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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

February 23, 2004

Mr. Roy J. Schepens, Manager
Office of River Protection
United States Department of Energy
Richland Operations Office
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

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EDMC

Mr. Keith Klein, Manager
Richland Operations Office
United States Department of Energy
P.O. Box 550, MSIN: A7-50
Richland, Washington 99352

Mr. James Henschel, Project Manager
Bechtel National Inc.
2435 Stevens Center Place, MSIN: H4-02
Richland, Washington 99352

Dear Messrs. Schepens, Klein, and Henschel:

Re: Draft Modification of Waste Treatment and Immobilization Plant (WTP) Dangerous Waste Permit

This letter transmits a proposed permit modification for incorporation of WTP design information into the *Dangerous Waste Portion of the Hanford Facility Resource Conversation and Recovery Act (RCRA) Permit for the Treatment, Storage, and Disposal (TSD) of Dangerous Waste* (Permit), WA7890008967. The proposed draft modification to Part III, Chapter 10, of the Permit includes incorporation of the following design packages into the Permit:

- Pretreatment Facility (PTF)-014 – Tank System for the High-Level Waste (HLW) Lag Storage and Feed Blending (HLP) System
- PTF-017 – Tank System for the Treated Low Activity Waste (LAW) Concentrate Storage Process (TCP) System

- PTF-025 – Tank System Ancillary Equipment for the Ultrafiltration Process (UFP) System
- PTF-026 – Tank System Ancillary Equipment for the HLP System
- PTF-032 – Tank System for the TCP System
- PTF-040 – Tank System for the UFP System
- LAW-006 – Tank System for the LAW Melter Offgas (LOP) System
- LAW-009 – Tank System for the Radioactive Liquid Waste Disposal (RLD) System
- LAW-010 – Tank System for the LAW Concentrate Receipt and Process (LCP) System
- LAW-011 – Tank System for the LAW Melter Feed Process (LFP) System
- LAW-017 – Miscellaneous Treatment Unit Subsystems for the LOP System
- HLW-009 – Tank System Ancillary Equipment for the HLW Primary Offgas Treatment System (HOP) System, Submerged Bed Scrubber Condensate Receiver Vessels
- HLW-010 – Miscellaneous Treatment Unit Subsystems for the HOP Silver Mordenite Units
- HLW- 038 – Double Wall Pipe for the RLD and HLW Condensate Receipt (HCP) Systems
- *Engineering Specifications for Field Applied Special Protective Coating for Secondary Containment Areas* (24590-WTP–3PS–AFPS–TP006, Revision 0).
- *Hanford Tank WTP Post Construction Traffic Analysis Final Project Report* (24590-100-SC-W000-00003-04-01, Revision 00B)

In addition, a draft change is proposed to the Permit to include two previously approved Class 1 and Class 2 modifications into the Permit. Permit changes also are included to add information to tables in Condition III.10.E., F., H., I., J., and K. There are a few minor changes to the Permit to update the tank identification numbers and to correct some minor errors, typos, and oversights.

In accordance with Washington Administrative Code (WAC) 173-303-840(3), public review of the draft permit modification will last 45 days. The public review starts February 23, 2004, and ends April 9, 2004. A public hearing is not currently planned for this modification. If a public hearing is requested during the comment period, the hearing will be held at the Ecology office in Kennewick after a 30-day notice has been published, as required by WAC 173-303-840. Ecology has distributed copies of the draft permit modification to the Hanford Public Information Repositories in Richland, Spokane, Seattle, and Portland for public review.

The draft permit modification package consists of the statement of basis, certified design packages, and updated Permit pages. The revisions proposed in the draft permit page changes are identified with double underlines indicating new text and strikeouts that indicate deleted text. The use of page changes in Part III, Chapter 10, at the issuance of the Permit modification has been discontinued and the entire Chapter 10 will be replaced with each modification. This will alleviate the confusion caused by inserting page changes when Chapter 10 was modified. The information in the design packages will be placed in the Permit appendices in Attachment 51 as indicated in the statement of basis prior to issuing the final permit decision.

