency response official. During security events, the Hanford Fire Department and Hanford Patrol will operate under a unified command system with Hanford Patrol making all decisions pertaining to security.

Additionally, an ICP shall be established as required to meet the needs of the event. The ICP shall be established in a safe location near the incident scene. Organizations supporting the ICP retain responsibility for their technical operations and provide facility expertise to the IC. The IC is responsible for the health and safety of personnel at the event scene (i.e., the impacted area under his/her direct control) and for the overall management strategy associated with the incident to ensure that functional areas are appropriately staffed and working cohesively towards mitigation of the incident.

The Incident Command Organization is staffed by pre-appointed and trained individuals as delineated in Table 2-1. Personnel working in support of the Incident Command Organization delineated in Table 2-1 must complete initial, annual, and ongoing training on their respective roles, responsibilities, and authorities within the Incident Command Organization. Drills and exercises are used to provide a format for Incident Command Organization responders to demonstrate their proficiency.

Contractor personnel shall provide a BED or BW for the purpose of supporting the Incident Command Organization as soon as possible. In the event of full implementation of the Incident Command Organization, additional facility personnel shall be available to support required functions.

Figure 2-1. Hanford Site Emergency Response Organization.

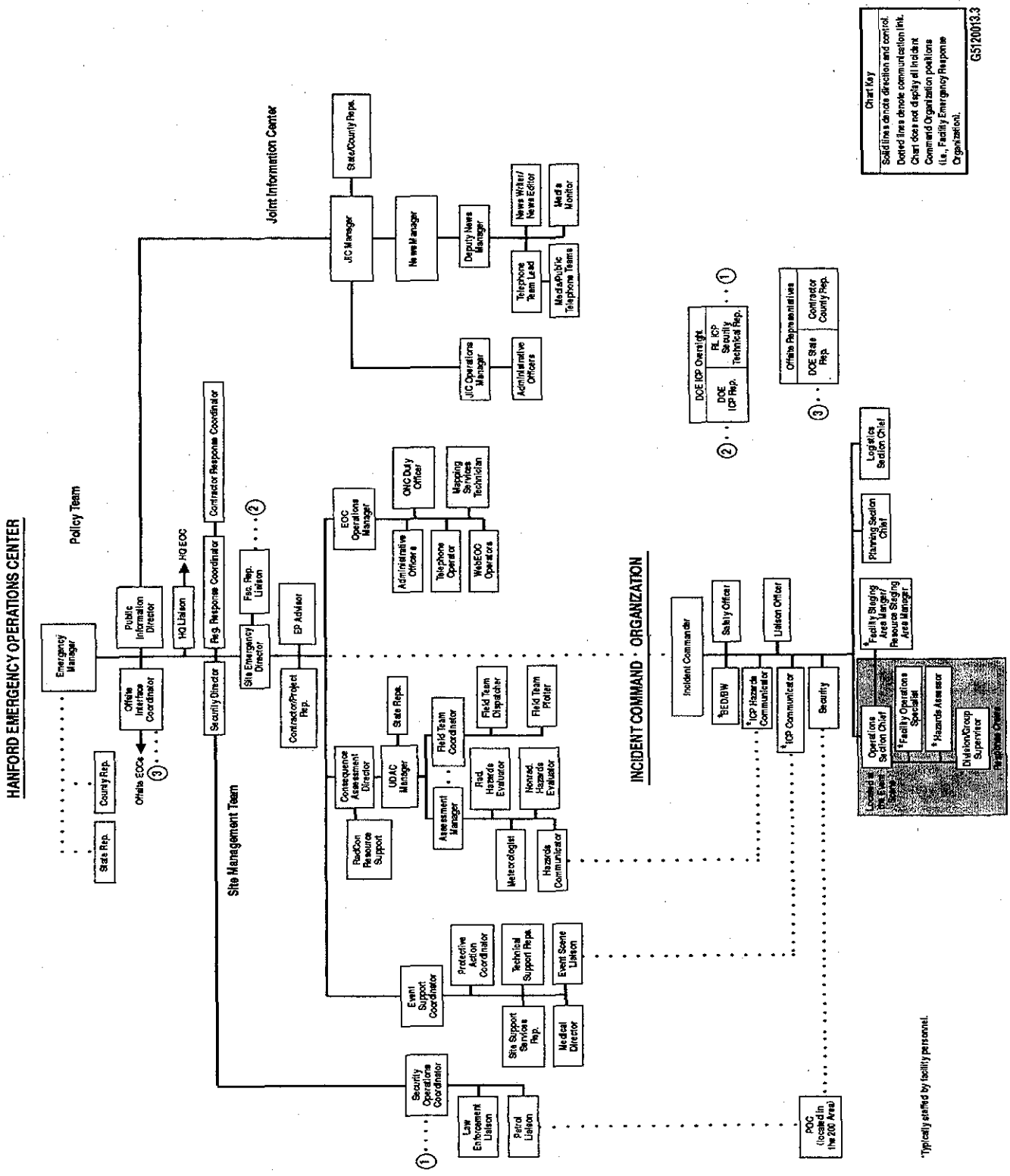

Table 2-1. Incident Command Organization Functions.

FUNCTION	RESPONSIBLE STAFFING
Incident Commander	Hanford Fire Department[1]
Building Emergency Director/ Building Warden	Affected facility
Liaison Officer	FHI or appropriate contractor personnel
Safety Officer	Hanford Fire Department
ICP Communicator	Affected hazardous facility
ICP Hazards Communicator	Affected hazardous facility
Facility Operations Specialists	Affected facility
Operations Section Chief	Hanford Fire Department/Hanford Patrol
Radiological Hazards Assessor	Affected facility radiological control manager (or equivalent)
Chemical Hazards Assessor	Hanford Fire Department, on-call Industrial Hygienist, or affected facility
Planning Section Chief	Hanford Fire Department
Logistics Section Chief	Hanford Fire Department
Resource Staging Area Manager	Hanford Fire Department
Facility Staging Area Manager	Affected facility

[1] During security events, the Hanford Fire Department and Hanford Patrol will operate under a unified command system with Hanford Patrol making all decisions pertaining to security.

2.2.1.1 Facility/Building Emergency Response Organization. Hanford Site facilities are divided into one of three types – administrative, low-hazards, and hazardous – depending on the hazards associated with the facility. Personnel and resources at the facility level comprise initial response capability for an emergency. Facilities shall direct appropriate emergency response actions, as delineated in the respective sections below, within the area under their control and at the scene of the emergency, including effective coordination with the IC and the Hanford EOC. Initial direction and control of emergency response at the facility prior to establishment of an ICP is the responsibility of the Facility/Building Emergency Response Organization.

A list of all BEDs and BWs assigned to low-hazards and hazardous facilities shall be located in the ONC in accordance with the Hanford Facility RCRA Permit (Dangerous Waste Portion) General Condition II.A.4. The list shall include telephone numbers (home and work) to ensure that these individuals can be reached 24 hours per day.

2.2.1.1.1 Administrative Facilities. Administrative facilities are defined as onsite office buildings or general-purpose facilities. The governing requirement for such facilities is 29 CFR 1910.38, which means that facilities where personnel are evacuated from the danger area when an emergency occurs, and are not permitted to assist in handling the emergency, are exempt from 29 CFR 1910.120(q) requirements.

The building management for administrative facilities shall assign BWs or BEDs (primary and alternates) who shall manage and control all aspects of the initial facility response and shall direct an emergency organization made up of individuals within the facility who will assist in the protection of personnel, the environment, and property. Personnel may take emergency actions to report an emergency, initiate protective action including personnel accountability, and provide control of personnel while implementing protective actions. Typically, three emergency positions are identified for these response actions: the BW/BED, Staging Area Manager, and Personnel Accountability Aides (or other contractor-designated names). These positions may also be present in low-hazards and hazardous facilities but only for emergency actions as required in 29 CFR 1910.38 and not for 29 CFR 1910.120. The BW/BED is responsible for emergency response at the event scene until arrival of the IC.

In addition, the building management, or designee, shall be responsible for:

- assigning and ensuring the training of the BW/BED, personnel accountability aides, and staging area managers (or other contractor-designated names); and
- maintaining the facility emergency response information boards/building emergency procedures.

Specific responsibilities of the BW/BED shall include, as applicable:

(a) activating internal facility alarms or communications systems, where applicable, to notify building occupants of protective actions to be taken;

(b) ensuring that a 911 telephone call is made when emergency assistance is required;

(c) assisting the IC, as necessary, in mitigating emergencies within the assigned building; and

(d) ensuring that building occupants take appropriate protective actions in response to events occurring in other onsite geographic areas or adjacent facilities.

2.2.1.1.2 Low-hazards Facilities. Low-hazards facilities are defined as facilities that cannot generate an Alert, Site Area Emergency, or General Emergency but contain hazards not found in administrative facilities. These facilities are typically subject to requirements driving preparation of an environmental, safety, and health related emergency preparedness plan/procedure, which include, but are not limited to, RCRA, CERCLA, the Toxic Substances Control Act, and the Occupational Safety and Health Administration (OSHA).

The building management for low-hazards facilities shall assign BWs or BEDs (primary and alternates) who shall manage and control all aspects of the initial facility response and direct a Facility/Building Emergency Response Organization made up of individuals within the facility who will assist in the protection of personnel, the environment, and property. The BW/BED is responsible for emergency response at the event scene until arrival of the IC.

In addition, the building management, or designee, shall be responsible for:

- assigning and ensuring the training of the Facility/Building Emergency Response Organization as necessary to support the Hanford Fire Department as the RL/ORP-designated hazardous materials emergency response agency;
- maintaining building emergency plans/procedures or facility-specific emergency response procedures, as applicable, in accordance with subsection 14.3.1;
- ensuring that facility personnel are aware of hazards; and
- ensuring that facility personnel are trained to respond to emergencies.

Specific responsibilities of the BW/BED shall include, as applicable:

(a) determining when an event has occurred or a condition exists that requires response in accordance with applicable state and Federal regulations;

(b) activating internal facility alarms or communications systems, where applicable, to notify building occupants of protective actions to be taken;

(c) ensuring that a 911 telephone call is made when emergency assistance is required;

(d) reporting events or conditions in accordance with applicable state and Federal regulations;

Permit requirement: Subsection 2.2.1.1.2(first paragraph), Class 1 Modification 9/30/99
Permit requirement: Subsection 2.2.1.1.2(a), Class 1 Modification 9/30/99
Permit requirement: Subsection 2.2.1.1.2(d), Class 1 Modification 9/30/99

(e) establishing an initial ICP and assigning other Incident Command Organization functions in accordance with established procedures to provide effective control at the event scene;

(f) assisting the IC, as necessary, in the mitigation of emergencies within the assigned building by:

- identifying the character, exact source, amount, and areal extent of any released material;
- assessing possible hazards to human health and the environment that may result from the release, fire, or explosion;
- taking reasonable measures (e.g., stopping processes/operations, collecting/containing released waste, removing/isolating containers) necessary to ensure that fires, explosions and releases do not occur, recur, or spread to other dangerous waste;
- monitoring for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, as appropriate; and

(g) ensuring that building occupants take appropriate protective actions in response events occurring in other onsite geographic areas or adjacent facilities.

The duties of the Facility/Building Emergency Response Organization may include, but will not be limited to:

- assisting in the alerting of employees of an emergency situation;
- assisting in building evacuations and building sweeps; and
- providing assistance to the Hanford Fire Department and/or Hanford Patrol to include meeting and directing responders to the event scene, providing safe routes of travel, and providing immediate and constant interface, coordination, and information as the emergency situation requires.

Emergency training requirements for the Facility/Building Emergency Response Organization are delineated in subsection 12.2.2.1.2.

2.2.1.1.3 Hazardous Facilities. Hazardous facilities are defined as facilities capable of generating an Alert, Site Area, or General Emergency as defined by DOE O 151.1. Facilities in this group include reactor or nuclear facilities, or nonnuclear hazard facilities. TSD units containing quantities of wastes or materials capable of generating an Alert or higher emergency will also be categorized as a hazardous facility.

The building management for each hazardous facility shall establish and maintain a Facility/Building Emergency Response Organization with overall responsibility for the initial and ongoing response to and mitigation of an emergency. BEDs (primary and alternates) shall be assigned to manage and control all aspects of the facility response and to direct the Facility/Building Emergency Response Organization at the event scene until arrival of the IC. Initiation of emergency lifesaving measures or support of protective actions for facilities which require self-contained breathing apparatus (SCBA) must not rely entirely on the Hanford Fire Department to provide such equipment on emergency response vehicles. The minimum assumption used for emergency planning for the Hanford Fire Department arrival shall be 10 minutes plus travel time to destination.

A BED (primary or alternate) must be within reasonable proximity to the facility (as defined by contractor policy) if work is being performed which could generate an Alert or higher emergency classification. On-call BEDs, where designated, may be used for facilities where hazardous materials are in storage and stable, and the work being performed is that of surveillance, or the routine activity poses minimal hazards.

The organization, size, and emergency response duties assigned to the Facility/Building Emergency Response Organization shall be based on a graded approach and upon hazards at the facility and the level necessary to support the Hanford Fire Department as the RL/ORP-designated hazardous materials emergency response agency. In addition, the positions and responsibilities of the Facility/Building Emergency Response Organization shall be documented in specific building emergency plans and/or procedures. The content, distribution and organizational approval of the building emergency plan and/or procedures shall be determined by the respective contractor emergency preparedness organization.

NOTE: Building emergency plans are not required for unoccupied hazardous facilities. However, BEDs shall be identified and trained to implement initial emergency response procedures.

The building management, or designee, shall be responsible for:

- assigning and ensuring the training of the Facility/Building Emergency Response Organization as necessary to support the Hanford Fire Department as the RL/ORP-designated hazardous materials emergency response agency;
- maintaining, reviewing, and revising the building emergency plan and applicable facility-specific emergency response procedures in accordance with subsection 14.3.1;
- ensuring that facility personnel are aware of hazards; and
- ensuring that facility personnel are trained to respond to emergencies.

Specific responsibilities of the BED shall include:

(a) determining when an event has occurred or a condition exists that requires appropriate emergency event classification;

(b) activating internal facility alarms or communications systems, where applicable, to implement actions to protect workers within their respective geographic area of responsibility as defined in the building emergency plan or procedures;

(c) assessing the potential or actual onsite and offsite consequences of the emergency;

(d) contacting the POC, via the 911 emergency number, to implement predetermined onsite protective actions and provide initial emergency and classification information in accordance with established procedures;

(e) reporting events or conditions in accordance with applicable state and Federal regulations;

(f) establishing an initial ICP and assigning other Incident Command Organization functions in accordance with established procedures to provide effective control at the event scene;

(g) assisting the IC, as necessary, in the mitigation of emergencies within the assigned building by:

- identifying the character, exact source, amount, and areal extent of any released materials;
- taking reasonable measures (e.g., stopping processes/operations, collecting/containing released waste, removing/isolating containers) necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other dangerous waste,
- monitoring for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, as appropriate; and

(h) ensuring that building occupants take appropriate protective actions in response to events occurring in other onsite geographic areas or adjacent facilities.

The duties of the Facility/Building Emergency Response Organization may include, but will not be limited to:

- assisting in the alerting of employees of an emergency situation;
- assisting in the safe evacuation of the incident scene hazard area;
- providing immediate first-aid if required;
- placing operating systems or controls in a safe configuration;

Permit requirement: Subsection 2.2.1.1.3(a), Class 1 Modification 9/30/99
Permit requirement: Subsection 2.2.1.1.3(e), Class 1 Modification 9/30/99
Permit requirement: Subsection 2.2.1.1.3(g), Class 1 Modification 9/30/99

- implementing or supporting the implementation of protective actions for the general population to include roadblocks and building sweeps;
- assisting in emergency classification and emergency notification of such classification within established regulatory time limits;
- providing assistance to the Hanford Fire Department and/or Hanford Patrol to include meeting and directing responders to the event scene, providing safe routes of travel, and providing immediate and constant interface, coordination, and information as the emergency situation requires;
- serving as emergency response team members in support of the Hanford Fire Department for entry into the incident scene hazard area for mitigation where personnel protective equipment requirements do not specify Level A or Level B dermal protection (refer to Appendix B of CFR 1910.120);
- providing chemical monitoring and assessment, in conjunction with the Hanford Fire Department Industrial Hygienist, for emergency response;
- providing radiological monitoring and assessment for emergency response; and
- providing support for chemical and/or radiological decontamination.

Emergency training requirements for the Facility/Building Emergency Response Organization are delineated in subsection 12.2.2.1.3.

2.2.1.2 Site Contractor Emergency Response Personnel

2.2.1.2.1 Hanford Fire Department. The Hanford Fire Department is the RL/ORP-designated incident command agency for control of all hazardous materials (radiological and nonradiological) and chemical/biological incidents on the site and, as such, controls the fire, hazardous materials, and/or personnel rescue response activities associated with an emergency. In this capacity, the Hanford Fire Department shall provide a hazardous materials response team, as defined in 29 CFR 1910.120(q)(6)(i)-(v) and NFPA 472, as well as a qualified Safety Officer for all emergency response activities.

As a 24-hour operational facility/dispatch center, the Hanford Fire Department also monitors facility fire alarm systems, and coordinates and provides emergency medical services on the Hanford Site. Emergency medical support responsibilities are further delineated in subsection 8.1.1.

2.2.1.2.2 Hanford Patrol. The Hanford Patrol monitors alarm systems and provides security services including coordination of the movement of emergency personnel through security gates, evacuation assistance, and barricade establishment where needed. Additional law enforcement is available through agreements with local and Federal agencies at the request of RL. The Hanford Patrol and Hanford Fire Department operate under a unified command system for security events with Hanford Patrol making all decisions pertaining to security.

Additionally, the POC, a 24-hour operational facility/dispatch center, is responsible for emergency functions that include, but are not limited to:

- operating the site's enhanced 911 system;
- acting as the single point-of-contact to initiate emergency response by
  - notifying the BED/BW (when not on the premises)
  - requesting response from the Hanford Fire Department
  - notifying appropriate on-call personnel
  - activating or requesting activation of appropriate alarm signals;

  NOTE: PNNL uses 375-2400 as single point-of-contact.
- activating the ONC conference bridge upon notification of a declared emergency and implementing onsite protective actions by activating warning sirens and crash alarm telephone systems; and
- receiving emergency response telephone calls during offsite shipments of RL/ORP-owned hazardous materials.

Emergency medical support responsibilities of the Hanford Patrol are further delineated in subsection 8.1.3.

2.2.1.3 Other Emergency Response Support Personnel. Some emergency situations may require facility or site support personnel to be used for emergency response at the event scene that are not assigned positions within the Hanford ERO. These emergency response support personnel – termed either as Skilled Support Personnel or Specialist Employees – are not trained to operate within the Hanford Incident Command System and must only be used for specific tasks defined in the following subsections.

2.2.1.3.1 Skilled Support Personnel. Personnel needed to operate specific support equipment, including those within the incident scene hazard area, but are not addressed in specific emergency response procedures, may be designated as Skilled Support Personnel. Such personnel shall receive a briefing prior to commencing any work. Training requirements in accordance with 29 CFR 1910.120(q)(4) are delineated in subsection 12.2.2.3.1.

2.2.1.3.2 Specialist Employees. Safety professionals and environmental specialists who provide technical advice within their field of expertise, but are not addressed in specific emergency response procedures, may be designated as Specialist Employees. Such personnel will only provide expertise and advise to the IC when requested and may not enter the incident scene hazard area. Training requirements in accordance with 29 CFR 1910.120(q)(5) are delineated in subsection 12.2.2.3.2.

2.2.2 Hanford Emergency Operations Center

The Hanford EOC is an emergency response facility maintained by RL for the purpose of providing an area where personnel may convene during emergency conditions to provide essential response functions. These functions include public information, offsite protective action recommendations, field monitoring and sampling, hazard assessment, oversight of onsite mitigative activities, and oversight of onsite protective actions.

The Hanford EOC shall be activated and operational within one hour upon declaration of an Alert or higher emergency.

The Hanford EOC may also be fully or partially activated in the following situations.

- As directed by the RL/ORP Manager, or designees, when events occur that are not classified as an Alert or higher emergency but where action to provide monitoring or assistance to the event scene or other agencies, is requested. Such events may include:
  - Hanford Site emergency conditions that potentially involve significant onsite or offsite consequences;
  - security events;
  - natural disasters (i.e., earthquake, tornado) that could or does result in significant onsite or offsite public or environmental impact;
  - requests from other government agencies for support of regional emergencies; or
  - threats or acts of terrorism, or when a national emergency is declared by the President of the United States or the United States Congress.
- As requested by the BED/BW, IC, or EDO where action to provide monitoring or assistance to the event scene is needed.
- As requested by the RAP team leader to support a RAP response.
- In response to non-DOE emergencies that affect the Hanford Site.
- In response to TEP events involving the offsite shipment of RL/ORP-owned hazardous materials.

The Hanford EOC is made up of several organizations that are responsible for implementing defined emergency response tasks. These organizational areas are defined in the following subsections. Detailed procedures for the activation, staffing, and operation of the Hanford EOC are contained in DOE-0223, *Emergency Plan Implementing Procedures.*

2.2.2.1 Policy Team. The primary functions of the Policy Team are the oversight of onsite activities, approval and communication of offsite protective action recommendations, approval of reclassification recommendations, oversight of public information activities, and coordination with offsite agencies.

The Policy Team is staffed by the RL/ORP Emergency Manager, Public Information Director, Emergency Preparedness Advisor, Offsite Interface Coordinator, DOE-HQ Liaison, Security Director, Regional Response Coordinator, and the responding state and county representatives.

During security incidents, RL is responsible for decisions that address mitigation of the security event. This involves direction and control of Hanford Site security and patrol forces, and coordination of facility response. However, the Federal Bureau of Investigation (FBI) may exercise the option to take command of security events involving the violation of the Atomic Energy Act of 1954 or other Federal statutes. Associated response by site contractor personnel for personnel and operational safety rests with the IC and the BED.

2.2.2.1.1 Policy Team Staffing and Responsibilities. The RL/ORP Manager (or designee) shall be the RL/ORP Emergency Manager. If the event involves an ORP facility, the ORP Manager (or designee) will assume the responsibility. The RL Manager (or designee) will assume the responsibility in all other events. The RL/ORP Emergency Manager is responsible for oversight operations of the Hanford EOC and for ensuring implementation of the responsibilities of RL as the Lead Federal Agency (LFA). In consultation with the Hanford EOC staff, the RL/ORP Emergency Manager approves emergency reclassification and termination, offsite PARs, and notifications.

Once operational, general functions of the Policy Team include:

- overview of onsite response and mitigation actions, and providing assistance to the event contractor as needed;
- providing offsite notifications and PARs to state, local, and Federal agencies, and continuous updates to the state/counties about conditions;
- notifying the DOE-HQ Cognizant Secretarial Officer (CSO) and the DOE-HQ Emergency Management Team if facility operations were shut down as a part of the protective action response;
- providing direction and control, as appropriate, during a security incident;
- approving the reclassification or termination of the emergency;
- directing the activities of the JIC in providing timely and accurate release of information to the public and media, including approval of RL/ORP news releases;
- requesting the national DOE emergency response assets as needed;
- providing liaisons to offsite emergency centers and responding DOE emergency response assets;
- providing a representative to DOE-HQ as requested; and
- designating a recovery organization.

2.2.2.2 Joint Information Center. The primary function of the JIC is the dissemination of accurate and timely information to the public and employees about RL/ORP activities during declared emergencies. The JIC operates under the direction of the Public Information Director and is staffed by RL/ORP, contractor, state, and county communication professionals responsible for coordinating the release of information to the public and media.

One or more News Writer(s) reside next to the Policy Team area in order to obtain the most current information for the development of draft press releases. Once developed, the News Writer(s) ensures that the releases are reviewed for technical accuracy and security sensitivities prior to approval by the RL Public Information Director. Upon approval, the press releases are sent to the JIC for dissemination.

The JIC provides a single location where RL/ORP and site contractors can coordinate the release of information with other Federal agencies, state, and local jurisdictions. Provisions shall be made at the JIC for representatives from the states of Washington and Oregon, plume EPZ counties, and other Federal agencies that may be involved in the emergency response.

The functions performed at the JIC include:

- preparing and coordinating information released to the public and media;
- answering questions of the public and media; and
- rumor control.

2.2.2.3 Site Management Team. The primary functions of the SMT are to provide support to the Incident Command Organization by providing additional resources not easily obtained by the IC; tracking the status of onsite protective actions; developing and directing implementation of additional onsite protective actions away from the event scene (i.e., the area not under the direct control of the IC) as required; and providing communications support. The SMT is also responsible for hazards assessment activities, tracking personnel medical issues, developing additional offsite protective action recommendations, record keeping, and overall operation of the center.

The SMT is made up of four support organizations that are responsible for implementing defined emergency response tasks. These organizations are defined below.

2.2.2.3.1 Executive Team and Support Staff. The Site Emergency Director is responsible for the coordination of all SMT activities. In this role, the Site Emergency Director is responsible for the activities of the Event Support Coordinator, EOC Operations Manager, and the Consequence Assessment Director. Since RL has an operational function over Hanford security forces, the Security Director in the Policy Team is responsible for the activities of the Security Operations Coordinator.

The Contractor Representative and SMT Emergency Preparedness Advisor provide support to the Site Emergency Director.

2.2.2.3.2 Security and Event Support. As part of the SMT staff, the Security Operations Coordinator's primary functions are security operations, which include interface with local law enforcement agencies, coordination with the Federal Bureau of Investigation (FBI), and oversight of onsite patrol activities. The Security Operation Coordinator reports directly to the Security Director. The Security Director will communicate planned actions of security forces to the Site Emergency Director to ensure all safety and security issues are addressed and coordinated. The Site Emergency Director, in conjunction with the Security Director, is responsible for periodically providing status information to the RL/ORP Emergency Manager and the Policy Team.

The Event Support Coordinator is responsible for event support activities to include site support services, technical support, communications with the event scene, and coordination with medical assessment activities. The Event Support Coordinator reports directly to the Site Emergency Director.

2.2.2.3.3 Unified Dose Assessment Center. As part of the SMT, the primary Unified Dose Assessment Center (UDAC) functions are monitoring and evaluating existing emergency conditions in order to develop additional protective action recommendations. The UDAC is responsible for field team activities to include plume tracking, monitoring, and sampling.

Representatives from the states of Washington and Oregon participate in the development of recommendations and provide direction for offsite environmental monitoring. The UDAC is operated by site contractor personnel with knowledge in the technical areas of meteorology, toxicology, industrial hygiene, and health physics. The Consequence Assessment Director is responsible for all UDAC activities and reports directly to the Site Emergency Director.

Specific UDAC responsibilities include:

- acquiring necessary data and measurements to evaluate personnel radiation doses and chemical exposures resulting from the event;
- assessing the potential for onsite and offsite consequences of a release of radioactive or nonradioactive materials based on meteorological conditions, source term, location and dispersal of the hazardous material;
- assisting the event contractor or other Hanford Site contractors in onsite hazard assessment or development of onsite protective actions;
- analyzing the consequences associated with evacuating versus remaining in a take cover situation for onsite personnel and recommending appropriate additional protective actions if necessary;
- developing offsite PARs in coordination with representatives from the states of Washington and Oregon; and
- coordinating and directing emergency environmental monitoring teams that are not assigned to the event facility. This may include state field teams performing offsite monitoring if requested by the states.

2.2.2.3.4 Hanford EOC Operations. As part of the SMT, the primary functions of the Hanford EOC Operations team are administration, record keeping tasks, and dissemination of information to offsite agencies (i.e., Hanford Emergency Notification Form, UDAC products, etc.). The EOC Operations Manager is responsible for these activities. In this role, the EOC Operations Manager reports directly to the Site Emergency Director.

2.2.2.4 Event Coordination Team. The Event Coordination Team is a partial staffing of the Hanford EOC that allows for a graded response to events occurring on or off the Hanford Site which are not further classified as an Alert or higher emergency. The Event Coordination Team can be used to provide resource and communications support to the ICP; to monitor abnormal conditions that could impact site workers, facilities, or operations (e.g., power outage, severe weather conditions); or for events that may require additional monitoring or distributing information to site workers and the public. The Event Coordination Team does not require that all Hanford EOC positions be filled. Instead, the on-call Site Emergency Director or Emergency Duty Officer will determine staffing and length of operation. Detailed procedures for the activation and responsibilities of the Event Coordination Team are contained in DOE-0223, *Emergency Plan Implementing Procedures.*

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3.0 OFFSITE RESPONSE INTERFACES

3.1 OVERVIEW

Interfaces and coordination with offsite agencies are important in the planning, preparedness, response, and recovery elements of the Hanford emergency management program. As such, RL shall interface with Federal, tribal, state, local, and private organizations and/or agencies:

- that have a responsibility to protect the public and environment within the EPZs of the Hanford Site;
- with which RL supports as the Regional Coordinating Office for Region 8 (Oregon, Washington, and Alaska); and
- with which RL has entered into special agreements for assistance.

Where appropriate, RL shall develop and maintain agreements to formalize areas of understanding, cooperation, and support with offsite agencies.

3.1.1 Planning and Preparedness

The modes of interface for planning and preparedness activities, as is determined beneficial by the parties, may include:

- coordination of emergency plans and procedures;
- periodic meetings to share information and coordinate activities;
- training opportunities related to offsite responsibilities;
- development of agreements for support to and from offsite agencies;
- participation in annual exercises; and
- development of public information programs.

3.1.2 Response and Recovery

In the event of an emergency on or affecting the Hanford Site, RL shall interface with offsite agencies to ensure coordination and support of response and recovery activities. These interfaces include:

- notification and periodic updates to local jurisdictions within the plume EPZ, states that contain portions of the ingestion EPZ, and other agencies that may be requested to provide assistance (see respective subsections in section 5.0);

- communication and coordination with DOE-HQ;
- RL representation in appropriate offsite emergency centers;
- offsite representation in the Hanford EOC;
- PARs to offsite agencies; and
- event scene interface with offsite responders.

Communications with state and local EOCs are depicted on Figure 3-1.

3.2 FEDERAL AGENCIES

3.2.1 U.S. Department of Energy-Headquarters

The DOE-HQ Cognizant Secretarial Officers are responsible for ensuring implementation of policy and requirements for activities conducted under their respective areas of cognizance.

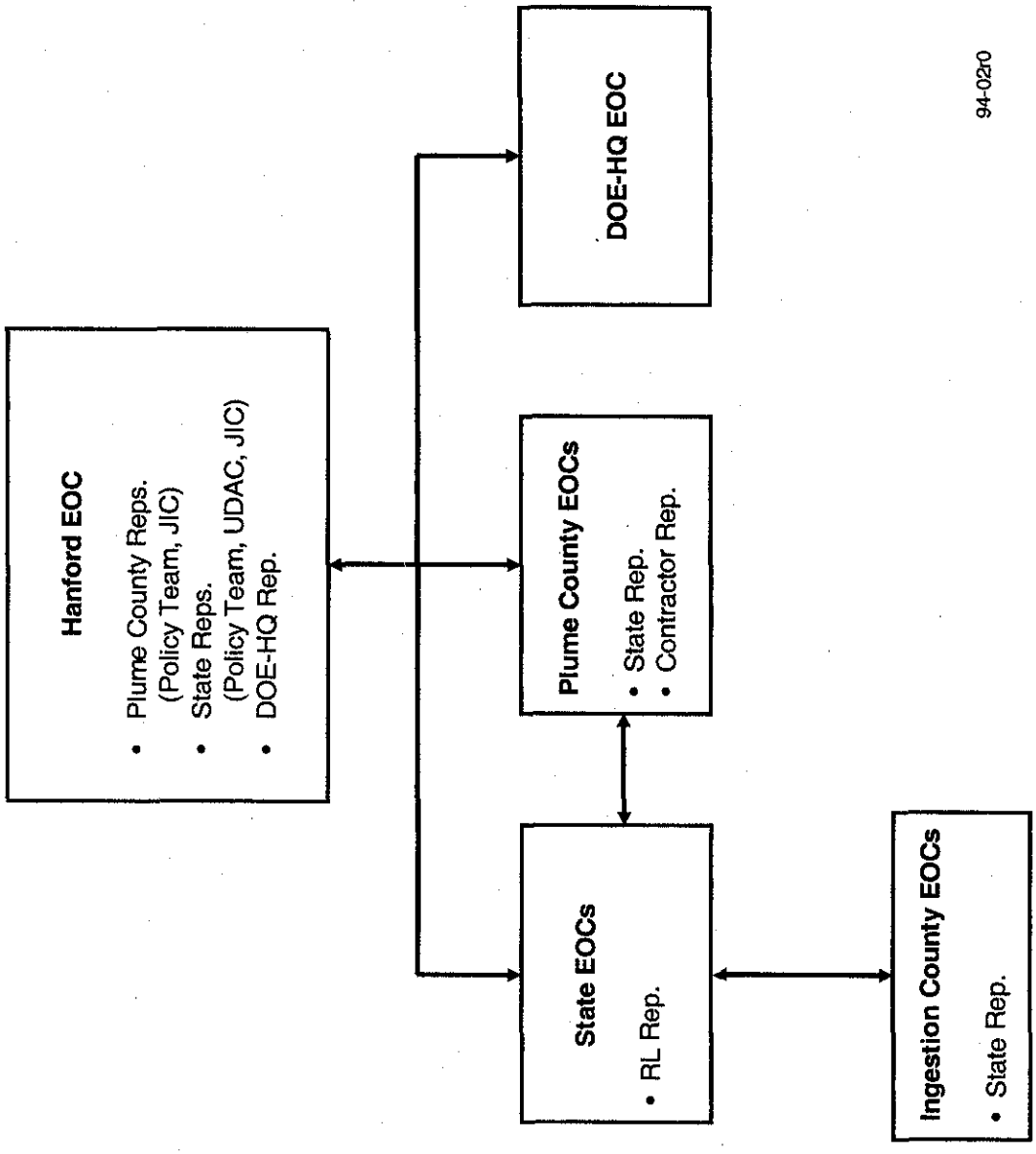
The DOE-HQ EOC serves as the point-of-contact for receipt of all emergency notifications and reports. Accordingly, the DOE-HQ EOC receives, coordinates, and disseminates emergency information to DOE-HQ elements and Program Office emergency points-of-contact, the White House Situation Room, and other Federal agencies. As such, emergency status reports shall be forwarded to the DOE-HQ EOC on a continuing basis until the emergency is terminated.

In the event of an emergency, a DOE-HQ Emergency Management Team is convened to:

- receive information on the facility, site, or area response;
- monitor the Operations/Field Office;
- provide appropriate support and assistance;
- assist with issue resolution; and
- coordinate interagency Congressional, and public information activities at the national level.

RL/ORP shall notify and provide information to the DOE-HQ EOC. Written reports shall be provided to the DOE-HQ EOC as soon as practical, but within 24 hours of emergency classification. A DOE-HQ Site Representative will respond to the Hanford EOC to provide liaison with the DOE-HQ EOC. Upon request from DOE-HQ, RL/ORP shall dispatch a liaison to support activation of the DOE-HQ EOC.

Figure 3-1. Lines of Communication Between Emergency Centers.



DOE also has seven emergency response assets available to assist at events if conditions warrant. These assets include:

- Aerial Measuring System (AMS) – provides fixed-wing aircraft and/or helicopters for remote sensing to detect and measure for ground deposition or perform aerial photography and multi-spectral imaging;
- National Atmospheric Release Advisory Capability (NARAC) – develops predictive plots to provide near real-time assessments of the consequences of accidental or potential radiation releases;
- Accident Response Group (ARG) – provides equipment for assessment, recovery, and disposal of damaged nuclear weapons and components;
- Federal Radiological Monitoring and Assessment Center (FRMAC) – coordinates the Federal radiological monitoring, assessment, and evaluation of data during a radiological emergency;
- Nuclear Emergency Support Team (NEST) – provides search and identification of nuclear materials, diagnostics and assessment of suspected nuclear devices, packaging, and transportation;
- Radiological Assistance Program (RAP) – provides radiological assistance during all types of radiological accidents or emergencies (considered DOE's First Responder team); and
- Radiation Emergency Assistance Center/Training Site (REAC/TS – provides health professionals and coordinators for consultation or direct medical care on health problems associated with radiation accidents.

Requesting emergency response asset assistance is delineated in subsection 5.1.1.2.3.

3.2.2 Federal Bureau of Investigation

The role of the FBI is to serve as the primary U.S. Law Enforcement Agency responsible for investigating alleged or suspected violations of the Atomic Energy Act of 1954, as amended, and other Federal statutes. As such, security events of national consequence occurring at the Hanford Site and within the jurisdiction of the U.S. Department of Justice (e.g., theft of special nuclear material, terrorist activity, weapons of mass destruction incidents) will be communicated to the FBI.

During these types of security events, the FBI becomes the Lead Federal Agency and acts as the On-scene Commander with responsibility for crisis management which may include intelligence, surveillance, tactical operations, behavioral assessments, negotiations, forensics, and investigation. The FBI will receive a complete briefing on the incident from Hanford EOC personnel and determine the need for additional regional and national FBI crisis management resources.

Command of FBI response activities, including plant security forces deployed at the event scene, will be the responsibility of the FBI Special-Agent-in-Charge when a declared security event has occurred. The FBI has the authority to assume command and control of all FBI and DOE on-scene crisis management resources, including plant security forces deployed at the event scene, when the FBI crisis management assets are in place and ready to assume their specific crisis management responsibilities. An RL Office of Security and Emergency Services (SES) representative will be assigned to provide direct support to the FBI as requested. RL will retain command and control of a security event until the FBI assumes this responsibility. Additionally, RL/ORP and site contractors will maintain operational control and authority over those site areas and resources not directly affected by the incident.

The DOE-HQ Office of Security and Emergency Operations maintains a memorandum of understanding (MOU) with the FBI Counterterrorism Division which provides mutual support guidelines concerning the contingency response planning, coordination of procedures, training and exercises, and operational cooperation required to effectively deal with actual or possible security related emergencies.

3.2.3 U.S. Coast Guard

The U.S. Coast Guard (USCG) (through the Thirteenth District Commander in Seattle, Washington and the Captain of the Port in Portland, Oregon) may regulate activities on navigable waters within the Hanford Site, when necessary, to prevent harm to persons, property, and the environment in or on those waters.

When notified of a Site Area or General Emergency, the USCG will close the appropriate portion of the Columbia River and make a broadcast to mariners.

In the event of an emergency, the ONC will make notifications and provide information to the USCG in Portland, Oregon.

3.2.4 U.S. Environmental Protection Agency

Under the provisions of the Federal Radiological Emergency Response Plan (FRERP), the EPA shall assume the LFA responsibility for coordinating the intermediate and long-term offsite radiation monitoring activities.

In the event of an emergency, the Hanford EOC shall notify and provide information to the EPA Region 10 in Seattle, Washington.

3.2.5 Federal Aviation Administration

The Federal Aviation Administration (FAA) may make flight restrictions for aircraft under their jurisdiction over the Hanford Site.

The ONC will notify and provide information to the FAA Seattle Center. At a Site Area or General Emergency the ONC may request the FAA to impose flight restrictions over the Hanford Site.

3.2.6 Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) is responsible for coordinating Federal assistance (other than monitoring resources) to the states if requested. Under the provisions of the FRERP, FEMA coordinates the offsite (nontechnical) response.

At the time of a declaration of an emergency, the Hanford EOC notifies and provides information to the FEMA Region 10 office in Bothell, Washington.

3.3 STATE GOVERNMENT

States, along with local governments, share the responsibility for the protection of the public and the environment. The responsibilities and concept of operations for state agencies are described in the emergency response plans of each state.

RL shall work with the states of Washington and Oregon to assist in development of their program and response plans for an emergency at the Hanford Site. Periodic meetings will be conducted with the states to coordinate plans and share information. General descriptions of emergency responsibilities as well as areas of cooperation and understanding between RL and the states are delineated in memoranda of understanding (MOU). Copies of the MOUs are provided in Appendix B.

3.3.1 The State of Washington

The Governor of Washington is responsible for command and control of state resources to maintain and preserve life, property, and the environment in Washington. The lead agency for emergency planning and response activities is the Emergency Management Division of the Military Department. Other state agencies that participate in the planning process and have emergency response roles include the:

- Department of Health;
- Department of Agriculture;

- State Patrol;
- Department of Ecology; and
- Department of Transportation.

An emergency response plan is maintained by the Emergency Management Division that describes the concept of operations and roles and responsibilities of the state agencies. Emergency procedures are maintained by each state agency.

Responsibilities of the state of Washington include:

- providing a 24-hour single point of contact for the receipt of emergency notifications from RL/ORP;
- disseminating information to potentially affected counties within the plume and ingestion EPZs;
- coordinating ingestion protective action decisions and public information with the counties, the state of Oregon, and RL;
- providing assistance to counties as requested;
- evaluating offsite emergency PARs made to plume EPZ counties;
- making protective action decisions to protect public health from ingestion-related impacts, such as contamination of the food chain;
- performing field environmental radiological monitoring and dose assessments;
- providing guidance on emergency worker exposure and authorizing emergency workers to exceed protective action guides;
- implementing food, milk, and animal-feed control measures; and
- requesting Federal assistance as required.

3.3.2 The State of Oregon

The Governor of Oregon is responsible for directing and controlling state activities to protect the lives and property of Oregon citizens. The lead agency for Hanford Site emergency planning is the Oregon Office of Energy. Other state agencies that participate in the planning process and have emergency response roles include the:

- State Public Information Officer;
- Health Division;
- Emergency Management Division;
- Department of Agriculture;
- Oregon State University Radiation Center

- Military Department;
- State Police; and
- State Highway Division.

An emergency response plan is maintained by the Oregon Office of Energy that describes the concept of operations and roles and responsibilities of state agencies. Emergency procedures are maintained by each state agency.

Responsibilities of the state of Oregon include:

- providing a 24-hour single point of contact for the receipt of emergency notifications from RL/ORP;
- making protective action decisions for the state of Oregon;
- coordinating protective action decisions and public information with counties, the state of Washington, and RL;
- coordinating state and local emergency response within the state of Oregon;
- performing field environmental radiological monitoring and dose assessments;
- providing guidance on emergency worker exposure and authorizing emergency workers to exceed protective action guides;
- providing assistance to Oregon counties within the ingestion EPZ;
- implementing food, milk, and animal-feed control measures; and
- requesting Federal assistance as required.

3.4 LOCAL ORGANIZATIONS

Cities and counties are responsible for protecting the lives and property of their residents. The responsibilities and concept of operations for local governments are described in the emergency response plans of each jurisdiction.

RL shall work with local emergency response organizations through the county and state emergency management organizations. Generally, RL shall interface directly with emergency response and planning organizations providing service to those areas within a plume EPZ of a Hanford Site facility. Interface with those jurisdictions within the ingestion EPZ generally shall be accomplished through the state emergency management organization. To accomplish the necessary close coordination with local agencies, periodic meetings shall be conducted to share information and discuss concerns.

3.4.1 Plume Emergency Planning Zone Counties

Portions of Benton, Franklin, and Grant Counties are within plume EPZs of a Hanford Site facility. The Boards of County Commissioners are responsible for making emergency protective action decisions and implementing emergency response actions, as necessary, to protect their residents outside the Hanford Site boundary. The lead agency for emergency planning and coordination of emergency response is the county emergency management agency. County emergency response plans and procedures are developed by the emergency management agencies, working with county, city, and volunteer emergency response agencies, such as:

- law enforcement;
- fire and emergency medical;
- public works/road departments;
- hospitals; and
- American Red Cross.