In accordance with WAC 173-303-830, only those conditions subject to modification are reopened. All other aspects of the existing Permit remain in effect for the duration of the modification process.

If there are any questions regarding this letter, please contact Ms. Suzanne Dahl at (509) 736-5705.

Sincerely,

for Laurel Cusack

Michael A. Wilson
Program Manager
Nuclear Waste Program

SS:lkd
Enclosure

cc: Nick Ceto, EPA
Cathy Massimino, EPA
John Eschenberg, USDOE-ORP
Joel Hebdon, USDOE
Lori Huffman, USDOE-ORP
Tony McKarns, USDOE
Jim Rasmussen, USDOE-ORP
Bill Taylor, USDOE-ORP
Jim Betts, BNI
Brad Erlandson, BNI
Fred Beraneck, WGI
Phil Peistrup, WGI
Steve Piccolo, WGI
Todd Martin, HAB
Stuart Harris, CTUIR
Pat Sobotta, NPT
Russell Jim, YN
Ken Niles, ODOE

cc/enc: USDOE Administrative Record (9 copies)

WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Statement of Basis

For the Modification of Waste Treatment and Immobilization Plant-Specific Conditions in the Dangerous Waste Portion of the Hanford Resource Conservation and Recovery Act Permit

April 2004
Publication No. 04-05-001

STATEMENT OF BASIS FOR MODIFICATION OF
THE DANGEROUS WASTE PORTION OF THE
RESOURCE CONSERVATION AND RECOVERY ACT PERMIT
FOR THE TREATMENT, STORAGE, AND DISPOSAL
OF DANGEROUS WASTE, PART III, CHAPTER 10 (WA7890008967),
WASTE TREATMENT AND IMMOBILIZATION PLANT

Publication Number 04-05-001

Permittees

United States Department of Energy
(Owner/Operator)
Office of River Protection/Richland Operations Office
P.O. Box 550
Richland, Washington 99352

Bechtel National, Inc.
(Co-Operator)
2535 Stevens Center Place
Richland, Washington 99352

This Statement of Basis has been developed by the Washington State Department of Ecology (Ecology) in accordance with the requirements of Washington Administrative Code (WAC) 173-303-840(2)(f)(iv). Its purpose is to present information on Ecology's tentative decision to modify Part III, Chapter 10, Waste Treatment and Immobilization Plant (WTP) of the Hanford Facility's Dangerous Waste Portion of the Resource Conservation and Recovery Act (RCRA) Permit for the Treatment, Storage, and Disposal (TSD) of Dangerous Waste, hereafter called "the Permit". This modification includes supporting technical information and engineering drawings for construction on the regulated portions of the WTP Pretreatment Building, Low Activity Waste Building, and High Level Waste Building. Additional changes incorporate previously approved Class 1' and Class 2 modifications into the Permit and changes to supporting information. Pursuant to WAC 173-303-830(3), only the conditions that are subject to this modification are reopened for comment.

Ecology has elected to prepare a Statement of Basis pursuant to WAC 173-303-840(2)(f)(iv) rather than a Fact Sheet. A Statement of Basis was prepared for previous major WTP Permit modifications. This process is being followed for permit modifications initiated by Ecology to incorporate similar design package information and other changes to the WTP Permit conditions. The September 25, 2002, Fact Sheet is available from Ecology upon request (Ecology Publication Number 01-05-006).

This Statement of Basis is divided into four sections, which include:

1.0 Hanford Facility Permit Background
2.0 The WTP Permitting Process
3.0 Procedures for Reaching a Final Decision on the Draft Permit
4.0 Proposed Modifications to the Hanford Facility Permit

1.0 Hanford Facility Permit Background

Ecology issued the Permit for the Hanford Facility in 1994. The Permit provides standard and general facility conditions, as well as, unit-specific conditions for the operation, closure, and post-closure of mixed and dangerous waste TSD units at Hanford.

The Permit is normally modified annually to incorporate newly permitted units, reflect Class 1/2/3 Modifications, and include minor changes in grammar, consistency, and presentation. The Washington State

Dangerous Waste Regulations in WAC 173-303-830 describe the types of changes or modifications that may be made to a dangerous waste permit issued by Ecology.