The emergency responsibilities of the plume EPZ counties include:

- making and implementing protective action decisions to protect citizens who live within the plume EPZ;
- implementing protective action decisions, made by the state of Washington, for ingestion-related impacts to residents within the ingestion EPZ;
- disseminating alert and warnings to the public and providing emergency public information; and
- coordinating response actions and public information with neighboring counties, the state of Washington, and RL.

RL maintains agreements with Benton, Franklin, and Grant Counties that outline the areas of responsibility and cooperation (see Appendix B).

3.4.1.1 Law Enforcement. RL SES interfaces with local law enforcement agencies for support to the Hanford Site during emergencies. Via a contractual agreement, the Benton County Sheriff's Office provides law enforcement on the Hanford Site (i.e., traffic enforcement and criminal investigation), and assists in access control; and, as such, coordinates activities with RL SES and the Hanford Patrol.

RL SES maintains memorandums of understanding with the law enforcement agencies of Kennewick, Richland, West Richland, Benton County, Franklin County, and the state of Washington.

3.4.1.2 Fire and Emergency Medical. The Hanford Fire Department is signatory to the Tri-County Mutual Aid Agreement for fire agencies. The agreement, signed by 11 local fire agencies, provides mutual aid for fire or medical emergencies.

The Hanford Fire Department meets regularly with local fire agencies. The Hanford Fire Department and AMH representatives meet routinely with emergency medical service agencies to coordinate and share information.

3.4.1.3 Hospitals. RL maintains agreements with local hospitals, which provide for the care of injured, contaminated (chemical or radiological) Hanford Site personnel. These hospitals include:

- Our Lady of Lourdes Health Care Center;
- Kennewick General Hospital; and
- Kadlec Medical Center.

RL shall provide for training and exercise support, as needed, related to the services provided to the Hanford Site. AMH shall provide expertise on radiological decontamination or chemical exposure and treatment as requested.

3.4.2 Ingestion Emergency Planning Zone Counties

Counties within the ingestion EPZ of the Hanford Site are responsible to implement measures to protect their residents from potential ingestion related impacts. In the state of Washington, the counties of Adams, Benton, Franklin, Grant, Kittitas, Klickitat, Walla Walla, and Yakima are within the 50-mile (80-kilometer) ingestion EPZ. In the state of Oregon, the counties of Morrow and Umatilla are included. Ingestion EPZ counties have emergency response plans that describe their responsibilities in the event of an emergency at the Hanford Site.

RL shall coordinate emergency planning and preparedness for ingestion counties through the Washington State Emergency Management Division and the Oregon Office of Energy. Ingestion county responsibilities include:

- coordinating with the state and implementing decisions regarding protective measures for its residents within the ingestion EPZ; and
- consulting with the respective state EOC on the identification of access control points, food control areas, food control stations, and strategies for relocation, restoration, and recovery in contaminated areas.

3.5 TRIBAL ORGANIZATIONS

RL shall provide appropriate information to the impacted tribal organizations to coordinate planning for ingestion-related response actions of the tribe(s).

3.6 PRIVATE ORGANIZATIONS

The Hanford Site emergency management program shall address private facilities on or near the site. These facilities may be impacted by an emergency at the Hanford Site, or may impact Hanford Site facilities if they experience an emergency.

RL shall coordinate emergency planning and preparedness activities with onsite private facilities (namely Energy Northwest and US Ecology. In the event of an emergency at a Hanford Site facility, onsite private facilities will receive notifications and information from RL.

Where emergencies at facilities operated by private organizations may impact the Hanford Site, RL shall ensure that the emergency management program addresses actions that must be taken to protect site workers and facilities.

Areas of cooperation with private organizations shall be documented in memorandums of understanding.

3.7 MEMORANDA OF UNDERSTANDING

RL shall develop and implement mutual assistance agreements with offsite agencies to document areas of cooperation and assistance when appropriate and as identified in Federal, state, and local regulations (see Table 3-1).

RL SES is responsible for executing and maintaining MOUs related to security and emergency preparedness. The Hanford Fire Department shall execute and maintain MOUs within its area of responsibility. MOUs shall be reviewed annually and revised as needed.

Copies of MOUs shall be provided to the CSO through their inclusion in Appendix B of this plan.

Table 3-1. Memorandums of Understanding

PARTIES	SERVICES/AREAS OF COOPERATION	POINTS OF CONTACT	CONSTRAINTS	DATE	EXPIRATION DATE	WHERE ON FILE
State of Washington	Document areas of cooperation between the parties in the planning for and response to emergencies at the Hanford Site.	Washington Emergency Management Division	None	01/08/04	Three years from actual date of signature or until canceled by any party after 60 days written notice to the other parties.	RL SES
State of Oregon	Document areas of cooperation between the state of Oregon and RL in the planning for and providing notification and interface in the event of an incident on the Hanford Site.	Oregon Department of Energy	None	06/21/00	Continue until canceled by either party by written notice to the other Amendments or modifications to this Agreement may be made upon written agreement by both parities to the Amendment.	RL SES
Benton County	Document areas of cooperation between the parties in the planning for and response to emergencies at the Hanford Site.	Benton County Emergency Management	None	03/16/00	Continue until canceled by either party by written notice to the other.	RL SES
Franklin County	Document areas of cooperation between the parties in the planning for and response to emergencies at the Hanford Site.	Franklin County Emergency Management	None	01/20/00	Continue until canceled by either party by written notice to the other.	RL SES
Grant County	Document areas of cooperation between the parties in the planning for and response to emergencies at the Hanford Site.	Grant County Emergency Management	None	05/25/00	Continue until canceled by either party by written notice to the other.	RL SES
Energy Northwest	Document areas of cooperation between the parties in the planning for and response to emergencies at the Hanford Site.	Energy Northwest Emergency Preparedness	The specific areas of assistance will be provided based upon availability, and are limited to those emergency actions necessary to protect onsite personnel, the public health and safety, and the environment in the event of a major emergency at the Hanford Site or Energy Northwest.	02/11/04	Continue until canceled by either of the parties upon 30 days written notice to the other party.	RL SES
AREVA NP, Inc. (formerly Framatome ANP)	Establishes means by which RL can assist AREVA NP through use of RL facilities during an emergency at the AREVA NP plant in Richland, Washington	AREVA NP	Emergencies affecting the Hanford Site or Hanford facilities takes precedence over all other uses of the RL facilities.	11/21/05	Continue until canceled by either of the parties upon 30 days written notice to the other party.	RL SES

Table 3-1. Memorandums of Understanding

PARTIES	SERVICES/AREAS OF COOPERATION	POINTS OF CONTACT	CONSTRAINTS	DATE	EXPIRATION DATE	WHERE ON FILE
National Weather Service	Sharing Meteorological Information.	NWS Western Regional Headquarters.	None	10/05/94	Agreement may be terminated by either party upon thirty days written notice to the other party.	RL SES
Our Lady of Lourdes Hospital (OLOL) Pasco, Washington	Significantly injured, contaminated persons will be admitted to facility for appropriate medical care.	OLOL Administrator	The responsibilities of OLOL will be limited to activities performed at the hospital.	08/17/98	Arrangements may be terminated by OLOL or by RL upon written notice to the other, which notice shall not become effective for at least 30 days after the date thereof.	RL SES
Kadlec Medical Center (KMC) Richland, Washington	Significantly injured, contaminated persons will be admitted to facility for appropriate medical care.	KMC Administrator	KMC will be limited to activities performed at the hospital and at the Emergency Decontamination Facility.	08/17/98	Arrangements may be terminated by KMC or by RL upon written notice to the other, which notice shall not become effective for at least 30 days after the date thereof.	RL SES
Kennewick General Hospital (KGH) Kennewick, Washington	Significantly injured, contaminated persons will be admitted to facility for appropriate medical care.	KGH Administrator	KGH will be limited to activities performed at the hospital.	08/17/98	Arrangements may be terminated by KGH or by RL upon written notice to the other, which notice shall not become effective for at least 30 days after the date thereof.	RL SES
Tri-County Mutual Aid Agreement	Provide mutual aid to parties hereto desire to augment the fire and emergency medical protection available in their establishments, districts, agencies, and municipalities in the event of large fires or conflagrations or other disaster.	Hanford Fire Department	Assistance under the agreement is not mandatory.	02/05/98	Remain in full force and effect until canceled by mutual agreement of the parties hereto or by written notice by one party to the other party giving ten (10) days notice of said cancellation.	Hanford Fire Department
Richland Police Department	Mutual law enforcement assistance.	Richland Police Department	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	03/14/00	Indefinite duration.	RL SES
West Richland Police Department	Mutual law enforcement assistance.	West Richland Police Department	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	03/14/00	Indefinite duration.	RL SES

Table 3-1. Memorandums of Understanding

PARTIES	SERVICES/AREAS OF COOPERATION	POINTS OF CONTACT	CONSTRAINTS	DATE	EXPIRATION DATE	WHERE ON FILE
Kennewick Police Department	Mutual law enforcement assistance.	Kennewick Police Department	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	03/14/00	Indefinite duration.	RL SES
Benton County Sheriff	Mutual law enforcement assistance.	Benton County Sheriff	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	03/14/00	Indefinite duration.	RL SES
Franklin County Sheriff	Mutual law enforcement assistance.	Franklin County Sheriff	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	03/14/00	Indefinite duration.	RL SES
Washington State Patrol	Mutual law enforcement assistance.	Washington State Patrol	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	02/14/00	Indefinite duration.	RL SES
Adams County Sheriff	Mutual law enforcement assistance.	Adams County Sheriff	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	03/27/00	Indefinite duration.	RL SES
Grant County Sheriff	Mutual law enforcement assistance.	Grant County Sheriff	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	03/14/00	Indefinite duration.	RL SES
Pasco Police Department	Mutual law enforcement assistance.	Pasco Police Department	Assistance will be provided subject to the provision of the agreement and any other conditions as the parties may agree.	04/03/00	Indefinite duration.	RL SES

APPENDIX C

HANFORD FIRE DEPARTMENT EQUIPMENT LIST

EQUIPMENT[1]	DESCRIPTION	NORMALLY LOCATED[2]
Engines 4 pumpers 3 ladders 1 aerial ladder	Examples of equipment contained on engines: • 1,500-2,000 gal/min (5,678.1-7,570.8 L/min) pump; • 300-500 gal (1,135.6-1,892.7 L) water tank; • 1 – 85' aerial ladder platform; • 3 – telescoping 65'-75' ladder trucks with nozzle; and • Jaws of Life.	1 pumper at Station 91, 92, 93, and 94 1 ladder at Station 91 1 ladder at Station 93 1 ladder at Station 94 Aerial at Station 92
Brush Fire Trucks 6 each	Examples of equipment contained on brush fire trucks: • 500 gal/min (1,892.7 L/min) pump; • 2,500 gal (9463.5 L) water tank; • 6x6 with 2,500 gal (9463.5 L) porti-tank; and • hose, nozzles, fittings, and tools.	1 at Station 91 2 at Station 92 2 at Station 93 1 at Station 94
Water Tenders 1 each	Examples of equipment contained on water tenders: • 1000 gal/min (3785.4 L/min) pump; • 2 - 2,500 gal (9463.5 L) porti-tanks; • 4,500 gal (17,034.3 L) water tank; and • hose, nozzles, fittings, and tools.	Station 92
Grass Fire Units 4 each	Examples of equipment contained on grass fire units: • 100 gal/min (378.5 L/min) pump; • 250 - 400 gal (946.3 – 1514.2 L) water tank; • 4-wheel drive; and • hose, nozzles, fittings, and tools.	1 at each station
Ambulances 6 each	Examples of equipment contained on ambulances: • life support systems; and • medical and emergency response supplies.	1 at Station 91 2 at Station 92 2 at Station 93 1 at Station 94
Command Vehicles 3 each	Contains communications equipment and protective equipment for commander.	Station 92
Mobile Air Vehicle 1 each	Examples of equipment contained on mobile air vehicle: • mobile air compressor, recharges self-contained breathing apparatus cylinders; and • tools and fittings for operation of vehicle and spare cylinders.	Station 91

EQUIPMENT[1]	DESCRIPTION	NORMALLY LOCATED[2]
Mobile Incident Command Vehicle 1 each	Examples of equipment contained on mobile incident command vehicle: • communications equipment; • radio communications in Tri-County area; • cell phones (including satellite); • 10,000 watt generator; and • copier, fax.	Station 92
Attack Vehicles 1 each	Examples of equipment contained on attack vehicles: • 450 lb (204.1 kg) of purple-K; • 300 gal (1,1335.6 L) aqueous film-forming foam concentrate; • 300 gal (1,135.6 L) of aqueous film-forming foam pre-mix solution; and • hose, nozzles, fittings, and tools.	Station 91
Hazardous Materials Vehicle 2 each	Examples of equipment contained on hazardous materials vehicle: • protective clothing for Hazardous Materials Response Team; • breathing apparatus for Hazardous Materials Response Team; • diking, plugging, and damming equipment; • detection instruments for Hazardous Materials Response Team; • tools for plugging and repairing leaking containers; • overpack containers for leaking containers; • command module with material safety data sheets, software, and portable meteorological station; and • tools and communications devices necessary to provide communications during emergency response activities.	2 at Station 92
Metal Fire Response Vehicle 1 each	Examples of equipment contained on metal fire response vehicle: • equipment for response to special metals fire; • 500 lb (226.8 kg) of extinguishing powder; and • 1,000 lb (453.6 kg) of carbon microspheroids.	Station 94
Rescue Truck 2 each	Examples of equipment contained on rescue truck: • heavy and light rescue; • water rescue; • hi/lo angle rescue; and • trench rescue.	1 at Station 92 1 at Station 93

[1]Emergency response vehicles identified in this table shall be serviced and maintained to keep them in safe operating condition and ready for response at all times. Should a unit be out of service for more than 30 days, written justification shall be provided to the Hanford Fire Department for review and approval. The written justification, when approved, will be maintained by the Hanford Fire Department until the equipment is returned to service.

[2]The Hanford Fire Department Chief has the authority to: 1) direct the placement of equipment as needed to control emergency events; and 2) take proactive action and assign different vehicle locations based on conditions such as fuel moisture content, area fire history, work in progress, or other conditions that could arise.

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Chapter 2
305-B Storage Facility

Index

Submitted by Co-Operator:

P. L. Pettiette — 6-14-06 Date

Reviewed by RL Program Office:

D. T. Evans — 6/15/06 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2 and Attachment 18**

Description of Modification:
Hanford Facility RCRA Permit, III.2:

CHAPTER 2
305-B Storage Facility

The 305-B Storage Facility (305-B) is an active storage unit for dangerous wastes and mixed wastes. These wastes are derived primarily from research and development activities and laboratory activities in the 300 Area. This Chapter sets forth the operating Conditions for this TSD unit.

III.2.A. COMPLIANCE WITH APPROVED PERMIT APPLICATION

The Permittees shall comply with all the requirements set forth in Attachment 18, including all Class 1 modifications specified below, and the Amendments specified in Condition III.2.B. Enforceable portions of the permit application have been incorporated in Attachment 18 and are identified as follows. All subsections, figures, and tables included in these portions are also enforceable, unless stated otherwise:

ATTACHMENT 18:

Chapter 1.0	Part A Dangerous Waste Permit, Revision ~~23~~, from Class 1 modification dated ~~May 2005~~ June 30, 2006
Chapter 2.0	Unit Description, from Class 1 modification dated March 31, 2005
Chapter 3.0	Waste Analysis Plan, from Class 1 modification dated March 31, 2005
Chapter 4.0	Process Information, from Class 1 modification dated December 31, 2003
Chapter 6.0	Procedures to Prevent Hazards, from Class 1 modification dated March 31, 2005
Chapter 7.0	Building Emergency Procedure, from Class 1 modification dated ~~September 30, 2005~~ June 30, 2006
Chapter 8.0	Personnel Training, from Class 1 modification dated September 30, 2003
Chapter 11.0	Closure and Post-Closure Requirements, from Class 1 modification dated June 30, 2006
Chapter 12.0	Reporting and Recordkeeping, from Class 1 modification dated August 2004
Chapter 13.0	Other Relevant Laws, from Class 1 modification dated August 2004

III.2.B. AMENDMENTS TO THE APPROVED PERMIT APPLICATION

III.2.B.1 For all shipments of dangerous waste to or from this TSD unit, except for shipments which occur wholly within the 300 Area, the Permittees shall comply with Conditions II.P and II.Q of this Permit

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:

G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Washington State Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2 and Attachment 18**

Description of Modification:

Remove and replace Chapter 1.0 with the attached Chapter 1.0 dated June 2006.

Modified Part A to reflect change in contractor from Pacific Northwest National Laboratory to Washington Closure Hanford, LLC.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: Permit Condition I.E.14.a

Enter wording of WAC 173-303-830, Appendix I Modification citation:

Unit-specific portion may be transferred to a new Co-operator as a Class [1]1 modification with prior approval of the Department's director.

Modification Approved: ☐ Yes ☐ No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Washington State Department of Ecology, or downgraded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2 and Attachment 18**

Description of Modification:

Remove and replace Chapter 7.0 with the attached Chapter 7.0 dated June 30, 2006

Modified to reflect change in contractor from Pacific Northwest National Laboratory to Washington Closure Hanford, LLC and facility closure.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: Permit Condition I.E.14.a

Enter wording of WAC 173-303-830, Appendix I Modification citation:

Unit-specific portion may be transferred to a new Co-operator as a Class [1]1 modification with prior approval of the Department's director.

Modification Approved: ☐ Yes ☐ No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Washington State Department of Ecology, or downgraded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Chapter 2
305-B Storage Facility

Index

Submitted by Co-Operator:

Alice K. Ikenberry — 4/17/06 Date

Reviewed by RL Program Office:

D. T. Evans — 4/18/06 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:
Hanford Facility RCRA Permit, III.2:

CHAPTER 2
305-B Storage Facility

The 305-B Storage Facility (305-B) is an active storage unit for dangerous wastes and mixed wastes. These wastes are derived primarily from research and development activities and laboratory activities in the 300 Area. This Chapter sets forth the operating Conditions for this TSD unit.

III.2.A. COMPLIANCE WITH APPROVED PERMIT APPLICATION

The Permittees shall comply with all the requirements set forth in Attachment 18, including all Class 1 modifications specified below, and the Amendments specified in Permit Condition III.2.B. Enforceable portions of the permit application have been incorporated in Attachment 18 and are identified as follows. All subsections, figures, and tables included in these portions are also enforceable, unless stated otherwise:

ATTACHMENT 18:

Chapter 1.0	Part A Dangerous Waste Permit, Revision 2, from Class 1 modification dated May 2005
Chapter 2.0	Unit Description, from Class 1 modification dated March 31, 2005
Chapter 3.0	Waste Analysis Plan, from Class 1 modification dated March 31, 2005
Chapter 4.0	Process Information, from Class 1 modification dated December 31, 2003
Chapter 6.0	Procedures to Prevent Hazards, from Class 1 modification dated March 31, 2005
Chapter 7.0	Building Emergency Procedure, from Class 1 modification dated September 30, 2005
Chapter 8.0	Personnel Training, from Class 1 modification dated September 30, 2003
Chapter 11.0	Closure and Post-Closure Requirements, from Class 1 modification dated June 30, 2006 ~~August 2004~~
Chapter 12.0	Reporting and Recordkeeping, from Class 1 modification dated August 2004
Chapter 13.0	Other Relevant Laws, from Class 1 modification dated August 2004

III.2.B. AMENDMENTS TO THE APPROVED PERMIT APPLICATION

III.2.B.1 For all shipments of dangerous waste to or from this TSD unit, except for shipments which occur wholly within the 300 Area, the Permittees shall comply with Permit Conditions II.P and II.Q of this Permit regarding dangerous waste shipment manifesting and transportation

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.0:

11.0 CLOSURE AND POST-CLOSURE REQUIREMENTS

This chapter is submitted in accordance with the requirements of WAC 173-303-806(4)(a)(xiii) to demonstrate that DOE-RL has ~~a plan has been~~ developed a plan to ensure safe closure of the 305-B Storage Facility. In accordance with WAC 173-303-610, copies of the closure plan and all revisions will be maintained ~~at 305-B Storage Facility until certification of closure completeness has been submitted and accepted by Ecology~~ in the unit specific operating record. ~~A post-closure plan is not required because 305-B Storage Facility is not a disposal unit and all dangerous waste and dangerous waste residues will be removed at the time of closure.~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.1:

11.1.1 Closure Performance Standard

The 305-B Storage Facility will be closed in a manner that will minimize the need for further maintenance and eliminate post-closure release of dangerous/mixed waste or dangerous/mixed waste constituents that could pose a risk to human health or the environment. ~~This standard will be met by removal of all dangerous/mixed waste and dangerous/mixed residues from the unit.~~ Closure activities will ~~return~~ assist in preparing the 305-B Storage Facility for demolition~~site to the appearance and use of surrounding land areas~~. After closure, the 305-B Storage Facility will be ~~in a condition suitable for use to support research and development activities~~demolished in accordance with the *Removal Action Work Plan #1 for the 300 Area Facilities* (DOE/RL-2004-77). This use is consistent with the surrounding land use.

~~If there is any evidence of spills or leaks from the unit into the environment, samples will be taken and analyzed to determine the extent of contamination in the soil, and if necessary, in groundwater.~~ Evidence of spills or leaks will be obtained through ~~sampling~~ (a) review of spill reports and operating log books; (b) visual inspection of unit structures accessible to the environment (e.g., floors) and through inspection of all visible barriers designed to prevent migration to the environment ~~(e.g., sumps)~~, and (c) sampling, as ~~appropriate~~necessary to characterize waste/debris that is found while performing visual inspection. If this ~~sampling~~ inspection program indicates that contamination is present, the potential for migration of contamination to the environment will be evaluated. If potential migration appears likely, ~~additional~~ samples will be taken. In addition, if the inspections identify any potential contaminant migration routes (e.g., cracks in sumps), ~~additional~~ samples will be collected to determine whether migration has occurred. Waste site specific information discovered during facility closure will be updated in WIDS. ~~Spill reports and logs shall be consulted to determine potential areas of contamination.~~

Spill reports and operating log books have been reviewed and it has been determined that there is no soil contamination resulting from TSD activities. Therefore, no closure actions outside of the unit boundary ~~are~~should be required.

~~Any contaminated soil will be excavated, removed, and disposed as dangerous or mixed waste. Soil will be decontaminated to the following levels, as required under WAC 173-303-610(2)(b):~~

~~- Background environmental levels for waste which are listed under WAC 173-303-081 or WAC 173-303-082~~

~~•Background environmental levels for waste which are characteristic dangerous waste under WAC 173-303-090~~

~~•Designation limits for waste that are designated under WAC 173-303-084, or WAC 173-303-101 through WAC 173-303-103.~~

Equipment and structural components will be decontaminated using the procedures described in Section 11.1.4. All residues resulting from decontamination will be ~~sampled and analyzed,~~ managed as described in Section 11.1.4.3~~, to determine whether they are dangerous waste. All residues will be removed from the unit and transferred to a facility having the necessary permits~~disposed ~~in accordance with approved CERCLA decision documents.~~ Residues containing listed waste, having dangerous waste characteristics, or exceeding dangerous waste designation limits will be ~~disposed as dangerous waste~~treated, if necessary, ~~to meet~~ land disposal regulations ~~the disposal facility~~ (40 CFR 268.45).

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology: Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **305-B Storage Facility**	Permit Part & Chapter: **Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.2:

11.1.2 Partial and Final Closure Activities

This plan identifies the steps necessary to perform final closure of the unit in order to meet the aforementioned closure performance standard (Section 11.1.1). Closure activities involve removal of the ~~dangerous and mixed~~ waste from ~~from the unit~~ and decontamination of the unit, as necessary. These activities can be implemented at any point during the active life of the unit. Partial closure of the unit will not be conducted. The entire 305-B Storage Facility ~~will be~~ was in use at all times prior to closure. The entire unit, therefore, represents the maximum extent of the operation ~~that will be unclosed~~ during the unit's active life.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology: Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.3:

11.1.3 Maximum Waste Inventory

The 305-B Storage Facility ~~is~~ was used to store a variety of different research-related waste. The maximum inventory of waste in storage at any time ~~will be~~was constrained by three factors:

- The total amount of dangerous/mixed waste in storage at 305-B Storage Facility at any time ~~will~~ did not exceed the design capacity of 30,000 gallons (it ~~is~~ was typically 2,000 to 5,000 gallons)
- The total amount of any particular dangerous/mixed waste in storage during any given year ~~will~~ did not exceed the amounts given in the Part A permit application for 305-B Storage Facility (Chapter 1.0, Part A)
- The total amount of dangerous/mixed waste by hazard class in storage at any one time ~~will~~did not exceed Uniform Building Code Class B Hazardous Material Quantity Restrictions (Chapter 4.0, Table 4.1).

Except on the relatively rare occasion when 85-gallon overpacks are used, approximately 90 percent of all dangerous wastes shipped from the unit ~~are~~ were contained in 55-gallon drums, with the remaining 10 percent consisting of 30-gallon and smaller containers.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.1:

11.1.4.1 Inventory Removal

The TSD operations will be transferred to the 331-C Storage Unit. Therefore, 305-B Storage Facility ~~C~~closure activities will be initiated after ~~by removal of~~ the dangerous/mixed waste inventory ~~present at~~ has been moved to 331-C Storage Unit. In the event that any of the waste inventory is encountered during closure, ~~305-B Storage Facility at the time of closure. Inventory removal procedures will be similar~~ identical to the waste handling, packaging, and manifesting activities associated with normal operation of the unit. All dangerous waste present will be placed into proper containers according to currently accepted waste handling procedures; mixed waste will be placed into containers and meet Hanford specifications outlined in WHC-EP-0063, Hanford Radioactive Solid Waste Packaging, Storage, and Disposal Requirements. To the extent possible, chemicals will be bulked into larger containers. If wastes are bulked, containers will be emptied in compliance with WAC 173-303-160 so that they are not dangerous waste. Small quantity laboratory chemicals that cannot be bulked will be packaged into labpack containers in compliance with the requirements of WAC 173-303-161. Aall containers of dangerous/mixed waste will be manifested, and custody transferred to a dangerous waste transporter having a proper dangerous waste identification number. Waste will be transported to a permitted dangerous waste facility for treatment or disposal.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology: Greta P. Davis 4/19/06
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.2:

11.1.4.2 Decontamination Inspection of Building Equipment and Structures

All equipment and structures in dangerous/mixed waste handling and storage areas will be ~~decontaminated~~ visually inspected at the time of closure. Equipment and structures to be ~~decontaminated~~ inspected include:

- Floors and walls of the four dangerous waste storage cells
- Floors, walls, and ceiling of high bay and flammable liquid bulking module areas
- Floors and walls of remainder of first floor except for offices, work area, and lavatories/change rooms
- Floors, walls, and ceiling of basement except equipment storage room
- Interior surfaces of all secondary containment trenches
- Fork lift and loading hoist
- Asphalt ramp outside north high bay door.

~~Before decontamination, sampling and analysis will be performed to determine decontamination requirements. In most cases, minimal decontamination consisting of washing or wiping will be performed unless the sampling and analysis indicates the presence of significant contamination. In order to determine whether such contamination exists, a systematic sampling approach designed to identify the presence of contaminated areas will be employed. Structures (i.e., floors, walls, ceilings) to be sampled before decontamination will be sampled on a regular grid with a spacing of 5 feet. This spacing provides an 80 percent probability of detecting a circular area of contamination having a radius of 2.5 feet or larger. Biased sampling of areas more likely to have been contaminated by unit operations, such as cracks or seams in the concrete floor or any visible stains, or areas of documented spills or releases, will also be performed. If any areas of contamination are detected, more thorough decontamination procedures will be used in those areas.~~

~~Structural surfaces will be sampled by collecting wipe samples at each grid point. At each sample location, two samples will be collected within adjacent 1-foot square templates. One sample will be collected using a gauze pad wetted with dilute nitric acid for extraction of inorganic contaminants. The other sample will be collected with a gauze pad wetted with hexane for extraction of organic contaminants.~~

~~Decontamination of equipment and structures will take place as described below. The magnitude of each phase of the operation and estimated time for completion is included.~~ Where accessible, building structures will be visually inspected ~~concurrently concurrently~~ while still in-place in the system and before decontamination. The inspections will determine which of the materials that will remain after closure already meet the clean closure standard of a "clean debris surface" and which ~~the~~ materials require~~ing~~ decontamination to meet the standard. A "*clean debris surface means the surface, that when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste, except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discoloration, and soils and waste in cracks, crevices and pits shall be limited to no more than 5% of each square inch of surface area.*" *(40 CFR 268.45)*

Materials removed from the facility as hazardous debris will be managed as described in Section 11.1.4.3~~will be disposed in accordance with approved CERCLA documentation~~. Inspection of materials for a "clean debris surface" will be documented on a checklist that will identify the area inspected, whether decontamination/treatment methods were implemented and the standard used to perform the inspection.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology: Greg P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.2.1:

11.1.4.2.1 Decontamination of Basement

Once Cell 7 has been completely emptied of stored waste, any visible residues ~~present~~ that do not meet the definition of a "clean debris surface", will be ~~scraped, vacuumed and/or swept up~~removed ~~until visibly clean~~. All residues thus obtained will be managed as described in Section 11.1.4.3~~placed in open top drums suitable containers and disposed of as appropriate (in accordance with the approved CERCLA decision document???)~~. All waste materials generated during the decontamination process of the Cell 7 will be designated ~~to determine whether the waste generated from decontamination is mixed waste~~appropriately. ~~After the above process is completed, wipe samples will be collected at various points along the floors, walls, and ceiling of the basement.~~

~~Swab samples will be collected from the Cell 7 to test for dangerous waste contamination resulting from storage activities. Any dangerous waste contamination found during this testing will be presumed to have come from storage activities unless otherwise documented. Random and biased sampling locations will be selected using the procedures noted in Section 11.4.4.~~

~~The swab samples will be analyzed for mixed waste constituents. Baseline smears will have been documented prior to introduction of mixed waste. Once the results from the testing are known, a decision can be made as to the appropriate decontamination procedures. If no contamination is found on the swab samples, decontamination procedures will consist of dusting, vacuuming, and wiping with soap and water. Vacuuming is performed using a commercial or industrial vacuum equipped with a high efficiency particulate air (HEPA) filter. The vacuum cleaner bag containing captured particulates is disposed of as appropriate.~~
~~Dusting/wiping is done with a damp cloth or wipe (soaked with water or solvent) to remove dust from surfaces not practically treatable with a vacuum. The cloth or wipe is also disposed of as appropriate. Brushing or sweeping is used to clean up coarse debris.~~
~~Minimal time will be required for setup of the equipment. Labor requirements for the process should be moderate. Minimal time will also be required for packaging debris and dismantling and removing cleaning equipment. Little wastewater (only the contents of the buckets) will be generated by this procedure. However, if contamination is found on the swab samples, more sophisticated decontamination procedures must be implemented. The entire Cell 7 storage room will be extensively treated via steam cleaning. Applying steam from a hand held wand to remove all residues from the surfaces will treat the ceiling, all four walls, and the floor. The contaminated wastewater generated by this activity will be contained by the designed spill controls already in place for waste storage areas. Pumps or vacuums will be used to empty the wastewater from the containment area into polyethylene lined, closed top drums. These containers will be transported for proper management at an approved dangerous waste or mixed waste TSD facility.~~
~~Although this procedure will require more time than the dusting, vacuuming, and wiping procedures outlined above, time requirements are still considered to be minimal for the steam cleaning approach. Wastewaters generated by this procedure are not anticipated to exceed 100 gallons.~~
~~Following completion of decontamination, sampling will be performed, as described in Section 11.1.4.4, to verify that decontamination is complete.~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology: Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.2.2:

11.1.4.2.2 Decontamination of Waste Handling Equipment

All equipment will be ~~decontaminated first by solvent washing followed by steam cleaning, or~~ managed as described in Section 11.1.4.3~~disposed of as dangerous waste, as appropriate, at an approved disposal facility (in accordance with the approved CERCLA decision document??)~~. ~~The decision to dispose or decontaminate equipment will be made at the time of closure. Whichever option, in the opinion of the Building Supervisor, is most environmentally and economically feasible will be chosen. If the equipment is not considered to be substantially contaminated, the solvent washing may not be performed. In this case, the steam cleaning technique only will clean the equipment.~~

~~All equipment to be decontaminated will be placed in one of the fully contained storage cells and subjected to the solvent wash deemed most effective for the removal of the suspected contamination. The equipment is then subjected to a final washing and rinsing by a steam cleaning unit. All wastewaters will be collected in the storage cell sumps, pumped to polyethylene lined closed top drums, and transported and disposed of as dangerous waste.~~

~~The time required for completion and wastewaters generated by these processes are largely dependent upon the amount of equipment that needs to be treated. However, at this time, minimal time and effort are anticipated. In addition, wastes to be generated are not anticipated to exceed 50 gallons.~~

~~Following completion of decontamination, sampling will be performed, as described in Section 11.1.4.4, to verify that decontamination is complete.~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.2.3:

11.1.4.2.3 Decontamination of Dangerous Waste Storage Cells

The dangerous waste storage cells will be inspected and ~~A~~any visible contamination present ~~in the storage cells~~ will be ~~scraped and/or swept until visibly clean~~decontaminated as needed to meet the definition of "clean surface debris". All collected residues ~~obtained from the scraping/sweeping exercise~~ will be managed as described in Section 11.1.4.3~~placed in open top drums~~~~suitable containers and disposed of as dangerous waste~~~~in accordance with approved CERCLA documentation~~. Each of the four storage cells will be ~~steam~~ cleaned using one or more of the removal technologies described in 40 CFR 268.45, as necessary to meet the "clean debris surface" criteria. ~~and t~~Any~~he~~ generated ~~waste~~waters will be collected ~~in each~~from each of the storage cell's ~~individual sumps. The wastewaters will be pumped from the sumps to polyethylene lined, closed top drums~~and placed in suitable containers in preparation for disposal. ~~No wastewaters will be mixed with scrapings, sweepings, or wastewaters from other storage cells.~~

~~The containerized waste will be analyzed to determine if they are designated as dangerous waste under WAC 173-303-070, and disposed in accordance with approved CERCLA documentation.Each sump area will be re-rinsed with water. This water will similarly be pumped to containers for disposal.~~

~~The containerized wastewaters will be analyzed to determine if they are designated as dangerous waste under WAC 173-303-070. If designated as dangerous, the wastewaters will be handled, transported, and disposed of as dangerous waste. If not dangerous waste, the wastewater will be managed appropriately. Total decontamination of the storage cells should be completed in no more than 2 weeks. Each of the storage cells should have approximately 30 gallons of wastewater generated during the cleaning and rinsing process; therefore, a total of 120 gallons of wastewater will need to be analyzed and disposed.~~

~~Following completion of decontamination, sampling will be performed, as described in Section 11.1.4.4, to verify that decontamination is complete.~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
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D.1. Closure, Changes to the closure plan.

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.2.4:

11.1.4.2.4 Decontamination of High Bay, Flammable Liquid Bulking Module and Other First Floor Areas

~~Wipe samples will be collected at various points along~~ The floors, walls, and ceiling of the entire first floor, except for the office, supply/office area, lunch room, and rest room~~.~~ will be visually inspected. The inspections will determine which of the structure that will remain after closure already meet the clean closure standard of a "clean debris surface" and which ~~the~~ materials require~~s~~ decontamination to meet the standard. A "*clean debris surface means the surface, that when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste, except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discoloration, and soils and waste in cracks, crevices and pits shall be limited to no more than 5% of each square inch of surface area.*" (40 CFR 268.45)
Materials removed from the system as hazardous debris will be managed as described in Section 11.1.4.3~~disposed in accordance with approved CERCLA documentation~~. Inspection of materials for a "clean debris surface" will be documented on a checklist that will identify the area inspected, whether decontamination/treatment methods were implemented and the standard used to perform the inspection. ~~The wipe samples will be analyzed to determine if these areas have been contaminated with dangerous waste constituents. Once the results from the testing are known, a decision can be made as to the appropriate decontamination procedures.~~
~~If no contamination is found on the wipe samples, decontamination procedures will consist of dusting, vacuuming, and wiping. Vacuuming is performed using a commercial or industrial vacuum equipped with a HEPA filter. The vacuum cleaner bag containing captured particulates is disposed of as appropriate.~~
~~Dusting/wiping is done with a damp cloth or wipe (soaked with water or solvent) to remove dust from surfaces not practically treatable with a vacuum. The cloth or wipe is also disposed of as appropriate. Brushing or sweeping is used to clean up coarse debris.~~
~~Minimal time will be required for setup of the equipment. Labor requirements for the process should be moderate. Minimal time will also be required for packaging debris and dismantling and removing cleaning equipment. Little wastewater (only the contents of the buckets) will be generated by this procedure.~~
~~On the other hand, i~~If contamination above the clean surface debris criteria is found, ~~on the wipe samples, more sophisticated decontamination procedures must be implemented. t~~The affected areas will be ~~extensively treated via steam cleaning~~ cleaned. ~~Applying steam with a hand held wand to remove all residues from the surfaces will treat such areas.~~ ~~The~~Any contaminated ~~wastewater~~ material generated by this activity will be managed as described in Section 11.1.4.3~~be contained, designated, and disposed in accordance with approved CERCLA decision documents. by the designed spill controls already in place for the waste storage areas. Pumps will be used to empty the wastewater from the containment area into polyethylene lined closed top drums. These containers will be transferred for proper treatment or disposal at an approved dangerous waste facility. Although this procedure will require more time than the dusting, vacuuming, and wiping procedures outlined above, time requirements are still considered to be minimal for the steam cleaning approach. Wastewaters generated by this procedure are not anticipated to exceed 200 gallons.~~
Following completion of decontamination, ~~sampling~~ another visual inspection will be performed, ~~as described in Section 11.1.4.4,~~ to verify that decontamination is complete.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.2.5:

~~11.1.4.2.5 Decontamination of Sumps~~

~~All collection sumps located at the 305-B Storage Facility, including those lining the storage cells on the west side of the unit, the sump along the east side inside wall, and those protecting the exits on the north and south ends, will be decontaminated by steam cleaning. Wastewaters collected in each sump from the implementation of the cleaning process will be pumped into polyethylene-lined, closed-top drums and analyzed as to whether or not the wastewater is designated as dangerous waste under WAC 173-303-070. If designated, the wastewater will be disposed of as dangerous waste. If the wastewater is not dangerous waste, the wastewaters will be discharged to the 300 Area process sewer system. The steam cleaning of all the sumps should take minimal time and generate approximately 100 gallons of wastewater.~~

~~Following completion of decontamination, sampling will be performed, as described in Section 11.1.4.4, to verify that decontamination is complete.~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
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Hanford Facility RCRA Permit Modification Notification Form

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305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.3:

11.1.4.3 Management of Decontamination Waste

~~Liquid d~~Decontamination waste will be placed in ~~drums~~suitable containers and sampled to determine disposal requirements. ~~Grab samples will be collected from drums using COLIWASA samplers.~~ In order to properly designate the decontamination waste under WAC 173-303-070, ~~grab~~ samples from each ~~drum~~ container will be analyzed for the following:

- Corrosivity using the methods described in SW-846
- Flash point using methods described in SW-846
- Toxicity characteristic using the toxicity characteristic leaching procedure described in SW-846 (includes analysis for metals, volatile organics, and semi-volatile organics including chlorinated pesticides)

The results of sample analysis will be used to determine how to dispose of ~~liquid~~ the decontamination waste, including LDR [WAC 173-303 and 40 CFR 268]. ~~The results of volatile and semi-volatile organic analysis of the liquid performed as part of the TCLP will be used to determine the presence of potential listed [WAC 173-303-081(1) and WAC 173-303-082(1)] dangerous waste constituents above background. (Background levels will be determined by analysis of the tap water used for makeup of the decontamination solutions.) Those liquid wastes with listed waste constituents above background will be designated as dangerous waste. The results of the ignitability, corrosivity, and TCLP analyses will be used to determine if liquid wastes are characteristic dangerous waste [WAC 173-303-090]. Organic and inorganic analytical results will also be used to determine if liquid wastes are dangerous waste mixtures [WAC 173-303-084].~~ Decontamination waste will be disposed in accordance with approved ~~*CERCLA documentation*~~*Removal Action Work Plan #1 for the 300 Area Facilities* (DOE/RL-2004-77).

All non-liquid waste generated during decontamination of ~~dangerous~~ waste storage areas and equipment (e.g., personnel protective clothing) will be collected in ~~55-gallon open-head drums~~suitable containers and managed ~~as dangerous waste~~in accordance with approved ~~CERCLA decision documentation~~*Removal Action Work Plan #1 for the 300 Area Facilities (DOE/RL-2004-77)*. ~~All non-liquid waste generated during decontamination of mixed waste storage areas and equipment will be similarly collected and managed as mixed waste.~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

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Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: [X] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis
G. P Davis
4/19/06
Date

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Hanford Facility RCRA Permit Modification Notification Form

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305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.4:

11.1.4.4 Methods for Sampling and Testing to Demonstrate Success of Decontamination

If sampling is necessary, the type and quality of analytical data appropriate to verify closure action levels would be determined before sampling. The data will be as specified in the 300 Area D&D Waste Sampling and Analysis Plan (DOE/RL-2004-084). Process knowledge and unit inspection results would be used to help resolve TSD unit sampling issues such as analytes of interest, sample location, number of samples, number and frequency of field quality control samples (i.e., trip blanks, equipment blanks, splits, and duplicates), sampling methodology, sample validation, data evaluation methods, and acceptance of sitewide background values. Sample handling, packaging and shipping, chain of custody, and laboratory quality assurance/ quality control are described in the 300 Area D&D Waste Sampling and Analysis Plan. ~~A series of wipe samples will be collected at various points along floors, walls, ceilings, and equipment of areas at which decontamination activities were conducted. These samples will be analyzed and used to verify whether decontamination procedures were effective. To verify decontamination, a systematic sampling approach designed to identify the presence of "hot spots" will be employed. Samples will be collected on a regular grid with a spacing of 5 feet. This spacing provides an 80 percent probability of detecting a circular "hot spot" having a radius of 2.5 feet or larger (Gilbert 1987, pp. 119-125). Biased sampling of areas more likely to have been contaminated by unit operations, such as cracks or seams in the concrete floor or any visible stains, or areas of documented spills or releases, will also be performed. If any "hot spots" are detected, additional decontamination will be performed. Decontaminated surfaces will be sampled by collecting wipe samples at each grid point. At each sample location, two samples will be collected within adjacent 1 foot square templates. One sample will be collected using a gauze pad wetted with dilute nitric acid for extraction of inorganic contaminants. The other sample will be collected with a gauze pad wetted with hexane for extraction of organic contaminants.~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
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Modification Approved: [X] Yes [ ] No (state reason for denial)
Reason for denial:

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Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.5:

11.1.4.5 Closure of Containers

At closure, all containers will be removed from the 305-B Storage Facility. ~~All dangerous waste residues will be removed from the containment system components.~~ Contaminated equipment, floors, walls, and loading areas will be ~~decontaminated or removed~~inspected to determine whether they meet the criteria "clean debris surface". All decontamination equipment and rinsate will be containerized, tested, and properly disposed. ~~Sampling and analysis will be conducted to ensure that no contamination remains around the storage area and containment system.~~ Additional details for closure and decontamination are provided in Sections 11.1.4.1 through 11.1.4.3.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: [X] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.4.6 through 11.1.4.11::

11.1.4.6 Closure of Tanks

This section is not applicable to the 305-B Storage Facility because waste ~~are~~ were not stored or treated in tanks.

11.1.4.7 Closure of Waste Piles

This section is not applicable to the 305-B Storage Facility because wastes are not stored in waste piles.

11.1.4.8 Closure of Surface Impoundments

This section is not applicable to the 305-B Storage Facility because wastes ~~are~~ were not placed in surface impoundments.

11.1.4.9 Closure of Incinerators

This section is not applicable to the 305-B Storage Facility because wastes ~~are~~ were not incinerated.

11.1.4.10 Closure of Land Treatment Facilities

This section is not applicable to the 305-B Storage Facility because wastes ~~are~~ were not treated in land treatment units.

11.1.4.11 Closure of Disposal Facilities

This section is not applicable to the 305-B Storage Facility because it ~~will~~ will not be closed as a dangerous waste disposal unit.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
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Hanford Facility RCRA Permit Modification Notification Form	
Unit: **305-B Storage Facility**	Permit Part & Chapter: **Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.6:

11.1.6 Closure Schedule

~~When closure begins, the inventory of dangerous and mixed waste will be removed within 90 days from receipt of the final volume of waste.~~ All closure activities will be completed ~~within 180 days of receipt of the final volume of waste~~by December 31, 2006. ~~The Director of the Washington State Department of Ecology will be notified by DOE RL at least 45 days before the final closure activities are begun.~~ Closure activities are summarized in Table 11.1. ~~A detailed schedule of closure activities is provided in Figure 11.1.~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.1.7:

11.1.7 Extension of Closure Time Frame

~~The inventory of dangerous and mixed waste will be removed from the 305-B Storage Facility within 90 days of receipt of the last volume of waste.~~ The closure activities described in this plan will be completed by December 31, 2006 ~~within 180 days of receipt of the final volume of waste~~. No extension to the time frame for initiation and completion of closure is currently expected to be necessary. Extensions to the time frames for closure would only be necessary if unexpected conditions were encountered during closure of the unit. ~~If it becomes apparent that all waste cannot be removed within 90 days, Ecology will be so notified at least 30 days prior to expiration of the 90 day period. This notification will demonstrate why more than 90 days is required for removal of the waste and will demonstrate that steps have been taken to prevent threats to human health and the environment and that the unit is in compliance with applicable permit standards.~~ If it becomes apparent that closure cannot be completed ~~within 180 days after approval of this plan~~by December 31, 2006, Ecology will be so notified at least 30 days prior to expiration ~~of the 180~~ this closure ~~day~~ period. This notification will demonstrate why ~~more than 180 days~~an extension is required for closure and will demonstrate that steps have been taken to prevent threats to human health and the environment and that the unit is in compliance with applicable permit standards.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class ¹1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class ¹1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, Table 11.1

Table 11.1. Summary of Closure Activities.

Closure Activity Description	Expected Duration
Receipt of final volume of dangerous and/or mixed waste	N/A
Notify EPA and Ecology that closure will begin	N/A
~~Remove waste inventory – package all dangerous and mixed waste, manifest, and transfer to permitted facility for treatment and/or disposal~~	~~45 days~~
~~Obtain wipe samples from structural surfaces and equipment to identify areas of contamination and determine level of decontamination needed~~Perform visual inspection of the building in accordance with Section 11.1.4	~~10~~ 15 days
~~Analyze wipe samples~~	~~25 days~~
Decontaminate structural surfaces and equipment using procedures ~~based on results of wipe sampling~~described in Section 11.1.4	35 days
~~Obtain wipe samples to verify decontamination~~	~~25 days~~
~~Analyze verification samples~~	~~35 days~~
Analyze decontamination waste to determine proper methods of treatment/disposal	70~~25~~ days
Dispose of decontamination waste based on results of waste analysis	20 days

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
[2] If the proposed modification does not match any modification listed in WAC 173-303-830, Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, Figure 11.1:

~~Figure 11.1. Detailed Schedule of Closure~~

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
Greta P. Davis 4/19/06
G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.
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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated June 30, 2006
Chapter 11.0, §11.2:

11.2 CERTIFICATION OF CLOSURE

Within 60 days of completion of the final closure activities described in this plan, a certification of closure will be submitted to Ecology. This certification will indicate that the 305-B Storage Facility has been closed as described in this plan and that the closure performance standards given in Section 11.1.1 haves been met. The certification will be submitted by registered mail and will be signed ~~by DOE-RL and an independent Professional Engineer registered in the State of Washington~~ as described below.

The ~~DOE-RL~~ owner and co-operator will self-certify with the following document or a document similar to it:

We, the undersigned, hereby certify that the 305-B Storage Facility closure activities were performed in accordance with the specifications in the Closure Plan, approved by Ecology on (date).

~~*I, (name), an authorized representative of the U.S. Department of Energy-Richland Operations Office located at the Federal Building, 825 Jadwin Avenue, Richland, Washington, hereby state and certify that the 305-B Storage Facility at the 300 Area, to the best of my knowledge and belief, has been closed in accordance with the attached approved closure plan, and that the closure was completed on (date).*~~

(Signature and date)

~~The DOE-RL will engage a~~An independent Professional Engineer registered in the State of Washington ~~to~~ will inspect closure activities, ~~to~~ verify that closure activities are being conducted according to this plan, and ~~to~~ certify that closure has been performed in accordance with this plan.

~~The engineer will inspect the 305-B Storage Facility at least weekly while closure activities are being performed. During these inspections the engineer will observe closure activities to determine whether they are being performed according to this plan. Inspections will include, but not be limited to:~~

~~□ Inspection of dangerous and mixed waste containment structures and systems to determine whether releases of waste to the environment have occurred~~

~~□ Verification that the dangerous and mixed waste inventory has been removed within 90 days of receipt of the last waste shipment~~

~~□ Inspection of manifests and Operating Record to verify that these waste were disposed of in compliance with WAC 173-303~~

~~□ Inspection of decontamination operations to verify that they are being performed using the procedures described in this plan~~

~~□ Inspections of the Operating Record to verify that samples of liquid decontamination waste were collected and analyzed using the procedures described in this plan~~

~~□ Inspection of the Operating Record to verify that decontamination waste were properly designated in compliance with WAC 173-303-070 and properly disposed.~~

~~Inspections by the engineer will be documented in a bound notebook. Notations will include the date and time of the inspection, the areas inspected, the activities inspected, applicable closure plan requirements inspected, status of observed activities with respect to plan requirements, corrective actions required status of past corrective actions, and name and signature of inspector. This inspection notebook will be made available to Ecology upon request.~~

Upon completion of closure according to the plan, ~~the DOE-RL will require~~ the independent professional engineer ~~to~~ will sign the following document or a document similar to it:

I, (name), a certified Professional Engineer, hereby certify, to the best of my knowledge and belief, that I have made visual inspection(s) of the 305-B Storage Facility at the 300 Area and that closure of the aforementioned unit has been performed in accordance with the ~~attached~~ approved closure plan.

(Signature, date, state Professional Engineer license number, business address, and phone number.)

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: D.1

Enter wording of WAC 173-303-830, Appendix I Modification citation:

D.1. Closure, Changes to the closure plan.

Modification Approved: ☒ Yes ☐ No (state reason for denial)

Reason for denial:

Reviewed by Ecology: Greta P. Davis 4/19/06

G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

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Hanford Facility RCRA Permit Modification Notification

Part III, Chapter 2
305-B Storage Facility

Replacement Index

Permit Attachment 18, Chapter 1.0
Permit Attachment 18, Chapter 11.0

1 **Chapter 1.0** **Part A**

1.0 PART A DANGEROUS WASTE PERMIT

The following is a chronology of the regulatory history of the 305-B Storage Facility.

- May 19, 1988, submitted Revision 0, Part A, Form 3 to the Washington State Department of Ecology (Ecology).
- December 1990, submitted Part A, Form 3, Revision 1 to Ecology. Fulfilling requirements of 40 CFR 270.72 for new TCLP waste numbers D018 through D043 and WAC 173-303-805 for newly added waste numbers D012 through D017.
- June 30, 1998, Part A, Form 3, Revision 1A, deleted dangerous waste numbers WC01 and WC02 and added dangerous waste number WSC2.
- December 31, 2001, Part A, Form 3, Revision 1B revised to delete dangerous waste numbers that were eliminated in accordance with Federal Register's (FR) 50 FR 51125, 62 FR 32977, and WAC 173-303: P019, P025, P032, P035, P052, P053, P055, P061, P079, P080, P083, P086, P090, P091, P100, P107, P117, U013, U040, U054, U065, U100, U104, U139, U175, U195, U198, U199, U212, U224, U229, U230, U231, U232, U233, U241, U242, U245. Added dangerous waste numbers that were added in accordance with Federal Register's (FR) 50 FR 51125, 62 FR 32977, and WAC 173-303: P127, P128, P185, P188, P189, P190, P191, P192, P194, P196, P197, P198, P199, P201, P202, P203, P204, P205, U271, U278, U279, U280, U364, 367, U372, U373, U387, U389, U394, U395, U404, U409, U410, U411, K013, K044.
- September 30, 2002, submitted Part A, Form 3, Revision 1C as Chapter 1.0 of Attachment 18 to the Hanford Facility RCRA Permit. No changes were made to the Part A, Form 3.
- May 2005, Part A, Revision 2, adopted the new Ecology Part A Form [ECY 030-31 Hanford (Rev. 3/5/04)].

June 30, 2006, Part A Form, Revision 3, was modified stating that all waste stored in the 305-B Storage Facility was transferred out of the unit on March 31, 2006. June 2006, the contractor (co-operator) for this TSD unit changed from Pacific Northwest National Laboratory to Washington Closure Hanford LLC.

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Dangerous Waste Permit Application Part A Form

Date Received	Reviewed by:	Date:
Month Day Year	Approved by:	Date:

Please refer to instructions for completing this form.

I. This form is submitted to: (place an "X" in the appropriate box)

☒	Request modification to a final status permit (commonly called a "Part B" permit)
☐	Request a change under interim status
☐	Apply for a final status permit. This includes the application for the initial final status permit for a site or for a permit renewal (i.e., a new permit to replace an expiring permit).
☐	Establish interim status because of the wastes newly regulated on: (Date)
	List waste codes:

II. EPA/State ID Number

W A 7 8 9 0 0 0 8 9 6 7

III. Name of Facility

US Department of Energy – Hanford Facility

IV. Facility Location (Physical address not P.O. Box or Route Number)

A. Street

825 Jadwin

City or Town	State	ZIP Code
Richland	WA	99352

County Code (if known)	County Name
005	Benton

B. Land Type	C. Geographic Location Latitude (degrees, mins, secs)	Longitude (degrees, mins, secs)	D. Facility Existence Date Month Day Year
F	SEE TOPO	MAP	03 22 1943

V. Facility Mailing Address

Street or P.O. Box

P.O. Box 550

City or Town	State	ZIP Code
Richland	WA	99352

VI. Facility contact (Person to be contacted regarding waste activities at facility)	
Name (last)	**(first)**
Klein	Keith
Job Title	**Phone Number (area code and number)**
Manager	(509) 376-7395*
Contact Address	
Street or P.O. Box	
P.O. Box 550	
City or Town	**State** / **ZIP Code**
Richland	WA / 99352

VII. Facility Operator Information	
A. Name	**Phone Number (area code and number)**
Department of Energy* Owner/Operator Washington Closure Hanford, LLC** Co-Operator for 305-B Storage Facility	(509) 376-7395* (509) 372-9951**
Street or P.O. Box	
P.O. Box 550* 3070 George Washington Way **	
City or Town	**State** / **ZIP Code**
Richland	WA / 99352
B. Operator Type F	
C. Does the name in VII.A reflect a proposed change in operator? ☐ Yes ☒ No **If yes, provide the scheduled date for the change:** Month / Day / Year	
D. Is the name listed in VII.A. also the owner? If yes, skip to Section VIII.C. ☐ Yes ☒ No	

VIII. Facility Owner Information	
A. Name	**Phone Number (area code and number)**
Keith A. Klein, Operator/Facility-Property Owner	(509) 376-7395*
Street or P.O. Box	
P.O. Box 550	
City or Town	**State** / **ZIP Code**
Richland	WA / 99352
B. Operator Type F	
C. Does the name in VII.A reflect a proposed change in operator? ☐ Yes ☒ No **If yes, provide the scheduled date for the change:** Month / Day / Year	

IX. NAICS Codes (5/6 digit codes)

A. First							B. Second						
5	6	2	2	1		Waste Treatment & Disposal	9	2	4	1	1	0	Administration of Air & Water Resource & Solid Waste Management Programs
C. Third							**D. Fourth**						
9	9	9	9	9	9	Unclassified Establishments	5	6	2	9	1	0	Remediation Services

X. Other Environmental Permits (see instructions)

A. Permit Type	B. Permit Number	C. Description
E	AIR02-1202	WAC 246-247, Non radioactive Air, 40 CFR 61, Subpart H, NESHAPS
E	DE98NWP-003	WAC 173-400, General Regulations for Air Pollution Sources WAC 173-460, Controls for New Sources of Toxic Air Pollutants

XI. Nature of Business (provide a brief description that includes both dangerous waste and non-dangerous waste areas and activities)

S01

The 305-B Storage Facility was a dangerous waste and mixed waste storage unit owned and operated by DOE and co-operated by PNNL. The unit was used for the collection, consolidation, packaging, storage, preparation for transport and disposal of both dangerous waste and mixed waste. It was an integral part of the Hanford Site's waste management system. Mixed waste was stored as received in storage cells in the basement of the facility. Other waste was stored in segregated cells in the high bay area. The waste stored at the 305-B Storage Facility consisted of listed waste, waste from nonspecific sources, characteristic waste, and state-only waste.

March 31, 2006, PNNL completed transferring out all waste stored at the 305-B Storage Facility. The majority of the waste stored at the 305-B Storage Facility was transferred to an offsite TSD facility, and the remainder was transferred to the 331-C Storage Unit. The 305-B Storage Facility was transferred to Washington Closure Hanford LLC (WCH) contractor (Co-Operator) in June 2006, for closure and demolition.

EXAMPLE FOR COMPLETING ITEMS XII and XIII (shown in lines numbered X-1, X-2, and X-3 below): A facility has two storage tanks that hold 1200 gallons and 400 gallons respectively. There is also treatment in tanks at 20 gallons/hr. Finally, a one-quarter acre area that is two meters deep will undergo *in situ vitrification.*

Section XII. Process Codes and Design Capacities								Section XIII. Other Process Codes							
Line Number		A. Process Codes (enter code)			B. Process Design Capacity		C. Process Total Number of Units	Line Number		A. Process Codes (enter code)			B Process Design Capacity		C. Process Total Number of Units	D. Process Description
					1. Amount	2. Unit of Measure (enter code)							1. Amount	2. Unit of Measure (enter code)		
X	1	S	0	2	1,600	G	002	X	1	T	0	4	700	C	001	In situ vitrification
X	2	T	0	3	20	E	001									
X	3	T	0	4	700	C	001									
	1	S	0	1	30,000	G	001		1							
	2								2							
	3								3							
	4								4							
	5								5							
	6								6							
	7								7							
	8								8							
	9								9							
1	0							1	0							
1	1							1	1							
1	2							1	2							
1	3							1	3							
1	4							1	4							
1	5							1	5							
1	6							1	6							
1	7							1	7							
1	8							1	8							
1	9							1	9							
2	0							2	0							
2	1							2	1							
2	2							2	2							
2	3							2	3							
2	4							2	4							
2	5							2	5							

XIV. Description of Dangerous Wastes

Example for completing this section: A facility will receive three non-listed wastes, then store and treat them on-site. Two wastes are corrosive only, with the facility receiving and storing the wastes in containers. There will be about 200 pounds per year of each of these two wastes, which will be neutralized in a tank. The other waste is corrosive and ignitable and will be neutralized then blended into hazardous waste fuel. There will be about 100 pounds per year of that waste, which will be received in bulk and put into tanks.

Line Number			A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Processes									
									(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
X	1		D	0	0	2	400	P	S	0	1	T	0	1				
X	2		D	0	0	1	100	P	S	0	2	T	0	1				
X	3		D	0	0	2												Included with above
		1	D	0	0	1	20,000	K	S	0	1							Includes Debris
		2	D	0	0	2	5,000	K	S	0	1							Includes Debris
		3	D	0	0	3	1000	K	S	0	1							Includes Debris
		4	D	0	0	4	1000	K	S	0	1							Includes Debris
		5	D	0	0	5	1000	K	S	0	1							Includes Debris
		6	D	0	0	6	1000	K	S	0	1							Includes Debris
		7	D	0	0	7	10,000	K	S	0	1							Includes Debris
		8	D	0	0	8	50,000	K	S	0	1							Includes Debris
		9	D	0	0	9	1000	K	S	0	1							Includes Debris
	1	0	D	0	1	0	1000	K	S	0	1							Includes Debris
	1	1	D	0	1	1	1000	K	S	0	1							Includes Debris
	1	2	D	0	1	2	220	K	S	0	1							Includes Debris
	1	3	D	0	1	3	220	K	S	0	1							Includes Debris
	1	4	D	0	1	4	220	K	S	0	1							Includes Debris
	1	5	D	0	1	5	220	K	S	0	1							Includes Debris
	1	6	D	0	1	6	220	K	S	0	1							Includes Debris
	1	7	D	0	1	7	220	K	S	0	1							Includes Debris
	1	8	D	0	1	8	2,000	K	S	0	1							Includes Debris
	1	9	D	0	1	9	2,000	K	S	0	1							Includes Debris
	2	0	D	0	2	0	220	K	S	0	1							Includes Debris
	2	1	D	0	2	1	220	K	S	0	1							Includes Debris
	2	2	D	0	2	2	2,000	K	S	0	1							Includes Debris
	2	3	D	0	2	3	2,000	K	S	0	1							Includes Debris
	2	4	D	0	2	4	2,000	K	S	0	1							Includes Debris
	2	5	D	0	2	5	2,000	K	S	0	1							Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
26	D026	2,000	K	S01	Includes Debris
27	D027	220	K	S01	Includes Debris
28	D028	220	K	S01	Includes Debris
29	D029	220	K	S01	Includes Debris
30	D030	220	K	S01	Includes Debris
31	D031	220	K	S01	Includes Debris
32	D032	220	K	S01	Includes Debris
33	D033	220	K	S01	Includes Debris
34	D034	220	K	S01	Includes Debris
35	D035	5,000	K	S01	Includes Debris
36	D036	220	K	S01	Includes Debris
37	D037	2,000	K	S01	Includes Debris
38	D038	2,000	K	S01	Includes Debris
39	D039	2,000	K	S01	Includes Debris
40	D040	2,000	K	S01	Includes Debris
41	D041	220	K	S01	Includes Debris
42	D042	220	K	S01	Includes Debris
43	D043	2,000	K	S01	Includes Debris
44	F001	2,000	K	S01	Includes Debris
45	F002	2,000	K	S01	Includes Debris
46	F003	5,000	K	S01	Includes Debris
47	F004	1,000	K	S01	Includes Debris
48	F005	5,000	K	S01	Includes Debris
49	F027	200	K	S01	Includes Debris
50	P001	200	K	S01	Includes Debris
51	P002	200	K	S01	Includes Debris
52	P003	200	K	S01	Includes Debris
53	P004	200	K	S01	Includes Debris
54	P005	200	K	S01	Includes Debris
55	P006	200	K	S01	Includes Debris
56	P007	200	K	S01	Includes Debris
57	P008	200	K	S01	Includes Debris
58	P009	200	K	S01	Includes Debris
59	P010	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
60	P 0 1 1	200	K	S 0 1	Includes Debris
61	P 0 1 2	200	K	S 0 1	Includes Debris
62	P 0 1 3	200	K	S 0 1	Includes Debris
63	P 0 1 4	200	K	S 0 1	Includes Debris
64	P 0 1 5	200	K	S 0 1	Includes Debris
65	P 0 1 6	200	K	S 0 1	Includes Debris
66	P 0 1 7	200	K	S 0 1	Includes Debris
67	P 0 1 8	200	K	S 0 1	Includes Debris
68	P 0 2 0	200	K	S 0 1	Includes Debris
69	P 0 2 1	200	K	S 0 1	Includes Debris
70	P 0 2 2	200	K	S 0 1	Includes Debris
71	P 0 2 3	200	K	S 0 1	Includes Debris
72	P 0 2 4	200	K	S 0 1	Includes Debris
73	P 0 2 6	200	K	S 0 1	Includes Debris
74	P 0 2 7	200	K	S 0 1	Includes Debris
75	P 0 2 8	200	K	S 0 1	Includes Debris
76	P 0 2 9	200	K	S 0 1	Includes Debris
77	P 0 3 0	200	K	S 0 1	Includes Debris
78	P 0 3 1	200	K	S 0 1	Includes Debris
79	P 0 3 3	200	K	S 0 1	Includes Debris
80	P 0 3 4	200	K	S 0 1	Includes Debris
81	P 0 3 6	200	K	S 0 1	Includes Debris
82	P 0 3 7	200	K	S 0 1	Includes Debris
83	P 0 3 8	200	K	S 0 1	Includes Debris
84	P 0 3 9	200	K	S 0 1	Includes Debris
85	P 0 4 0	200	K	S 0 1	Includes Debris
86	P 0 4 1	200	K	S 0 1	Includes Debris
87	P 0 4 2	200	K	S 0 1	Includes Debris
88	P 0 4 3	200	K	S 0 1	Includes Debris
89	P 0 4 4	200	K	S 0 1	Includes Debris
90	P 0 4 5	200	K	S 0 1	Includes Debris
91	P 0 4 6	200	K	S 0 1	Includes Debris
92	P 0 4 7	200	K	S 0 1	Includes Debris
93	P 0 4 8	200	K	S 0 1	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
94	P049	200	K	S01	Includes Debris
95	P050	200	K	S01	Includes Debris
96	P051	200	K	S01	Includes Debris
97	P054	200	K	S01	Includes Debris
98	P056	200	K	S01	Includes Debris
99	P057	200	K	S01	Includes Debris
100	P058	200	K	S01	Includes Debris
101	P059	200	K	S01	Includes Debris
102	P060	200	K	S01	Includes Debris
103	P062	200	K	S01	Includes Debris
104	P063	200	K	S01	Includes Debris
105	P064	200	K	S01	Includes Debris
106	P065	200	K	S01	Includes Debris
107	P066	200	K	S01	Includes Debris
108	P067	200	K	S01	Includes Debris
109	P068	200	K	S01	Includes Debris
110	P069	200	K	S01	Includes Debris
111	P070	200	K	S01	Includes Debris
112	P071	200	K	S01	Includes Debris
113	P072	200	K	S01	Includes Debris
114	P073	200	K	S01	Includes Debris
115	P074	200	K	S01	Includes Debris
116	P075	200	K	S01	Includes Debris
117	P076	200	K	S01	Includes Debris
118	P077	200	K	S01	Includes Debris
119	P078	200	K	S01	Includes Debris
120	P081	200	K	S01	Includes Debris
121	P082	200	K	S01	Includes Debris
122	P084	200	K	S01	Includes Debris
123	P085	200	K	S01	Includes Debris
124	P087	200	K	S01	Includes Debris
125	P088	200	K	S01	Includes Debris
126	P089	200	K	S01	Includes Debris
127	P092	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
128	P093	200	K	S01	Includes Debris
129	P094	200	K	S01	Includes Debris
130	P095	200	K	S01	Includes Debris
131	P096	200	K	S01	Includes Debris
132	P097	200	K	S01	Includes Debris
133	P098	200	K	S01	Includes Debris
134	P099	200	K	S01	Includes Debris
135	P101	200	K	S01	Includes Debris
136	P102	200	K	S01	Includes Debris
137	P103	200	K	S01	Includes Debris
138	P104	200	K	S01	Includes Debris
139	P105	200	K	S01	Includes Debris
140	P106	200	K	S01	Includes Debris
141	P108	200	K	S01	Includes Debris
142	P109	200	K	S01	Includes Debris
143	P110	200	K	S01	Includes Debris
144	P111	200	K	S01	Includes Debris
145	P112	200	K	S01	Includes Debris
146	P113	200	K	S01	Includes Debris
147	P114	200	K	S01	Includes Debris
148	P115	200	K	S01	Includes Debris
149	P116	200	K	S01	Includes Debris
150	P118	200	K	S01	Includes Debris
151	P119	200	K	S01	Includes Debris
152	P120	200	K	S01	Includes Debris
153	P121	200	K	S01	Includes Debris
154	P122	200	K	S01	Includes Debris
155	P123	200	K	S01	Includes Debris
156	P127	200	K	S01	Includes Debris
157	P128	200	K	S01	Includes Debris
158	P185	200	K	S01	Includes Debris
159	P188	200	K	S01	Includes Debris
160	P189	200	K	S01	Includes Debris
161	P190	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
162	P191	200	K	S01	Includes Debris
163	P192	200	K	S01	Includes Debris
164	P194	200	K	S01	Includes Debris
165	P196	200	K	S01	Includes Debris
166	P197	200	K	S01	Includes Debris
167	P198	200	K	S01	Includes Debris
168	P199	200	K	S01	Includes Debris
169	P201	200	K	S01	Includes Debris
170	P202	200	K	S01	Includes Debris
171	P203	200	K	S01	Includes Debris
172	P204	200	K	S01	Includes Debris
173	P205	200	K	S01	Includes Debris
174	U001	200	K	S01	Includes Debris
175	U002	200	K	S01	Includes Debris
176	U003	200	K	S01	Includes Debris
177	U004	200	K	S01	Includes Debris
178	U005	200	K	S01	Includes Debris
179	U006	200	K	S01	Includes Debris
180	U007	200	K	S01	Includes Debris
181	U008	200	K	S01	Includes Debris
182	U009	200	K	S01	Includes Debris
183	U010	200	K	S01	Includes Debris
184	U011	200	K	S01	Includes Debris
185	U012	200	K	S01	Includes Debris
186	U014	200	K	S01	Includes Debris
187	U015	200	K	S01	Includes Debris
188	U016	200	K	S01	Includes Debris
189	U017	200	K	S01	Includes Debris
190	U018	200	K	S01	Includes Debris
191	U019	200	K	S01	Includes Debris
192	U020	200	K	S01	Includes Debris
193	U021	200	K	S01	Includes Debris
194	U022	200	K	S01	Includes Debris
195	U023	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
196	U024	200	K	S01	Includes Debris
197	U025	200	K	S01	Includes Debris
198	U026	200	K	S01	Includes Debris
199	U027	200	K	S01	Includes Debris
200	U028	200	K	S01	Includes Debris
201	U029	200	K	S01	Includes Debris
202	U030	200	K	S01	Includes Debris
203	U031	200	K	S01	Includes Debris
204	U032	200	K	S01	Includes Debris
205	U033	200	K	S01	Includes Debris
206	U034	200	K	S01	Includes Debris
207	U035	200	K	S01	Includes Debris
208	U036	200	K	S01	Includes Debris
209	U037	200	K	S01	Includes Debris
210	U038	200	K	S01	Includes Debris
211	U039	200	K	S01	Includes Debris
212	U041	200	K	S01	Includes Debris
213	U042	200	K	S01	Includes Debris
214	U043	200	K	S01	Includes Debris
215	U044	200	K	S01	Includes Debris
216	U045	200	K	S01	Includes Debris
217	U046	200	K	S01	Includes Debris
218	U047	200	K	S01	Includes Debris
219	U048	200	K	S01	Includes Debris
220	U049	200	K	S01	Includes Debris
221	U050	200	K	S01	Includes Debris
222	U051	200	K	S01	Includes Debris
223	U052	200	K	S01	Includes Debris
224	U053	200	K	S01	Includes Debris
225	U055	200	K	S01	Includes Debris
226	U056	200	K	S01	Includes Debris
227	U057	200	K	S01	Includes Debris
228	U058	200	K	S01	Includes Debris
229	U059	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
230	U060	200	K	S01	Includes Debris
231	U061	200	K	S01	Includes Debris
232	U062	200	K	S01	Includes Debris
233	U063	200	K	S01	Includes Debris
234	U064	200	K	S01	Includes Debris
235	U066	200	K	S01	Includes Debris
236	U067	200	K	S01	Includes Debris
237	U068	200	K	S01	Includes Debris
238	U069	200	K	S01	Includes Debris
239	U070	200	K	S01	Includes Debris
240	U071	200	K	S01	Includes Debris
241	U072	200	K	S01	Includes Debris
242	U073	200	K	S01	Includes Debris
243	U074	200	K	S01	Includes Debris
244	U076	200	K	S01	Includes Debris
245	U077	200	K	S01	Includes Debris
246	U078	200	K	S01	Includes Debris
247	U079	200	K	S01	Includes Debris
248	U080	200	K	S01	Includes Debris
249	U081	200	K	S01	Includes Debris
250	U082	200	K	S01	Includes Debris
251	U083	200	K	S01	Includes Debris
252	U084	200	K	S01	Includes Debris
253	U085	200	K	S01	Includes Debris
254	U086	200	K	S01	Includes Debris
255	U087	200	K	S01	Includes Debris
256	U088	200	K	S01	Includes Debris
257	U089	200	K	S01	Includes Debris
258	U090	200	K	S01	Includes Debris
259	U091	200	K	S01	Includes Debris
260	U092	200	K	S01	Includes Debris
261	U093	200	K	S01	Includes Debris
262	U094	200	K	S01	Includes Debris
263	U095	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
264	U096	200	K	S01	Storage-Container
265	U097	200	K	S01	Includes Debris
266	U098	200	K	S01	Includes Debris
267	U099	200	K	S01	Includes Debris
268	U101	200	K	S01	Includes Debris
269	U102	200	K	S01	Includes Debris
270	U103	200	K	S01	Includes Debris
271	U105	200	K	S01	Includes Debris
272	U106	200	K	S01	Includes Debris
273	U107	200	K	S01	Includes Debris
274	U108	200	K	S01	Includes Debris
275	U109	200	K	S01	Includes Debris
276	U110	200	K	S01	Includes Debris
277	U111	200	K	S01	Includes Debris
278	U112	200	K	S01	Includes Debris
279	U113	200	K	S01	Includes Debris
280	U114	200	K	S01	Includes Debris
281	U115	200	K	S01	Includes Debris
282	U116	200	K	S01	Includes Debris
283	U117	200	K	S01	Includes Debris
284	U118	200	K	S01	Includes Debris
285	U119	200	K	S01	Includes Debris
286	U120	200	K	S01	Includes Debris
287	U121	200	K	S01	Includes Debris
288	U122	200	K	S01	Includes Debris
289	U123	200	K	S01	Includes Debris
290	U124	200	K	S01	Includes Debris
291	U125	200	K	S01	Includes Debris
292	U126	200	K	S01	Includes Debris
293	U127	200	K	S01	Includes Debris
294	U128	200	K	S01	Includes Debris
295	U129	200	K	S01	Includes Debris
296	U130	200	K	S01	Includes Debris
297	U131	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
298	U132	200	K	S01	Includes Debris
299	U133	200	K	S01	Includes Debris
300	U134	200	K	S01	Includes Debris
301	U135	200	K	S01	Includes Debris
302	U136	200	K	S01	Includes Debris
303	U137	200	K	S01	Includes Debris
304	U138	200	K	S01	Includes Debris
305	U140	200	K	S01	Includes Debris
306	U141	200	K	S01	Includes Debris
307	U142	200	K	S01	Includes Debris
308	U143	200	K	S01	Includes Debris
309	U144	200	K	S01	Includes Debris
310	U145	200	K	S01	Includes Debris
311	U146	200	K	S01	Includes Debris
312	U147	200	K	S01	Includes Debris
313	U148	200	K	S01	Includes Debris
314	U149	200	K	S01	Includes Debris
315	U150	200	K	S01	Includes Debris
316	U151	200	K	S01	Includes Debris
317	U152	200	K	S01	Includes Debris
318	U153	200	K	S01	Includes Debris
319	U154	200	K	S01	Includes Debris
320	U155	200	K	S01	Includes Debris
321	U156	200	K	S01	Includes Debris
322	U157	200	K	S01	Includes Debris
323	U158	200	K	S01	Includes Debris
324	U159	200	K	S01	Includes Debris
325	U160	200	K	S01	Includes Debris
326	U161	200	K	S01	Includes Debris
327	U162	200	K	S01	Includes Debris
328	U163	200	K	S01	Includes Debris
329	U164	200	K	S01	Includes Debris
330	U165	200	K	S01	Includes Debris
331	U166	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
332	U167	200	K	S01	Includes Debris
333	U168	200	K	S01	Includes Debris
334	U169	200	K	S01	Includes Debris
335	U170	200	K	S01	Includes Debris
336	U171	200	K	S01	Includes Debris
337	U172	200	K	S01	Includes Debris
338	U173	200	K	S01	Includes Debris
339	U174	200	K	S01	Includes Debris
340	U176	200	K	S01	Includes Debris
341	U177	200	K	S01	Includes Debris
342	U178	200	K	S01	Includes Debris
343	U179	200	K	S01	Includes Debris
344	U180	200	K	S01	Includes Debris
345	U181	200	K	S01	Includes Debris
346	U182	200	K	S01	Includes Debris
347	U183	200	K	S01	Includes Debris
348	U184	200	K	S01	Includes Debris
349	U185	200	K	S01	Includes Debris
350	U186	200	K	S01	Includes Debris
351	U187	200	K	S01	Includes Debris
352	U188	200	K	S01	Includes Debris
353	U189	200	K	S01	Includes Debris
354	U190	200	K	S01	Includes Debris
355	U191	200	K	S01	Includes Debris
356	U192	200	K	S01	Includes Debris
357	U193	200	K	S01	Includes Debris
358	U194	200	K	S01	Includes Debris
359	U196	200	K	S01	Includes Debris
360	U197	200	K	S01	Includes Debris
361	U200	200	K	S01	Includes Debris
362	U201	200	K	S01	Includes Debris
363	U202	200	K	S01	Includes Debris
364	U203	200	K	S01	Includes Debris
365	U204	200	K	S01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
366	U 2 0 5	200	K	S 0 1	Includes Debris
367	U 2 0 6	200	K	S 0 1	Includes Debris
368	U 2 0 7	200	K	S 0 1	Includes Debris
369	U 2 0 8	200	K	S 0 1	Includes Debris
370	U 2 0 9	200	K	S 0 1	Includes Debris
371	U 2 1 0	200	K	S 0 1	Includes Debris
372	U 2 1 1	200	K	S 0 1	Includes Debris
373	U 2 1 3	200	K	S 0 1	Includes Debris
374	U 2 1 4	200	K	S 0 1	Includes Debris
375	U 2 1 5	200	K	S 0 1	Includes Debris
376	U 2 1 6	200	K	S 0 1	Includes Debris
377	U 2 1 7	200	K	S 0 1	Includes Debris
378	U 2 1 8	200	K	S 0 1	Includes Debris
379	U 2 1 9	200	K	S 0 1	Includes Debris
380	U 2 2 0	200	K	S 0 1	Includes Debris
381	U 2 2 1	200	K	S 0 1	Includes Debris
382	U 2 2 2	200	K	S 0 1	Includes Debris
383	U 2 2 3	200	K	S 0 1	Includes Debris
384	U 2 2 5	200	K	S 0 1	Includes Debris
385	U 2 2 6	200	K	S 0 1	Includes Debris
386	U 2 2 7	200	K	S 0 1	Includes Debris
387	U 2 2 8	200	K	S 0 1	Includes Debris
388	U 2 3 4	200	K	S 0 1	Includes Debris
389	U 2 3 5	200	K	S 0 1	Includes Debris
390	U 2 3 6	200	K	S 0 1	Includes Debris
391	U 2 3 7	200	K	S 0 1	Includes Debris
392	U 2 3 8	200	K	S 0 1	Includes Debris
393	U 2 3 9	200	K	S 0 1	Includes Debris
394	U 2 4 0	200	K	S 0 1	Includes Debris
395	U 2 4 3	200	K	S 0 1	Includes Debris
396	U 2 4 4	200	K	S 0 1	Includes Debris
397	U 2 4 6	200	K	S 0 1	Includes Debris
398	U 2 4 7	200	K	S 0 1	Includes Debris
399	U 2 4 8	200	K	S 0 1	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
400	U249	200	K	S01	Includes Debris
401	U271	200	K	S01	Includes Debris
402	U278	200	K	S01	Includes Debris
403	U279	200	K	S01	Includes Debris
404	U280	200	K	S01	Includes Debris
405	U328	200	K	S01	Includes Debris
406	U353	200	K	S01	Includes Debris
407	U359	200	K	S01	Includes Debris
408	U364	200	K	S01	Includes Debris
409	U367	200	K	S01	Includes Debris
410	U372	200	K	S01	Includes Debris
411	U373	200	K	S01	Includes Debris
412	U387	200	K	S01	Includes Debris
413	U389	200	K	S01	Includes Debris
414	U394	200	K	S01	Includes Debris
415	U395	200	K	S01	Includes Debris
416	U404	200	K	S01	Includes Debris
417	U409	200	K	S01	Includes Debris
418	U410	200	K	S01	Includes Debris
419	U411	200	K	S01	Includes Debris
420	WPCB	5,000	K	S01	Includes Debris
421	WP01	5,000	K	S01	Includes Debris
422	WP02	1,000	K	S01	Includes Debris
423	WP03	500	K	S01	Includes Debris
424	WT01	30,000	K	S01	Includes Debris
425	WT02	20,000	K	S01	Includes Debris
426	WSC2	5,000	K	S01	Includes Debris
427	K013	200	K	S01	Includes Debris
428	K044	200	K	S01	Includes Debris

XV. Map

Attach to this application a topographic map of the area extending to at least one (1) mile beyond property boundaries. The map must show the outline of the facility; the location of each of its existing and proposed intake and discharge structures; each of its dangerous waste treatment, storage, recycling, or disposal units; and each well where fluids are injected underground. Include all springs, rivers, and other surface water bodies in this map area, plus drinking water wells listed in public records or otherwise known to the applicant within ¼ mile of the facility property boundary. The instructions provide additional information on meeting these requirements.

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (refer to Instructions for more detail).

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, recycling, and disposal areas; and sites of future storage, treatment, recycling, or disposal areas (refer to Instructions for more detail).