Approximately 50 TSD units at Hanford are operating or closing under RCRA interim or final status standards.

Conditions of the Permit are presented in six parts:

- Standard Conditions (Part I)
- General Facility Conditions (Part II)
- Unit-Specific Conditions for Final Status Operations (Part III)
- Corrective Action for Past Practices (Part IV)
- Unit-Specific Conditions for Units Undergoing Closure (Part V)
- Unit-Specific Conditions for Units in Post-Closure (Part VI)

As noted above, the WTP TSD Unit was added to the Unit-Specific Conditions for Final Status Operations (Part III) portion of the Permit on September 25, 2002. The permit modification was effective on October 25, 2002. The WTP Unit is currently being constructed under final status standards.

2.0 The WTP Permitting Process

The permitting of the WTP Unit is using a phased (or stepped) approach. The first phase was completed on September 25, 2002, with issuance of a final permit for beginning construction of the WTP Unit Low Activity Waste (LAW) and High Level Waste (HLW) buildings and a compliance schedule to provide additional detailed information to Ecology. The compliance schedule addresses submittal of information necessary for construction of the rest of the WTP Unit, and eventual operation. The second phase of permitting is implementation of the compliance schedule, which requires design and other information be submitted before regulated portions of the WTP Unit are constructed. The third phase of permitting is implementation of the last portion of the compliance schedule, which requires updating portions of the Dangerous Waste Permit Application that were incorporated into the final Permit. These portions of the Permit are more administrative in nature, and can not be completed before the design is nearly complete (e.g., Contingency Plan, Closure Plan, Training Plan). It is anticipated that at the completion of these three phases, the WTP Unit will be in compliance with all the relevant requirements of WAC 173-303, and after receiving written permission from Ecology, can begin storage or treatment of dangerous and/or mixed waste. For more details on the WTP permitting process, see the September 25, 2002, Fact Sheet (Ecology Publication Number 01-05-006).

The design submittals (second phase described above) have been structured to allow the Permittees to provide design information in roughly the same order as the buildings are constructed. Therefore, the packages start at the lowest level of the building (i.e., below grade levels) and are submitted for regulated areas of each level of the building before construction begins. This process has been modified for some design packages. If the process system in the design package is located on more than one level in a WTP Building, the design package can address components on more than one building level. This will prevent the confusion caused by one process system description being segmented into multiple design packages.

The Permit breaks out design packages into three general groups by the type of regulated equipment: (1) secondary containment; (2) primary containment (e.g., tanks, miscellaneous units [i.e., evaporators and melters], containment buildings); and (3) other associated, regulated equipment (e.g., ancillary equipment, equipment associated with miscellaneous units). Using tank systems as an example, secondary containment packages include details of the design of secondary containment that must be in place in regulated areas when the floors and walls are built for that level of the building (e.g., floor slope, sump location). Construction of the floors and walls is usually followed by the installation of tanks and other large equipment. Therefore, a tank package on that level will be included in the Permit before installation (e.g., structural details for those tanks or miscellaneous units showing nozzle locations, unit volumes, tank shell

thickness). The last equipment usually installed on a level for a tank system is the ancillary equipment (e.g., piping, pumps, process instrumentation, electrical equipment). Therefore, the ancillary equipment package that provides details for equipment on that level will be included in the Permit before installation (e.g., materials of construction, pipe support details, pump types and their operating limits).

With each WTP Building consisting of multiple levels, the total number of design packages is large. The Permittees estimate about 150 packages will have to be incorporated into the Permit. This could potentially trigger 150 public comment periods. In reality, Ecology intends to group packages, where possible, to reduce the potential number of public comment periods.

The secondary containment, primary containment, and other associated, regulated equipment packages for different levels require repetitive information submittals in each package. Again, using tank systems as an example, the method of installation of secondary containment liners on each level is expected to be the same and most tanks will use the same construction specifications. The Permit allows the Permittees to reference the previously submitted design information. Therefore, some design packages may consist mostly of references to information previously provided.