XVIII. Certifications

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

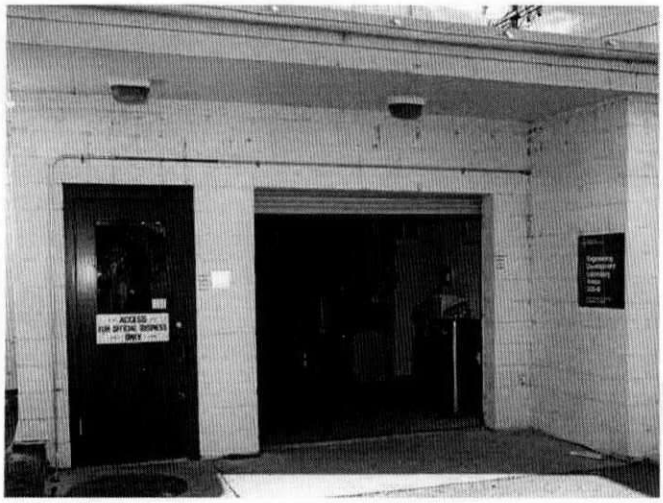
Operator* Name and Official Title (type or print)	**Signature**	**Date Signed**
Keith A. Klein, Manager U.S. Department of Energy Richland Operations Office	for K E Klein	7/7/06
Co-Operator** Name and Official Title (type or print)	**Signature**	**Date Signed**
Patrick L. Pettiette Project Manager Washington Closure Hanford LLC	for P. Pettiette	6/15/06

Co-Operator** – Address and Telephone Number
3070 George Washington Way
Richland, WA 99352
(509) 372-9951

Facility-Property Owner* Name and Official Title (type or print)	**Signature**	**Date Signed**
Keith A. Klein, Manager U.S. Department of Energy Richland Operations Office	for K Klein	7/7/06

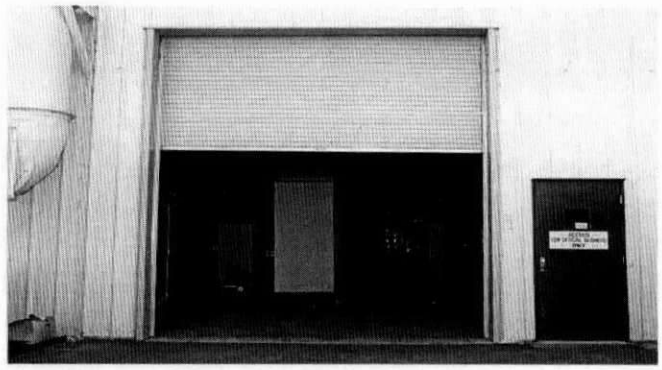
Comments

305-B Storage Facility



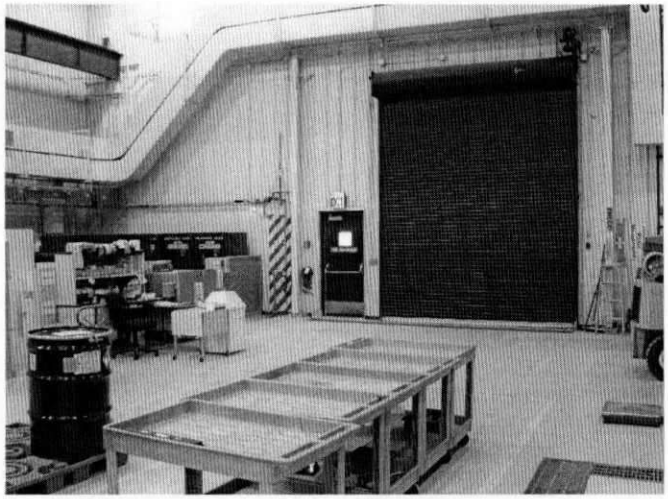
View Looking West

88A907-8CN
(PHOTO TAKEN 1988)

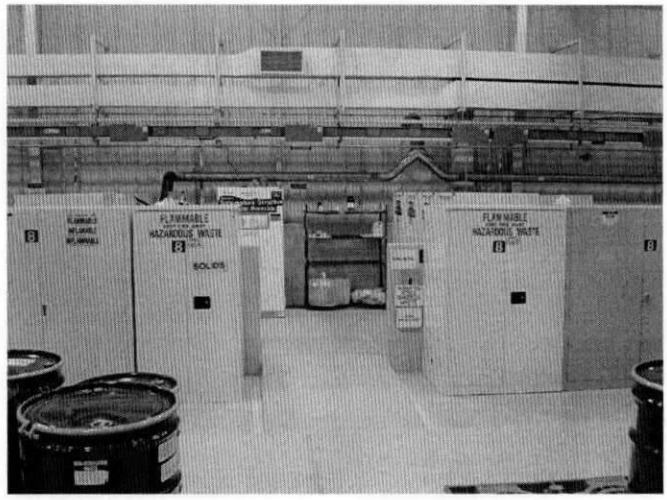


View Looking South

88A907-1CN
(PHOTO TAKEN 1988)



305-B High Bay, Loading Area

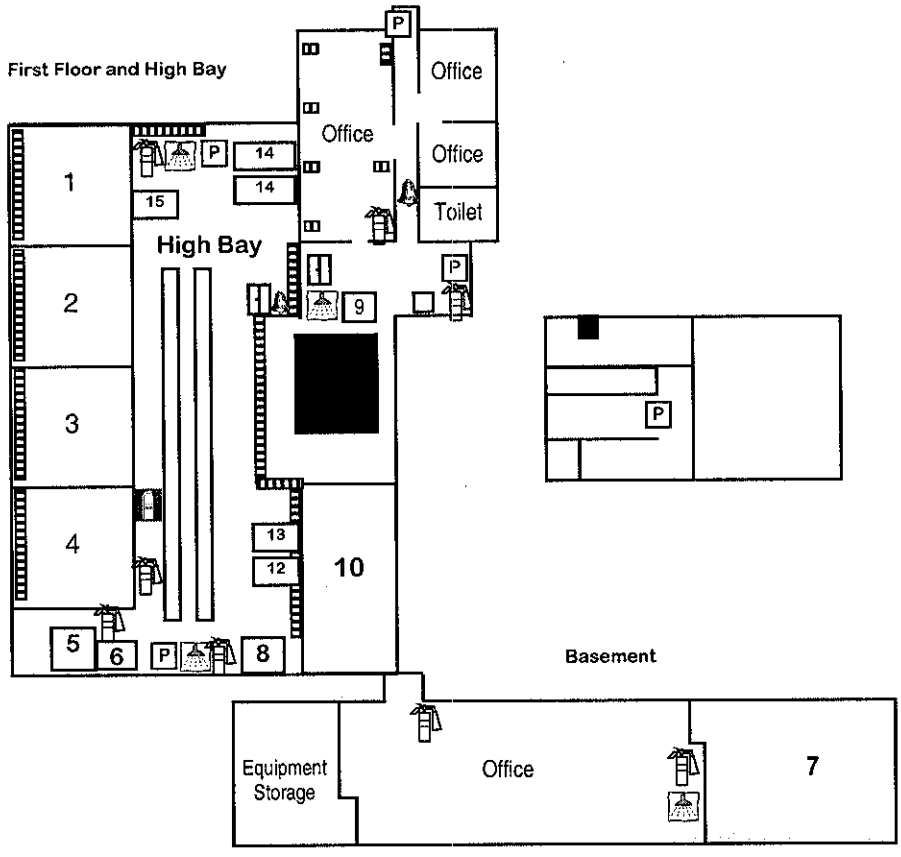


305-B Storage Cell

305-B Storage Cell and Bulking Module

305-B Bulking Module and Flammables Module

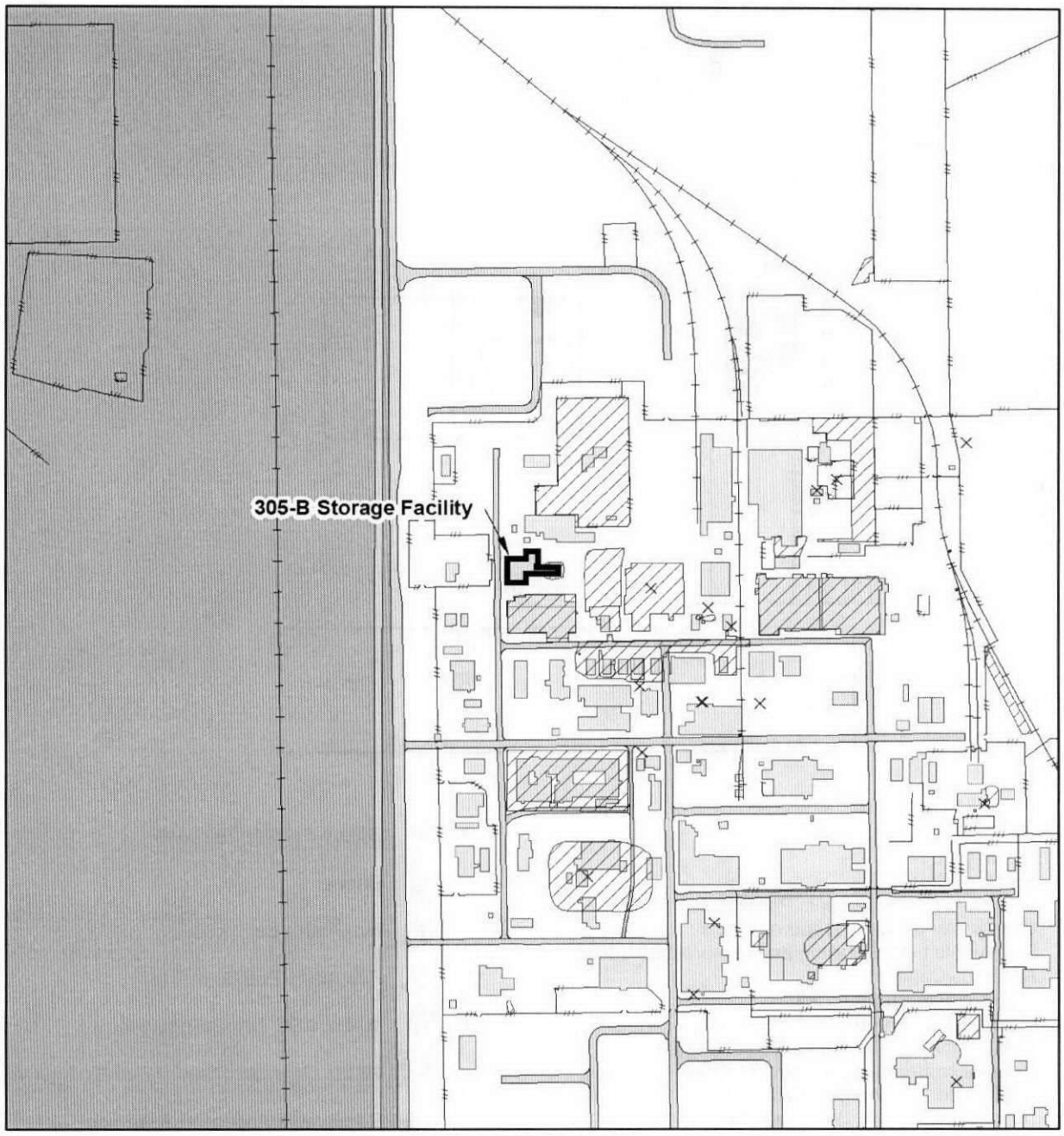
305-B Storage Facility



Legend

1. Acids, Oxidizers
2. Poisons, Class 9
3. Alkaline, WSDW, Organic Peroxides
4. Organics and Compressed Aerosols
5. Flammable Liquid Bulking and compressed gases
6. Asbestos Cabinet
7. Mixed Waste Storage Cell
8. Flammable Storage
9. Small Quantity Flammable Mixed Waste
10. Outdoor Non-regulated Drum Storage
11. WSDW Non-flammable Drums
12. Universal/Recycling Storage Area
13. Acid Drums
14. Alkaline Drums
15. Explosive Magazine

- Safety Shower/Eyewash
- Phone
- Fire Alarm Bell
- Fire Alarm Pull Box
- 10-Lb. ABC Fire Extinguisher
- 15 Lb. Or larger Class D Fire Extinguisher
- Removable Access to Basement
- Emergency Equipment Cabinet
- Collection Sump



305-B Storage Facility

Prepared for:
US DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE

Created and Published by: Central Mapping Services
Fluor Hanford, Richland, WA (509) 376-8759

INTENDED USE: REFERENCE ONLY

TSD Unit Boundary
DOE Operating Areas
Hanford Facility
Waste Management Units
Linear Waste Management Units
Spot Waste Management Units

Buildings and Mobiles
Structures
Concrete
Major Roads
Service Roads
Railroads
Fences

Meters: 0 50 100 150 200
Feet: 0 200 400 600

O:\Projects\2004\RCRA_TSD\041102_Top10FacilityTopos2005_Bowman\Maps\050401_305BStorageFacility_LineDwg_85x11_Rev3.mxd - 6/5/2006 @ 12:28:53 PM

Chapter 11.0 Closure and Post-Closure Requirements

Tables

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11.0 CLOSURE AND POST-CLOSURE REQUIREMENTS

This chapter is submitted in accordance with the requirements of WAC 173-303-806(4)(a)(xiii) to demonstrate that DOE-RL has developed a plan to ensure safe closure of the 305-B Storage Facility. In accordance with WAC 173-303-610, copies of the closure plan and all revisions will be maintained in the unit specific operating record.

11.1 CLOSURE PLANS

This plan presents the activities required for final closure of the 305-B Storage Facility at its maximum extent of operation. The wastes included are those regulated as dangerous waste and mixed waste. Partial closure will not be conducted. Closure activities are presented in sufficient detail such that the closure process is understandable and a closure schedule can be developed.

11.1.1 Closure Performance Standard

The 305-B Storage Facility will be closed in a manner that will minimize the need for further maintenance and eliminate post-closure release of dangerous/mixed waste or dangerous/mixed waste constituents that could pose a risk to human health or the environment. Closure activities will assist in preparing the 305-B Storage Facility for demolition. After closure, the 305-B Storage Facility will be demolished in accordance with the *Removal Action Work Plan #1 for the 300 Area Facilities* (DOE/RL-2004-77). This use is consistent with the surrounding land use.

Evidence of spills or leaks will be obtained through (a) review of spill reports and operating log books; (b) visual inspection of unit structures accessible to the environment (e.g., floors) and through inspection of all visible barriers designed to prevent migration to the environment, and (c) sampling, as necessary to characterize waste/debris that is found while performing visual inspection. If this inspection program indicates that contamination is present, the potential for migration of contamination to the environment will be evaluated. If potential migration appears likely, samples will be taken. In addition, if the inspections identify any potential contaminant migration routes (e.g., cracks in sumps), samples will be collected to determine whether migration has occurred. Waste site specific information discovered during facility closure will be updated in WIDS.

Spill reports and operating log books have been reviewed and it has been determined that there is no soil contamination resulting from TSD activities. Therefore, no closure actions outside of the unit boundary should be required.

Equipment and structural components will be decontaminated using the procedures described in Section 11.1.4. All residues resulting from decontamination will be managed as described in Section 11.1.4.3. Residues containing listed waste, having dangerous waste characteristics, or exceeding dangerous waste designation limits will be treated, if necessary, to meet land disposal regulations (40 CFR 268.45).

11.1.2 Partial and Final Closure Activities

This plan identifies the steps necessary to perform final closure of the unit in order to meet the aforementioned closure performance standard (Section 11.1.1). Closure activities involve removal of the waste from and decontamination of the unit, as necessary. These activities can be implemented at any point during the active life of the unit. Partial closure of the unit will not be conducted. The entire 305-B Storage Facility was in use at all times prior to closure. The entire unit, therefore, represents the maximum extent of the operation during the unit's active life.

11.1.3 Maximum Waste Inventory

The 305-B Storage Facility was used to store a variety of different research-related waste. The maximum inventory of waste in storage at any time was constrained by three factors:

- The total amount of dangerous/mixed waste in storage at 305-B Storage Facility at any time did not exceed the design capacity of 30,000 gallons (it was typically 2,000 to 5,000 gallons)
- The total amount of any particular dangerous/mixed waste in storage during any given year did not exceed the amounts given in the Part A permit application for 305-B Storage Facility (Chapter 1.0, Part A)
- The total amount of dangerous/mixed waste by hazard class in storage at any one time did not exceed Uniform Building Code Class B Hazardous Material Quantity Restrictions (Chapter 4.0, Table 4.1).

Except on the relatively rare occasion when 85-gallon overpacks are used, approximately 90 percent of all dangerous wastes shipped from the unit were contained in 55-gallon drums, with the remaining 10 percent consisting of 30-gallon and smaller containers.

11.1.4 Inventory Removal, Disposal or Decontamination of Equipment, Structures, and Soils

Steps for removing or decontaminating all dangerous/mixed waste containers, residues, and contaminated equipment are described below.

11.1.4.1 Inventory Removal

The TSD operations will be transferred to the 331-C Storage Unit. Therefore, 305-B Storage Facility closure activities will be initiated after the dangerous/mixed waste inventory has been moved to 331-C Storage Unit. In the event that any of the waste inventory is encountered during closure, all containers of dangerous/mixed waste will be manifested, and custody transferred to a dangerous waste transporter having a proper dangerous waste identification number. Waste will be transported to a permitted dangerous waste facility for treatment or disposal.

11.1.4.2 Decontamination Inspection of Building Equipment and Structures

All equipment and structures in dangerous/mixed waste handling and storage areas will be visually inspected at the time of closure. Equipment and structures to be inspected include:

- Floors and walls of the four dangerous waste storage cells
- Floors, walls, and ceiling of high bay and flammable liquid bulking module areas
- Floors and walls of remainder of first floor except for offices, work area, and lavatories/change rooms
- Floors, walls, and ceiling of basement except equipment storage room
- Interior surfaces of all secondary containment trenches
- Fork lift and loading hoist
- Asphalt ramp outside north high bay door.

Where accessible, building structures will be visually inspected while still in-place in the system and before decontamination. The inspections will determine which of the materials that will remain after closure already meet the clean closure standard of a "clean debris surface" and which materials require decontamination to meet the standard. A *"clean debris surface means the surface, that when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste, except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discoloration, and soils and waste in cracks, crevices and pits shall be limited to no more than 5% of each square inch of surface area." (40 CFR 268.45)*

Materials removed from the facility as hazardous debris will be managed as described in Section 11.1.4.3. Inspection of materials for a "clean debris surface" will be documented on a checklist that will identify

the area inspected, whether decontamination/treatment methods were implemented and the standard used to perform the inspection.

11.1.4.2.1 Decontamination of Basement

Once Cell 7 has been completely emptied of stored waste, any visible residues that do not meet the definition of a "clean debris surface" will be removed. All residues thus obtained will be managed as described in Section 11.1.4.3. All waste materials generated during the decontamination process of the Cell 7 will be designated appropriately.

11.1.4.2.2 Decontamination of Waste Handling Equipment

All equipment will be managed as described in Section 11.1.4.3.

11.1.4.2.3 Decontamination of Dangerous Waste Storage Cells

The dangerous waste storage cells will be inspected and any visible contamination present will be decontaminated as needed to meet the definition of "clean surface debris". All collected residues will be managed as described in Section 11.1.4.3. Each of the four storage cells will be cleaned using one or more of the removal technologies described in 40 CFR 268.45, as necessary to meet the "clean debris surface" criteria. Any generated waste will be collected from each of the storage cells and placed in suitable containers in preparation for disposal.

11.1.4.2.4 Decontamination of High Bay, Flammable Liquid Bulking Module and Other First Floor Areas

The floors, walls, and ceiling of the entire first floor, except for the office, supply/office area, lunch room, and rest room will be visually inspected. The inspections will determine which of the structure that will remain after closure already meet the clean closure standard of a "clean debris surface" and which materials require decontamination to meet the standard. A *"clean debris surface means the surface, that when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste, except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discoloration, and soils and waste in cracks, crevices and pits shall be limited to no more than 5% of each square inch of surface area."* (40 CFR 268.45)

Materials removed from the system as hazardous debris will be managed as described in Section 11.1.4.3. Inspection of materials for a "clean debris surface" will be documented on a checklist that will identify the area inspected, whether decontamination/treatment methods were implemented and the standard used to perform the inspection. If contamination above the clean surface debris criteria is found, the affected areas will be cleaned. Any contaminated material generated by this activity will be managed as described in Section 11.1.4.3.

Following completion of decontamination, another visual inspection will be performed, to verify that decontamination is complete.

11.1.4.3 Management of Decontamination Waste

Decontamination waste will be placed in suitable containers and sampled to determine disposal requirements. In order to properly designate the decontamination waste under WAC 173-303-070, samples from each container will be analyzed for the following:

- Corrosivity using the methods described in SW-846
- Flash point using methods described in SW-846
- Toxicity characteristic using the toxicity characteristic leaching procedure described in SW-846 (includes analysis for metals, volatile organics, and semi-volatile organics including chlorinated pesticides)

The results of sample analysis will be used to determine how to dispose of the decontamination waste, including LDR [WAC 173-303 and 40 CFR 268]. Decontamination waste will be disposed in accordance with approved *Removal Action Work Plan #1 for the 300 Area Facilities* (DOE/RL-2004-77).

All non-liquid waste generated during decontamination of waste storage areas and equipment (e.g., personnel protective clothing) will be collected in suitable containers and managed in accordance with approved *Removal Action Work Plan #1 for the 300 Area Facilities (DOE/RL-2004-77).*

11.1.4.4 Methods for Sampling and Testing to Demonstrate Success of Decontamination

If sampling is necessary, the type and quality of analytical data appropriate to verify closure action levels would be determined before sampling. The data will be as specified in the 300 Area D&D Waste Sampling and Analysis Plan (DOE/RL-2004-084). Process knowledge and unit inspection results would be used to help resolve TSD unit sampling issues such as analytes of interest, sample location, number of samples, number and frequency of field quality control samples (i.e., trip blanks, equipment blanks, splits, and duplicates), sampling methodology, sample validation, data evaluation methods, and acceptance of sitewide background values. Sample handling, packaging and shipping, chain of custody, and laboratory quality assurance/ quality control are described in the 300 Area D&D Waste Sampling and Analysis Plan.

11.1.4.5 Closure of Containers

At closure, all containers will be removed from the 305-B Storage Facility. Contaminated equipment, floors, walls, and loading areas will be inspected to determine whether they meet the criteria "clean debris surface". All decontamination equipment and rinsate will be containerized, tested, and properly disposed. Additional details for closure and decontamination are provided in Sections 11.1.4.1 through 11.1.4.3.

11.1.4.6 Closure of Tanks

This section is not applicable to the 305-B Storage Facility because waste were not stored or treated in tanks.

11.1.4.7 Closure of Waste Piles

This section is not applicable to the 305-B Storage Facility because wastes are not stored in waste piles.

11.1.4.8 Closure of Surface Impoundments

This section is not applicable to the 305-B Storage Facility because wastes were not placed in surface impoundments.

11.1.4.9 Closure of Incinerators

This section is not applicable to the 305-B Storage Facility because wastes were not incinerated.

11.1.4.10 Closure of Land Treatment Facilities

This section is not applicable to the 305-B Storage Facility because wastes were not treated in land treatment units.

11.1.4.11 Closure of Disposal Facilities

This section is not applicable to the 305-B Storage Facility because it will not be closed as a dangerous waste disposal unit.

11.1.5 Closure of Disposal Facilities

This section is not applicable to the 305-B Storage Facility because it will not be closed as a dangerous waste disposal unit.

11.1.6 Closure Schedule

All closure activities will be completed by December 31, 2006. Closure activities are summarized in Table 11.1.

11.1.7 Extension of Closure Time Frame

The closure activities described in this plan will be completed by December 31, 2006. No extension to the time frame for initiation and completion of closure is currently expected to be necessary. Extensions to the time frames for closure would only be necessary if unexpected conditions were encountered during closure of the unit. If it becomes apparent that closure cannot be completed by December 31, 2006, Ecology will be so notified at least 30 days prior to expiration this closure period. This notification will demonstrate why an extension is required for closure and will demonstrate that steps have been taken to prevent threats to human health and the environment and that the unit is in compliance with applicable permit standards.

11.1.8 Amendments to Closure Plan

If changes are deemed necessary to the approved closure plan, DOE-RL will submit a written request to Ecology for authorizing a change to the approved plan. The written request will include a copy of the amended plan, in accordance with WAC 173-303-610(3)(b).

Table 11.1. Summary of Closure Activities

Closure Activity Description	Expected Duration
Receipt of final volume of dangerous and/or mixed waste	N/A
Notify EPA and Ecology that closure will begin	N/A
Perform visual inspection of the building in accordance with Section 11.1.4	15 days
Decontaminate structural surfaces and equipment using procedures described in Section 11.1.4	35 days
Analyze decontamination waste to determine proper methods of treatment/disposal	70 days
Dispose of decontamination waste based on results of waste analysis	20 days

11.2 CERTIFICATION OF CLOSURE

Within 60 days of completion of the final closure activities described in this plan, a certification of closure will be submitted to Ecology. This certification will indicate that the 305-B Storage Facility has been closed as described in this plan and that the closure performance standards given in Section 11.1.1 have been met. The certification will be submitted by registered mail and will be signed as described below.

The owner and co-operator will self-certify with the following document or a document similar to it:

> *We, the undersigned, hereby certify that the 305-B Storage Facility closure activities were performed in accordance with the specifications in the Closure Plan, approved by Ecology on (date).*
> (Signature and date)

An independent Professional Engineer registered in the State of Washington will inspect closure activities, verify that closure activities are being conducted according to this plan, and certify that closure has been performed in accordance with this plan.

Upon completion of closure according to the plan, the independent professional engineer will sign the following document or a document similar to it:

> *I, (name), a certified Professional Engineer, hereby certify, to the best of my knowledge and belief, that I have made visual inspection(s) of the 305-B Storage Facility at the 300 Area and that closure of the aforementioned unit has been performed in accordance with the approved closure plan.*
>
> (Signature, date, state Professional Engineer license number, business address, and phone number.)

11.3 POST-CLOSURE PLAN

This section and subsequent subsections are not applicable because the 305-B Storage Facility is not to be closed as a dangerous waste disposal unit.

11.4 NOTICE IN DEED

This section is not applicable because the 305-B Storage Facility is not to be closed as a dangerous waste disposal unit.

11.5 CLOSURE COST ESTIMATE

It is DOE-RL's understanding that federal facilities are not required to comply with WAC 173-303-620. However, projections of anticipated costs for closure will be provided in accordance with Permit Condition II.H.1.

11.6 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

In accordance with 40 CFR 264.140(c) and WAC 173-303, this section is not required for federal facilities. The Hanford Site is a federally owned facility for which the federal government is an operator and this section is therefore not applicable to the 305-B Storage Facility.

11.7 POST-CLOSURE COST ESTIMATE

A post-closure cost estimate is not required for the 305-B Storage Facility because it will not be closed as a dangerous waste disposal facility.

11.8 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

Post-closure financial assurance is not required for the 305-B Storage Facility because it will not be closed as a dangerous waste disposal facility.

11.9 LIABILITY REQUIREMENTS

In accordance with 40 CFR 264.140(c) and WAC 173-303, this section is not required for federal facilities. The Hanford Site is a federally owned facility for which the federal government is an operator and this section is therefore not applicable to the 305-B Storage Facility.

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant (WTP)

Index

Ecology approved PCNs for quarter ending June 30, 2006:

PCN	Ecology Approval Date on Modification Form
24590-LAW-PCN-ENV-06-001	4-12-2006
24590-PTF-PCN-ENV-05-026	4-12-2006
24590-PTF-PCN-ENV-05-027	4-12-2006
24590-PTF-PCN-ENV-05-031	4-12-2006
24590-PTF-PCN-ENV-05-039	4-12-2006
24590-PTF-PCN-ENV-06-009	4-12-2006
24590-PTF-PCN-ENV-05-025	4-12-2006
24590-PTF-PCN-ENV-06-001	6-15-2006
24590-LAW-PCN-ENV-06-005	6-22-2006
24590-HLW-PCN-ENV-05-009	6-27-2006
24590-HLW-PCN-ENV-05-011	6-27-2006
24590-LAB-PCN-ENV-06-001	6-27-2006
24590-PTF-PCN-ENV-06-008	6-27-2006

Quarter Ending March 31, 2006 24590-LAW-PCN-ENV-06-001

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Page 2 of 2: Hanford Facility RCRA Permit, Part III, Chapter 10, Attachment 51, Appendix 9.9
Update LAW Plant Item Material Selection Data Sheet for the LAW Concentrate Receipt Vessels *LCP-VSL-00001/-00002* in Appendix 9.9 of the Dangerous Waste Permit

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
D. A. Klein	3/27/06 Date	R. J. Schepens	4/5/06 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of the modification is to update the LAW Plant Item Material Selection Data Sheet for the LAW Concentrate Receipt Vessels *LCP-VSL-00001/-00002* currently in Appendix 9.9 in the Dangerous Waste Permit (DWP).

The following are the main changes to the above mentioned Plant Item Material Selection Data Sheet:

- General corrosion and erosion consideration information has been added
- Additional references and items in the bibliography section have been added
- Information on routine and non-routine operations has been added
- Removed plant offspring items LCP-PMP-00001A/B, and LCP-PMP-00002A/B

These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following Plant Item Material Selection Data Sheet in the DWP:

Appendix 9.9			
Replace:	24590-LAW-N1D-LCP-P0001, Rev. 0	With:	24590-LAW-N1D-LCP-P0001, Rev. 1

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: NA
Enter wording of WAC 173-303-830, Appendix I Modification citation: NA

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
S. Dahl 4/12/06 Date

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10668000

LCP-VSL-00001 & LCP-VSL-00002 (LAW)

LAW Concentrate Receipt Vessel

- Design Temperature (°F)(max/min): 150/40
- Design Pressure (psig) (max/min): 15/FV
- Location: process cell

Offspring items

LCP-AGT-00001 – LCP-AGT-00002

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Cannot be maintained during the 40 year design life.

Options Considered:

- The vessel is filled with waste at up to 122°F.
- The vessel will be washed with process water or caustic.

Materials Considered:

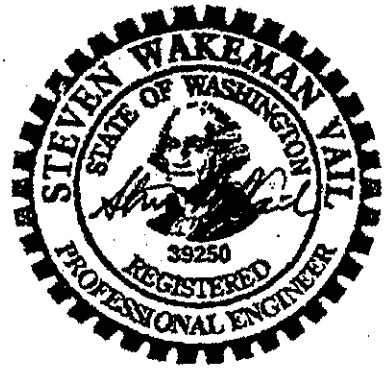
Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.016 inch general erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid and water.
- Develop lay-up strategy.



3/14/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	3/14/06	Issued for Permitting Use		HMK	
0	12/29/03	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Vessels receive waste for melter feed. Operating temperature range is 77 to 150°F, with a nominal operating temperature of 122°F, and operating pH range is 11 to 14.5. Spray nozzles are present to spray inside of vessel with demineralized water. NaOH is also available to the spray nozzles. Vessels have mechanical agitators and internal transfer pumps.

a General Corrosion
Hamner (1981) lists a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 μm/y) at 77°F and over 20 mpy at 122°F. He also states 316 (and 316L) has a rate of less than 2 mpy in 50% NaOH at temperatures up to 122°F. Dillon (2000) and Sedriks (1996) both state that the 300 series stainless steels are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. The corrosion rate for 304L in pure NaOH is expected to be less than about 1 mpy up to about 212°F though Sedriks states the data beyond about 122°F are incorrect due to the presence of oxidizing agents.

In this system, the normal pH, nitrate concentrations and temperatures are such that 304L and 316L stainless steels will be acceptable.

Conclusion:
304L or 316L is expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
Chloride is known to cause pitting of stainless steels and related alloys in acid and neutral solutions. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices such as might form after partial removal of deposits during multiple rinse cycles. Dillon and Koch (1995) are both of the opinion that fluoride will have little effect in an alkaline media.

The nominal operating temperature for these vessels is 122 °F. At this temperature, 304L or 316L stainless steels would be acceptable in the proposed alkaline-nitrate waste.

If the vessel were filled with process water and left stagnant, there would be a tendency to pit. The time to initiate would depend on the source of the water, being shorter for filtered river water and longer for DIW. Pitting has been observed in both cases, probably because residual chlorides are likely to remain.

Conclusion:
Localized corrosion, such as pitting, is common but can be mitigated, if caused by chlorides, using alloys with higher nickel and molybdenum contents. Based on the expected operating conditions, 316L is expected to be satisfactory.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, the environment and also because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), chloride stress corrosion cracking does not usually occur below about 140 °F. With the proposed temperatures, 316L is recommended.

Conclusion:
At the normal operating conditions, 316L stainless is the minimum recommended.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting.

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system under normal operating conditions.

PLANT ITEM MATERIAL SELECTION DATA SHEET

g Microbiologically Induced Corrosion (MIC)
The normal operating conditions are not conducive to microbial growth.

Conclusion:
Not a concern.

h Fatigue/Corrosion Fatigue
Corrosion fatigue does not appear to be a concern.

Conclusions
Not expected to be a concern.

i Vapor Phase Corrosion
Vapor phase corrosion will be a function of the degree of agitation, solution chemistry, and temperature. Under the stated conditions, and with the presence of wash rings in the vessel, vapor phase corrosion does not appear to be a concern.

Conclusion:
Not expected to be a concern.

j Erosion
Velocities within the vessel are expected to be small. Based on 24590-WTP-RPT-M-04-0008, a general erosion allowance of 0.016 inch is adequate for components with solids content less than 27.3 wt%.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No significantly dissimilar metals are present.

Conclusion:
Not expected to be a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
At this time, the design does not provide for the presence of nitric acid reagent in this system.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
5. Hammer, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
6. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
7. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158

Bibliography:

1. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Andersen, TD, 21 December 2000, to JR Divine: No provision for adding nitric or other acid.
3. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
4. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
5. Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
6. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
7. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084
8. Zapp, PE, 1998, *Preliminary Assessment of Evaporator Materials of Construction*, BNF—003-98-0029, Rev 0, Westinghouse Savannah River Co., Inc for BNFL Inc.

PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) LAW concentrate receipt vessel (LCP-VSL-00001, LCP-VSL-00002)

Facility LAW

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	3.87E+01	3.53E+01			
Chloride	g/l	1.84E+01	2.00E+01			
Fluoride	g/l	1.84E+01	2.01E+01			
Iron	g/l	2.84E+00	2.90E+00			
Nitrate	g/l	2.73E+02	2.89E+02			
Nitrite	g/l	8.22E+01	8.93E+01			
Phosphate	g/l	5.93E+01	6.30E+01			
Sulfate	g/l	3.16E+01	3.43E+01			
Mercury	g/l	9.46E-02	3.16E-02			
Carbonate	g/l	1.29E+02	1.11E+02			
Undissolved solids	wt%	5.0%	4.8%			
Other (Pb)	g/l	6.89E-01	2.94E-02			
Other	g/l					
pH	N/A					Note 2
Temperature	°F					Note 3, Note 4

List of Organic Species:

References

System Description: 24590-LAW-3YD-LCP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: TCP03/LCP01
Off Normal Input Stream # (e.g., overflow from other vessels):
P&ID: 24590-LAW-M6-LCP-P0001, 24590-LAW-M6-LCP-P0002, Rev 1
PFD: 24590-LAW-M5-V17T-P0001, -P0002, Rev 0
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. pH 11 to 14.5 (24590-WTP-M4C-V11T-00005, Rev A)
3. T operation 77 °F to 150 °F, T nominal 122 °F(24590-LAW-M1C-LFP-00001, Rev C)
4. The 150 F is maximum temperature from pretreatment and no additional design margin is required.

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

6.1.1. LAW Concentrate Receipt Vessels (LCP-VSL-00001 and LCP-VSL-00002)

Routine Operations

LAW concentrate receipt vessels (CRV) are designed for receiving waste for melter feed. The equipment associated with the CRVs that promote decontamination and decommissioning includes:

- The internal spray nozzles that spray the inside of the vessel with demineralized water
- Flushing the inside of the vessel with demineralized water (from spray nozzles or transfer from the PT facility) draining of the vessel heel, use of other decontamination solutions (NaOH and so on) through header connections to the spray nozzles during final decontamination and decommissioning

Each LAW CRV is equipped with the following:

- Mechanical agitator (LCP-AGT-00001, -00002)
- Two 100 % pumps (LCP-PMP-00001A/B, -00002A/B) to transfer LAW concentrate
- Internal rotary spray nozzles for periodic wash-down
- Overflow to RLD-VSL-00004, C3/C5 drains/sump collection vessel via a common overflow header
- Pressure, level (redundant), temperature, and density instruments

Non-Routine Operations that Could Affect Corrosion/Erosion

- Overflows to RLD-VSL-00004
- Washing required on failure of agitator

Attachment 2
06-ED-032

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-LAW-PCN-ENV-06-001.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

3/29/06
Date

Quarter Ending 6/30/2006 24590-PTF-PCN-ENV-05-026

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. A. Klein — Date: 3/16/06

Reviewed by ORP Program Office:

R. J. Schepens — Date: 4/5/06

Quarter Ending 6/30/2006

24590-PTF-PCN-ENV-05-026

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update the Material Selection Data Sheet (MSDS) for the alkaline effluent vessels (RLD-VSL-00017-A/B) in Appendix 8.9 of the Dangerous Waste Permit.

Changes to the documents are summarized below.

Material Selection Data Sheet 24590-PTF-N1D-RLD-P0002, Rev. 2

1. The recommended Corrosion Allowance was clarified to include the corrosion and erosion allowances.
2. Revisions were made to the General Corrosion section to include references for the corrosion data.
3. Section j Erosion was revised to include select erosion rates and a reference for the rates.
4. The References section was revised to add 7 references.
5. The Bibliography was revised to add two references.

These changes do not substantially alter permit conditions or reduce the capacity of the facility to protect human health and the environment.

Please replace the following in the DWP

Appendix 8.9			
Replace:	24590-PTF-N1D-RLD-P0002, Rev. 1	With:	24590-PTF-N1D-RLD-P0002, Rev. 2

WAC 173-303-830 Modification Class: [1][2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: N/A

Enter wording of WAC 173-303-830, Appendix I Modification citation: N/A

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl 4/21/06 Date

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10667003

RLD-VSL-00017-A/B (PTF)
Alkaline Effluent Vessels

- Design Temperature (°F)(max/min): 180/40
- Design Pressure (psig) (max/min): 15/FV
- Location: out cell

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- Normal operating conditions

Materials Considered:

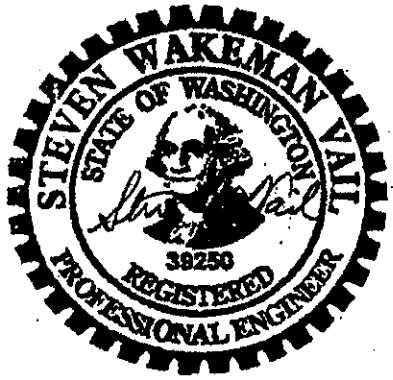
Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.08 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid or water.



3/8/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 7 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
2	3/8/06	Issued for Permitting Use			
1	1/25/05	Issued for Permitting Use	DLA	JRD	SWV
0	2/17/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

These vessels will normally receive caustic effluent from LVP-VSL-00001, spent reagents from CRP-VSL-00001 and potentially active material from PWD-VSL-00046.

a General Corrosion
Hamner's data (1981) shows a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 μm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Dillon (2000) and Sedriks (1996) both state that the 300 series alloys are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Divine's work (1986) with simulated-radwaste evaporators, six months at 140°F, showed 304L was slightly more resistant to corrosion (<0.2 mpy) than was 316L (<0.6 mpy); Ni 200, pure nickel, was much less resistant (≈7 mpy) probably due to the complexants. Zapp (1998) notes that the Savannah River evaporator vessels, operating at about 300°F, are made of 304L and have suffered no failures in about 30 years; 304L heat transfer surfaces have failed however after about 10 years.

Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212°F though Sedriks (1996) states the data beyond about 122°F are incorrect. Danielson and Pitman (2000), based on short term studies, suggest a corrosion rate of about 0.5 mpy for 316L in simulated waste at boiling, >212°F.

Ohl and Carlos (1994), in their review of the 242-A Evaporator, found in waste similar to that expected in LAW, the corrosion of 304L after about two years of operation at 140°F was less than the accepted variability of the plate. Because of uncertainties in the starting thickness of the metal, a review of the raw data was inconclusive.

Uhlig (1948) has shown that pure nickel is resistant to corrosion by NaOH. However, as Divine (1986) pointed out, the presence of complexing agents may reverse the trend. Agarwal (2000) states that the higher nickel alloys, such as C-22, are highly corrosion resistant though specific mention of alkaline media is not made. The general literature mainly discusses cracking problems (see below) rather than uniform corrosion.

In these vessels, the hydroxide concentration will be significantly lower as is the temperature; thus, the corrosion rates will be smaller.

Conclusion:
At temperatures less than about 140°F, 304L or 316L are expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy. Based on the Savannah River experience with Hanford-like waste at higher temperatures, 304L is expected to be satisfactory to 180°F. Rinsing procedure should be developed to minimize effects of acid in the presence of fluoride. A 0.08 inch corrosion allowance is recommended to compensate for the possibility of high fluoride concentrations in acid conditions.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Dillon and Koch (1995) are of the opinion that fluoride will have little effect. Jenkins (1998) has stated that localized corrosion can occur under the deposits on tubes, probably due to the chlorides. Further, Revie (2000) and Uhlig (1948) note that nitrates inhibit chloride pitting. Wilding and Paige (1976) note that nitric acid inhibits chloride attack though their data are at higher temperatures and concentrations.

Conclusion:
Localized corrosion, such as pitting, is not expected to be a concern at the normal operating conditions. 304L is satisfactory.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion: Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. The "L" grades are also more resistant to cracking than the higher carbon versions. If the concentrations are as stated, stress corrosion cracking will be minimized.

Conclusion:
Because of the normal operating environment 304L stainless steel is expected to be acceptable even to 180 °F.

e Crevice Corrosion
For the most part, the pitting discussion covers this area.

Conclusion:
See Pitting

PLANT ITEM MATERIAL SELECTION DATA SHEET

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating temperatures are slightly high for microbial growth. Additionally, the location of the system in the process suggests little chance of the introduction of microbes.

Conclusion:
MIC is not expected to be a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a problem in this vessel.

Conclusions
Not considered to be a problem.

i Vapor Phase Corrosion
The vapor phase portion of the vessel will be spattered with solution and pitting or crevice corrosion may be a concern. A rinsing procedure should be developed to minimize the formation of deposits.

Conclusion:
Provided deposits are not allowed to remain, vapor phase corrosion is not a concern.

j Erosion
Velocities are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
Not expected to be applicable.

Conclusion:
Not a concern.

m Galvanic Corrosion
For the environment and the proposed alloys, there is not believed to be a concern.

Conclusion:
Not a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

p Inadvertent Nitric Acid Addition

Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:

The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. CCN 130172, Divine, JR, 1986, Letter to A.J. Diliberto, *Reports of Experimentation*, Battelle, Pacific Northwest Laboratories, Richland, WA 99352
4. CCN 130173, Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
5. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
6. Danielson, MJ & SG Pitman, 2000, *Corrosion Tests of 316L and Hastelloy C-22 in Simulated Tank Waste Solutions*, PNWD-3015 (BNFL-RPT-019, Rev 0), Pacific Northwest Laboratory, Richland WA.
7. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
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9. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
10. Jenkins, CF, 1998, *Performance of Evaporators in High Level Radioactive Chemical Waste Service*, Presented at Corrosion 98, NACE International, Houston TX 77084
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12. Ohl, PC & WC Carlos, 1994, *Hanford High-Level Evaporator/Crystallizer Corrosion Evaluation*, WHC-SA-1983-FP, Westinghouse Hanford Co., Richland, WA 99352
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17. Zapp, PE, 1998, *Preliminary Assessment of Evaporator Materials of Construction*, BNF—003-98-0029, Rev 0, Westinghouse Savannah River Co., Inc for BNFL Inc.

Bibliography:

1. CCN 130170, Blackburn, LD to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Evaluation of 240-AR Chloride Limit*, August 15, 1991.
2. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
3. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
4. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels i FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
5. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Alkaline effluent vessel (RLD-VSL-00017A/B)

Facility PTF

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l					
Chloride	g/l	8.16E-01	1.78E+00			
Fluoride	g/l	2.09E+00	4.56E+00			
Iron	g/l					
Nitrate	g/l	3.62E+00	7.88E+00			
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l					
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-RDP-00001, Rev 0
Mass Balance Document: 24590-WTP-MVC-V11T-00006, Rev A
Normal Input Stream #: LVP21, RLD09
Off Normal Input Stream # (e.g., overflow from other vessels): See section 4.11.2, Non-routine Operations
P&ID: 24590-PTF-M6-RLD-P0003, Rev 0
PFD: 24590-PTF-M5-V17T-P0022004, Rev 0
Technical Reports:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. T normal operation 59 °F to 125 °F, nominal 111 °F (24590-PTF-MVC-RLD-00004, Rev 0); could receive caustic scrubber purge non routinely at 125 °F
3. pH approximately 13 to 15

Assumptions:

4.11.2 Alkaline Effluent Vessel (RLD-VSL-00017 A/B)

Routine Operations

During normal operations, RLD-VSL-00017A will receive the following feeds:

- Caustic effluent from caustic collection vessel LVP-VSL-00001
- Caustic effluent from a future caustic collection vessel
- Spent reagents from CRP-VSL-00001
- Potentially active material from the C3 drain vessel PWD-VSL-00046

Non-Routine Operations that Could Affect Corrosion/Erosion

During non-routine operations, RLD-VSL-00017A/B will receive the following feeds:

- Process condensate area sump RLD-SUMP-00003
- PWD-VSL-00045 contents that do not meet BOF transfer criteria
- Overflow from reagent vessels (from floor berms of SHR-TK-00009, DIW-TK-00001/SHR-TK-00001, and NAR-TK-00007)
- Potentially active material from non-radioactive liquid effluent tank in BOF (NLD-TK-00001)

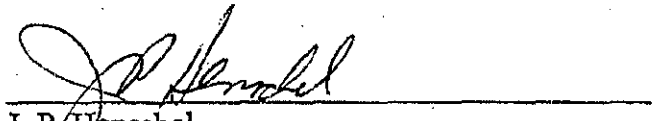
Attachment 2
06-ED-028

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-PTF-PCN-ENV-05-026.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



3/27/06

J. P. Henschel
Project Director

Date

Quarter Ending _____ 24590-PTF-PCN-ENV-05-027

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. A. Klein — Date: 3/16/06

Reviewed by ORP Program Office:

R. J. Schepens — Date: 4/5/06

Quarter Ending _____ 24590-PTF-PCN-ENV-05-027

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update PTF Plant Item Material Selection Data Sheets (MSDSs) for the Cs Concentrate Breakpot and Cs Eluate Breakpot (CNP-BRKPT-00001/2) currently in Appendix 8.9 of the Dangerous Waste Permit (DWP).

Changes to the MSDSs (24590-PTF-N1D-CNP-P0008 and 24590-PTF-N1D-CNP-P0010) include:

- Parsing the corrosion allowance into the corrosion and erosion elements
- Adding information on erosion as well as inadvertent nitric acid addition
- Adding references to the text, references, and bibliography sections
- Replacing the Operating Conditions sheet with the Process Corrosion Data Sheet (page 5) and description from WTP Process Corrosion Data Document (page 6)
- Revising design temperature

The specific changes are identified on the documents. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following MSDSs in the DWP:

Appendix 8.9			
Replace:	24590-PTF-N1D-CNP-P0008, Rev. 0	With:	24590-PTF-N1D-CNP-P0008, Rev. 1
Replace:	24590-PTF-N1D-CNP-P0010, Rev. 0	With:	24590-PTF-N1D-CNP-P0010, Rev. 1

WAC 173-303-830 Modification Class: [1,2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: N/A

Enter wording of WAC 173-303-830, Appendix I Modification citation: N/A

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class [1]1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl 4/21/06 Date

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10666998

CNP-BRKPT-00002 (PTF)
Cs Eluate Breakpot

- Design Temperature (°F) (max/min): 372/40
- Design Pressure (psig) (internal/external): 15/FV
- Location: incell

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- The breakpot is normally empty and at ambient temperature.
- Operation at temperatures approaching the maximum design temperature is expected to be of short duration.

Materials Considered:

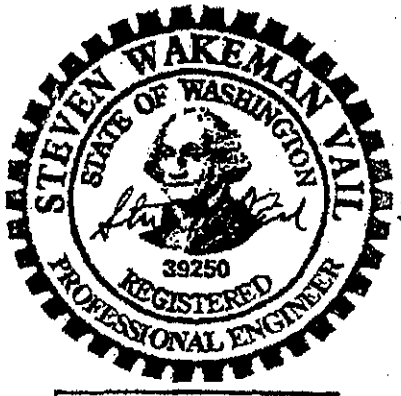
Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop procedure to flush thoroughly with water after use with alkaline solution.



3/8/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	3/8/06	Issued for Permitting Use		Hmk	
0	6/22/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

During the elution cycle the eluate comes from CXP-IXC-00001/2/3/4 to CNP-BRKPT-00002 and then to CNP-VSL-00001. The elution cycle is 15 hrs and is normally at an ambient temperature of 77 °F. The maximum operating temperature of 140 °F is attributed to circumstances where neutralized Cs concentrate (approx pH 14) could be transferred from CNP-VSL-00003 (the contingency vessel) to CNP-BRKPT-00002. However, this is not a likely route for transfer and for the purposes of this evaluation are considered infrequent. The breakpot could also see steam temperatures during transfer. These high-temperature conditions are assumed to be of short duration. This evaluation is based on a nominal operating temperature of 77 °F.

a General Corrosion
At the expected pH, little specific information was found for the general/uniform corrosion of stainless steels or other material in the given waste. Typically, the austenitic and higher alloy steels are expected to have corrosion rates of less than about 4 mpy in HNO_3 at the maximum temperature. This lack of data is not critical because the alloys needed for the system typically fail by pitting, crevice corrosion, or cracking.

Hamner (1981) lists the corrosion rate for both 304L and 316L as < 2 mpy at temperatures up to 150°F. Based on estimates from Cole (1974), corrosion rates for all of the concentrations <4 M and at temperatures to boiling are expected to be less than 1 mpy.

Conclusion:
Under the stated conditions, 304L is expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy at up to 150°F.

b Pitting Corrosion
With the stated conditions, 304L will be adequate.

Conclusion:
The data from the flowsheets suggest there are insufficient halides to cause pitting in 304L.

c End Grain Corrosion
Not believed to be applicable to this system.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1981), stress corrosion cracking does not usually occur below about 140°F. Further, the use of "L" grade stainless reduces the opportunity for cracking.

Conclusion:
The use of 304L is recommended.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting.

f Corrosion at Welds
Corrosion at welds is not a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are not suitable for MIC.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a concern.

Conclusions
Not believed to be a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

i Vapor Phase Corrosion
Vapor phase corrosion is not expected to be a concern. Further, the presence of wash rings indicates deposits can be prevented.

Conclusion:
Not expected to be a concern.

j Erosion
Velocities within the vessel are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
None anticipated.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Breakpot will see low pH conditions during normal operations.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. CCN 130176, Cole, HS, 1974. *Corrosion of Austenitic Stainless Steel Alloys Due to HNO_3 – HF Mixtures*, ICP-1036, Idaho Chemical Programs – Operations Office, Idaho Falls, ID
4. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
5. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
6. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158

Bibliography:

1. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
2. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
3. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
4. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
5. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084
6. Wilding, MW and BE Paige, 1976, *Survey on Corrosion of Metals and Alloys in Solutions Containing Nitric Acid*, ICP-1107, Idaho Chemical Programs, Idaho National Engineering Laboratory, Idaho Falls, ID

PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #): Cs concentrate breakpot (CNP-BRKPT-00002)
Cs evaporator eluate lute pot (CNP-VSL-00001)

Facility: PTF

In Black Cell?: Yes

Chemicals	Unit[1]	Contract Max		Non-Routine [3]		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	2.30E-01	2.31E-01			
Chloride	g/l	8.85E-02	1.06E-01			
Fluoride	g/l	1.05E-01	1.28E-01			
Iron	g/l	1.89E-02	1.89E-02			
Nitrate	g/l	1.54E+01	8.81E+00	4.46E-04	4.46E-04	
Nitrite	g/l	4.86E-01	5.83E-01			
Phosphate	g/l	3.53E-01	4.13E-01			
Sulfate	g/l	1.88E-01	2.24E-01			
Mercury	g/l	5.47E-04	1.42E-04			
Carbonate	g/l	6.59E-01	7.24E-01			
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Assumption 1
Temperature	°F					Note 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-CNP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CXP11, CXP12, CNP02
Off Normal Input Stream # (e.g., overflow from other vessels): CNP01 acid charge
P&ID: N/A
PFD: 24590-PTF-M5-V17T-P0014, Rev 1
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Breakpot: Steam is used for transfer. The breakpot is normally empty and at ambient temperature most of the time.
   Vessel: Thermal operating range 77 °F (eluate) to 140 °F (24590-PTF-M5C-CNP-00001, Rev 0)
3. Nitric acid charge (CNP01)

Assumptions:

1. Stream CXP12 post elution rinse pH approx 0.5, CXP11 elution stream pH approx. 0.3 or more.

4.1.2 Cs Concentrate Breakpot (CNP-BRKPT-00002), Cs Evaporator Eluate Lute Pot (CNP-VSL-00001)

Routine Operations

Under normal operations, the eluant from the IX columns goes directly to the Cs concentrate breakpot, CNP-BRKPT-00002. Eluate is then gravity-fed through a lute pot, CNP-VSL-00001, into the separator vessel, CNP-EVAP-00001. CNP-BRKPT-00002 is vented to the vessel vent system and contains wash rings and purge air.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10667001

CNP-BRKPT-00001, (PTF)
Cs Concentrate Breakpot

- Design Temperature (°F) (max/min): 372/40
- Design Pressure (psig) (internal/external): 15/FV
- Location: incell

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- The vessel is normally empty and at ambient temperature

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified), or better

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop procedure for thorough removal of caustic solution by rinsing/flushing before adding acidic solutions.

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

3/8/06

EXPIRES: 12/07/07

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REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	3/8/06	Issued for Permitting Use	DLA	HMK	APR
0	6/23/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

This vessel is normally empty but is available to receive recovered acid flows from the Cs evaporator nitric acid rectifier or from the Cs ion exchange columns or Cs concentrate from the Cs evaporator separator vessel.

a General Corrosion
Hamner (1981) lists a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 µm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Dillon (2000) and Sedriks (1996) both state that the 300 series alloys are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212°F though Sedriks states the data beyond about 122°F are incorrect.

Hamner (1981) lists a corrosion rate for 304 (and 304L) in 2 M HNO_3 of less than 2 mpy. Davis (1994) states the corrosion rate for 304L in 12% HNO_3 will be less than about 1 mpy up to about 212°F.

Conclusion:
316L is expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy at the stated conditions providing breakpots are flushed before acidic solutions are introduced.

b Pitting Corrosion
Chloride is notorious for causing pitting in acid and neutral solutions. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. At pH < 12, chloride can be a concern. However, Revie (2000) and Uhlig (1948) both note nitrate inhibits chloride corrosion. Therefore the nitrate concentration in the solution is expected to be beneficial and 316L can be used if the chloride concentration is not more than stated.

Conclusions
Under the stated conditions, 316L is the minimum alloy recommended.

c End Grain Corrosion
Not applicable to this system.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. Further, the use of "L" grade stainless reduces the opportunity for sensitization to cracking.

Conclusions:
At the normal operating environment 316L stainless steel is expected to be acceptable.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are suitable for MIC. However, MIC is not normally observed in operating systems except for those exposed to untreated process water.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a concern.

Conclusions
Not believed to be a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

i Vapor Phase Corrosion
No vapor phase corrosion is expected.

Conclusion:
Not applicable.

j Erosion
Velocities are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
None expected.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. CCN 130173, Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
4. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
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2. CCN 130175, Boschen, Steve, http://www.al6xn.com/images/stainlessguide.pdf
3. CCN 130176, Cole, HS, 1974, *Corrosion of Austenitic Stainless Steel Alloys Due to HNO_3 – HF Mixtures*, ICP-1036, Idaho Chemical Programs – Operations Office, Idaho Falls, ID
4. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
5. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
6. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
7. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084
8. Wilding, MW and BE Paige, 1976, *Survey on Corrosion of Metals and Alloys in Solutions Containing Nitric Acid*, ICP-1107, Idaho Chemical Programs, Idaho National Engineering Laboratory, Idaho Falls, ID

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #): Eluate contingency vessel (CNP-VSL-00003)
Eluate contingency breakpot (CNP-BRKPT-00001)

Facility: PTF

In Black Cell?: Yes

Chemicals	Unit[2]	Contract Max		Non-Routine 4		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	1.17E+01	1.10E+01			
Chloride	g/l	4.51E+00	5.02E+00			
Fluoride	g/l	6.36E+00	6.98E+00			
Iron	g/l	8.60E-01	8.97E-01			
Nitrate	g/l	4.93E+02	4.94E+02			
Nitrite	g/l	2.49E+01	2.77E+01			
Phosphate	g/l	1.80E+01	1.96E+01			
Sulfate	g/l	9.58E+00	1.08E+01			
Mercury	g/l	1.47E-02	8.71E-03			
Carbonate	g/l	3.36E+01	3.43E+01			
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2
						Note 4

List of Organic Species:

References

System Description: 24590-PTF-3YD-CNP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CNP12, CNP14, CXP11, CXP12
Off Normal Input Stream # (e.g., overflow from other vessels): N/A
P&ID: N/A
PFD: 24590-PTF-M5-V17T-P0014, Rev 1
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Steam is used for transfer. The breakpot is normally empty and at ambient temperature most of the time.
   CNP-VSL-00003: T normal operation 77 °F (eluate stream) to 140 °F (24590-PTF-M5C-CNP-00001, Rev 0)
3. Composition can vary and is received on a contingency basis.
   The vessel receives: Cs Eluate at low pH of approx. 0.3 or more, with low levels of Cl, F, etc, also can receive Cs Evap Concentrate that has been neutralized to pH approx. 14 with high levels of Cl, F, etc. Minimum pH based on 0.5M nitric acid
4. Note CXP11 has the same composition as CXP21 but CXP21 does not appear in the mass balance because it is a contingent stream to the vessel.

Assumptions:

This vessel is a contingency vessel and under normal operations contains a heel only. It is available to receive Cs Concentrate and Cs Eluate.

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.1.1 Cs Evaporator Breakpot (CNP-BRKPT-00001)

Routine Operations

This vessel is normally empty and is not used on a routine basis but is available to receive Cs concentrate and Cs eluate, which drains to the eluate contingency storage vessel (CNP-VSL-00003).

Non-Routine Operations that Could Affect Corrosion/Erosion

Recovered acid flows by gravity from the bottom of the Cs evaporator nitric acid rectifier (CNP-DISTC-00001) to the Cs evaporator recovered nitric acid vessel (CNP-VSL-00004). CNP-VSL-00004 has enough eluant to complete one elution of a normal bed of SuperLig 644 resin. If the acid needs reprocessing, as evidenced by an activity above allowable levels, it is recycled through the nitric acid recovery process by way of a steam ejector to the Cs concentrate breakpot, CNP-BRKPT-00001, draining to the eluate contingency storage vessel (CNP-VSL-00003). Then it is sent back to the cesium evaporator breakpot (CNP-BRKPT-00002) at the beginning of the system. If the acid is acceptable (low gamma and correct HNO_3 concentration), it is transferred directly into the eluant stream feeding the IX columns.

Attachment 2
06-ED-029

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-PTF-PCN-ENV-05-027.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

3/27/06
Date

Quarter Ending March 31, 2006 24590-PTF-PCN-ENV-05-031

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. A. Klein 3/6/06 Date

Reviewed by ORP Program Office:

R. J. Schepens 3/28/06 Date

Quarter Ending March 31, 2006 24590-PTF-PCN-ENV-05-031

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update PTF Plant Item Mechanical Systems Data Sheet (MSDS) for the Pretreatment Facility Ultimate Overflow Vessel (PWD-VSL-00033) currently located in Appendix 8.6 of the Dangerous Waste Permit (DWP).

The following are the changes to the above mentioned Mechanical Systems Data Sheet:

- Two calculation references were added.
- Under the Design Data table, the "Actual Operating weight" and "Test weight" were revised to reflect new load values obtained from the seismic redesign effort.
- Note 6 and 10 were deleted.
- Note 7 and 8 were revised to reflect that the seller is responsible for ensuring an additional corrosion and erosion allowances are engineered into the vessel.
- Note 11 was added to describe changes on sheet 1 of 6 and sheet 4 of 6.

These changes do not alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following Mechanical Systems Data Sheet in the DWP:

Appendix 8.6			
Replace:	24590-PTF-MVD-PWD-P0001, Rev. 2	With:	24590-PTF-MVD-PWD-P0001, Rev. 3

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter Relevant WAC 173-303-830, Appendix I Modification citation number:
Enter wording of WAC 173-303-830, Appendix I Modification citation: NA

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl 4/21/06 Date

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

R10613725

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033

Project	RPP-WTP	P&ID	24590-PTF-M6-PWD-P0002
Project No	24590	Calculation 2	24590-PTF-MVC-PWD-00029, 24590-PTF-MVC-PWD-00021 2
Project Site	Hanford	Vessel Drawing	24590-PTF-MV-PWD-P0001001
Description	Ultimate Overflow Vessel		ISSUED BY RPP-WTP PDC

Reference Data

Charge Vessels (Tag Numbers)	PWD-VSL-00131, PWD-VSL-00132
Pulsejet Mixers / Agitators (Tag Numbers)	PWD-PJM-00031, PWD-PJM-00032, PWD-PJM-00033, PWD-PJM-00034, PWD-PJM-00035, PWD-PJM-00036, PWD-PJM-00037, PWD-PJM-00038
RFDs/Pumps (Tag Numbers)	PWD-RFD-00131, PWD-RFD-00132

Design Data

Quality Level		QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-I	Design Code	ASME VIII Div 1		
Service/Contents		Radioactive Liquid	Code Stamp	Yes		
Design Specific Gravity		1.57	NB Registration	Yes		
Operating Volume	gal	29,580	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	41,650	Estimated	115,400	503,700	465,000
Environmental Qualifications		NIA	Actual ** 2	129,000	517,500 2	499,600 2

Inside Diameter	inch	288			Wind Design	Not Required	
Length/Height (TL-TL)	inch	89			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-SS90-T0001 24590-WTP-3PS-MV00-TP002	
Internal Pressure	psig	0	15	NIA	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.22	FV	NIA	Postweld Heat Treat	Not Required	
Temperature	°F	218	225	NIA	Corrosion Allowance	inch	0.08 (Notes 7,8)
Min. Design Metal Temp.	°F	0			Hydrostatic Test Pressure *	Psig	19.5

* As determined by the vendor. 3

** The actual weights shown herein are based on the original seismic data and these figures are subject to change, based on the new loads, obtained from the seismic redesign. 3

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

ERIC B. ISERN STATE OF WASHINGTON 33449 REGISTERED PROFESSIONAL ENGINEER

2/13/06

EXPIRES: 07/28/07

This Bound Document Contains a total of 8 sheets

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
3	2/26/06	Issued for Permitting Use	C. Thompson	B. Makadia/L. Han	C. Slater	J. Julyk
2	3/28/05	Issued for Permitting Use	C. Thompson	H. Khurana	C. Slater	M. Hoffmann
1	12/22/03	Issued for Permitting Use	J. Jackson	R. Simmons	C. Slater	M. Hoffmann
0	10/03/03	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	SA 240 316 with max. Carbon of 0.030 %	See Drawing	Auxiliary (Note 1)
Shell	SA 240 316 with max. Carbon of 0.030 %	See Drawing	Primary (Note 1)
Bottom Head	SA 240 316 with max. Carbon of 0.030 %	See Drawing	Primary (Note 1)
Support	SA 240 304 with max. Carbon of 0.030 % (Note 3)	See Drawing	NIA
Jacket/Coils/Half-Pipe Jacket	NIA	NIA	NIA
Internals	SA240 316 with max. Carbon of 0.030 %	See Drawing	Thermowell Primary (Note 1)
Pipe	SA312 TP316 Seamless with max. Carbon of 0.030%	See Drawing	See Note 1
Forgings/ Bar stock	SA182 F316/SA 479 316 with max. Carbon of 0.030%	See Drawing	As Note-1 for Nozzle Necks
Gaskets	NIA	NIA	NIA
Bolting	NIA	NIA	NIA

Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Weld Surface Finish	De-scaled as laid

Remarks

Note 1: All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination. Radiography is the preferred method of volumetric testing. If it is considered impractical to perform radiographic examination, the Seller may propose ultrasonic examinations.

Note 2: Vessel supports shall be designed to restrain the vessel in a fully buoyant state.

Note 3: Ring beam bottom flange material shall be A 572 Gr. 50.

Note 4: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 5: Contents of this document are Dangerous Waste Permit affecting.

Note 6: Deleted per report # 24590-WTP-RPT-M-04-0007 Rev. 0 dated Nov. 1, 2004. 3

Note 7: Seller shall ensure that an additional 0.083" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances. 3

Note 8: Seller shall ensure that an additional 0.053" is available for erosion in the interior conical surface of the pulse jet mixers. 3

Note 9: Required data for thermal stress analysis for nozzles exposed to higher temperatures.

- Cell ambient temperature = 113°F
- Headspace temperature or Operating temperature = 218°F
- Ambient and headspace natural convection heat transfer coefficients = 0.895 Btu/hr ft²°F for vessel head and 0.852 Btu/hr ft²°F for vessel shell
- Inlet fluid transfer frequency and mass flow rate for nozzle N39.

  Steam max temperature = 352°F

  Transfer frequency = 1 transfer/month

  Steam mass flow rate = 1,399 lb/hr

Note 10: Deleted. 3

Note 11: Revision 3 of this data sheet incorporates CCN #'s 129149, 128549 and revises notes 7, 8 and 10 shown above. The CCN's added the words "...in the form of overblow pressures:", to the paragraph above the graph and further revised the note below the graph, as noted herein on sheet 4 of 6. Revised sheet 1 of 6 as noted, revised row 2 to read "Calculation". 3

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033

Equipment Cyclic Data Sheet

Plant Item Number	24590-PTF-MV-PWD-VSL-00033
Component Description	Parent Vessel

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

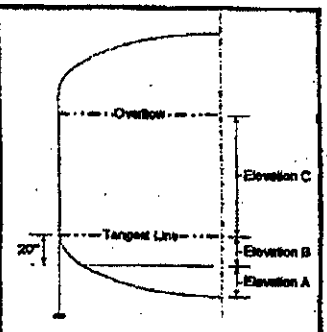
Materials of Construction	SA 240 316 with max. Carbon of 0.030%
Design Life	40 years
Component Function and Life Cycle Description	The primary function of the Ultimate Overflow Vessel are to: • Collect gravity drains, and line flushes • Collect overflows from Pretreatment Facility process vessels. • Receive pit sump emptying ejector discharge The vessel is normally emptied once every fifty days. Washdown is not more than once per year.

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	15	10	Nominal assumption
Operating Pressure	psig	-0.22	0	292	
Operating Temperature	°F	59	218	292	Uniform material temperature range, not between two points
Contents Specific Gravity		1.0	1.57	NA	
Contents Level	inch	Empty	Flooded	292	Coincident with pressure cycles
Localized Features					
Nozzles		Within 50°F of operating temperature range		As above	

Hydrodynamic Loading

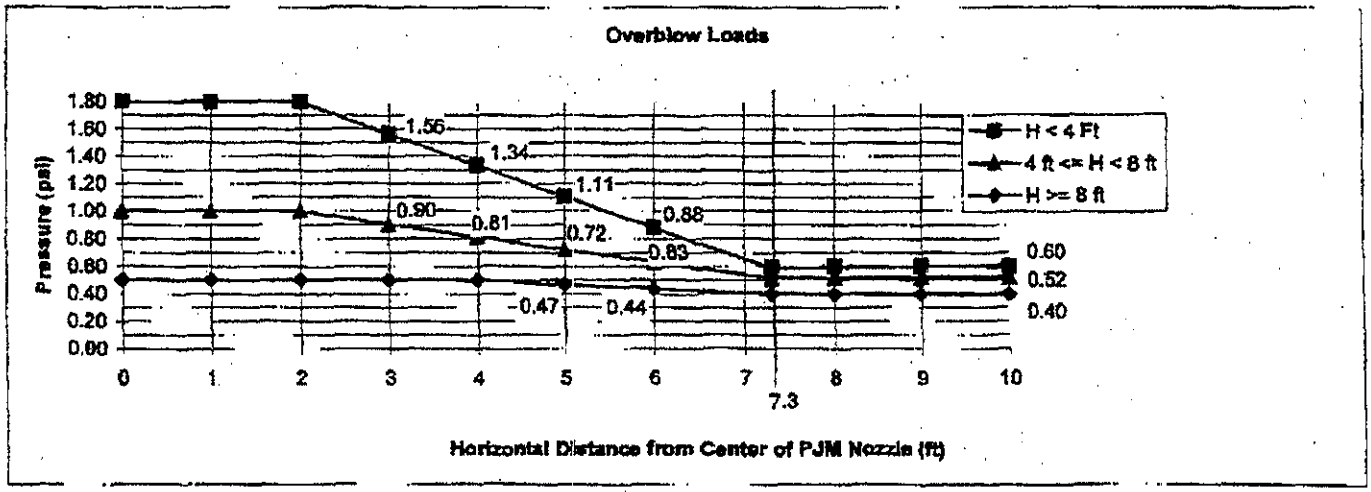
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.

The following table indicates the normal hydrodynamic pressure at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.



Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	-0.15 to 0.15	-0.05 to 0.12	-0.15 to 0.15	-0.03 to 0.10	-0.06 to 0.15	18.6×10^6

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle, up to the overflow level, as plotted in the form of overblow pressures: 3



For all vessel internal components other than the overblowing pulse jet mixer, the overblow forces shall be applied a) in the vertical upward direction, and b) in the horizontal direction radiating from the centerline of the overblowing pulse jet mixer. For the overblowing pulse jet mixer, the force shall be applied in the vertical upward direction only. The overblow force on all components, including the structures and supports, shall be calculated by applying the overblow pressure at the location of the nearest surface of the component and to the projected area of the component, facing the appropriate direction. The normal force component, specified for the normal pulse jet mixer operation condition, is not applicable to the overblow condition. Any single pulse jet mixer may overblow 1000 cycles. Reference CCN 125541 dated 07/27/05. 2

Notes

- *Cycle increase: increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*
- *Nozzle N39 shall be fatigue assessed/analyzed for 500 temperature/pressure cycles from 0 psig at 59°F to 15 psig at 352°F, the pressure cycles shall coincide with the temperature cycles. See Note 9, on Page 2.*

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033

Equipment Cyclic Data Sheet

Plant Item Number:	*PWD-VSL-00131, PWD-VSL-00132*
Component Description	*Charge Vessels*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*These charge vessels are cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessels are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty).*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*55*	*10*	*Nominal assumption*
Operating Pressure	psig	*FV*	*30*	*18,100*	
Operating Temperature	°F	*59*	*218*	*292*	*Pressure cycles to be at 218 °F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.*
Contents Specific Gravity		*1.0*	*1.57*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*18,100*	*Coincident with pressure cycles*
Localized Features					
Supports		*As above*		*As above with contents level changing coincident with pressure cycles.*	

Notes

- *Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033

Equipment Cyclic Data Sheet

Plant Item Number:	PWD-PJM-00031, PWD-PJM-00032, PWD-PJM-00033, PWD-PJM-00034, PWD-PJM-00035, PWD-PJM-00036, PWD-PJM-00037, PWD-PJM-00038
Component Description	Pulse Jet Mixers

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	SA 240 316 with max. Carbon of 0.030 %
Design Life	40 years
Component Function and Life Cycle Description	These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) in addition to thrust.

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	85	10	Nominal assumption
Operating Pressure	psig	FV	60	16.6×10^6	
Operating Temperature	°F	59	218	16.6×10^6	Pressure cycles to be at 218 °F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.
Contents Specific Gravity		1.0	1.57	N/A	Nominal assumption
Contents Level	inch	Empty	Flooded	16.6×10^6	Coincident with pressure cycles
Thrust Load	lbf	0	262	16.6×10^6	Coincident with pressure cycles
Localized Features					
Supports		As above		As above with contents level changing coincident with pressure cycles.	

Notes

- Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Attachment 2
06-ED-024

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-PTF-PCN-ENV-05-031.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

W S ELLIOS FOR

J. P. Henschel
Project Director

MAR 13, 2006
Date

Quarter Ending 06/30/2006 24590-PTF-PCN-ENV-05-039

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. A. Klein 3/27/06
D. A. Klein Date

Reviewed by ORP Program Office:

R. J. Schepens 4/5/06
R. J. Schepens Date

Quarter Ending 06/30/2006

24590-PTF-PCN-ENV-05-039

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update PTF Plant Item Material Selection Data Sheets (MSDS) for the Cs Ion Exchange Feed Vessel, CXP-VSL-00001, Cs IX Rinse Collection Vessel, CXP-VSL-00004, and Cs IX Reagent Vessel, CXP-VSL-00005 in Appendix 8.9 of the Dangerous Waste Permit (DWP) to incorporate the following revisions:

- Specifically call out the erosion allowance that is included within the approved corrosion allowance
- Update references

These changes do not alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following MSDSs in the DWP:

Appendix 8.9			
Replace:	24590-PTF-N1D-CXP-P0001, Rev. 0	With:	24590-PTF-N1D-CXP-P0001, Rev. 1
Replace:	24590-PTF-N1D-CXP-P0007, Rev. 0	With:	24590-PTF-N1D-CXP-P0007, Rev. 1
Replace:	24590-PTF-N1D-CXP-P0008, Rev. 0	With:	24590-PTF-N1D-CXP-P0008, Rev. 1

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter Relevant WAC 173-303-830, Appendix I Modification citation number:
Enter wording of WAC 173-303-830, Appendix I Modification citation:

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)	Reviewed by Ecology:
Reason for denial:	S. Dahl — Date: 4/21/06

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

CXP-VSL-00001 (PTF)
Cs Ion Exchange Feed Vessel

ISSUED BY
RPP-WTP PDC

R10667872

- Design Temperature (°F)(max/min): 138/40
- Design Pressure (psig) (internal/external): 15/10
- Location: incell

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Maintenance will not be performed on this vessel for the forty years design life

Operating Modes Considered:

- The vessel is filled with LAW.
- The vessel is filled with demineralized water.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid and water.

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

3/8/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	3/8/06	Issued for Permitting Use		JRD	APR
0	5/18/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

This vessel normally receives filtered LAW from one of the ultrafilter permeate vessels (UFP-VSL-000062A/B/C), as well as batches of pre-elution displaced LAW from the ion exchange column, and provides feed buffer capacity to allow continuous operation of the IX system.

a General Corrosion
Hamner (1981) lists a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 µm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Dillon (2000) and Sedriks (1996) both state that the 300 series alloys are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212°F though Sedriks states the data beyond about 122°F are incorrect.

In this system, the normal hydroxide concentrations and temperatures are such that either 304L or 316L stainless steel will be acceptable.

Conclusion:
At temperatures less than about 140°F, 304L and 316L are expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Dillon and Koch (1995) are both of the opinion that fluoride will have little effect in an alkaline media. If the chloride concentrations are low at the low pH and high at the high pH, then even the low pH conditions are expected to be benign towards 304L.

Normally the vessel is to operate between 77 and 113 °F. At the normal temperature, based on the work of Zapp (1998) and others, 304L stainless steel would be acceptable in the proposed alkaline conditions.

If the vessel were rinsed with acid or filled with process water and left stagnant, there would be a tendency to pit. The time to initiate would depend on the amount of residual chlorides. The more pitting-resistant 316L is recommended.

Conclusion:
Localized corrosion, such as pitting, is not a concern. It is expected that 316L will be a better choice than 304L.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not likely in this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), chloride stress corrosion cracking does not usually occur below about 140°F. During the normal operations, either 304L or 316L are expected to be satisfactory.

Neither 304L nor 316L are susceptible to caustic cracking at the proposed conditions.

Conclusion:
At the normal operating environment, either 304L or 316L is recommended.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

PLANT ITEM MATERIAL SELECTION DATA SHEET

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are not conducive to microbial growth if microbes were introduced.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Not expected to be a concern.

Conclusions
Not a concern.

i Vapor Phase Corrosion
The vapor phase portion of the vessel is expected to be contacted with particles of waste from splashing. It is unknown whether this will be sufficiently washed or whether residual acids or solids will be present. Due to the possibility that deposits may remain, 316L is the minimum recommended.

Conclusion:
Not expected to be a concern with 316L.

j Erosion
Erosion of vessel should be minimal with the very low undissolved solids content anticipated. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
There are no moving surfaces within the vessel.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. CCN 130173, Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
4. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073.
5. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073.
6. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218.
7. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141.
8. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158.
9. Zapp, PE, 1998, *Preliminary Assessment of Evaporator Materials of Construction*, BNF—003-98-0029, Rev 0, Westinghouse Savannah River Co., Inc for BNFL Inc.

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1. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
2. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073.
3. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158.
4. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084.

PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA

Component(s) (Name/ID #) Cs ion exchange feed vessel (CXP-VSL-00001)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	3.15E+01	3.17E+01			
Chloride	g/l	1.21E+01	1.45E+01			
Fluoride	g/l	1.44E+01	1.73E+01			
Iron	g/l	2.31E+00	2.60E+00			
Nitrate	g/l	2.23E+02	2.59E+02			
Nitrite	g/l	6.69E+01	8.01E+01			
Phosphate	g/l	4.63E+01	5.66E+01			
Sulfate	g/l	2.57E+01	3.08E+01			
Mercury	g/l	7.47E-02	1.94E-02			
Carbonate	g/l	9.03E+01	9.83E+01			
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note3
Temperature	°F					Note 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-CXP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CXP06, UFP33, CXP01
Off Normal Input Stream #: off spec treated LAW high in Cs
P&ID: N/A
PFD: 24590-PTF-M5-V17T-P0012, Rev 0
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. T operation 77 °F to 113 °F (24590-PTF-MVC-CXP-00001, Rev 0)
3. pH approximately 12 (based on Al(OH)$_3$ precipitation) to 14, CXP06, UFP33 are highly basic, contain 0.25M NaOH.

Assumptions:

4.3.3 Cs Ion Exchange Feed Vessel (CXP-VSL-00001)

Routine Operations

The Cs ion exchange feed vessel (CXP-VSL-00001) is designed to receive LAW from the ultrafiltration process system (UFP) and provide feed buffer capacity to allow continuous operation of the IX system. The vessel normally receives filtered LAW from one of the three ultrafilter permeate vessels (UFP-VSL-00062-A, -B, or -C), as well as batches of pre-elution displaced LAW from the ion exchange columns. It can receive (intermittently) LAW that bypasses the ultrafilters (from UFP-VSL-00001-A or -B) and off-specification recycle from the Cs treated LAW collection vessel. The total batch volume of the Cs-IX feed vessel is 80,000 gallons.

Non-Routine Operations that Could Affect Corrosion/Erosion

This vessel is also used as a point of recycle for the IX system if the Cs treated LAW is found to be out of specification for ^{137}Cs content. This vessel overflows to PWD-VSL-00033. For corrosion evaluation, the recycle stream is bounded by the feed stream.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10667873

CXP-VSL-00004 (PTF)
Cs IX Caustic Rinse Collection Vessel

ISSUED BY
RPP-WTP PDC

- Design Temperature (°F)(max/min): 138/40
- Design Pressure (psig) (max/min): 15/FV:
- Location: incell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

OFFSPRING ITEMS

CXP-VSL-00006 – CXP-VSL-00009
CXP-PJM-00001, CXP-RFD-00004A/B
CXP-RFD-00005 – CXP-RFD-00006

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- The vessel is filled with caustic rinse water.
- The vessel is filled with process condensate or demineralized water.
- No acid is present.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- None

3/14/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 7 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	3/14/06	Issued for Permitting Use			
0	5/18/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

This vessel allows recycle and reuse of the originally nominal 0.25 M NaOH solution from the Cs IX column. The solution exits the column with a nominal caustic concentration of about 0.1 M NaOH. This vessel can also receive fresh nominal 0.25 M NaOH solution as well as process condensate from one of the process condensate vessels.

a General Corrosion
The caustic rinse collection vessel collects rinse water from the IX columns during the wash cycle. The rinse solution is made up of diluted caustic solution with process condensate and/or demineralized water

Hamner (1981) lists a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 µm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Dillon (2000) and Sedriks (1996) both state that the 300 series alloys are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212°F though Sedriks states the data beyond about 122°F are incorrect.

In this system, the normal hydroxide concentrations and temperatures are such that 304L stainless steel will be acceptable.

Conclusion:
At the given temperatures, 304L and 316L are expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Dillon and Koch (1995) are both of the opinion that fluoride will have little effect in an alkaline media. If the chloride concentrations are low at the low pH and high at the high pH, then even the low pH conditions are expected to be benign towards 304L. Revie (2000) and Uhlig (1948) note nitrate inhibits chloride pitting.

Normally the vessel is to operate at 77 to 113 °F. At the normal temperature, based on the work of Zapp (1998) and others, 304L stainless steel would be acceptable in the proposed alkaline conditions.

If the vessel were filled with process water and left stagnant, there would be a tendency to pit. The time to initiate would depend on the amount of residual chlorides.

Conclusion:
Localized corrosion, such as pitting, is not expected. At the stated operating conditions304L will be suitable.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not likely in this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), chloride stress corrosion cracking does not usually occur below about 140°F. During the normal operations, either 304L or 316L are expected to be satisfactory.

Neither 304L nor 316L are susceptible to caustic cracking at the proposed conditions.

Conclusion:
At the normal operating environment, the alloy recommended is 304L.

PLANT ITEM MATERIAL SELECTION DATA SHEET

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are not conducive to microbial growth if microbes were introduced.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Not expected to be a concern.

Conclusions
Not a concern.

i Vapor Phase Corrosion
The vapor phase portion of the vessel is expected to be contacted with particles of waste from splashing. It is unknown whether this will be sufficiently washed or whether residual acids or solids will be present. Under the stated conditions, with wash ring present in the vessel, this is not expected to be a concern

Conclusion:
Not a concern.

j Erosion
Based on past experiments by Smith & Elmore (1992), the solids are soft and erosion is not expected to be a concern for the vessel wall. Based on 24590-WTP-RPT-M-04-0008, a general erosion allowance of 0.004 inch is adequate for components with solids content less than 2 wt%. No localized protection is necessary for the applicable portions of the bottom head to accommodate PJM discharge velocities of up to 12 m/s for a usage of 100 % operation as documented in 24590-WTP-M0C-50-00004.

The PJM nozzle requires no additional protection as documented in 24590-WTP-M0C-50-00004.

Conclusion:
The recommended corrosion allowance provides sufficient protection for erosion of the vessel.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-M0C-50-00004, Rev. D, *Wear Allowance for WTP Waste Slurry Systems*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. CCN 000853, Zapp, PE, 1998, *Preliminary Assessment of Evaporator Materials of Construction*, BNF—003-98-0029, Rev 0, Westinghouse Savannah River Co., Inc for BNFL Inc.
4. CCN 130172, Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
5. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
6. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
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9. Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
10. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
11. Smith, H. D. and M. R. Elmore, 1992, *Corrosion Studies of Carbon Steel under Impinging Jets of Simulated Slurries of Neutralized Current Acid Waste (NCAW) and Neutralized Cladding Removal Waste (NCRW)*, PNL-7816, Pacific Northwest Laboratory, Richland, Washington.
12. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

Bibliography:

1. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
2. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
3. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Cs IX caustic rinse collection vessel (CXP-VSL-00004)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l					
Chloride	g/l					
Fluoride	g/l					
Iron	g/l					
Nitrate	g/l	8.70E-04	1.01E-03			
Nitrite	g/l	1.30E-04	1.55E-04			
Phosphate	g/l	1.35E-04	1.58E-04			
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l	2.53E-04	2.76E-04			
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Assumption 1
Temperature	°F					Note 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-CXP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CXP13,CXP22,CXP14
Off Normal Input Stream # (e.g., overflow from other vessels): N/A
P&ID: N/A
PFD: 24590-PTF-M5-V17T P0012, Rev 0
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Thormal operation 77 °F to 113 °F (24590 PTF-MVC-CXP-00004, Rev 0)

Assumptions:

1. Process condensate at pH 7, stream CXP13 has pH 13 (0.1M NaOH)

4.3.4 Cs-IX Caustic Rinse Collection Vessel (CXP-VSL-00004)

Routine Operations

The Cs-IX caustic rinse collection vessel (CXP-VSL-00004) allows recycle and reuse of the originally nominal 0.25 M NaOH solution. The Cs-IX caustic rinse collection vessel is designed to receive spent caustic regeneration solution that has been discharged from a Cs IX column (CXP-IXC-00001, -00002, -00003, or -00004) during the regeneration sequence.

The spent regeneration solution, which originates as a fresh 0.25 M NaOH solution before introduction into the column, exits the column with a nominal caustic concentration of about 0.1 M NaOH. This solution is then collected in the Cs-IX caustic rinse collection vessel for use in the LAW displacement sequence. During the column regeneration, 2500 gallons of fresh 0.25 M NaOH solution are fed to a column. A significant portion of the initial NaOH that is fed to the column reacts with the resin and, as a result, the initial solution exiting the column is depleted in NaOH. Only about half of the volume of the total batch of regeneration solution is captured for use in the LAW displacement sequence; since the later half has a higher strength in NaOH, it is captured. This is accomplished by valving the first portion of the exiting regeneration solution to one of the acidic/alkaline effluent vessels (PWD-VSL-00015 or -00016), and valving the second portion to the Cs-IX caustic rinse collection vessel.

For startup and makeup purposes, the Cs-IX caustic rinse collection vessel can receive fresh nominal 0.25 M NaOH solution from an outcell tank (SHR-TK-00005). It can also receive (as a source of water) process condensate from one of the process condensate tanks (RLD-TK-00006-A or -B) via a header. Some adjustment of the NaOH concentration can be made using these two sources. The solutions made in the Cs-IX caustic rinse collection vessel can also be used to cool Cs IX columns (through the use of flow-through cooling) in abnormal situations. Alternatively, the Cs-IX caustic rinse collection vessel can be used to receive batches of cooling solution that have passed through a column.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10667874

CXP-VSL-00005 - (PTF)
Cs IX Reagent Vessel

- Design Temperature (°F)(max/min): 138/40
- Design Pressure (psig) (max/min): 15/FV
- Location: incell

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- The vessel is filled with caustic.
- The vessel is filled with demineralized water.
- The vessel is filled with nitric acid (standby condition).

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid and water (rinse prior to adding acid after receiving solids from CXP-VSL-00004).

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

3/8/06

EXPIRES: 12/07/

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

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REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	3/8/06	Issued for Permitting Use		HMK	APR
0	5/18/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

This vessel is expected to receive demineralized water, nominal 0.25 M NaOH solution, nominal 0.1 M NaOH solution, standby nitric acid, and recycled spent regeneration caustic solution from CXP-VSL-00004.

a General Corrosion
Hamner (1981) lists a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 μm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Dillon (2000) and Sedriks (1996) both state that the 300 series alloys are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212°F though Sedriks states the data beyond about 122°F are incorrect.

In this system, the normal hydroxide concentrations and temperatures are such that 304L or a higher alloy stainless steel will be acceptable.

The addition or presence of 0.5 M HNO_3 is not a concern for the given concentrations.

Conclusion:
At temperatures less than about 140°F, 304L or better is expected to be sufficiently resistant to the solution with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
The nitric acid does not contain chloride or fluoride. The NaOH may contain chloride impurities. The two possible opportunities for pitting are either acidifying high chloride waste or leaving the vessel full of DIW with residual chloride.

Chloride is known to cause pitting in acid and neutral solutions. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Dillon and Koch (1995) are both of the opinion that fluoride will have little effect in an alkaline media. If the chloride concentrations are low at the low pH and high at the high pH, then even the low pH conditions are expected to be benign towards 304L. Revie (2000) and Uhlig (1948) note nitrate inhibits chloride pitting.

Normally the vessel is to operate with a fluid temperature 77°F. At this temperature, based on the work of Zapp (1998) and others, 304L stainless steel would be acceptable in the proposed alkaline conditions.

The small quantity of halides will not be harmful even if the solution is neutralized or modified with HNO_3.

If the vessel were filled with process water and left stagnant, there would be a tendency to pit. The time to initiate would depend on the amount of residual chlorides.

Conclusion:
Localized corrosion, such as pitting, is not expected. It is expected that 304L will be satisfactory.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not expected in this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), chloride stress corrosion cracking does not usually occur below about 140°F. During the normal operations, either 304L or 316L are expected to be satisfactory.

Because of the potential for caustic cracking, 304L and 316L are generally not recommended for use above 140°F. However, based on the proposed temperatures, either is acceptable.

Conclusion:
At the normal operating environment, the alloy recommended is 304L stainless.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

PLANT ITEM MATERIAL SELECTION DATA SHEET

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are conducive to microbial growth if microbes were introduced. The use of DIW as process water should minimize the possibility of introduction of microbes.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Not expected to be a concern.

Conclusions
Not a concern.

i Vapor Phase Corrosion
The vapor phase portion of the vessel is expected to be contacted with particles of waste from splashing. Wash rings within vessel should provide sufficient rinsing to minimize presence of deposits.

Conclusion:
Not believed to be of concern.

j Erosion
Velocities within the vessel are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not believed to be of concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

p Inadvertent Nitric Acid Addition

Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:

The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. CCN 130173, Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
4. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
5. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
6. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
7. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
8. Revic, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
9. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
10. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
11. Zapp, PE, 1998, *Preliminary Assessment of Evaporator Materials of Construction*, BNF—003-98-0029, Rev 0, Westinghouse Savannah River Co., Inc for BNFI, Inc.

Bibliography:

1. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
2. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
3. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Cs IX reagent vessel (CXP-VSL-00005)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l					
Chloride	g/l					
Fluoride	g/l					
Iron	g/l					
Nitrate	g/l	8.83E-04	1.03E-03			
Nitrite	g/l	1.32E-04	1.57E-04			
Phosphate	g/l	1.37E-04	1.61E-04			
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l	2.58E-04	2.82E-04			
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A	13.0	13.0			Note 2
Temperature	°F					Assumption 1

List of Organic Species:

References

System Description: 24590-PTF-3YD-CXP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CXP03
Off Normal Input Stream # (e.g., overflow from other vessels): N/A
P&ID: N/A
PFD: 24590-PTF-M5-V17T P0012, Rev 0
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Normally pH is approximately 13. This vessel also receives 0.1M NaOH, 0.25M NaOH, and 0.5 M nitric acid for chemical adjustment.

Assumptions:

1. Tnormal operation is 77 °F, Tmax 113 °F (24590-PTF-MVD-CXP-P0015, Rev 0)

4.3.5 Cs-IX Reagent Vessel (CXP-VSL-00005)

The CS-IX reagent vessel (CXP-VSL-00005) provides reagents for the Cs ion exchange columns.

Routine Operations

The Cs-IX reagent vessel is designed to receive demineralized water, nominal 0.25 M NaOH solution, nominal 0.1 M NaOH solution, and standby nitric acid from outcell sources as fresh reagents. In addition, the Cs-IX reagent vessel receives recycled spent regeneration caustic solution from the Cs-IX caustic rinse collection vessel (CXP-VSL-00004).

The Cs-IX reagent vessel functions like a breakpot, feeding liquids to the suction of the Cs-IX feed pumps and preventing backflow of contaminated fluids to clean systems. Unlike a true breakpot, however, there are valves on the bottom draining discharge line of the Cs-IX reagent vessel because the discharge must serve two pumps on separate occasions. The Cs-IX reagent vessel also serves as a source for ventilation of the Cs IX columns. The Cs-IX reagent vessel has a demister (with pressure-drop-measurement included in the top portion of this vessel) to enable demisting of any potentially entrained liquid with the vented column gasses.