Ecology is authorized, pursuant to WAC 173-303-830(4)(e), to grant temporary authorizations for the Permittees to start construction on a design package after Ecology approval, but before the draft permit modification process is complete. A Permittee is allowed to request a temporary authorization to implement a modification prior to public notice and comment, pursuant to WAC 173-303-830(4)(e)(ii)(A). To issue a temporary authorization, Ecology must find it meets the criteria as described in WAC 173-303-830(4)(ii)(A) and -830(4)(iii). The term of a temporary authorization is limited to 180 days with the potential for Ecology approval of two terms, with a maximum combined duration of 360 days. The purpose of a temporary authorization is to allow the timely implementation of a permit modification. Construction that takes place under a temporary authorization is at the Permittees' risk because public comment may require the Permittees to modify something that is already built. The submittal schedule developed by the Permittees will allow most design packages to undergo public comment and be incorporated into the Permit prior to construction of those areas.

3.0 Procedures for Reaching a Final Decision on the Draft Permit

This Washington State Hazardous Waste Management Act, Chapter 70.105 Revised Code of Washington (RCW), and regulations promulgated in Chapter 173-303 of the WAC, regulate the management of dangerous waste in Washington. In accordance with WAC 173-303-800, facilities that treat, store, and/or dispose of dangerous waste must obtain a permit for these activities.

A 45-day public comment period for draft permit modifications to Part III, Chapter 10, WTP, of the Permit begins on February 23, 2004, and ends on April 9, 2004. All comments received during the public comment period will be considered and responded to before final decisions are made on the proposed modifications. Regulatory requirements for public notice and involvement (for this permit modification) are described in WAC 173-303-840(3). Comments must be post-marked or received by e-mail no later than December 15, 2003. Comments hand delivered by April 9, 2004, to the address below also will be accepted. Direct all written comments to:

Mr. Steve Skurla
Department of Ecology
1315 W. 4th Avenue
Kennewick, Washington 99336
E-mail address: ssku461@ecy.wa.gov

A public hearing will be held at the Department of Ecology, (address shown above), if requested.

Ecology will consider and respond to all written comments submitted by the deadline, and verbal comments submitted at the public meeting, if held. Ecology will then make a final permit decision, which will become effective 30 days after Ecology provides notice of the decision to the Permittees and all who commented. If

Ecology's decision includes substantial changes to the Permit because of public comment, Ecology will initiate a new public comment period.

All commenters and the Permittees shall receive a copy of the Responsiveness Summary and a notification of the final permit decision. Ecology's final permit decision may be appealed within 30 days after notice of the final permit decision has been provided.

Copies of the Permit for the Hanford Facility, including the proposed, draft permit modifications are available for review at the Hanford Public Information Repositories listed below. [For additional information, call the Hanford Cleanup Hotline toll-free at (800) 321-2008].

HANFORD PUBLIC INFORMATION REPOSITORIES

Portland
Portland State University
Branford Price Miller Library
934 SW Harrison and Park
Portland, Oregon 97207
(503) 725-3690
Attn: Michael Bowman/Jocelyn Kramer
E-mail: bowman@lib.pdx.edu

Richland
Public Reading Room
2770 University Drive
Consolidated Information Center, Rm. 101L
Richland, Washington 99352
(509) 372-7443
Attn: Terri Traub
E-mail: reading_room@pnl.gov

Spokane
Gonzaga University
Foley Center
East 502 Boone
Spokane, Washington 99258-0001
(509) 323-3839
Attn: Connie Scarppelli
E-mail: carter@its.gonzaga.edu

Seattle
University of Washington Suzzallo Library
Government Publication Division
Seattle, Washington 98195
(206) 543-4664
Attn: Eleanor Chase
E-mail: echase@u.washington.edu
Public Service: (206) 543-1937

This Statement of Basis for the proposed draft permit modification is also available on the World Wide Web at http://www.ecy.wa.gov/programs/nwp/.

If special accommodations are needed for public comment, please contact Tim Hill, Department of Ecology, Nuclear Waste Program, at (509) 736-3026 (voice), or (360) 407-6006 (TDD).