The Cs-IX reagent vessel normally receives the following:

- Demineralized water from outcell tank DIW-TK-00001 during the pre-elution rinse and post-elution rinse sequences
- Nominal 0.25 M NaOH solution from the balance of facilities (BOF) header during the regeneration sequence

Non-Routine Operations that Could Affect Corrosion/Erosion

In abnormal situations, the Cs-IX reagent vessel can receive the following:

- Nominal 0.1 M NaOH solution as recycled spent regeneration solution from the Cs-IX caustic rinse collection vessel (CXP-VSL-00004). This solution is used in the LAW displacement sequence. The vessel can also receive fresh nominal 0.1 M NaOH solution for emergency cooling from outcell tank SHR-TK-00001.
- Standby (0.5 M) nitric acid from outcell tank NAR-TK-00007.

This vessel also overflows to PWD-VSL-00033.

Attachment 2
06-ED-031

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-PTF-PCN-ENV-05-039.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

3/30/06
Date

Quarter Ending 6/30/2006 24590-PTF-PCN-ENV-06-009

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator: D. A. Klein 3/21/06 Date

Reviewed by ORP Program Office: R. J. Schepens 4/5/06 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update General Arrangement Plan at El. 28' located in Appendix 8.4 of the Dangerous Waste Permit (DWP). The changes to this drawing do not affect the secondary containment areas or regulated equipment as identified in the permit. Updates to the drawing include the following:

- Deleted references to the cancelled General Arrangement Section drawings P0008 thru P00017
- Identified C2 Fan Coil Units and radiation monitoring equipment
- Identified PVP racks
- Changed Annex to Control Room in reference note
- Other minor revisions, such as addition of platforms for crane maintenance and deletion of Chilled Water pumps, vessels, and Steam Condensate System equipment.

These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following drawing in Appendix 8.4 of the Dangerous Waste Permit:

Appendix 8.4			
Replace	24590-PTF-P1-P01T-P0002	Rev. 2	24590-PTF-P1-P01T-P0002 Rev. 3

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: N/A

Enter wording of WAC 173-303-830, Appendix I Modification citation: N/A

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

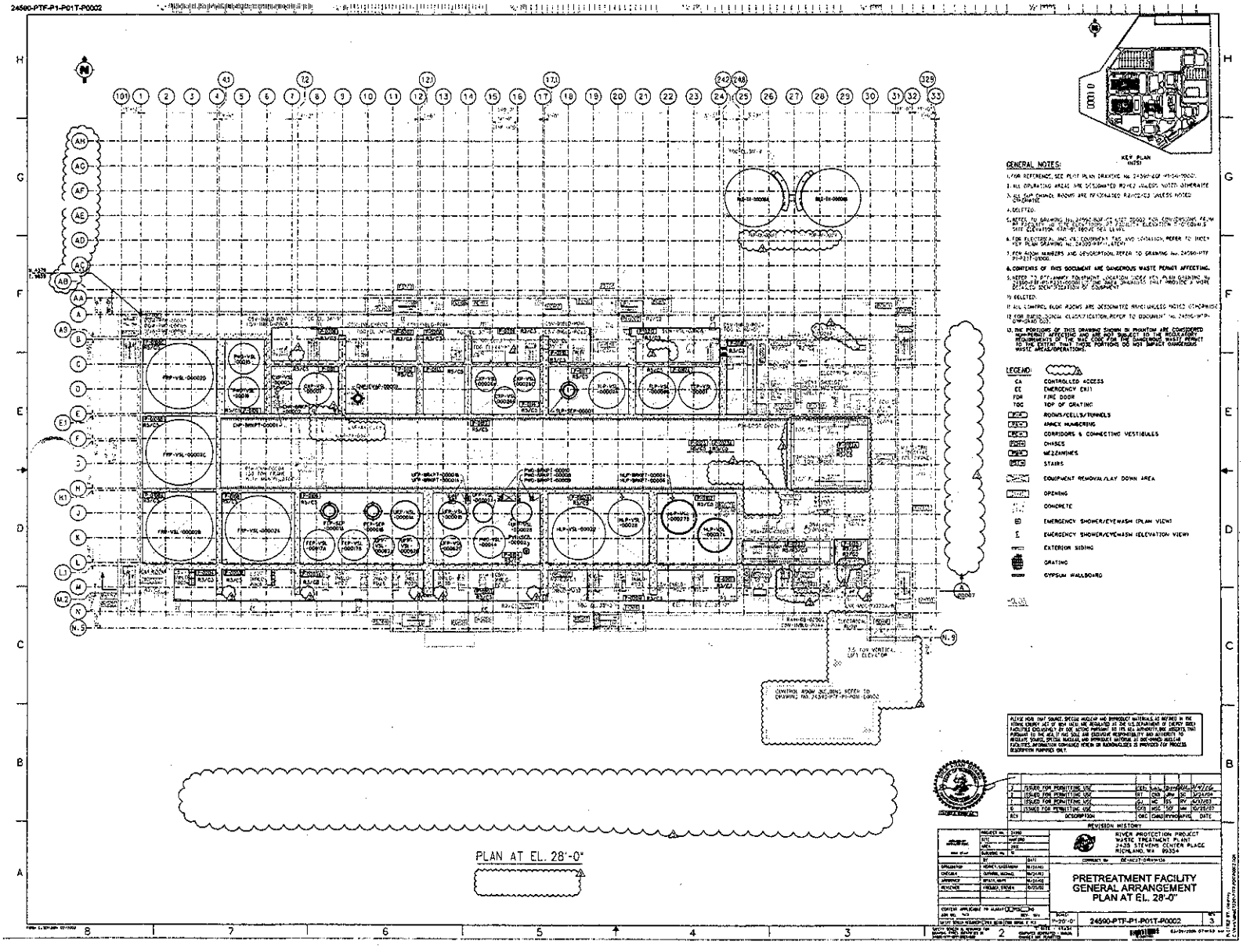
Reviewed by Ecology:

S. Dahl 4/21/06 Date

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

24590-PTF-P1-P01T-P0002



PLAN AT EL. 28'-0"

GENERAL NOTES:

1. FOR REFERENCE, SEE PLOT PLAN DRAWING No. 24590-WTP-P1-P01-P0001.
2. ALL OPERATING AREAS ARE DESIGNATED RS/HC (HAZ'D. WASTE) UNLESS OTHERWISE NOTED ON DRAWING.
3. ALL UNCHANGE ROOMS ARE DESIGNATED RS/HC/CS UNLESS NOTED OTHERWISE.
4. DELETED.
5. REFER TO DRAWING [illegible] FOR CONFIGURATION, FROM SITE ELEVATION 424'-0" ABOVE MEAN SEA LEVEL.
6. FOR ELECTRICAL AND I&C EQUIPMENT TAG AND LOCATION, REFER TO INDEX KEY PLAN DRAWING No. 24590-WTP-P1-A7P01.
7. FOR ROOM NUMBERS AND DESCRIPTION, REFER TO DRAWING No. 24590-PTF-P1-P01T-P0001.
8. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
9. REFER TO RTF UNIT PLATFORM LOCATION INDEX KEY PLAN DRAWING No. 24590-WTP-P1-A7P01-P0001 FOR [illegible] EQUIPMENT.
10. DELETED.
11. ALL CONTROL ROOM ROOMS ARE DESIGNATED RS/HC/CS UNLESS NOTED OTHERWISE.
12. FOR RADIOLOGICAL CLASSIFICATION, REFER TO DOCUMENT No. 24590-WTP-CHP-RAD-P0001.
13. THE PORTIONS OF THIS DRAWING SHOWN IN PHANTOM ARE CONSIDERED NON-PERMIT AFFECTING AND ARE NOT SUBJECT TO THE REGULATORY REQUIREMENTS OF THE WAC CODE FOR THE DANGEROUS WASTE PERMIT TO THE EXTENT THAT THOSE PORTIONS DO NOT AFFECT DANGEROUS WASTE AREAS/OPERATIONS.

KEY PLAN
(NTS)

LEGEND:

CA	CONTROLLED ACCESS
EE	EMERGENCY EXIT
FOR	FIRE DOOR
TOC	TOP OF GRATING
[ROOM]	ROOMS/CELLS/TUNNELS
[AREA]	AREA NUMBERING
[CORR]	CORRIDORS & CONNECTING VESTIBULES
[CHASE]	CHASES
[MEZZ]	MEZZANINES
[STAIR]	STAIRS
	EQUIPMENT REMOVAL/LAY DOWN AREA
	OPENING
	CONCRETE
	EMERGENCY SHOWER/EYEWASH (PLAN VIEW)
	EMERGENCY SHOWER/EYEWASH (ELEVATION VIEW)
	EXTERIOR SIDING
	GRATING
	GYPSUM WALLBOARD

PLEASE NOTE THAT SOURCE, SPECIAL NUCLEAR AND BYPRODUCT MATERIALS AS DEFINED IN THE ATOMIC ENERGY ACT OF 1954 (AEA) ARE REGULATED BY THE U.S. DEPARTMENT OF ENERGY (DOE) FACILITIES EXCLUSIVELY. BY DOE ACTING PURSUANT TO ITS SELF-AUTHORITY AND ASSERTS THAT PURSUANT TO THE AEA, IT HAS SOLE AND EXCLUSIVE RESPONSIBILITY AND AUTHORITY TO REGULATE SOURCE, SPECIAL NUCLEAR, AND BYPRODUCT MATERIAL AT DOE-OWNED NUCLEAR FACILITIES. INFORMATION CONTAINED HEREIN OR SUBMODALITIES IS PROVIDED FOR PROCESS DESCRIPTION PURPOSES ONLY.

REV	DESCRIPTION	CHK'D	CHK'D	APP'VD	DATE
7	ISSUED FOR PERMITTING USE	CEP	SMH	DPH	3/9/06
8	ISSUED FOR PERMITTING USE	RIT	CKD	JMW	3/24/06
9	ISSUED FOR PERMITTING USE	GJ	MC	TS	PV 6/21/07
10	ISSUED FOR PERMITTING USE	CKD	MCC	TCP	MM 10/25/07

REVISION HISTORY

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No. DE-AC27-01RV14136

PRETREATMENT FACILITY
GENERAL ARRANGEMENT
PLAN AT EL. 28'-0"

SCALE: 1/8"=1'-0" | 24590-PTF-P1-P01T-P0002 | 3

Attachment 2
06-ED-030

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-PTF-PCN-ENV-06-009.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

3/30/06
Date

Quarter Ending March 31, 2006 24590-PTF-PCN-ENV-05-025

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. A. Klein — Date: 4/3/06

Reviewed by ORP Program Office:

R. J. Schepens — Date: 4/26/06

Quarter Ending March 31, 2006

24590-PTF-PCN-ENV-05-025

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update PTF Plant Item Material Selection Data Sheet (MSDS) for the Pretreatment Facility Ultimate Overflow Vessel (PWD-VSL-00033) currently located in Appendix 8.9 of the Dangerous Waste Permit (DWP).

The following are the major changes to the above mentioned MSDS:

- Design Temperature increased from 185 °F to 225 °F
- Location modified from in-cell to out-cell
- PJM Discharge Velocity increased from 32 fps to 40 fps
- Drive cycle reduced from 25% to 17% at 40 fps
- Added specific allowance for corrosion and erosion
- Added process limitation, " Develop a recovery procedure for non-routine vessel overflows."
- Added DOE Atomic Energy Act Disclaimer
- Corrosion Considerations were updated, including, sources of material entering vessel, references, and a revised discussion of erosion in section j of the MSDS.
- Added discussion of routine and non-routine operations

These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Appendix 8.9			
Replace:	24590-PTF-N1D-PWD-P0005, Rev. 1	With:	24590-PTF-N1D-PWD-P0005, Rev. 2

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: NA

Enter wording of WAC 173-303-830, Appendix I Modification citation: NA

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(d)(ii) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: ☐ Yes ☐ No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl 5/16/06

Date

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10667002

PWD-VSL-00033, (PTF)
Ultimate Overflow Vessel

- Design Temperature (°F)(max/min): 225/0
- Design Pressure (psig) (max/min): 15/FV
- Location: out cell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

ISSUED BY
RPP-WTP PDC

Offspring items
PWD-VSL-00131, PWD-VSL-00132
PWD-PJM-00031– PWD-PJM-00038,
PWD-RFD-00131, PWD-RFD-00132

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- Normal operating conditions which can range from acidic to alkaline
- Alkaline conditions at elevated temperature
- Acid conditions with elevated halides and temperatures, such as would occur if the tank contained a volume of alkaline waste and two or three volumes of 5 N nitric acid were added.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance:0.040 inch (includes 0.024 inch corrosion allowance and 0.016 inch general erosion allowance; localized protection required as discussed in section j)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid and water.
- Develop a recovery procedure for non-routine vessel overflows.

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

3/8/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 8 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
2	3/8/06	Issued for Permitting Use			
1	3/27/03	Issued For Permitting Use	DLA	SWV	MWHoffmann
0	9/24/02	Issued For Permitting Use	DLA	JRD	MWHoffman

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

PWD-VSL-00033 receives material from various sources including drains and flushes from waste feed and transfer lines, drains in the C5/R5 cells and bulges, and plant wash from RLD-VSL-00008. During non-routine operations, this vessel could receive overflow material from most systems within Pretreatment.

a General Corrosion
Under normal operation, the concentrations of most chemicals will be sufficiently low that 304L will be satisfactory. Further, in this vessel, the temperatures normally will be sufficiently low that uniform corrosion will not be a concern, the main exceptions being non-routine operations or from ultrafilter cleaning. The amount of fluoride is expected to be small although ultrafilter washing with nitric acid might result in a high acidic fluoride concentration. Wilding and Paige (1976) have shown that in 5% nitric acid with 1000 ppm fluoride at 290°F, the corrosion rate of 304L can be as high as 5 mpy.

Hamner (1981) lists a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 µm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Dillon (2000) and Sedriks (1996) both state that the 300 series are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Divine's work with simulated-radwaste evaporators, six months at 140°F, showed 304L was slightly more resistant to corrosion (<0.2 mpy) than was 316L (<0.6 mpy); Ni 200, pure nickel, was much less resistant (≈7 mpy) probably due to the complexants. Zapp notes that the Savannah River evaporator vessels, operating at about 300°F, are made of 304L and have suffered no failures in about 30 years; 304L heat transfer surfaces have failed however after about 10 years. Ohl & Carlos, in their review of the 242-A Evaporator, found in waste similar to that expected, the corrosion of 304L after about two years of operation at 140°F was less than the accepted variability of the plate.

Davis (1987) states the corrosion rate for 304L in pure NaOH will be less than about 0.11 mpy up to about 212°F though Sedriks (1996) states the data beyond about 122°F are low due to oxidizing agents. Danielson & Pitman (2000), based on short term studies, suggest a corrosion rate of about 0.5 mpy for 316L in simulated waste at boiling, >212°F.

Conclusion:
If the temperature were to remain in the stated operating conditions and the environment were alkaline, 304L would be marginally satisfactory with 316L better.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Dillon and Koch (1995) are of the opinion that fluoride will have little effect. Jenkins (1998) has stated that localized corrosion can occur under the deposits on tubes, probably due to the chlorides. Further, Revie (2000) and Uhlig (1948) note that nitrates inhibit chloride pitting. Wilding and Paige (1976) note that nitric acid inhibits chloride attack though the data are at higher temperatures and concentrations.

Conclusion:
Localized corrosion, such as pitting, is common and would be a concern in waste with the expected maximum halide levels. However, the presence of nitrate will mitigate their effects. Under normal conditions with agitation, 316L is expected to be satisfactory.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. If the concentrations are as stated, stress corrosion cracking will be minimized. Although caustic cracking is possible above 140°F, it is not expected under these conditions, probably due to the presence of oxidizing species such as nitrate.

Conclusion:
Because of the normal operating environment, 316L stainless steel is expected to be acceptable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

e Crevice Corrosion
For the most part, the pitting discussion covers this area. Should acid cleaning be used, the presence of excessive heat tint (darker than a light or straw yellow) could lead to crevice corrosion.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating temperatures are suitable for microbial growth, but the location of the system in the process suggests little chance of the introduction of microbes. Further, the alternation between acidic and alkaline conditions is not conducive to their growth.

Conclusion:
MIC is not expected to be a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a problem in this vessel.

Conclusions
Not considered to be a problem.

i Vapor Phase Corrosion
The vapor phase portion of the vessel will be spattered with solution and pitting or crevice corrosion may be a concern.

Conclusion:
Pitting is a possible concern but is covered by the pitting discussion.

j Erosion
Based on past experiments by Smith & Elmore (1992), the solids are soft and erosion is not expected to be a concern for the vessel wall. Based on 24590-WTP-RPT-M-04-0008, a general erosion allowance of 0.016 inch is adequate for components with maximum solids content up to 27.3 wt%. Additional 316L stainless steel should be provided as localized protection for the applicable portions of the bottom head to accommodate PJM discharge velocities of up to 12 m/s with solids concentrations of 26.7 wt% for a usage of 19 % operation as documented in 24590-WTP-M0C-50-00004. PWD-VSL-00033 requires at least 0.083-inch additional protection. The 26.7 wt% is considered to be conservative and is based on the WTP Prime Contract maximum. During normal operation, the solids content of PWD-VSL-00033 is expected to be well below the anticipated maximum.

The wear of the PJM nozzles can occur from flow for both the discharge and reflood cycles of operation. At least 0.053–inch of additional 316L stainless steel should be provided on the inner surface of the PJM nozzle to accommodate wear due to PJM discharge and suction velocities with solids concentrations of 26.7 wt% for usage of 19 % operation as documented in 24590-WTP-M0C-50-00004.

Conclusion:
The recommended corrosion allowance provides sufficient protection for erosion of the vessel wall. Additional localized protection for the bottom head will accommodate PJM discharge velocities and for the PJM nozzles will accommodate PJM discharge and reflood velocities.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
Not expected to be applicable.

Conclusion:
Not a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

m Galvanic Corrosion
For the environment and the proposed alloys, galvanic corrosion is not believed to be a concern.

Conclusion:
Not a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-M0C-50-00004, Rev D, *Wear Allowance for WTP Waste Slurry Systems*
2. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
3. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
4. CCN 097795, Jenkins, CF. SRTC, teleconference with JR Divine, RPP-WTP, 16 February, 2000.
5. CCN 130172, Divine, JR, 1986, Letter to A J. Dilliberto, *Reports of Experimentation*, Battelle, Pacific Northwest Laboratories, Richland, WA 99352
6. CCN 130173, Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
7. Danielson, MJ & SG Pitman, 2000, *Corrosion Tests of 316L and Hastelloy C-22 in Simulated Tank Waste Solutions*, PNWD-3015 (BNFL-RPT-019, Rev 0), Pacific Northwest Laboratory, Richland WA.
8. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
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PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Ultimate overflow vessel (PWD-VSL-00033)

Facility PTF

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine (Note 3)		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l			9.79E+01	7.25E+01	
Chloride	g/l			4.24E+01	3.14E+01	
Fluoride	g/l			5.08E+01	3.76E+01	
Iron	g/l			1.88E+02	1.27E+02	
Nitrate	g/l			8.83E+02	5.80E+02	
Nitrite	g/l			2.34E+02	1.73E+02	
Phosphate	g/l			1.67E+02	1.23E+02	
Sulfate	g/l			9.00E+01	6.66E+01	
Mercury	g/l			1.31E+00	1.83E+00	
Carbonate	g/l			2.57E+02	1.91E+02	
Undissolved solids	wt%			26.7%	26.5%	Note 6
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 4
Temperature	°F					Note 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-PWD-00001, Rev 1
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: NA
Off Normal Input Stream # (e.g., overflow from other vessels): Note 3
P&ID: 24590-PTF-M6-PWD-P0002, Rev 2
PFD: 24590-PTF-M5-V17T-P0022001, Rev 0
Technical Reports:

Notes:

1. Concentrations less than 1x 10^{-6} g/l do not need to be reported; list values to two significant digits max.
2. T normal operation 59 °F to 77 °F (24590-PTF-MVC-PWD-00029, Rev 0)
3. Receives streams from FRP-VSL-00002ABCD, FEP-VSL-00017AB, FEP-VSL-00005, TLP-VSL-00009, TCP-VSL-00001, HLP-VSL-00022, HLP-VSL-00027AB, HLP-VSL-00028, UFP-VSL-00002, UFP-VSL-00062AB, CXP-VSL-00001, CXP-VSL-00005, CXP-VSL-00026ABC, RDP-VSL-00002, CNP-VSL-00003/4, CNP-DIST-00001, CNP-EVAP-00001, PVP-HEME-00001ABC, PVP-VSL-00001, PWD-VSL-00015/16/43/44, RLD-VSL-00017AB
4. Receives numerous streams, mainly highly basic (pH 13 to 14), with the exception of the RDP and CNP component streams which can be as low as pH 0.2
5. Overflow is diluted to Newtonian fluid with water as soon as normal operation is achieved. Expected minimum dilution ratio 1.5.

Assumptions:

4.9.11 Ultimate Overflow Vessel (PWD-VSL-00033)

Routine Operations

PWD-VSL-00033 is located at the -45 ft level in a pit that allows limited remote access to equipment. It has a batch volume of 15,000 gallons. The vessel is sized to handle the highest overflow rate for 30 minutes and/or match the size of PWD-VSL-00043 since both of these vessels are in the pit of the PT facility.

Vessel PWD-VSL-00033 receives material during normal operations from the following sources:

- Pipe and annulus drains and flushes from waste feed and transfer lines between facilities
- Gravity drains from C5/R5 cells located above elevation 0 ft 0 in.
- All gravity drains from C5/R5 process bulges
- C5 floor drains
- All gravity drains from C5/R5 sample cabinets
- Line flushes from the laboratory drains
- Plant wash from RLD-VSL-00008 via RLD-BRKPT-00004
- C3 overflow and drain headers
- An air in-bleed and forced purge air are provided to dilute hydrogen generated in vessel PWD-VSL-00033. Wash rings are used for vessel washing. RFDs transfer the effluent from PWD-VSL-00033 to PWD-VSL-00044.
- Reverse flow diverters transfer the effluent from vessel PWD-VSL-00033 to PWD-VSL-00044.
- Vessel PWD-VSL-00033 vents to the vessel vent caustic scrubber (PVP-SCB-00002) via the vessel vent header.

Non-Routine Operations that Could Affect Corrosion/Erosion

- Vessel PWD-VSL-00033 initially overflows to PWD-VSL-00043 and ultimately to PWD-SUMP-00040. Ejectors are used to transfer the sump contents to vessel PWD-VSL-00043 or back to PWD-VSL-00033.
- During flooding of the hot cell, vessel PWD-VSL-00033 receives discharge from hot cell east cell floor drain PWD-FD-00006.
- A vessel-emptying ejector is used for non-routine transfers to the plant wash vessel (PWD-VSL-00044) via PWD-BRKPT-00008. This ejector uses process condensate as a motive force instead
- of steam.
- During abnormal operations, vessel PWD-VSL-00033 receives overflow material from the following sources. Most of these sources will enter PWD-VSL-00033 via one of two headers, either the C5 overflow header or the C3 overflow header.
  - Waste feed receipt vessels (FRP-VSL-00002A/B/C/D)
  - Waste feed evaporator feed vessels (FEP-VSL-00017A/B)
  - Waste feed evaporator condensate vessel (FEP-VSL-00005)
  - HLW effluent transfer vessel (PWD-VSL-00043)

PLANT ITEM MATERIAL SELECTION DATA SHEET

- Ultrafiltration feed preparation vessels (UFP-VSL-00001A/B)
- Ultrafiltration feed vessels (UFP-VSL-00002A/B)*
- Ultrafilter permeate collection vessels (UFP-VSL-00062A/B/C)
- Cs IX feed vessel (CXP-VSL-00001)
- Cs IX caustic rinse collection vessel (CXP-VSL-00004)
- Cs IX reagent vessel (CXP-VSL-00005)
- Eluate contingency storage vessel (CNP-VSL-00003)
- Cs evaporator recovered nitric acid vessel (CNP-VSL-00004)
- Acidic/alkaline effluent vessels (PWD-VSL-00015/PWD-VSL-00016)
- Plant wash vessel (PWD-VSL-00044)
- LAW SBS condensate receipt vessels (TLP-VSL-00009A/B)
- Treated LAW concentrate storage vessel (TCP-VSL-00001)
- Treated LAW evaporator condensate vessel (TLP-VSL-00002)
- HLW feed receipt vessel (HLP-VSL-00022)
- HLW lag storage vessels (HLP-VSL-00027A/B)*
- HLW feed blend vessel (HLP-VSL-00028)*
- Spent resin slurry vessels (RDP-VSL-00002A/B/C)
- Vessel vent caustic scrubber (PVP-SCB-00002)
- Vessel vent HEME drain collection vessel (PVP-VSL-00001)
- Alkaline effluent vessels (RLD-VSL-00017A/B)
- PJV drain collection vessel (PJV-VSL-00002)
- Cs IX treated LAW collection vessels (CXP-VSL-00026A/B/C)
- Hot cell east berm floor drain (PWD-FD-00006)
- Waste feed evaporator separator vessels (FEP-SEP-00001A/B) (in case of loss of circulation in the evaporators)

Overflows from non-Newtonian vessels (marked with *) will be diluted with water as soon as normal operation is achieved/recovered. Minimum dilution ratio (water/fluid) of 1.5 is expected.

During abnormal operations, vessel PWD-VSL-00033 could also receive material from PWD-SUMP-00040 via PWD-EJCTR-00062.

Attachment 2
06-ED-034

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-PTF-PCN-ENV-05-025.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. K. Reynolds for

J. F. Henschel
Project Director

5 Apr 06
Date

Quarter Ending June 30, 2006 24590-PTF-PCN-ENV-06-001

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. A. Klein — 4/27/06 Date

Reviewed by ORP Program Office:

R. J. Schepens — 5/31/06 Date

Quarter Ending June 30, 2006

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update Plant Item Material Selection Data Sheets (MSDS) for the Pretreatment Facility for PWD-BRKPT-00015/16 and PWD-VSL-00015/16 currently located in Appendix 8.9 of the Dangerous Waste Permit (DWP).

The following are the major changes to the above mentioned MSDS:

- Update references
- Added specific allowance for corrosion and erosion
- Reformatting of Process Corrosion Data Sheets (formerly Operating Conditions in previous permit version) for PWD-BRKPT-00015 and PWD-BRKPT-00016

These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Appendix 8.9			
Replace:	24590-PTF-N1D-PWD-P0003, Rev. 2	With:	24590-PTF-N1D-PWD-P0003, Rev. 3
Replace:	24590-PTF-N1D-PWD-P0008, Rev. 0	With:	24590-PTF-N1D-PWD-P0008, Rev. 1

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: NA

Enter wording of WAC 173-303-830, Appendix I Modification citation: NA

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: ☒ Yes ☐ No (state reason for denial)	Reviewed by Ecology:
Reason for denial:	S. Dahl 6/15/06 Date

[1] *Class 1 modifications requiring prior Agency approval.*

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10672004

PWD-VSL-00015 & PWD-VSL-00016 (PTF)
Acidic/Alkaline Effluent Vessel

- Design Temperature (°F)(max/min): 237/0
- Design Pressure (psig) (max/min): 15/-10
- Location: incell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

ISSUED BY
RPP-WTP PDC

Offspring items

PWD-VSL-00015–
PWD-VSL-00101 – PWD-VSL-00105
PWD-PJM-00001 – PWD-PJM-00008
PWD-RFD-00101 – PWD-RFD-00105

PWD-VSL-00016–
PWD-VSL-00111 – PWD-VSL-00115
PWD-PJM-00011 – PWD-PJM-00018,
PWD-RFD-00111 - PWD-RFD-00115

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheets

Options Considered:

- Normal operating conditions.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.016 inch general erosion allowance; localized protection will be provided as necessary as discussed in section j)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid operation or ensure a sufficient alkaline heel exists during acid addition.

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

4/18/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 8 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
3	4/18/06	Issued for Permitting Use	DLA	HmK	SWV
2	12/23/04	Issued for Permitting Use	DLA	APR	SWV
1	11/10/04	Issued for Permitting Use	DLA	JRD	APR
0	2/26/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

These vessels receive acidic/alkaline cleaning effluent and solutions from equipment in the CNP, CXP and UFP systems, as well as non-routine transfers from other PWD system vessels.

a General Corrosion
The normal operating temperature is 80 to 100 °F. Periodically, steam can heat incoming streams to 212 °F (with a design temperature of 237 °F). The high temperature is anticipated to be localized and of short duration.

In Hamner's data (1981), 304 (and 304L) lists a corrosion rate in NaOH of less than 20 mpy (500 µm/y) at 77 °F and over 20 mpy at 122 °F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122 °F and 50 % NaOH. Dillon (2000) and Sedriks (1996) both state that the 300 series alloys are acceptable in up to 50 % NaOH at temperatures up to about 122 °F or slightly above. Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212 °F though Sedriks (1996) states the data beyond about 122 °F are low because of the presence of oxidizing agents -- similar to nitrates and nitrites. Danielson & Pitman (2000), based on short term studies, suggest a corrosion rate of about 0.5 mpy for 316L in simulated waste at boiling, >212 °F. Divine's work (1986) with simulated-radwaste evaporators showed that 304L was slightly more resistant to corrosion (<0.2 mpy) than was 316L (<0.6 mpy). Zapp (1998) notes that the Savannah River evaporator vessels, operating at about 300 °F, are made of 304L and have suffered no failures in about 30 years; 304L heat transfer surfaces have failed however after about 10 years.

The amount of fluoride is expected to be small although ultrafilter washing with nitric acid might result in a high acidic fluoride concentration. Wilding and Paige (1976) have shown that in 5 % nitric acid with 1000 ppm fluoride at 290 °F, the corrosion rate of 304L can be as high as 5 mpy. If it is assumed that the corrosion rate is roughly proportional to the fluoride concentration, even at high temperatures, normal conditions will result in low rates -- the unknown is the acid wash conditions. If acid is added from another source, the vessel should either be flushed prior to addition of acid or retain a sufficient alkaline heel.

If the solutions vary between strongly oxidizing (permanganate), alkaline, and acidic, then the conditions are similar to those in nuclear reactor systems during decontamination and enhanced corrosion should be expected.

Conclusion:
304L or 316L will be sufficiently resistant to the waste solution at the expected temperatures with a probable general corrosion rate of less than 1 mpy. Based on the Savannah River experience with Hanford-like waste at higher temperatures, 304L is expected to be satisfactory in hot waste. Rinsing procedure should remove as much waste as possible followed by a water rinse prior to acid cleaning to prevent acid cleaning in the presence of excessive fluoride.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions with 316L more resistant than 304L. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices even with 304L. Dillon and Koch (1995) are of the opinion that fluoride will have little effect. Jenkins (2000) has stated that localized corrosion can occur under the deposits on tubes, probably due to the chlorides. Further, Revie (2000) and Uhlig (1948) note that nitrates inhibit chloride pitting. Wilding and Paige (1976) note that nitric acid inhibits chloride attack though their data are at higher temperatures and concentrations.

The vessels are shown to have substantial concentrations of chlorides and fluorides under normal operation. No indication of how much can be present from ultrafilter washing. At the stated levels of halides and under alkaline conditions, 304L is expected to be satisfactory even at 237 °F. If the pH drops below 12, the halides must be removed. Pulse jet mixers provide sufficient agitation to prevent deposits.

Conclusion:
Under normal conditions with agitation, 304L may be acceptable. However, because of non-routine low pH conditions, the more pitting resistant 316L is recommended for conservatism.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not applicable to this system.

PLANT ITEM MATERIAL SELECTION DATA SHEET

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment but also because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140 °F. The "L" grades of both 304 and 316 are also more resistant to cracking than the higher carbon versions. Further, the presence of nitrate is expected to inhibit cracking. If the concentrations are as stated, stress corrosion cracking will be minimized. Because of the high chloride concentrations, the likelihood of residual halides is high. Therefore a minimum of 316L is recommended

Conclusion:
With the normal operating environment, 316L stainless steel is expected to be acceptable.

e Crevice Corrosion
The pitting discussion covers this area.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating temperatures are slightly high for microbial growth but, additionally, the location of the system in the process suggests little chance of the introduction of microbes. Further, the alternation between acidic and alkaline conditions is not conducive to their growth.

Conclusion:
MIC is not expected to be a problem.

h Fatigue/Corrosion Fatigue
At the operating pH, corrosion fatigue is not expected to be a problem in a proper designed vessel.

Conclusions
Not considered to be a problem.

i Vapor Phase Corrosion
The vapor phase portion of the vessel will be spattered with solution. The presence of wash rings within the vessels will allow this area to be rinsed.

Conclusion:
Not considered to be a problem.

j Erosion
Based on past experiments by Smith & Elmore (1992), the solids are soft and erosion is not expected to be a concern for the vessel wall. Based on 24590-WTP-RPT-M-04-0008, a general erosion allowance of 0.016 inch is adequate for components with maximum solids content up to 27.3 wt%. Additional 316L stainless steel should be provided as localized protection for the applicable portions of the bottom head to accommodate PJM discharge velocities of up to 12 m/s with solids concentrations of 2.0 wt% for a usage of 65 % (PWD-VSL-00015) or 54 % (PWD-VSL-00016) operation as documented in 24590-WTP-M0E-50-00003. PWD-VSL-00015 requires at least 0.093-inch additional protection and PWD-VSL-00016 requires at least 0.077 inch additional protection. The 2.0 wt% is considered to be conservative and is based on the WTP Prime Contract maximum. During normal operation, the solids content of the PWD-VSL-00015/16 vessels is expected to be well below the anticipated maximum.

PLANT ITEM MATERIAL SELECTION DATA SHEET

The wear of the PJM nozzles can occur from flow for both the discharge and reflood cycles of operation. At least 0.065 inch, for PWD-VSL-00015, and 0.054 inch, for PWD-VSL-00016, of additional 316L stainless steel should be provided on the inner surface of the PJM nozzle to accommodate wear due to PJM discharge and suction velocities with solids concentrations of 2.0 wt% for 65 % (PWD-VSL-00015) or 54 % (PWD-VSL-00016) operation as documented in 24590-WTP-M0E-50-00003.

Conclusion:
The recommended corrosion allowance provides sufficient protection for erosion of the vessel wall. Additional localized protection for the bottom head will accommodate PJM discharge velocities and for the PJM nozzles will accommodate PJM discharge and reflood velocities.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
Fretting/wear is not anticipated due to the lack of moving parts.

Conclusion:
Not a concern.

m Galvanic Corrosion
In the proposed environment and with the lack of dissimilar alloys, there are no potential differences. Therefore, no galvanic corrosion is expected.

Conclusion:
Not a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 2 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 2 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

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2. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
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3. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
4. Phull, HS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, Fl., March 26-31, 2000, NACE International, Houston TX 77218.
5. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Acidic/alkaline effluent vessels (PWD-VSL-00015,16)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	2.02E+01	1.15E+01			
Chloride	g/l	4.28E+00	4.74E+00			
Fluoride	g/l	4.75E+00	5.32E+00			
Iron	g/l	7.14E+00	6.41E+00			
Nitrate	g/l	1.23E+02	1.23E+02			
Nitrite	g/l	2.20E+01	2.45E+01			
Phosphate	g/l	1.82E+01	1.78E+01			
Sulfate	g/l	8.54E+00	9.50E+00			
Mercury	g/l	7.79E-02	7.84E-02			
Carbonate	g/l	5.66E+01	5.46E+01			
Undissolved solids	wt%	1.3%	1.4%			
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2
						Note 4

List of Organic Species:

References

System Description: 24590-PTF-3YD-PWD-00001, Rev 1
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: PWD01, UFP27, UFP28, UFP32
Off Normal Input Stream # (e.g., overflow from other vessels): See section 4.9.9, Non-routine Operations
P&ID: 24590-PTF-M6-PWD-P0003, Rev 0
PFD: 24590-PTF-M5-V17T-P0022001 Rev. 0
Technical Reports:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. T normal operation 80 °F to 100 °F (24590-PTF-MVC-PWD-00031, Rev 0)
3. pH 14 but could receive 2M nitric acid (pH ~0.3) from UF cleaning, on non-routine basis.
4. 19M NaOH can be added to these vessels.

Assumptions:

4.9.9 Acidic/Alkaline Effluent Vessel (PWD-VSL-00015)

Routine Operations

The vessel is sized to accommodate one wash/cleaning cycle from ultrafiltration with allowances for the other small streams that are received along with enough space to neutralize material.

During normal operations, vessel PWD-VSL-00015 receives acidic/alkaline effluent from the following sources:

- Alkaline cleaning effluent via breakpot PWD-BRKPT-00015 from ultrafiltration feed vessels (UFP-VSL-00002A/B)
- Caustic rinse from cesium ion exchange columns (CXP-IXC-00001, CXP-IXC-00002, CXP-IXC-00003, and CXP-IXC-00004)
- Process condensate from cesium nitric acid recovery (CNP-HX-00002, 3, and 4)
- Nitric acid, demineralized water, and sodium hydroxide drains from reagent bulge UFP-BULGE-00001

Non-Routine Operations that Could Affect Corrosion/Erosion

During non-routine operations, vessel PWD-VSL-00015 receives acidic/alkaline effluent from the following sources:

- Caustic rinse from cesium ion exchange via caustic rinse collection tank (CXP-VSL-00004)
- Acidic cleaning effluent via breakpot PWD-BRKPT-00015 from ultrafiltration feed vessels (UFP-VSL-00002A/B)
- Caustic rinses from solids washing/leaching (UFP-VSL-00062A/B/C)
- During abnormal operations, vessel PWD-VSL-00015 receives effluent from the following source:
- Overflow from PWD-VSL-00016
- An air in-bleed is provided to dilute hydrogen generated in vessel PWD-VSL-00015. The level and temperature in vessel PWD-VSL-00015, as well as the temperature in the acidic/alkaline effluent breakpot, are monitored in the main control room. Pulse jet mixers are used to provide a uniform mixture during neutralization within vessel PWD-VSL-00015. An RFD supplies a representative sample of the vessel contents, which will be analyzed for pH in the laboratory. Excess acidic effluent is neutralized with 19 M sodium hydroxide supplied from a reagent header. Wash rings are used for vessel and breakpot washing. A vessel-emptying ejector is used for non-routine transfers to the plant wash vessel (PWD-VSL-00044).
- An RFD supplies a representative sample of the contents of vessel PWD-VSL-00015 for analysis. If the pH is confirmed to be 12 or above, RFDs transfer the high- active effluent from vessel PWD-VSL-00015 to the waste feed evaporator feed vessels (FEP-VSL-00017A or B) for recycle.
- Vessel PWD-VSL-00015 vents to the vessel vent caustic scrubber (PVP-SCB-00002) via the vessel vent header, overflows to the acidic/alkaline effluent vessel (PWD-VSL-00016), and ultimately overflows to vessel PWD-VSL-00033. Breakpot PWD-BRKPT-00015 vents to scrubber PVP-SCB-00002 via the vessel vent header and overflows to vessel PWD-VSL-00015.

4.9.10 Acidic/Alkaline Effluent Vessel (PWD-VSL-00016)

Routine Operations

The vessel is sized to accommodate one wash/cleaning cycle from ultrafiltration with allowances for the other small streams that are received along with enough space to neutralize material.

During normal operations, vessel PWD-VSL-00016 receives acidic/alkaline effluent from the following sources:

- Alkaline Acidic cleaning effluent via breakpot PWD-BRKPT-00016 from ultrafiltration feed vessels (UFP-VSL-00002A/B)
- Caustic leach solutions (UFP-VSL-00062A/B/C)
- Ultrafiltration solides wash (UFP-VSL-00062A/B/C)
- Nitric acid, demineralized water, and sodium hydroxide drains from reagent bulge UFP-BULGE-00002

Non-Routine Operations that Could Affect Corrosion/Erosion

- During non-routine operations, vessel PWD-VSL-00016 receives acidic/alkaline effluent from the following sources:
  - Caustic rinse from cesium ion exchange via caustic rinse collection tank (CXP-VSL-00004)
  - Caustic rinse from cesium ion exchange columns (CXP-IX-00001/2/3/4).
  - Process condensate from cesium nitric acid recovery (CNP-HX-00002, 3 and 4).
  - Alkline cleaning effluent via breakpot PWD-BRKPT-00016 from Ultrafiltration Feed Vessels (UFP-VSL-00002A/B).
  - Plant wash from PWD-VSL-00044.
  - Overflow from PWD-VSL-00015

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10672005

PWD-BRKPT-00015 & PWD-BRKPT-00016 (PTF)

ISSUED BY
RPP-WTP PDC

Acidic/Alkaline Effluent Breakpots

- Design Temperature (°F)(max/min): 368/40
- Design Pressure (psig) (internal/external): 15/FV
- Location: incell

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Options Considered:

- Breakpot will transfer acidic wash.
- Breakpot will transfer alkaline wash.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid or water.

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
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REGISTERED
PROFESSIONAL ENGINEER

4/18/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 7 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	4/18/06	Issued for Permitting Use		HMK	AMVail
0	2/17/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

PWD-BRKPT-00015 routinely receives alkaline cleaning effluent from UFP-VSL-00002A/B and non-routinely may receive acidic cleaning effluent from UFP-VSL-00002A/B. PWD-BRKPT-00016 routinely receives acidic cleaning effluent from UFP-VSL-00002A/B and non-routinely may receive alkaline cleaning effluent from UFP-VSL-00002A/B or plant wash from PWD-VSL-00044.

a General Corrosion
Hamner's data (1981), 304 (and 304L) lists a corrosion rate in NaOH of less than 20 mpy (500 μm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Dillon (2000) and Sedriks (1996) both state that the 300 series are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Divine's work (1986) with simulated-radwaste evaporators, six months at 140°F, showed 304L was slightly more resistant to corrosion (<0.2 mpy) than was 316L (<0.6 mpy). Zapp (1998) notes that the Savannah River evaporator vessels, operating at about 300°F, are made of 304L and have suffered no failures in about 30 years; 304L heat transfer surfaces have failed however after about 10 years.

Because the solution is expected to be ≤2M HNO_3, 304L stainless steel is an excellent choice for the material of construction. Corrosion rates of ≤1 mpy are expected.

Conclusion:
At the stated operating conditions, 304L is expected to be sufficiently resistant with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
The vessels are shown to have no chlorides or fluorides under normal operation. Under the stated no-halide conditions, 304L is expected to be satisfactory. It is assumed, however, that the fluids will not be stagnant nor will there be deposits.

Conclusion
At these temperatures and concentrations, pitting is not anticipated and 304L is acceptable.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
If the vessel is halide free, 304L will be satisfactory.

Conclusion:
The use of 304L is expected to be acceptable for chloride free conditions.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating temperatures are generally acceptable for MIC but the location of the system in the process suggests little chance of the introduction of microbes.

Conclusion:
MIC is not expected to be a problem.

PLANT ITEM MATERIAL SELECTION DATA SHEET

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a problem.

Conclusions
Not expected to be a concern.

i Vapor Phase Corrosion
Not considered to be a concern.

Conclusion:
Not a problem.

j Erosion
Velocities are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not considered to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. CCN 130172, Divine, JR, 1986, Letter to A.J. Diliberto, *Reports of Experimentation*, Battelle, Pacific Northwest Laboratories, Richland, WA 99352
4. CCN 130173, Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
5. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
6. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
7. Zapp, PE, 1998, *Preliminary Assessment of Evaporator Materials of Construction*, BNF—003-98-0029, Rev 0, Westinghouse Savannah River Co., Inc for BNFL Inc.

Bibliography:

1. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
2. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
3. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Acidic/Alkaline effluent breakpot (PWD-BRKPT-00015)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l					
Chloride	g/l					
Fluoride	g/l					
Iron	g/l					
Nitrate	g/l					
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l					
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					
Temperature	°F					Note 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-PWD-00001, Rev 1
Mass Balance Document 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: UFP27,28 cleaning effluents (see section 4.9.5, Routine)
Off Normal Input Stream # (e.g., overflow from other vessels): see section 4.9.5, Non-routine
P&ID: 24590-PTF-M6-PWD-P0009, Rev 0
PFD: 24590-PTF-M5-V17T-P0022001, Rev 0
Technical Reports:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Steam is used for transfer. The breakpot is normally empty and at ambient temperature most of the time.

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Acidic/alkaline effluent breakpot (PWD-BRKPT-00016)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l					
Chloride	g/l					
Fluoride	g/l					
Iron	g/l					
Nitrate	g/l					
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l					
Undissolved solids	wt%					
Other (NaMnO4, Pb....)	g/l					
Other	g/l					
pH	N/A					
Temperature	°F					Note 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-PWD-00001, Rev 1
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: See section 4.9.6
Off Normal Input Stream # (e.g., overflow from other vessels): PWD02, cleaning effluent (section 4.9.6)
P&ID: 24590-PTF-M6-PWD-P0003, Rev 0
PFD: 24590-PTF-M5-V17T-P0022001 Rev. 0
Technical Reports:

Notes:

1. Concentrations less than 1x 10^{-1} g/l do not need to be reported; list values to two significant digits max.
2. Steam is used for transfer. The breakpot is normally empty and at ambient temperature most of the time.

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.9.5 Acidic/Alkaline Effluent Breakpot(PWD-BRKPT-00015)

Routine Operations

Receives alkaline cleaning effluent from UFP-VSL-00002A/B. This breakpot serves as a moisture separator for ejected plant wash from PT vessels. The breakpot does not accumulate any fluid.

Non-Routine Operations that Could Affect Corrosion/Erosion

Receives acidic cleaning effluent from UFP-VSL-00002A/B.

4.9.6 Acidic /Alkaline Effluent Breakpot (PWD-BRKPT-00016)

Routine Operations

Receives acidic cleaning effluent from UFP-VSL-00002A/B.
This breakpot serves as a moisture separator for ejected plant wash from PT vessels. The breakpot does not accumulate any fluid.

Non-Routine Operations that Could Affect Corrosion/Erosion

Receives alkaline cleaning effluent from UFP-VSL-00002A/B. Receives plant wash from PWD-VSL-00044.

Attachment 2
06-ED-045

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification 24590-PTF-PCN-ENV-06-001.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

5/10/06
Date

Quarter Ending 6/30/2006

24590-LAW-PCN-ENV-06-005

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

Denis Klein 6/27/06

D. A. Klein Date

Reviewed by ORP Program Office:

R J Schepens 6/8/06

R. J. Schepens Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update the LAW Plant Item Material Selection Data Sheets (MSDSs) for LOP-SCB-00001 and LOP-SCB-00002 LAW Melter 1 and Melter 2 Submerged Bed Scrubbers (SBS) and LOP-VSL-00001 and LOP-VSL-00002 LAW Melter 1 and Melter 2 SBS Condensate Vessels currently in Appendix 9.9 in the Dangerous Waste Permit (DWP).

Changes to the MSDSs (24590-LAW-N1D-LOP-P0001 and 24590-LAW-N1D-LOP-P0002) include:

- Parsing the corrosion allowance into the corrosion and erosion elements
- Adding information on erosion as well as inadvertent nitric acid addition
- Adding references to the text, references, and bibliography sections
- Replacing the Operating Conditions sheet with the Process Corrosion Data Sheet (page 5) and description from WTP Process Corrosion Data Document (pages 6 & 7)

The specific changes are identified on the documents. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following MSDSs in the DWP:

Appendix 9.9			
Replace:	24590-LAW-N1D-LOP-P0001, Rev. 0	With:	24590-LAW-N1D-LOP-P0001, Rev. 1
	24590-LAW-N1D-LOP-P0002, Rev. 0		24590-LAW-N1D-LOP-P0002, Rev. 1

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: N/A

Enter wording of WAC 173-303-830, Appendix I Modification citation: N/A

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl 6/22/06 Date

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1] 1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10672006

LOP-SCB-00001 & LOP-SCB-00002 (LAW)
Melter 1 and Melter 2 Submerged Bed Scrubbers (SBS)

- Design Temperature (°F)(max/min): 237/41
- Design Pressure (psig) (max/min): 15/FV
- Location: process cell

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- Normal operation at pH 3 at the normal operating temperature
- Normal operation at pH 8 at the normal operating temperature
- Vessel is at pH 3 and the temperature reaches 167°F due to loss of cooling jacket function

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18		X
6% Mo (N08367/N08926)	7.64		X
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: Hastelloy C-22 or the equivalent; packing is a ceramic

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop lay-up strategy

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STATE OF WASHINGTON
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PROFESSIONAL ENGINEER

4/18/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

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REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	4/18/06	Issued for Permitting Use			
0	1/27/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Offgas from the film cooler at a nominal temperature of 572 °F is directed into the SBS column vessel for cooling and solids removal. A cooling jacket located on the outside of the scrubber vessel maintains the required temperatures. Loss of cooling jacket function could allow the solution temperature to rise as high as 167 °F.

a General Corrosion
Wilding and Paige (1976) have shown that in 5% nitric acid with 1000 ppm fluoride at 290°F, the corrosion rate of 304L can be kept as low as 5 mpy by the use of Al^{+++}. Additionally, Sedriks (1996) has noted with 10% (≈2N) nitric acid and 3,000 ppm fluoride at 158°F, the corrosion rate of 304L is over 4,000 mpy; C-22 has a corrosion rate of about 75 mpy. While the anticipated pH in this case is higher, there are regions in the system where the pH is low or where there could be excess fluoride without the presence of aluminum. Consequently, corrosion resistant alloys such as Hastelloy C-22 will be required.

The dissolution rate of the ceramic components in the proposed environment is unknown. However, data from Clark and Zoitos (1992) suggest Al_2O_3, SiC, and ZrO_2 ceramics will have little reactivity in the proposed solutions. The effect of fluoride and the varying temperatures is unclear but the uniform corrosion rate is expected to be larger.

Conclusion:
Hastelloy C-22 or the equivalent is recommended to protect the regions in the scrubber that are exposed to excessive temperatures and concentrations. A high-fired alumina, silicon carbide (reaction bonded and with no free silicon), or zirconia is expected to be a suitably resistant ceramic for the packing.

b Pitting Corrosion
Chloride is known to cause pitting of stainless steels and related alloys in acid and neutral solutions. Normally the vessel is to operate at 113°F at a pH of 3 to 8. Furthermore, the temperature could rise to about 167°F in the case of loss of cooling jacket function. Data from Phull et al (2000) imply that with these conditions, Hastelloy C-22 or equivalent will be needed as a minimum.

Further, if the vessel were filled with process water and left stagnant, there would be a tendency to pit. The time to initiate would depend on the source of the water, being shorter for filtered river water and longer for DIW. Pitting has been observed in both cases, and is likely because residual chlorides are likely to remain. Pitting is less likely for the higher alloys such as C-22.

Conclusion:
Hastelloy C-22 or equivalent is recommended.

c End Grain Corrosion
End grain corrosion only occurs in concentrated acid conditions.

Conclusion:
Not believed likely in this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, the environment, and because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. For the proposed conditions, Hastelloy C-22 or equivalent is required because of its greater resistance to SCC.

Conclusion:
Because of the normal operating environment as well as that which can occur during off normal conditions, the minimum alloy recommended is Hastelloy C-22.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
It is expected that the heat tint will be removed during normal operation.

Conclusion:
Weld corrosion is not considered a problem for this system.

PLANT ITEM MATERIAL SELECTION DATA SHEET

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are not conducive to microbial growth. The system is downstream of the main entry points of microbes and the air streams are heated to over 500°F.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a concern. The pressures encountered are so low and the strength of the material is so comparatively high that corrosion fatigue is not a problem.

Conclusions
Should not be a concern.

i Vapor Phase Corrosion
The vapor phase portion of the vessel is expected to be contacted with particles of waste from splashing. It is expected the region will be sufficiently washed to prevent solids deposits.

Conclusion:
Vapor phase corrosion is not believed to be of concern.

j Erosion
Velocities within the vessel are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not believed to be of concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No metal/metal contacting surfaces expected.

Conclusion:
Not believed to be of concern.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not believed to be of concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
At this time, the design does not provide for the presence of nitric acid reagent in this system. Additionally, the scrubbers see low pH under normal operating conditions.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. Clark, DE & BK Zoitos (Editors), 1992, *Corrosion of Glass, Ceramics and Ceramic Superconductors*, Noyes Publications, Park Ridge, NJ 07656
4. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
5. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
6. Wilding, MW and BE Paige, 1976, *Survey on Corrosion of Metals and Alloys in Solutions Containing Nitric Acid*, ICP-1107, Idaho National Engineering Laboratory, Idaho Falls, ID

Bibliography:

1. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Berhardsson, S, R Mellstrom, and J Oredsson, 1981, *Properties of Two Highly corrosion Resistant Duplex Stainless Steels*, Paper 124, presented at Corrosion 81, NACE International, Houston, TX 77218
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
5. Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
6. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
7. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
8. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
9. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
10. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) SBS and SBS condensate collection vessels (LOP-VSL-00001, LOP-VSL-00002, LOP-SCB-00001, LOP-SCB-00002)

Facility LAW

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	5.07E-02	5.12E-02			
Chloride	g/l	1.22E+01	1.35E+01			
Fluoride	g/l	2.81E+00	2.88E+00			
Iron	g/l	2.62E-02	2.54E-02			
Nitrate	g/l	5.86E-02	6.60E-02			
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l	9.93E-01	3.45E-02			
Carbonate	g/l					
Undissolved solids	wt%	1.4%	1.3%			
Other (Pb)	g/l	6.11E-03	3.85E-04			
Other	g/l					
pH	N/A					Note 2
Temperature (note 2)	°F					Note 3

List of Organic Species:

References

System Description: 24590-LAW-3YD-LOP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: LOP01, LOP04
Off Normal Input Stream # (e.g., overflow from other vessels):
P&ID: 24590-LAW-M6-LOP-P0001, 24590-LAW-M6-LOP-P0002, Rev 1
PFD: 24590-LAW-M5-V17T-P0007, -P0008, Rev 0
Technical Reports: N/A

Notes:

1. Concentrations less than 1×10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. pH 3 to 8 (CCN 025050)
3. Tmin 41, T nominal 113 °F. If loss of cooling jacket function assume 167 °F (24590-LAW-MVC-LOP-00001, Rev B)

Assumptions:

6.3.1 SBS and SBS Condensate Vessels (LOP-SCB-00001,2 and LOP-VSL-00001,2)

Routine Operations

Offgas from the film cooler flows through the offgas line then enters the SBS column, which is enclosed in the SBS column vessel (LOP-SCB-00001/2) for further cooling and solids removal. Each melter has a dedicated SBS. The SBS is a passive device designed for aqueous scrubbing of entrained radioactive particulate from melter offgas plus cooling and condensation of melter vapor emissions.

The SBS has two offgas inlets, one for the normal operations line and one for the standby line. The inlet pipes run down through the bed to the packing support plate. The bed-retaining walls extend below the support plate, creating a lower skirt to prevent gas from bypassing the packing. A hold-down screen is used to prevent the bed from being carried out by upward flow through the bed. Gas bubbles are formed as the gas passes through holes in the support plate. The bubbles rise through the packed bed and cause the liquid to circulate up through the packing, and hence downward in the annular space outside the packed bed. The packing breaks larger bubbles into smaller ones to increase the gas-to-water contact area and helps increase the particulate removal and heat transfer efficiencies.

The scrubbed offgas discharges through the top of the SBS. The liquid circulation helps to prevent buildup of captured material in the bed by constantly washing the material away. A cooling jacket located on the outside of the scrubber vessel and cooling coils located inside the vessel maintain the scrubbing liquid at required temperatures.

As the offgas cools, water vapor condenses and increases the liquid inventory. The liquid overflows into the SBS condensate vessel (LOP-VSL-00001/2) located next to the SBS column vessel, thereby maintaining a constant liquid depth in the SBS column vessel. The SBS condensate vessel has a cooling jacket to further cool the condensate. This cooled condensate, when recycled (pumps

LOP-PMP-00001/4) to the SBS column vessel, contributes to the cooling of the SBS condensate and keeps collected solids mobilized for removal. The condensate vessel has the capacity to hold about 2 days of condensate. Venting of this vessel is via the SBS column vessel into the main offgas discharge pipe.

To help remove solids, the recirculated stream is pumped through eight lances that agitate the bottom of the SBS column vessel and consolidate the solids near the pump suction. To suspend the solids accumulated in the SBS condensate vessel, an eductor is used, powered by a side stream from the recirculation line.

Condensate produced and solids captured in the SBS column vessels are removed periodically.

Non-Routine Operations that Could Affect Corrosion/Erosion

- Both the SBS and SBS condensate vessels contain spray nozzles that are used during startup to fill the vessels and for decontamination. If maintenance of the offgas line, SBS, or WESP is required during the lifetime of the melter, a maintenance bypass line is provided from the standby offgas line in the wet process cell to the standby line on the other melter. The other melter must be idled for this to occur since the standby line must be open to the SBS, but none of the treatment steps are bypassed.
- **Solids buildup in SBS bed** - This may cause the offgas to bypass the bed with reduced quenching and decontamination. Higher pressure differential indicates a buildup. Depending on the reduction of function, the maintenance bypass is activated and the SBS is flushed out, the bed is fluidized by increasing offgas flow, or the bed is replaced at the next melter changeout.

PLANT ITEM MATERIAL SELECTION DATA SHEET

- **Chilled water failure in the SBS** - If the chilled water flow to the SBS fails, the scrubbing solution temperature begins to increase. If the chilled water flow is not restored in a reasonable period, the solution temperature rises and liquid begins to evaporate. The equilibrium temperature reached is about 165 °F (74 °C). Demineralized water is added to either the SBS column or the condensate vessel via the wash header to compensate for water evaporated.
- **Solids buildup in SBS** - This results in reduced liquid flow through the bed, with reduced quenching and decontamination. A higher offgas temperature indicates this problem. Depending on the reduction of function, the melter is idled, the maintenance bypass opened, and the SBS isolated and flushed out. If the problem is not severe, the corrective action may be deferred until the next melter changeout.
- **Loss of SBS pump** - Loss of the SBS water purge pump (LOP-PMP-00063A/6A) interrupts the periodic transfer from the SBS column vessel to the SBS condensate collection vessel. Pump LOP-PMP-00003B/6B acts as a backup and periodically pumps accumulated condensate to the SBS condensate collection vessel until the failed pump is replaced. The spare pump in the SBS condensate vessel (LOP-PMP-00002/5) can also be used to transfer liquid from the system to the SBS condensate collection vessel.
- **Loss of SBS condensate vessel pump** - The SBS condensate vessel has two pumps that have the capability of either recirculating condensate to the SBS or pumping it to the SBS condensate collection vessel. If one fails, the other one acts as a backup until the failed pump is replaced.
- **Loss of eductor in the SBS condensate vessel** - If the eductor fails, the melter is idled, the maintenance bypass is activated, and the offgas line is isolated by closing the isolation valve downstream of the WESP. The eductor is then replaced.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10672007

LOP-VSL-00001 & LOP-VSL-00002 (LAW)
Melter 1 & Melter 2 SBS Condensate Vessel

ISSUED BY
RPP-WTP PDC

- Design Temperature (°F)(max/min): 237/40
- Design Pressure (psig) (max/min): 15/FV
- Location: incell

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- Normal operation at pH 3 at stated nominal operating temperature
- The vessel is pH 8 at stated nominal operating temperature
- Vessel is at pH 3 and temperature reaches 167°F due to loss of cooling function
- Vessel is at pH 8 and temperature reaches 167°F due to loss of cooling function

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18		X
6% Mo (N08367/N08926)	7.64		X
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: UNS N06022

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop lay-up strategy

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

4/18/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 8 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	4/18/06	Issued for Permitting Use		HMK	Awail
0	1/29/04	Issued for Permitting Use	DLA	JRD	APR

4/18/06

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Vessels receive liquid overflow from the SBS column vessels. Nominal operating temperature is 113°F with an expected maximum of 167°F.

a General Corrosion
Wilding and Paige (1976) have shown that in 5% nitric acid with 1000 ppm fluoride at 290°F, the corrosion rate of 304L can be kept as low as 5 mpy by the use of Al^{+++}. Additionally, Sedriks (1996) has noted with 10% (≈2N) nitric acid and 3,000 ppm fluoride at 158°F, the corrosion rate of 304L is over 4,000 mpy; C-22 or equivalent has a corrosion rate of about 75 mpy. Because of the possibility of hot, low pH contents with a low Al^{+++}/F^- ratio, an alloy more corrosion resistant than the 300 series stainless steels, such as Hastelloy C-22 or equivalent, will be required. With the expected pH ranging between 3 and 8 and the concentration of chloride, 316L is marginally acceptable.

Conclusion:
316L is marginally acceptable with a 6% Mo alloy or Hastelloy C-22 better. C-22 or the equivalent is recommended to protect the vessel from off-normal conditions.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions. Normally the vessel is to operate at 113 °F at a pH range of 3 to 8. However, the temperature could approach boiling. Data from Phull et al (2000) imply that with these conditions, 6% Mo is marginal and Hastelloy C-22 or equivalent will be needed as a minimum.

Further, if the vessel were filled with process water and left stagnant, there would be a tendency to pit. The time to initiate would depend on the source of the water, being shorter for filtered river water and longer for DIW. Pitting has been observed in both cases, and is likely because residual chlorides are likely to remain. Pitting is less likely for the higher alloys such as Hastelloy C-22 or equivalent.

Conclusion:
Hastelloy C-22 or the equivalent is recommended.

c End Grain Corrosion
End grain corrosion only occurs in high acid conditions.

Conclusion:
Not believed likely in this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, the environment, and also because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. However, with the proposed off-normal conditions where there will be a tendency to concentrate salts, Hastelloy C-22 or equivalent is required.

Conclusion:
Because of the normal operating environment as well as that which can occur during off-normal conditions, the minimum alloy recommended is Hastelloy C-22 or equivalent.

e Crevice Corrosion
See Pitting. The nominal operating temperature is well above the critical crevice corrosion temperature for 316L and marginal for 6% Mo.

Conclusion:
See Pitting

f Corrosion at Welds
Weld corrosion is not considered a problem for C-22. 316L welds corrode significantly faster than the bulk alloy.

Conclusion:
Not a concern with C-22.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are not conducive to microbial growth – the average operating temperature is approximately correct but the pH is too acid.

Conclusion:
MIC is not considered a problem.

PLANT ITEM MATERIAL SELECTION DATA SHEET

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a concern.

Conclusions
Not expected to be a concern.

i Vapor Phase Corrosion
The vapor phase portion of the vessel is expected to be splashed with particles of waste. Hastelloy C-22 is sufficiently resistant. Vapor phase corrosion is not a concern.

Conclusion:
Not expected to be a concern.

j Erosion
Velocities are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No metal/metal contacting surfaces expected.

Conclusion:
Not expected to be a concern.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not expected to be a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
At this time, the design does not provide for the presence of nitric acid reagent in this system. Additionally, the vessels see low pH under normal operating conditions.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
4. Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
5. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
6. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218
7. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
8. Wilding, MW and BE Paige, 1976, *Survey on Corrosion of Metals and Alloys in Solutions Containing Nitric Acid*, ICP-1107, Idaho National Engineering Laboratory, Idaho Falls, ID

Bibliography:

1. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Berhardsson, S, R Mellstrom, and J Oredsson, 1981, *Properties of Two Highly corrosion Resistant Duplex Stainless Steels*, Paper 124, presented at Corrosion 81, NACE International, Houston, TX 77218
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
5. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
6. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
7. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) SBS and SBS condensate collection vessels (LOP-VSL-00001, LOP-VSL-00002, LOP-SCB-00001, LOP-SCB-00002)

Facility LAW

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	6.07E-02	5.12E-02			
Chloride	g/l	1.22E+01	1.35E+01			
Fluoride	g/l	2.61E+00	2.68E+00			
Iron	g/l	2.62E-02	2.54E-02			
Nitrate	g/l	5.85E-02	6.60E-02			
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l	9.93E-01	3.45E-02			
Carbonate	g/l					
Undissolved solids	wt%	1.4%	1.3%			
Other (Pb)	g/l	6.11E-03	3.86E-04			
Other	g/l					
pH	N/A					Note 2
Temperature (note 2)	°F					Note 3

List of Organic Species:

References

System Description: 24590-LAW-3YD-LOP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: LOP01, LOP04
Off Normal Input Stream # (e.g., overflow from other vessels):
P&ID: 24590-LAW-M6-LOP-P0001, 24590-LAW-M6-LOP-P0002, Rev 1
PFD: 24590-LAW-M5-V17T-P0007, -P0008, Rev 0
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-5} g/l do not need to be reported; list values to two significant digits max.
2. pH 3 to 8 (CCN 025050)
3. Tmin 41, T nominal 113 °F. If loss of cooling jacket function assume 167 °F (24590-LAW-MVC-LOP-00001, Rev B)

Assumptions:

6.3.1 SBS and SBS Condensate Vessels (LOP-SCB-00001,2 and LOP-VSL-00001,2)

Routine Operations

Offgas from the film cooler flows through the offgas line then enters the SBS column, which is enclosed in the SBS column vessel (LOP-SCB-00001/2) for further cooling and solids removal. Each melter has a dedicated SBS. The SBS is a passive device designed for aqueous scrubbing of entrained radioactive particulate from melter offgas plus cooling and condensation of melter vapor emissions.

The SBS has two offgas inlets, one for the normal operations line and one for the standby line. The inlet pipes run down through the bed to the packing support plate. The bed-retaining walls extend below the support plate, creating a lower skirt to prevent gas from bypassing the packing. A hold-down screen is used to prevent the bed from being carried out by upward flow through the bed. Gas bubbles are formed as the gas passes through holes in the support plate. The bubbles rise through the packed bed and cause the liquid to circulate up through the packing, and hence downward in the annular space outside the packed bed. The packing breaks larger bubbles into smaller ones to increase the gas-to-water contact area and helps increase the particulate removal and heat transfer efficiencies.

The scrubbed offgas discharges through the top of the SBS. The liquid circulation helps to prevent buildup of captured material in the bed by constantly washing the material away. A cooling jacket located on the outside of the scrubber vessel and cooling coils located inside the vessel maintain the scrubbing liquid at required temperatures.

As the offgas cools, water vapor condenses and increases the liquid inventory. The liquid overflows into the SBS condensate vessel (LOP-VSL-00001/2) located next to the SBS column vessel, thereby maintaining a constant liquid depth in the SBS column vessel. The SBS condensate vessel has a cooling jacket to further cool the condensate. This cooled condensate, when recycled (pumps LOP-PMP-00001/4) to the SBS column vessel, contributes to the cooling of the SBS condensate and keeps collected solids mobilized for removal. The condensate vessel has the capacity to hold about 2 days of condensate. Venting of this vessel is via the SBS column vessel into the main offgas discharge pipe.

To help remove solids, the recirculated stream is pumped through eight lances that agitate the bottom of the SBS column vessel and consolidate the solids near the pump suction. To suspend the solids accumulated in the SBS condensate vessel, an eductor is used, powered by a side stream from the recirculation line.

Condensate produced and solids captured in the SBS column vessels are removed periodically.

Non-Routine Operations that Could Affect Corrosion/Erosion

- Both the SBS and SBS condensate vessels contain spray nozzles that are used during startup to fill the vessels and for decontamination. If maintenance of the offgas line, SBS, or WESP is required during the lifetime of the melter, a maintenance bypass line is provided from the standby offgas line in the wet process cell to the standby line on the other melter. The other melter must be idled for this to occur since the standby line must be open to the SBS, but none of the treatment steps are bypassed.
- **Solids buildup in SBS bed** – This may cause the offgas to bypass the bed with reduced quenching and decontamination. Higher pressure differential indicates a buildup. Depending on the reduction of function, the maintenance bypass is activated and the SBS is flushed out, the bed is fluidized by increasing offgas flow, or the bed is replaced at the next melter changeout.

PLANT ITEM MATERIAL SELECTION DATA SHEET

- **Chilled water failure in the SBS** - If the chilled water flow to the SBS fails, the scrubbing solution temperature begins to increase. If the chilled water flow is not restored in a reasonable period, the solution temperature rises and liquid begins to evaporate. The equilibrium temperature reached is about 165 °F (74 °C). Demineralized water is added to either the SBS column or the condensate vessel via the wash header to compensate for water evaporated.
- **Solids buildup in SBS** - This results in reduced liquid flow through the bed, with reduced quenching and decontamination. A higher offgas temperature indicates this problem. Depending on the reduction of function, the melter is idled, the maintenance bypass opened, and the SBS isolated and flushed out. If the problem is not severe, the corrective action may be deferred until the next melter changeout.
- **Loss of SBS pump** - Loss of the SBS water purge pump (LOP-PMP-00003A/6A) interrupts the periodic transfer from the SBS column vessel to the SBS condensate collection vessel. Pump LOP-PMP-00003B/6B acts as a backup and periodically pumps accumulated condensate to the SBS condensate collection vessel until the failed pump is replaced. The spare pump in the SBS condensate vessel (LOP-PMP-00002/5) can also be used to transfer liquid from the system to the SBS condensate collection vessel.
- **Loss of SBS condensate vessel pump** - The SBS condensate vessel has two pumps that have the capability of either recirculating condensate to the SBS or pumping it to the SBS condensate collection vessel. If one fails, the other one acts as a backup until the failed pump is replaced.
- **Loss of eductor in the SBS condensate vessel** - If the eductor fails, the melter is idled, the maintenance bypass is activated, and the offgas line is isolated by closing the isolation valve downstream of the WESP. The eductor is then replaced.

Attachment 2
06-ESQ-058

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-LAW-PCN-ENV-06-005.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel

J. P. Henschel
Project Director

5/18/06
Date

Quarter Ending 06/30/06 24590-HLW-PCN-ENV-05-009

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
D. A. Klein	4/18/06 Date	R. J. Schepens	5/19/06 Date

Quarter Ending 06/30/06

24590-HLW-PCN-ENV-05-009

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update the Canister Decon Vessel 2 Mechanical Data Sheet 24590-HLW-MVD-HDH-P0012, Rev. 0, currently in Appendix 10.6 in the Dangerous Waste Permit (DWP).

The following are the changes to the above mentioned Mechanical Data Sheet 24590-HLW-MVD-HDH-P0012, Rev. 0:

- Note 5 was added to indicate that an additional code was added for certain components.

This change does not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following in the DWP:

Appendix 10.6			
Replace:	24590-HLW-MVD-HDH-P0012, Rev. 0	With:	24590-HLW-MVD-HDH-P0012, Rev. 1

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: NA

Enter wording of WAC 173-303-830, Appendix I Modification citation: NA

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(d)(ii) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl — 6/27/06 (Date)

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

R10660668

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-HLW-MV-HDH-VSL-00004

Project:	RPP-WTP	P&ID:	24590-HLW-M6-HDH-P20001
Project No:	24590	Process Data Sheet:	24590-HLW-MVD-HDH-00010 /1
Project Site:	Hanford	Vessel Drawing	24590-HLW-MV-HDH-P0006, 24590-HLW-MV-HDH-P0007
Description:	Canister Decon Vessel 2		

Reference Data

ISSUED BY
APP-WTP PDC

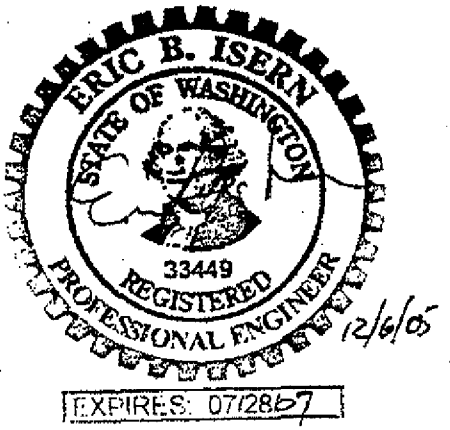
Charge Vessels (Tag Numbers)	Not Required
Pulsejet Mixers / Agitators (Tag Numbers)	Not Required
RFDs/Pumps (Tag Numbers)	Not Required

Design Data

Quality Level	CM		Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category	SC-III		Design Code	Generally to ASME VIII Div 1		
Service/Contents	Nitric Acid, Water, Ceric Nitrate		Code Stamp	No		
Design Specific Gravity	1.25		NB Registration	No		
Maximum Operating Volume gal	212 with Canister in Vessel		Weights (lbs)	Empty	Operating	Test
Total Volume gal	630		Estimated	3400	21,200	21,200
Environmental Qualification /1	N/A		Actual *			

Inside Diameter	inch	30			Wind Design	None	
Length/Height (TL-TL)	inch	220 (OAL)			Snow Design	None	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-FB01-T0001	
Internal Pressure	psig	Atm	15	Note 1	Seismic Base Moment *	ft*lb	
External Pressure	psig	Atm	Atm	Note 1	Postweld Heat Treat	None	
Temperature	°F	149	225	Note 1	Corrosion Allowance	Inch	0.04
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.



This Bound Document Contains a total of 3 Sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
1	12/27/05	Issued for Permitting Use	C. Thompson	B. Makadia / L. Han	C. Slater	J. Jukyk
0	3/24/04	Issued for Permitting Use	K. Brightman	B. Balakrishnan	C. Slater	M. Hoffmann

	MECHANICAL DATA SHEET: VESSEL	PLANT ITEM No. 24590-HLW-MV-HDH-VSL-00004

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Lid Assembly	B-265 2	See Drawing	N/A
Shell	B-265 2	See Drawing	N/A
Bottom Head	B-265 2	See Drawing	N/A
Support	B-265 2	See Drawing	N/A
Shaft	304SS Minimum	N/A	N/A
Bearings	304SS Minimum	N/A	N/A
Pipe	B-861/B-363 Seamless	See Drawing	N/A
Tubing	B-338 2	See Drawing	N/A
Forgings/ Bar stock	B-381 F2 / SB348-2 Note 5 (1)	See Drawing	N/A
Gaskets	Note 3	N/A	N/A
Bolting	A-193 B8 / A-194 8	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Collar
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Internal Finish	Welds Descaled as Laid
		External Finish	Welds Descaled as Laid

Remarks

* To be determined by the vendor.

Note 1: Steam coil design pressure = 180 psig, design temperature = 393°F
Cooling coil design pressure = 119 psig, design temperature = 174°F

Note 2: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 3: Body flange gasket shall be Garlock Helicoflex HN 208A seal configuration with titanium jacket. (1)

Note 4: Contents of this document are Dangerous Waste Permit affecting.

	MECHANICAL DATA SHEET: VESSEL	PLANT ITEM No. 24590-HLW-MV-HDH-VSL-00004

Equipment Cyclic Data Sheet

Component Plant Item Number:	***HDH-VSL-00004***
Component Description	***Canister Decon Vessel 2***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SB-265 2***
Design Life	***40 Years***
Component Function and Life Cycle Description	***A cycle consists of the following:*** • ***A 10,000 lb canister will be loaded into the vessel and the lid will be closed*** • ***The vessel will fill to the overflow with one-molar nitric acid and Cerium +4 solution.*** • ***The heating coil will raise the temperature of the liquid from 68°F to 149°F.*** • ***Heating and cooling coils will maintain the temperature of the liquid at 149°F for 6 hours.*** • ***The nitric acid solution will be drained from the vessel*** • ***The upper and lower spray rings will rinse the canister with nitric acid and demineralized water*** • ***Flow to the upper spray ring will stop, the lid will open, and the canister will be slowly removed from the vessel while the lower spray ring continues to rinse the canister.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***N/A***	***N/A***	***N/A***	
Operating Pressure	psig	***Atm***	***Atm***	***29,200***	
Operating Temperature	°F	***48***	***149***	***29,200***	
Contents Specific Gravity		***1.00***	***1.25***	***29,200***	
Contents Level	inch	***Empty***	***Full***	***29,200***	
Localized Features					
Vessel and Supports		***Empty / Full+Canister***		***29,200***	

Notes

Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Note 5: Bar SB348-2 is used for Spray Nozzles PIN 08D & 09D, Rollers and Roller Pins PIN 18C & 18D, Thermowells PIN 38A & 38C, Stabilizer bars PIN 19B, Lid Hold Downs PIN 28B & 31K. (1)

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No. R10858188

24590-HLW-MV-HDH-VSL-00004

Project:	RPP-WTP	P&ID:	24590-HLW-M6-HDH-20001
Project No:	24590	Process Data Sheet:	24590-HLW-MVD-HDH-00010
Project Site:	Hanford	Vessel Drawing	24590-HLW-MV-HDH-00006, 24590-HLW-MV-HDH-00007
Description:	Canister Decon Vessel 2		

Reference Data

ISSUED BY HPP-WTP PDC

Charge Vessels (Tag Numbers)	Not Required
Pulsejet Mixers / Agitators (Tag Numbers)	Not Required
RFDs/Pumps (Tag Numbers)	Not Required

Design Data

Quality Level		CM		Fabrication Specs	24590-WTP-3PS-MV00-T0001		
Seismic Category		SC-III		Design Code	Generally to ASME VIII Div 1		
Service/Contents		Nitric Acid, Water, Ceric Nitrate		Code Stamp	No		
Design Specific Gravity		1.25		NB Registration	No		
Maximum Operating Volume	gal	212 with Canister in Vessel		Weights (lbs)	Empty	Operating	Test
Total Volume	gal	630		Estimated	3400	21,200	21,200
ENVIRONMENTAL QUALIFICATION: N/A				Actual *			

Inside Diameter	inch	30			Wind Design	None	
Length/Height (TL-TL)	inch	220 (DAL)			Snow Design	None	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-FB01-T0001	
Internal Pressure	psig	Atm	15	Note 1	Seismic Base Moment *	ft*lb	
External Pressure	psig	Atm	Atm	Note 1	Postweld Heat Treat	None	
Temperature	°F	149	225	Note 1	Corrosion Allowance	Inch	0.04
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Lid Assembly	B-265 2	See Drawing	N/A
Shell	B-265 2	See Drawing	N/A
Bottom Head	B-265 2	See Drawing	N/A
Support	B-265 2	See Drawing	N/A
Shaft	304SS Minimum	N/A	N/A
Bearings	304SS Minimum	N/A	N/A
Pipe	B-861/B-363 Seamless	See Drawing	N/A
Tubing	B-338 2	See Drawing	N/A
Forgings/ Bar stock	B-381 F2 / SB348-2 Note 5	See Drawing	N/A
Gaskets	Note 3	N/A	N/A
Bolting	A-193 B8 / A-194 8	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Collar
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Internal Finish	Welds Descaled as Laid
		External Finish	Welds Descaled as Laid

Remarks

* To be determined by the vendor.

Note 1: Steam coil design pressure = 180 psig, design temperature = 393°F
Cooling coil design pressure = 119 psig, design temperature = 174°F

Note 2: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 3: Body flange gasket shall be Garlock-Helicoflex HN 208A seal configuration with titanium jacket. (2)

Note 4: Contents of this document are Dangerous Waste Permit affecting.

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. 24590-HLW-MV-HDH-VSL-00004

Equipment Cyclic Data Sheet

Component Plant Item Number:	HDH-VSL-00004
Component Description	Canister Decon Vessel 2

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	SB-265 2
Design Life	40 Years
Component Function and Life Cycle Description	A cycle consists of the following: • A 10,000 lb canister will be loaded into the vessel and the lid will be closed • The vessel will fill to the overflow with one-molar nitric acid and Cerium +4 solution. • The heating coil will raise the temperature of the liquid from 68°F to 149°F. • Heating and cooling coils will maintain the temperature of the liquid at 149°F for 6 hours. • The nitric acid solution will be drained from the vessel • The upper and lower spray rings will rinse the canister with nitric acid and demineralized water • Flow to the upper spray ring will stop, the lid will open, and the canister will be slowly removed from the vessel while the lower spray ring continues to rinse the canister.

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	N/A	N/A	N/A	
Operating Pressure	psig	Atm	Atm	29,200	
Operating Temperature	°F	68	149	29,200	
Contents Specific Gravity		1.00	1.25	29,200	
Contents Level	inch	Empty	Full	29,200	
Localized Features					
Vessel and Supports		Empty / Full+Canister		29,200	

Notes

***Cycle Increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*

***Note 5:** Bar SB348-2 is used for Spray Nozzles P/N 08D & 09D, Rollers and Roller Pins P/N 18C & 18D, Thermowells P/N 38A & 38C, Stabilizer bars P/N 19B, Lid Hold Downs P/N 28B & 31K.*

Approval

Rev	Description	System Engr	Vessel Engr	Checked	Reviewed	Approved	Date
0	Issue for Purchase	G. Fenton	R. Simmons	T. Galioto C. Slater	D. Yarbrough	M. Hoffmann	10/29/03
1	Issued to Incorporate 24590-WTP-SDDR-PROC-04-01079	R. Tomaszczak	Paul Polani	Steve Crow	Jeff Pullen	M. Hoffmann	1/21/05
2	Revised per Note 3 on sheet 1 of 2.						11/28/05

Quarter Ending 06/30/06 24590-HLW-PCN-ENV-05-011

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Page 2 of 2: Hanford Facility RCRA Permit, Part III, Chapter 10, Attachment 51, Appendix 10.6

Update Mechanical Data Sheet, *Canister Decon Vessel 1*, 24590-HLW-MVD-HDH-P0006, Rev. 1 and Material Selection Data Sheet, *Canister Decon Vessels (HDH-VSL-00002 and 00004)*, 24590-HLW-N1D-HDH-P0003, Rev. 0 in Appendix 10 of the Dangerous Waste Permit.

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
D. A. Klein	4/18/06 Date	R. J. Schepens	5/19/06 Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **Waste Treatment and Immobilization Plant**	Permit Part & Chapter: **Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update the Mechanical Data Sheet for the Canister Decon Vessel 1 (HDH-VSL-00001)[2] currently in Appendix 10.6 of the Dangerous Waste Permit and the Material Selection Data Sheet for Canister Decon Vessels (HDH-VSL-00002 and HDH-VSL-00004) currently in Appendix 10.9 of the Dangerous Waste Permit.

Changes to the documents are summarized below.

Mechanical Data Sheet 24590-HLW-MVD-HDH-P0006, Rev. 1

1. Note 5 was added to indicate that an additional code was added for certain components.

Material Selection Data Sheet 24590-HLW-N1D-HDH-P0003, Rev. 0

1. The recommended Corrosion Allowance was clarified to include the corrosion and erosion allowances.
2. A paragraph was added to the Corrosion Considerations section to describe the decontamination process.
3. Editorial changes were made to Section a General Corrosion.
4. Section j Erosion was revised to include select erosion rates and a reference for the rates.
5. Section p Inadvertent Addition of Nitric Acid was revised to state the vessels normally contain nitric acid and operate at a low pH.
6. The References section was revised to add 4 references.
7. The Bibliography was revised to delete a reference.

These changes do not substantially alter permit conditions or reduce the capacity of the facility to protect human health and the environment.

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1] 1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Quarter Ending 06/30/06

Please replace the following in the DWP

Appendix 10.6			
Replace:	24590-HLW-MVD-HDH-P0006, Rev. 1	With:	24590-HLW-MVD-HDH-P0006, Rev. 2
Appendix 10.9			
Replace:	24590-HLW-N1D-HDH-P0003, Rev. 0	With:	24590-HLW-N1D-HDH-P0003, Rev. 1

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: N/A

Enter wording of WAC 173-303-830, Appendix I Modification citation: N/A

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl 6/27/06 Date

R10660667

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No. 24590-HLW-MV-HDH-VSL-00002

Project:	RPP-WTP	P&ID:	24590-HLW-M6-HDH-P0001
Project No:	24590	Process Data Sheet:	24590-HLW-MTD-HDH-00001 /2\
Project Site:	Hanford	Vessel Drawing	24590-HLW-MV-HDH-P0004, P0005
Description:	Canister Decon Vessel 1		

~~ISSUED BY~~ RPP-WTP PDC

Reference Data

Charge Vessels (Tag Numbers)	Not Required
Pulsejet Mixers / Agitators (Tag Numbers)	Not Required
RFDs/Pumps (Tag Numbers)	Not Required

Design Data

Quality Level		CM		Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-III		Design Code	Generally to ASME VIII Div 1		
Service/Contents		Nitric Acid, Water, Ceric Nitrate		Code Stamp	No		
Design Specific Gravity		1.25		NS Registration	No		
Maximum Operating Volume	gal	212 with Canister in Vessel		Weights (lbs)	Empty	Operating	Test
Total Volume	gal	630		Estimated	3400	21,200	21,200
Environmental Qualification /2\		N/A		Actual *			

Inside Diameter	inch	30			Wind Design	None	
Length/Height (TL-TL)	inch	220 (OAL) /2\			Snow Design	None	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-FB01-T0001	
Internal Pressure	psig	Atm	15	Note 1	Seismic Base Moment *	ft*lb	
External Pressure	psig	Atm	Atm	Note 1	Postweld Heat Treat	None	
Temperature	°F	149	225	Note 1	Corrosion Allowance	inch	0.04
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

ERIC B. ISERN
STATE OF WASHINGTON
33449
REGISTERED
PROFESSIONAL ENGINEER
12/6/05
EXPIRES: 07/28/07

This Bound Document Contains a total of 3 Sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
2	12/27/05	Issued for Permitting Use	G. Thompson	B. Makadia / L. Han	C. Slater	J. Julyk
1	3/24/04	Issued for Permitting Use	K. Brightman	B. Balakrishnan	C. Slater	M. Hofmann
0	10/29/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

	MECHANICAL DATA SHEET: VESSEL	PLANT ITEM No. 24590-HLW-MV-HDH-VSL-00002

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Lid Assembly	B-265 2	See Drawing	N/A
Shell	B-265 2	See Drawing	N/A
Bottom Head	B-265 2	See Drawing	N/A
Support	B-265 2	See Drawing	N/A
Shaft	304SS Minimum	N/A	N/A
Bearings	304SS Minimum	N/A	N/A
Pipe	B-861/B-363 Seamless	See Drawing	N/A
Tubing	B-338 2	See Drawing	N/A
Forgings/ Bar stock	B-381 F2 / SB348-2 Note 5 (2)	See Drawing	N/A
Gaskets	Note 3	N/A	N/A
Bolting	A-193 B8 / A-194 8	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Collar
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Internal Finish	Welds Descaled as Laid
		External Finish	Welds Descaled as Laid

Remarks

* To be determined by the vendor.

Note 1: Steam coil design pressure = 180 psig, design temperature = 393°F
Cooling coil design pressure = 119 psig, design temperature = 174°F

Note 2: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 3: Body flange gasket shall be Garlock Helicoflex HN 208A seal configuration with titanium jacket. (2)

Note 4: Contents of this document are Dangerous Waste Permit affecting.