4.0 Proposed Permit Modification to Part III, Chapter 10, WTP of the Permit

The proposed Draft Permit Modification to Part III, Chapter 10, WTP of the Permit includes:

- Inclusion of design packages into the Permit (acronyms are defined in 'Notes' in Table 1):
  - PTF-014 – Tank System for the HLP System
  - PTF-017 - Tank System for the TCP System
  - PTF-025 – Tank System Ancillary Equipment for the UFP System
  - PTF-026 – Tank System Ancillary Equipment for the HLP System
  - PTF-032 - Tank System for the TCP System
  - PTF-040 – Tank System for the UFP System
  - LAW-006 – Tank System for the LOP System on the + 3 foot elevation
  - LAW-009 – Tank System for the RLD system on the +3 foot elevation
  - LAW-010 – Tank System for the LCP System on the +3 foot elevation
  - LAW-011 – Tank System for the LFP System on the +3 foot elevation
  - LAW-017 – Miscellaneous Treatment Unit Subsystems for the LOP System on the +3 foot elevation

- HLW-009 – Tank System Ancillary Equipment for the HOP System SBS Condensate Receiver Vessels
- HLW-010 – Miscellaneous Treatment Unit Subsystems for the HOP Silver Mordenite Units on the -21 foot elevation
- HLW- 038 –Double Wall Pipe for the RDL & HCP Systems on the -21 foot elevation
- *Engineering Specifications for Field Applied Special Protective Coating for Secondary Containment Areas* (WTP–3PS–AFPS–TP006).
- *Hanford Tank WTP Post Construction Traffic Analysis Final Project Report* (24590-100-SC-W000-00003-04-01, Revision 00B

- Other changes include:
  - Incorporation of previously approved Class 1' and Class 2 Permit modifications including changes to Chapter 4.0 of Appendix 51
  - Incorporation of new information into the Permit tables.

4.1 Supplemental Design Information

Table 1 lists the design information included in this draft permit modification and where in the Permit the information is proposed to be located. At final issuance of the permit modification, Ecology will specify where each drawing or report resides in the Permit. Paper copies of the page changes to the Permit as a result of this modification will be stored in the Administrative Record. Duplicate sets of drawings will not be issued to the Permittees at issuance of the permit modification in order to minimize the amount of duplicate paperwork, unless drawing changes are made as a result of public comment. The letter issuing the modification to the Permittees will include the current Permit with the modifications on a CD-ROM.

4.2 Other Changes Included in This Modification

As the Permit for the WTP Unit is implemented, Ecology will modify the permit conditions for many reasons including: to clarify text, add new conditions, delete existing conditions, or to correct errors. To communicate the changes in the draft review package, the draft permit modification will include page changes showing all significant draft changes to the Permit. The text to be deleted will be struck-out with a single line and the new text will be double-underlined. Only the text changing in the current modification will have changes highlighted by underlines and strikeouts. At issuance of the next permit modification, clean page changes will be issued to the Permittees and Administrative Record for the previous modification.

Two Class 1' Modifications (as defined in WAC-173-303-830) to interim compliance dates were granted by Ecology. The changes are in Attachment 51, Appendix 1.0 and were necessary to bring the compliance dates in line with the new Tri-Party Agreement Milestone date for operation of the WTP in 2011. Draft page changes are included in this modification package.

The *Engineering Specifications for Field Applied Special Protective Coating for Secondary Containment Areas* (WTP–3PS–AFPS–TP006) was submitted and will be included in Attachment 51, Appendix 7.7.

A traffic analysis report was also submitted in this modification package. The Dangerous Waste Permit Interim Compliance Schedule Item 2 requires submittal of a revised traffic report for incorporation into the Administrative Record. The *Hanford Tank WTP Post Construction Traffic Analysis Final Project Report* (24590-100-SC-W000-00003-04-01, Revision 00B) was submitted to fulfill this requirement. Bechtel National, Inc. and U.S. Department of Energy Certification Statements were submitted as well.

At the time the permit was originally issued, WTP tanks and miscellaneous units were identified using the British Nuclear Fuels Ltd. numbering system. Bechtel National Inc. (BNI) has changed all the identifiers to match the BNI corporate tank numbering system. This permit modification has continued to revise the identifiers to the BNI identification numbers in the tables in the Permit Conditions. This will align the identifiers in the Permit Conditions with the drawings and documents submitted and incorporated in

Appendix 51. The rest the identifiers included in other portions of the Permit will be updated in an upcoming permit modification that will tie into the renewal of the entire Hanford Site dangerous waste permit in 2004.