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. ***24590-HLW-MV-HDH-VSL-00002***

Equipment Cyclic Data Sheet

Component Plant Item Number:	***HDH-VSL-00002***
Component Description	***Melter 1 Canister Decon Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SB-265 2***
Design Life	***40 Years***
Component Function and Life Cycle Description	***A cycle consists of the following:*** • ***A 10,000 lb canister will be loaded into the vessel and the lid will be closed*** • ***The vessel will fill to the overflow with one-molar nitric acid and Cerium +4 solution.*** • ***The heating coil will raise the temperature of the liquid from 68°F to 149°F.*** • ***Heating and cooling coils will maintain the temperature of the liquid at 149°F for 6 hours.*** • ***The nitric acid solution will be drained from the vessel*** • ***The upper and lower spray rings will rinse the canister with nitric acid and demineralized water*** • ***Flow to the upper spray ring will stop, the lid will open, and the canister will be slowly removed from the vessel while the lower spray ring continues to rinse the canister.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***N/A***	***N/A***	***N/A***	
Operating Pressure	psig	***Atm***	***Atm***	***29,200***	
Operating Temperature	°F	***48***	***149***	***29,200***	
Contents Specific Gravity		***1.00***	***1.25***	***29,200***	
Contents Level	inch	***Empty***	***Full***	***29,200***	
Localized Features					
Vessel and Supports		***Empty / Full+Canister***		***29,200***	

Notes

Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Note 5: Bar SB348-2 is used for Spray Nozzles PIN 08D & 09D, Rollers and Roller Pins PIN 18C & 18D, Thermowells PIN 38A & 38C, Stabilizer bars PIN 19B, Lid Hold Downs PIN 28B & 31K. (2)

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No. R10658187

24590-HLW-MV-HDH-VSL-00002

Project:	RPP-WTP	P&ID:	24590-HLW-M6-HDH-00001	ISSUED BY WTP PDC
Project No:	24590	Process Data Sheet:	24590-HLW-MTD-HDH-00001	
Project Site:	Hanford	Vessel Drawing	24590-HLW-MV-HDH-00004, 00005	
Description:	Canister Decon Vessel 1			

Reference Data

Charge Vessels (Tag Numbers)	Not Required
Pulsejet Mixers / Agitators (Tag Numbers)	Not Required
RFDs/Pumps (Tag Numbers)	Not Required

Design Data

Quality Level	CM		Fabrication Specs	24590-WTP-3PS-MV00-T0001		
Seismic Category	SC-III		Design Code	Generally to ASME VIII Div 1		
Service/Contents	Nitric Acid, Water, Ceric Nitrate		Code Stamp	No		
Design Specific Gravity	1.25		NB Registration	No		
Maximum Operating Volume gal	212 with Canister in Vessel		Weights (lbs)	Empty	Operating	Test
Total Volume gal	630		Estimated	3400	21,200	21,200
ENVIRONMENTAL QUALIFICATION: N/A			Actual *			

Inside Diameter	inch	30			Wind Design	None	
Length/Height (TL-TL)	inch	220 (OAL)			Snow Design	None	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-FB01-T0001	
Internal Pressure	psig	Atm	15	Note 1	Seismic Base Moment *	ft*lb	
External Pressure	psig	Atm	Atm	Note 1	Postweld Heat Treat	None	
Temperature	°F	149	225	Note 1	Corrosion Allowance	inch	0.04
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Lid Assembly	B-265 2	See Drawing	N/A
Shell	B-265 2	See Drawing	N/A
Bottom Head	B-265 2	See Drawing	N/A
Support	B-265 2	See Drawing	N/A
Shaft	304SS Minimum	N/A	N/A
Bearings	304SS Minimum	N/A	N/A
Pipe	B-861/B-363 Seamless	See Drawing	N/A
Tubing	B-338 2	See Drawing	N/A
Forgings/ Bar stock	B-381 F2 / SB348-2 Note 5	See Drawing	N/A
Gaskets	Note 3	N/A	N/A
Bolting	A-193 B8 / A-194 8	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Collar
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Internal Finish	Welds Descaled as Laid
		External Finish	Welds Descaled as Laid

Remarks

* To be determined by the vendor.

Note 1: Steam coil design pressure = 180 psig, design temperature = 393°F
Cooling coil design pressure = 119 psig, design temperature = 174°F

Note 2: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 3: Body flange gasket shall be Garlock Helicoflex HN 208A seal configuration with titanium jacket. (3)

Note 4: Contents of this document are Dangerous Waste Permit affecting.

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. *24590-HLW-MV-HDH-VSL-00002*

Equipment Cyclic Data Sheet

Component Plant Item Number:	***HDH-VSL-00002***
Component Description	***Melter 1 Canister Decon Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SB-265 2***
Design Life	***40 Years***
Component Function and Life Cycle Description	***A cycle consists of the following:*** • ***A 10,000 lb canister will be loaded into the vessel and the lid will be closed*** • ***The vessel will fill to the overflow with one-molar nitric acid and Cerium +4 solution.*** • ***The heating coil will raise the temperature of the liquid from 68°F to 149°F.*** • ***Heating and cooling coils will maintain the temperature of the liquid at 149°F for 6 hours.*** • ***The nitric acid solution will be drained from the vessel*** • ***The upper and lower spray rings will rinse the canister with nitric acid and demineralized water*** • ***Flow to the upper spray ring will stop, the lid will open, and the canister will be slowly removed from the vessel while the lower spray ring continues to rinse the canister.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***N/A***	***N/A***	***N/A***	
Operating Pressure	psig	***Atm***	***Atm***	***29,200***	
Operating Temperature	°F	***48***	***149***	***29,200***	
Contents Specific Gravity		***1.00***	***1.25***	***29,200***	
Contents Level	inch	***Empty***	***Full***	***29,200***	
Localized Features					
Vessel and Supports		***Empty / Full+Canister***		***29,200***	

Notes

Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Note 5: Bar SB348-2 is used for Spray Nozzles PIN 08D & 09D, Rollers and Roller Pins PIN 18C & 18D, Thermowells PIN 38A & 38C, Stabilizer bars PIN 19B, Lid Hold Downs PIN 28B & 31K.

Approval

Rev	Description	System Engr	Vessel Engr	Checked	Reviewed	Approved	Date
0	**Issue for Purchase**	D. Chol	R. Simmons	M. Staley C. Slater	M. Wright	M. Hoffmann	6/16/03
1	**Revised as Indicated**	G. Fenton	R. Simmons	T. Galioto C. Slater	D. Yarbrough	M. Hoffmann	10/29/03
2	**Issued to incorporate 24590-WTP-SDDR-PROC-04-01079**	R. Tomeczak	Paul Poloni	Steve Crow	Jeff Pullen	M. Hoffmann	1/21/05
3	**Revised per Note 3 on sheet 1 of 2.**						11/28/05

PLANT ITEM MATERIAL SELECTION DATA SHEET

HDH-VSL-00002 & HDH-VSL-00004 (HLW)
Canister Decon Vessels

ISSUED BY
RPP-WTP PDC

R10592511

- Design Temperature (°F) (max/min): 225/40
- Design Pressure (psig) (internal/external): 15/atm
- Location: out cell

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached sheets 6 and 7

Operating Modes Considered:

- The tank is filled with the acidic decontamination solution at normal operating temperature.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18		X
6% Mo (N08367/N08926)	7.64		X
Alloy 22 (N06022)	11.4		X
Ti-2 (R50400)	10.1	X	

Recommended Material: UNS R50400

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

None identified

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

12/1/05

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 7 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	12/1/05	Issued for Permitting Use		HMK	SMVail
0	3/15/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Canister decontamination vessels hold the filled canister and the ceric nitrate solution during decontamination. Heating and cooling coils are used to maintain the decontamination solution at 149 °F. After the decontamination solution is drained from the vessel, spray rings rinse the canister with nitric aid and demineralized water.

a General Corrosion
Corrosion rates of 304 stainless steel in Ce-IV/nitric acid solutions depend on temperature, nitric acid concentration, and cerium concentration, but are typically about 350 mpy. Thus, the neat solution is good for decontamination of stainless steel but cannot be stored in stainless steel containers.

There are no published data on the dissolution rate of Ti-2 by $Ce(NO_3)_4/HNO_3$ solutions. However, Craig (1989) states that Ti is very resistant to nitric acid except that in the 20-70% concentration range (maximum at 45%), the corrosion rate is relatively high. The use of about 12% acid minimizes this. Corrosion is inhibited by Ti^{+4}, Cr^{+6}, and Fe^{+3} ions as well as by other oxidizing ions. Ce^{+4} is not mentioned. However, it is expected to behave similarly.

Zirconium, according to Craig (1989), can crack in concentrated nitric acid, such as might be present in condensed vapors. Consequently, it is not more appealing than Ti.

West Valley Nuclear Services has not examined their Ti-2 vessel for corrosion. However, they do not believe it has been a problem. The reason Ti was selected was that it was recommended by Battelle-Northwest (PNNL). PNNL recommended it because electrodes used in several earlier studies were Ti and had not visibly degraded.

Conclusion:
Ti appears to be an acceptable alloy although there are no published data, or known unpublished data, on the topic. Based on an examination of the chemical and electrochemical behaviors of Ti alloys and Ce^{+4} solutions, no problem appears to exist.

b Pitting Corrosion
No data are available. Ti is resistant to pitting in chloride solutions although the effects of a highly oxidizing medium, such as Ce^{+4}, with chloride are unknown. However, in this system, there should be no chloride except for that brought over with any ^{137}Cs contamination. According to Meigs (2000), this should amount only to 0.13 Ci of ^{137}Cs, equivalent to about 1.5 mg of Cs and therefore 0.4 mg of chloride. With approximately 800 L of solution, the chloride is expected to be about 0.5 ppb.

Pitting of the canister is not expected to be a concern because of the low chloride concentration, the high nitrate concentration, and the high general corrosion rate.

Conclusion:
Pitting of the canister is not considered a problem as long as the 304L meets specifications. Pitting of the Decontamination Vessel is not a concern.

c End Grain Corrosion
No published data, but not expected to be a concern.

Conclusion:
Not likely in this system.

d Stress Corrosion Cracking
Cracking of the canister is not a concern at the stated conditions because there is too much nitrate, too little chloride, and the uniform corrosion rate is too high. Work by Mackey (2000) showed post-decontamination cracking of the canister is not a concern.

No reports of cracking of Ti in this environment are known.

Conclusion:
Ti-2 is acceptable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting.

f Corrosion at Welds
West Valley reports no problems. Proper welding techniques will be required (H_2, O_2, or N_2 shall not be present in the welding cover gas).

Conclusion:
Weld corrosion is not considered a problem.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are not conducive to microbial growth.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a problem except possibly in the coils and their entry point into the vessel – these lines will be used alternately for heating and cooling the acid and will undergo severe stresses. Design and material will accommodate this.

Conclusions
Proper design and material choice mitigates this concern.

i Vapor Phase Corrosion
West Valley has encountered no problems.

Conclusion:
Not expected to be a concern.

j Erosion
Velocities are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
The canister is expected to be anodic relative to the vessel. The canister is purposely being corroded and so this state is acceptable. It is unknown whether hydrogen will be generated at the Ti surface. Because of the strong oxidizing nature of the solution, hydrogen, if present, is not expected to survive long enough to diffuse into the Ti.

Conclusion:
The hydrogen generation rate at the Ti-2 surface is not expected to be a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Addition of Nitric Acid
Vessels normally contain nitric acid and operate at a low pH.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. Craig, BD, Editor, 1989, *Handbook of Corrosion Data*, ASM International, Metals Park, OH 44073
4. Mackey, DB, Personal communication to JR Divine, 24 March, 2000
5. Meigs, R, Personal communication: to D E Larson, 22 March 2000, amount of soluble Cs on the canister.

Bibliography:

1. Bray, LA, 1988, *Development of a Chemical Process Using Nitric Acid-Cerium (IV) for Decontamination of High-Level Waste Canisters*, Battelle, Pacific Northwest Laboratory, Richland, WA 99352
2. Bray, LA, MR Elmore, KJ Carson, RJ Elovich, GM Richardson, and LD Anderson, 1992, *Decontamination Testing of Radioactive-Contaminated Stainless Steel Coupons Using a Ce(IV) Solution*, Battelle, Pacific Northwest Laboratory, Richland, WA 99352
3. Bray, LA and JR Divine Telecon, March 2000

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Canister decon vessel (HDH-VSL-00002, HDH-VSL-00004)

Facility HLW

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	1.15E-03	1.82E-03			
Chloride	g/l					
Fluoride	g/l					
Iron	g/l	7.38E-01	7.37E-01			
Nitrate	g/l	2.42E+02	2.42E+02			
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l					
Undissolved solids	wt %	5.45E-02	5.45E-02			
Other (Pb)	g/l	2.23E-04	1.89E-04			
Other(Cerium)	g/l	6.81E+01	6.81E+01			
pH	N/A					Note 3
Temperature	°F					Note 2

List of Organic Species:

References

System Description: 24590-HLW-3YD-HDH-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: HDH01, HDH05, HDH03, NAR21A/B
Off Normal Input Stream # (e.g., overflow from other vessels):
P&ID: 24590-HLW-M6-HDH-00001, Rev 1
PFD: 24590-HLW-M5-V17T-00006, Rev 4
Technical Reports:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Tmin 40 °F, Tnorm 149 °F, Tmax 225 °F (24590-HLW-MVD-HDH-00008, Rev 1)
3. Approximately pH 0 to 0.5 (24590-HLW-M4C-HDH-00001, Rev A).

Assumptions

PLANT ITEM MATERIAL SELECTION DATA SHEET

5.2.4 Canister Decontamination Vessel (HDH-VSL-00002, HDH-VSL-00004)

Routine Operations

The canister decontamination vessel is used to hold the filled canister and ceric nitrate solution during the decontamination process. High-pressure steam at 343 °F is supplied to raise the solution temperature from 68 °F to 149 °F and is held at 149 °F for 6 hours during the decontamination process. Heating and cooling coils maintain the temperature of the liquid at 149 °F. The nitric acid solution is drained from the vessel. Spray rings will rinse the canister with nitric acid and demineralized water. The canister is then removed from the vessel.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Attachment 3
06-ED-041

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Forms 24590-HLW-PCN-ENV-05-009 and 24590-HLW-PCN-ENV-05-011.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

W. S. Elkins for JPH — 4/27/06

J. P. Henschel — W. S. ELKINS
Project Director

Date

Quarter Ending June 30, 2006 24590-LAB-PCN-ENV-06-001

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. A. Klein 4/24/06 Date

Reviewed by ORP Program Office:

R. J. Schepens 5/19/06 Date

Quarter Ending June 30, 2006 24590-LAB-PCN-ENV-06-001

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of the modification is to update the Plant Item Material Selection Data Sheet (MSDS) for the Lab Area Sink Drain Collection Vessel (RLD-VSL-00164) currently located in Appendix 11.9 in the Dangerous Waste Permit (DWP).

The following are the main changes to the above mentioned Plant Item Material Selection Data Sheet:

- General corrosion and erosion consideration information has been added
- New references were added

These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following MSDS in the DWP:

Appendix 11.9			
Replace:	24590-LAB-N1D-RLD-P0002, Rev. 0	With:	24590-LAB-N1D-RLD-P0002, Rev. 1

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: NA

Enter wording of WAC 173-303-830, Appendix I Modification citation: NA

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl 6/27/06 Date

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10672006

RLD-VSL-00164 (LAB)
Lab Area Sink Drain Collection Vessel (RLD C3 Vessel)

ISSUED BY RPP-WTP PDC

- Design Temperature (°F)(max/min): 240/-20
- Design Pressure (psig) (max/min): 15/7
- Location: Lab

Operating conditions as stated on attached Material Selection Data Sheet

Options Considered:

- Vessel contains contaminated liquid effluent at normal operating temperatures less than 92°F.
- Mixing will be provided by pumps and eductors. Solid accumulation at bottom of vessel is anticipated. Wash rings are available for flushing.
- Dilute acid is available for cleaning vessel internals.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18		X
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: UNS N08367 or N08926

Recommended Corrosion Allowance: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Develop flushing/rinsing procedure

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

4/18/04

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 5 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	4/18/04	Issued for Permitting Use			
0	3/4/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

a General Corrosion
In this vessel, the normal pH conditions and temperatures are such that 316L stainless steel would be acceptable if no chlorides are present. However, because of the of expected halide concentration, a 6% Mo alloy will be necessary.

Conclusion:
A 6% Mo alloy is recommended.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions. Under the stated conditions, for temperature and pH, a 6% Mo alloy or better is needed.

Conclusion:
Localized corrosion, such as pitting, is common and would be a serious concern at the expected halide levels. Under the stated conditions, 6% Mo is recommended.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not likely in this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140 °F. With the maximum fluid temperature stated at 92 °F and with a large concentration of chlorides, 316L is not recommended. A more resistant alloy such as 6%-Mo alloys or better will be needed.

Conclusion:
A 6% Mo alloy or better is recommended.

e Crevice Corrosion
Non-negligible amounts of solids are expected to accumulate at the bottom of the vessel. With the proposed operating conditions, 304L and 316L are not acceptable. A 6% Mo alloy or better is recommended. In addition, see Pitting.

Conclusion:
A resistant alloy such as a 6% Mo is recommended.

f Corrosion at Welds
Other than pitting or crevice corrosion, corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are suitable for microbial growth. However, liquids received should either be treated or DIW so the possibility of infection is small.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Not expected to be a concern.

Conclusions
Not believed to be a concern.

i Vapor Phase Corrosion
Vapor phase corrosion is not expected to be a concern.

Conclusion:
Not a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

j Erosion
Velocities within the vessel are expected to be small. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not a concern.

o Creep
The temperatures are too low to be a concern for metallic vessels.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-LAB-MVC-RLD-00002, Rev. A, *Material Selection Data Sheet*
2. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158

Bibliography:

1. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
2. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
3. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
4. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
5. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
6. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
7. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

Materials Selection Data

Component (Name/ID) Radioactive Liquid Disposal Vessel (24590-LAB-MV-RLD-VSL-00164)
System RLD

Operations

Chemicals	Unit	Cold Startup	Normal Operation	Standby/Idle	Cleaning	Accident
		Note 1		Note 2		
Aluminum	g/l		1.51E-02			
Bromide	g/l		3.44E-06			
Chloride	g/l		1.88E+00			
Fluoride	g/l		1.62E-01			
Hydroxide	g/l		1.47E-01			
Iron	g/l		1.80E-03			
Nitrate	g/l		1.98E+00			
Nitrite	g/l		6.89E-03			
Phosphate	g/l		2.26E-03			
TOC*	g/l		1.99E-01			
Sulfate	g/l		3.79E-01			
Undissolved solids	g/l		See comments (1)			
Particle size/hardness	µm (##)		NA			
Other ($NaMnO_4$, Hg, etc)	g/l		3.88E-06 (Hg)			
Carbonate	g/l		7.12E+00			
pH	-		6 to 8			
Dose rate -- β/γ (inside)	Rad		See comments (2)			
Temperature	°F		See comments (3)			
Velocity	fps		NA			
Vibration			NA			
Time of exposure	#		NA			

- % of total; ## - use Mho scale

Based on Calc. No. 24590-LAB-MVC-RLD-00002, Rev. A

Notes:
Note 1: Assume same as normal operations minus radionuclides.
Note 2: Same as normal operation.

Comments:
(1) Total Solids accumulation per month at the bottom of the C3 vessel (RLD-VSL-00164) = 0.20 in.
(2) Activity in C3 vessel: 137-Cs: 1.10E-07 Ci/gal and 90-Sr: 2.52E-06 Ci/gal.
(3) The minimum, normal, and maximum fluid temperatures will be approximately 50°F, 78°F, and 92°F, respectively.

☐ Black Cell

* List expected organic species: Potassium hydrogen phthalate, Ammonium hydrogen oxalate, Ethanol, Glacial acetic acid, Chloramine-T

☐ Flushing

Use maximum of 2 significant figures

Attachment 2
06-ED-044

Bechtel National, Inc, Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-LAB-PCN-ENV-06-001.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

5/4/06
Date

Quarter Ending June 30, 2006 24590-PTF-PCN-ENV-06-008

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. A. Klein 6/1/06

D. A. Klein Date

Reviewed by ORP Program Office:

R. J. Schepens 6/6/06

R. J. Schepens Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update PTF Plant Item Material Selection Data Sheets (MSDS) for the Cs Evaporator Primary condenser, CNP-HX-00002, Cs Evaporator Inter-Condenser, CNP-HX-00003, Cs Evaporator Concentrate Reboiler, and Cs Evaporator After-Condenser, CNP-HX-00004 in Appendix 8.9 of the Dangerous Waste Permit (DWP) to incorporate the following revisions:

CNP-HX-00001

- Process Corrosion Data Sheets have been updated to account for revised maximum operating temperatures and revised/added assumptions
- Specifically call out the erosion allowance that is included within the approved corrosion allowance
- Update references
- Bibliographies have been updated

These changes do not alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Please replace the following MSDSs in the DWP:

Appendix 8.9			
Replace:	24590-PTF-N1D-CNP-P0002, Rev. 0	With:	24590-PTF-N1D-CNP-P0002, Rev. 1
Replace:	24590-PTF-N1D-CNP-P0003, Rev. 0	With:	24590-PTF-N1D-CNP-P0003, Rev. 1
Replace:	24590-PTF-N1D-CNP-P0004, Rev. 0	With:	24590-PTF-N1D-CNP-P0004, Rev. 1
Replace:	24590-PTF-N1D-CNP-P0012, Rev. 0	With:	24590-PTF-N1D-CNP-P0012, Rev. 1

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: NA

Enter wording of WAC 173-303-830, Appendix I Modification citation: NA

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

BK Buhl-Mahal 6/27/06

S. Dahl Date

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10682509

CNP-HX-00002 (PTF)
Cs Evaporator Primary Condenser

- Design Temperature (°F)(max/min): Shell side: 250/40; Tube side: 125/40
- Design Pressure (psig) (max/min): Shell side: 50/FV; Tube side: 100/FV
- Location: outcell

ISSUED BY
RPP-WTP PDC

Design temperature and pressure information is considered bounding and to be confirmed by Vendor.

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- Normal operations

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: Shell side and tube side: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- None

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

5/25/04

EXPIRES: 12/07/07

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PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

CNP-HX-00002 is a water-cooled, U-tube unit with condensation taking place on the shell side. Product flow includes excess water from the pre-elution and post-elution rinses from the ion exchange columns.

a General Corrosion
In normal operation, the vessel will contain either treated process water (slightly acidic) or DIW. Based on Uhlig (1948), little uniform corrosion is expected at these conditions. The uniform corrosion rate of the 300 series stainless steels in DIW at temperatures up to about boiling are generally considered small, <1 mpy. Hamner (1981) lists a corrosion rate for 304 (and 304L) in pure water of less than 2 mpy (his smallest unit of measurement).

Conclusion:
304L or 316L are acceptable for this system with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
With the proposed temperatures, 304L is acceptable under the stated no-chloride conditions.

Conclusion:
The data suggest there are no halides to cause pitting, 304L is recommended.

c End Grain Corrosion
Not believed to be applicable to this system.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140 °F. Further, the use of "L" grade stainless reduces the opportunity for sensitization.

Conclusion:
The use of 304L is expected to be acceptable for the stated no-chloride conditions.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not a problem in the proposed environment.

Conclusion:
Weld corrosion is not a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are potentially suitable for MIC. However, MIC is not normally observed in operating systems.

Conclusion:
MIC will not be a problem.

PLANT ITEM MATERIAL SELECTION DATA SHEET

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a concern.

Conclusion:
Not applicable.

i Vapor Phase Corrosion
Not applicable to this system.

Conclusion:
Vapor phase corrosion is not expected.

j Erosion
There are no solids and the velocities are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
None expected.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
The contents of the condenser are essentially water with no reportable halides. The lowering of the pH by the inadvertent addition of nitric acid would be of no concern.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of nitric acid.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation of Stainless Steel Wear Rates in WTP Waste Streams at Low Velocities,*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
5. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
6. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

Bibliography:

1. CCN 130170, Blackburn, LD to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Evaluation of 240-AR Chloride Limit*, August 15, 1991.
2. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
3. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
4. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
5. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
6. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218
7. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Cs evaporator primary, inter- and after- condenser (CNP-HX-00002,3,4)

Facility PTF

In Black Cell? No

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/m^3					
Chloride	g/m^3					
Fluoride	g/m^3					
Iron	g/m^3					
Nitrate	g/m^3					
Nitrite	g/m^3					
Phosphate	g/m^3					
Sulfate	g/m^3					
Mercury	g/m^3					
Carbonate	g/m^3					
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/m^3					
Other	g/m^3					
pH	N/A					Assumption 1
Temperature	°F					Assumption 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-CNP-00001, Rev 0
Mass Balance Document: Chemical Max Calculation 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CNP04
Off Normal Input Stream # (e.g., overflow from other vessels): N/A
P&ID: N/A
PFD: 24590-PTF-M5-V17T-P0014, Rev 1
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-4} g/m^3 do not need to be reported; list values to two significant digits max.

Assumptions:

1. The overheads from the distillation column are expected to be contain primarily water with pH near or at 7.0.
2. Assume same as T normal operation for the evaporator, 122 °F to 212 °F (pressure of operation for last condenser is atmospheric)

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.1.5 Cs Evaporator Primary Condenser (CNP-HX-00002), Cs Evaporator Inter-Condenser (CNP-HX-00003), and Cs Evaporator After-Condenser (CNP-HX-00004)

Routine Operations

The Cs evaporator primary condenser, CNP-HX-00002, is a water-cooled, U-tube unit with condensation taking place on the shell side. The condenser shell incorporates a condensate sump, which contains a weir arrangement to control the flow split between the reflux and the overhead product flows. The overhead product flow includes excess water from the pre-elution and post-elution rinses sent to the Cs evaporator separator vessel from the cesium ion exchange columns.

To reduce the boiling temperature of the liquids in the Cs evaporator separator vessel, the system is run under vacuum. This is achieved using a two-stage steam ejector system. Exhaust vapors from the ejectors are condensed in Cs evaporator inter-condenser, CNP-HX-00003, and after-condenser, CNP-HX-00004, prior to venting to the ventilation system scrubbing equipment. Process condensate from the Cs evaporator primary condenser and Cs evaporator secondary condenser drains to the acidic/alkaline effluent vessels, PWD-VSL-00015 and PWD-VSL-00016, located in the PWD system.

The condensate from the condensers has a minimal amount of HNO_3, making it slightly acidic but not acidic enough to warrant neutralization; thus, it will be considered and referred to as process condensate.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10682510

CNP-HX-00003 (PTF)
Cs Evaporator Inter-Condenser

ISSUED BY
RPP-WTP PDC

- Design Temperature (°F) (max/min): Shell side: 378/40; Tube side: 125/40
- Design pressure (psig) (max/min): Shell side: 100/FV; Tube side: 100/FV
- Location: outcell

Design temperature and pressure information is considered bounding and to be confirmed by Vendor.

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- Normal operation

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: Shell side and tube side: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- None

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5/24/06

EXPIRES: 12/07/07

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PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Exhaust vapors from the Cs evaporator separator vessel are condensed in CNP-HX-00003. A minimal amount of HNO_3 is present in the condensate making it slightly acidic.

a General Corrosion
In normal operation, the vessel will contain either treated process water (slightly acidic) or DIW. Based on Uhlig (1948), little uniform corrosion is expected at these conditions. The uniform corrosion rate of the 300 series stainless steels in DIW at temperatures up to about boiling are generally considered small, <1 mpy. Hamner (1981) lists a corrosion rate for 304 (and 304L) in pure water of less than 2 mpy (his smallest unit of measurement).

Conclusion:
304L or 316L are acceptable for this system with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
With the proposed temperatures, 304L is acceptable under the stated no-chloride conditions.

Conclusion:
The data from the flowsheets suggest there are no halides to cause pitting; therefore, 304L is recommended.

c End Grain Corrosion
Not believed to be applicable to this system.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. Further, the use of "L" grade stainless reduces the opportunity for sensitization.

Conclusion:
The use of 304L is expected to be acceptable for the stated no-chloride conditions.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are suitable for MIC if infected. However, infection is considered unlikely.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a concern.

Conclusions
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

i Vapor Phase Corrosion
Not applicable to this system.

Conclusion:
Vapor phase corrosion is not expected.

j Erosion
Velocities within the condenser are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not believed to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
The contents of the condenser are essentially water with no reportable halides. The lowering of the pH by the inadvertent addition of nitric acid would be of no concern.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of nitric acid.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation of Stainless Steel Wear Rates in WTP Waste Streams at Low Velocities,*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
5. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
6. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

Bibliography:

1. CCN 130170, Blackburn, LD to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Evaluation of 240-AR Chloride Limit*, August 15, 1991.
2. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
3. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
4. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
5. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Cs evaporator primary, inter- and after- condenser (CNP-HX-00002,3,4)

Facility PTF

In Black Cell? No

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/m^3					
Chloride	g/m^3					
Fluoride	g/m^3					
Iron	g/m^3					
Nitrate	g/m^3					
Nitrite	g/m^3					
Phosphate	g/m^3					
Sulfate	g/m^3					
Mercury	g/m^3					
Carbonate	g/m^3					
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/m^3					
Other	g/m^3					
pH	N/A					Assumption 1
Temperature	°F					Assumption 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-CNP-00001, Rev 0
Mass Balance Document, Chemical Max Calculation 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CNP04
Off Normal Input Stream # (e.g., overflow from other vessels): N/A
P&ID: N/A
PFD: 24590-PTF-M5-V17T-P0014, Rev 1
Technical Reports: N/A

Notes:

1. Concentrations less than 1x 10^{-4} g/m^3 do not need to be reported; list values to two significant digits max

Assumptions:

1. The overheads from the distilation column are expected to be contain primarily water with pH near or at 7.0.
2. Assume same as T normal operation for the evaporator, 122 °F to 212 °F (pressure of operation for last condenser is atmospheric)

4.1.5 Cs Evaporator Primary Condenser (CNP-HX-00002), Cs Evaporator Inter-Condenser (CNP-HX-00003), and Cs Evaporator After-Condenser (CNP-HX-00004)

Routine Operations

The Cs evaporator primary condenser, CNP-HX-00002, is a water-cooled, U-tube unit with condensation taking place on the shell side. The condenser shell incorporates a condensate sump, which contains a weir arrangement to control the flow split between the reflux and the overhead product flows. The overhead product flow includes excess water from the pre-elution and post-elution rinses sent to the Cs evaporator separator vessel from the cesium ion exchange columns.

To reduce the boiling temperature of the liquids in the Cs evaporator separator vessel, the system is run under vacuum. This is achieved using a two-stage steam ejector system. Exhaust vapors from the ejectors are condensed in Cs evaporator inter-condenser, CNP-HX-00003, and after-condenser, CNP-HX-00004, prior to venting to the ventilation system scrubbing equipment. Process condensate from the Cs evaporator primary condenser and Cs evaporator secondary condenser drains to the acidic/alkaline effluent vessels, PWD-VSL-00015 and PWD-VSL-00016, located in the PWD system.

The condensate from the condensers has a minimal amount of HNO_3, making it slightly acidic but not acidic enough to warrant neutralization; thus, it will be considered and referred to as process condensate.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10682511

CNP-HX-00001 (PTF)
Cs Evaporator Concentrate Reboiler

ISSUED BY
RPP-WTP PDC

- Design Temperature (°F) (max/min): Shell side: 325/40; Tube side: 250/40
- Design pressure (psig) (max/min): Shell side: 50/FV; Tube side: 50/FV
- Location: hot cell

Design temperature and pressure information is considered bounding and to be confirmed by Vendor.

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- The vessel is at the stated pH range at the normal operating temperature.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X (shell-side)	
6% Mo (N08367/N08926)	7.64		X
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material:

Tube-side components: UNS N06022
Shell-side components (steam): 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: Shell side and tube side; 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- Use DIW as process cooling water.

5/24/06

EXPIRES: 12/07/07

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PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

a General Corrosion
In the proposed pH operating range, little specific information was found for the general/uniform corrosion of stainless steels or other material in the given waste. This lack of data is not critical because the alloys needed for the system typically fail by pitting, crevice corrosion, or cracking. On this basis, a corrosion allowance has little meaning though a nominal value is given.

Even during high chloride conditions, either 304L or 316L is expected to have a sufficiently low uniform corrosion rate.

Conclusion:
Both 304L and 316L are expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
Chloride is notorious for causing pitting in acid and neutral solutions. Dillon (2000) is of the opinion that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. At pH < 12, chloride can be a concern. However, Revie (2000) and Uhlig (1948) both note nitrate inhibits chloride corrosion. Therefore, the high nitrate concentrations in the solution are expected to be beneficial.

Because of the high chloride conditions, and the high design temperature, C-22 or better is required for the tube-side components of the reboiler that will be in contact with the waste. For the shell-side, which is in contact with steam only, 304L will be sufficiently resistant. However, taking into consideration the relatively elevated design temperature on the shell side and the increased possibility of crevice corrosion, 316L is recommended.

Conclusion:
The high chloride conditions are such that an alloy such as C-22 or better will be required for only the components in contact with waste. Otherwise, 316L is suitable.

c End Grain Corrosion
Not believed to be applicable to this system.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part, this is because the amount varies with temperature, metal sensitization, and the environment. It is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. The use of high nickel alloys for the tube-side components (waste) reduces the susceptibility to cracking.

Conclusion:
With the suggested high chloride conditions, C-22 will be needed for the tube-side components.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting.

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

PLANT ITEM MATERIAL SELECTION DATA SHEET

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are suitable for MIC. However, MIC is not normally observed in operating systems.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a concern.

Conclusions
Not applicable.

i Vapor Phase Corrosion
Not applicable to this system.

Conclusion:
Not expected to be a concern.

j Erosion
Velocities within the vessel are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not believed to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Addition of Nitric Acid
Reboiler routinely operates at low pH.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation of Stainless Steel Wear Rates in WTP Waste Streams at Low Velocities,*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. CCN 130173, Dillon, CP (Nickel Development Institute), Personal Communication to J R Divine (ChemMet, Ltd., PC), 3 Feb 2000.
4. CCN 130177, Zapp, PE, 2000, *Material Corrosion and Plate-Out Test of Types 304L and 316L Stainless Steel*, WSRC-TR-2000-00434, Savannah River Site, Aiken, SC
5. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
6. Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
7. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
8. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

Bibliography:

1. CCN 130170, Blackburn, LD to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Evaluation of 240-AR Chloride Limit*, August 15, 1991.
2. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
3. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
4. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
5. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
6. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
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PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Cs evaporator separator vessel (CNP-EVAP-00001)
Cs concentrate reboiler (CNP-HX-00001)

Facility PTF

In Black Cell? Yes (CNP-EVAP-00001 only)

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	1.38E+01	1.29E+01			
Chloride	g/l	5.29E+00	5.89E+00			
Fluoride	g/l	6.28E+00	7.02E+00			
Iron	g/l	1.01E+00	1.05E+00			
Nitrate	g/l	5.78E+02	5.80E+02			
Nitrite	g/l	2.93E+01	3.25E+01			
Phosphate	g/l	2.11E+01	2.30E+01			
Sulfate	g/l	1.12E+01	1.25E+01			
Mercury	g/l	1.72E-02	7.88E-03			
Carbonate	g/l	3.95E+01	4.03E+01			
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 2
Temperature	°F					Note 3

List of Organic Species:

References

System Description: 24590-PTF-3YD-CNP-00001, Rev 0
Mass Balance Document: 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CNP02, CNP03,CNP12, CNP10,CNP20
Off Normal Input Stream # (e.g., overflow from other vessels): N/A
P&ID: N/A
PFD: 24590-PTF-M5-V17T-P0014, Rev 1
Technical Reports: N/A

Notes:

1. Concentrations less than 1×10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. pH approximately 0.3 to 14. Operates primarily at acidic and, NaOH added prior to transfer out. Minimum pH based on 0.5 M nitric acid.
3. Thormal operation 122 °F to 140 °F (24590-PTF-MSC-CNP-00001, Rev 0)

Assumptions:

Breakpot CNP-BRKT-00001 and CNP-VSL-00003 are for non-routine use and are normally empty. These vessels can receive a range of evaporator concentrate.

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.1.4 Cs Evaporator Separator Vessel (CNP-EVAP-00001), Cs Evaporator Concentrate Reboiler (CNP-HX-00001), and Eluate Contingency Storage Vessel (CNP-VSL-00003)

Routine Operations

Eluate from CNP-BRKPT-00002 is gravity-fed through a lute pot, CNP-VSL-00001, into the separator vessel, CNP-EVAP-00001. The Cs evaporator eluate lute pot, CNP-VSL-00001, provides a vacuum seal between CNP-BRKPT-00002 and the Cs evaporator separator vessel, CNP-EVAP-00001. The cesium concentrate is transferred from the Cs evaporator separator vessel using transfer ejectors to send it to vessel HLP-VSL-00028 or HLP-VSL-00027B in the HLP system.

Non-Routine Operations that Could Affect Corrosion/Erosion

If the HLP system cannot accept additional volume at the time of a required transfer, the eluate contingency storage vessel, CNP-VSL-00003, will receive the transfer.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10682508

CNP-HX-00004 (PTF)
Cs Evaporator After-Condenser

ISSUED BY
RPP-WTP PDC

- Design Temperature (°F)(max/min): Shell side: 378/40: Tube side: 125/40
- Design Pressure (psig) (max/min): Shell side: 100/FV; Tube side: 100/FV
- Location: outcell

Design temperature and pressure information is considered bounding and to be confirmed by Vendor.

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on attached Process Corrosion Data Sheet

Operating Modes Considered:

- Normal operation

Materials Considered:

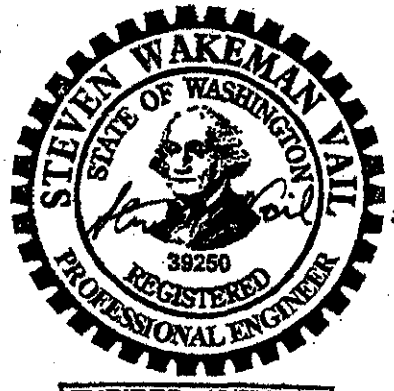
Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: Shell side and tube side: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- None



5/24/06

EXPIRES: 12/07/07

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

This bound document contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	5/24/06	Issued for Permitting Use			
0	9/8/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Exhaust vapors from the Cs evaporator separator vessel are condensed in CNP-HX-00004 prior to venting to the ventilation system scrubbing equipment. The condensate from the condensers has a minimal amount of HNO_3 making it slightly acidic.

a General Corrosion
In normal operation, the vessel will contain either treated process water (slightly acidic) or DIW. Based on Uhlig (1948), little uniform corrosion is expected at these conditions. The uniform corrosion rate of the 300 series stainless steels in DIW at temperatures up to about boiling are generally considered small, <1 mpy. Hamner (1981) lists a corrosion rate for 304 (and 304L) in pure water of less than 2 mpy (his smallest unit of measurement).

Conclusion:
304L or 316L are acceptable for this system with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
With the proposed temperatures, 304L is acceptable under the stated no-chloride conditions.

Conclusion:
The data from the flowsheets suggest there are no halides to cause pitting; 304L is recommended.

c End Grain Corrosion
Not believed to be applicable to this system.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. Further, the use of "L" grade stainless reduces the opportunity for sensitization.

Conclusion:
The use of 304L is expected to be acceptable for the stated no-chloride conditions.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting.

f Corrosion at Welds
Corrosion at welds is not a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are suitable for MIC if infected. However, infection is considered unlikely.

Conclusion:
MIC is not considered a problem.

PLANT ITEM MATERIAL SELECTION DATA SHEET

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a concern.

Conclusions
Not applicable.

i Vapor Phase Corrosion
Not applicable to this system.

Conclusion:
Vapor phase corrosion is not expected.

j Erosion
Velocities within the condenser are expected to be low. Erosion allowance of 0.004 inch for components with low solids content (< 2 wt%) at low velocities is based on 24590-WTP-RPT-M-04-0008.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
The contents of the condenser are essentially water with no reportable halides. The lowering of the pH by the inadvertent addition of nitric acid would be of no concern.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of nitric acid.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation of Stainless Steel Wear Rates in WTP Waste Streams at Low Velocities.*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
5. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
6. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

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2. CCN 130171, Ohl, PC to PG Johnson, Internal Memo, Westinghouse Hanford Co, *Technical Bases for Cl- and pH Limits for Liquid Waste Tank Cars*, MA: PCO:90/01, January 16, 1990.
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5. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

24590-WTP-RPT-PR-04-0001, Rev. B
WTP Process Corrosion Data

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Cs evaporator primary, inter- and after- condenser (CNP-HX-00002,3,4)

Facility PTF

In Black Cell? No

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/m^3					
Chloride	g/m^3					
Fluoride	g/m^3					
Iron	g/m^3					
Nitrate	g/m^3					
Nitrite	g/m^3					
Phosphate	g/m^3					
Sulfate	g/m^3					
Mercury	g/m^3					
Carbonate	g/m^3					
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/m^3					
Other	g/m^3					
pH	N/A					Assumption 1
Temperature	°F					Assumption 2

List of Organic Species:

References

System Description: 24590-PTF-3YD-CNP-00001, Rev 0
Mass Balance Document: Chemical Max Calculation 24590-WTP-M4C-V11T-00005, Rev A
Normal Input Stream #: CNP04
Off Normal Input Stream # (e.g., overflow from other vessels): N/A
P&ID: N/A
PFD: 24590-PTF-M5-V17T-P0014, Rev 1
Technical Reports: N/A

Notes:

1 Concentrations less than 1x 10^{-4} g/m^3 do not need to be reported; list values to two significant digits max.

Assumptions:

1. The overheads from the distillation column are expected to be contain primarily water with pH near or at 7.0.
2. Assume same as T normal operation for the evaporator, 122 °F to 212 °F (pressure of operation for last condenser is atmospheric)

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.1.5 Cs Evaporator Primary Condenser (CNP-HX-00002), Cs Evaporator Inter-Condenser (CNP-HX-00003), and Cs Evaporator After-Condenser (CNP-HX-00004)

Routine Operations

The Cs evaporator primary condenser, CNP-HX-00002, is a water-cooled, U-tube unit with condensation taking place on the shell side. The condenser shell incorporates a condensate sump, which contains a weir arrangement to control the flow split between the reflux and the overhead product flows. The overhead product flow includes excess water from the pre-elution and post-elution rinses sent to the Cs evaporator separator vessel from the cesium ion exchange columns.

To reduce the boiling temperature of the liquids in the Cs evaporator separator vessel, the system is run under vacuum. This is achieved using a two-stage steam ejector system. Exhaust vapors from the ejectors are condensed in Cs evaporator inter-condenser, CNP-HX-00003, and after-condenser, CNP-HX-00004, prior to venting to the ventilation system scrubbing equipment. Process condensate from the Cs evaporator primary condenser and Cs evaporator secondary condenser drains to the acidic/alkaline effluent vessels, PWD-VSL-00015 and PWD-VSL-00016, located in the PWD system.

The condensate from the condensers has a minimal amount of HNO_3, making it slightly acidic but not acidic enough to warrant neutralization; thus, it will be considered and referred to as process condensate.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Attachment 2
06-ESQ-078

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-PTF-PCN-ENV-06-008.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

W. S. Elkins

J. P. Henschel
Project Director

05/06/06
Date

06-ESD-0134

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WA7890008967, ATTACHMENT 18
305-B STORAGE FACILITY

*Complete document located in Sensitive Table