Additional data will be added to Tables in Sections III.10.E., III.10. F., III.10.H., III.10.I., III.10.J., and III.10.H.,based on information provided in the design packages included in this modification.

One Class 2 Modification (as defined in WAC-173-303-830) will delete from the list of regulated areas the Drum Transfer Tunnel located on the -21 foot level of the High Level Waste Building. The Drum Transfer Tunnel is designed to move non-liquid mixed waste (mainly spent, containerized High Efficiency Particulate Air (HEPA) filters from the HEPA Filter Room on the west side of the High Level Waste Building to the east side of the building for transfer out of the building. The Permittees originally believed open canisters containing waste and/or contaminated failed equipment might be stored in the tunnel for more than 90 days and therefore requested that the tunnel be included in the permit as a containment building unit per WAC 173-303-695. Now, the Permittees have decided to not use the Drum Transfer Tunnel for storage of waste for more than 90 days. Because the tunnel is no longer to be used for storing waste, it would no longer be required to be regulated under WAC 173-303. Ecology has accepted this proposed change, but reminds the Permittees that storing waste in the Drum Transfer Tunnel for more than 90 days will be a violation of the WTP Permit. Draft changes to the table in Chapter III.10.F and Attachment 51, Chapter 4.0 are included in this modification package.

The second Class 2 Modification adds the Pour Tunnels No. 1 and 2 to the regulated units in the -21 foot elevation of the High Level Waste Building. These areas were added as a containment buildings units because they will hold unlidded canisters for cooling prior to transfer to the canister handling cave for lid welding. Ecology approved these modifications on January 24, 2004. As a convenience we are incorporating the changes to permit documents as a result of the Class 2 modification with this modification package. The marked-up page changes are included in this review package but, the Class 2 modifications were subject to a separate public review process and are not considered open for public comment at this time.

Table 1 - Design Packages Submitted by Permittees

PACKAGE PTF-014, Rev 0 - Tank System for the HLP System			
DOCUMENT/ DRAWING NUMBER	**TITLE**	**REPLACES**	**PERMIT LOCATION**
24590-CM-HC4-HXYG-0138-02-10, Rev 00A	IQRPE Independent Assessment Report	N/A	8.11
25490-PTF-M5-V17T-P0007, Rev 0	Process Flow Diagram	N/A	8.1
25490-PTF-M5-V17T-P0008, Rev 0	Process Flow Diagram	N/A	8.1
25490-PTF-PEN-ENV-04-001	Permit Equivalency Notice, "Changes to the PT HLP System Permit Process Flow Diagram 24590-PTF-M5-V17T-P0008 Rev 0"	N/A	8.1
24590-PTF-M6-HLP-P0001, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-HLP-P0002, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-HLP-P0003, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-HLP-P0005, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-HLP-P0006, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-HLP-P0007, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-HLP-P0009, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-HLP-P0010, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-PEN-ENV-04-002	Permit Equivalency Notice, "Changes to the PT HLP System Permit Piping & Instrument Diagram 24590-PTF-M6-HLP-P0001 Rev 1"	N/A	8.2
24590-PTF-PEN-ENV-04-003	Permit Equivalency Notice, "Changes to the PT HLP System Permit Piping & Instrument Diagram 24590-PTF-M6-HLP-P0003 Rev 1"	N/A	8.2
24590-PTF-PEN-ENV-04-004	Permit Equivalency Notice, "Changes to the PT HLP System Permit Piping & Instrument Diagram 24590-PTF-M6-HLP-P0010 Rev 1"	N/A	8.2
24590-PTF-MV-HLP-P0003, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-HLP-P0004, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-HLP-P0005, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-HLP-P0006, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MVD-HLP-P0006, Rev 1	Mechanical Data Sheets	N/A	8.6
24590-PTF-MVD-HLP-P0007, Rev 1	Mechanical Data Sheets	N/A	8.6
24590-PTF-MVD-HLP-P0008, Rev 1	Mechanical Data Sheets	N/A	8.6
24590-PTF-MVD-HLP-P0009, Rev 1	Mechanical Data Sheets	N/A	8.6
24590-PTF-N1D-HLP-P0003, Rev 0	Vessel/Tank Material Selection Data Sheet	N/A	8.9
24590-PTF-N1D-HLP-P0007, Rev 1	Vessel/Tank Material Selection Data Sheet	N/A	8.9
24590-PTF-N1D-HLP-P0010, Rev 1	Vessel/Tank Material Selection Data Sheet	N/A	8.9
24590-PTF-3YD-HLP-00001, Rev 0	HLP System Description for the HLW Lag	N/A	Administrative

	Storage & Feed Blending Process (HLP) System		Record
24590-PTF-3YN-HLP-00001, Rev 0	HLP System Description Notice	N/A	Administrative Record

PACKAGE PTF-017, Rev 0 - Tank System for the TCP System

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-CM-HC4-HXYG-00138-02-04 Rev 00A	IQRPE Independent Assessment Report	N/A	8.11
24590-PTF-M5-V17T-P0006 Rev 0	Process Flow Diagram	N/A	8.1
24590-PTF-M6-TCP-P0001 Rev 0	Piping & Instrumentation Diagram	N/A	8.2
24590-PTF-M6-TCP-P0002 Rev 0	Piping & Instrumentation Diagram	N/A	8.2
24590-PTF-MV-TCP-P0002 Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MVD-TCP-P0002 Rev 1	Mechanical Drawings	N/A	8.6
24590-PTF-NID-TCP-P0001 Rev 0	Vessel/Tank Material Selection Data Sheet	N/A	8.9
24590-PTF-3YN-TCP-00001 Rev 0	System Description Change Notice	N/A	Administrative Record
24590-PTF-3YD-TCP-00001 Rev 0	System Description for the Treated LAW Concentrate Storage Process (TCP)	N/A	Administrative Record

PACKAGE PTF-025, Rev 0 - Tank System Ancillary Equipment for PT Facility UFP System

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-CM-HC4-HXYG-00138-02-06, Rev 00A	IQRPE Independent Assessment Report	N/A	8.11
24590-PTF-NID-UFP-P0001, Rev 0	Material Selection Data Sheets	N/A	8.9
24590-PTF-NID-UFP-P0002, Rev 0	Material Selection Data Sheets	N/A	8.9
24590-PTF-PER-J-02-004, Rev 0	System Logic Description for the UFP System	N/A	8.13

PACKAGE PTF-026, Rev 0, Tank System Ancillary Equipment for PT Facility HLP System

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-CM-HC4-HXYG-00138-02-09, Rev 00A	IQRP Independent Assessment Report	N/A	8.11
24590-WTP-PER-PL-02-001, Rev 3	Piping Material Class Description	24590-WTP-PER-PL-02-001, Rev 2	4.0
24590-PTF-N1D-HLP-P0001, Rev 0	Material Selection Data Sheet	N/A	8.9
24590-PTF-PER-J-02-006, Rev 0	System Logic Description for the HLW Lag Storage & Feed System	N/A	8.13

PACKAGE PTF-032, Rev 0 - Tank System Ancillary Equipment for the TCP System			
24590-CM-HC4-HXYG-00138-02-05, Rev 00A	IQRP Independent Assessment Report	N/A	8.11
24590-PTF-PER-J-012, Rev 0	System Logic Description for the TCP System	N/A	8.13
PACKAGE PTF-040, Rev 0, Tank System for PT Facility UFP System			
24590-CM-HC4-HXYG-00138-01-18, Rev 00A	IQRP Independent Assessment Report	N/A	8.11
24590-PTF-M5-V17T-P0009, Rev 0	Process Flow Diagram	N/A	8.1
24590-PTF-M5-V17T-P0010, Rev 0	Process Flow Diagram	N/A	8.1
24590-PTF-M5-V17T-P0011, Rev 0	Process Flow Diagram	N/A	8.1
24590-PTF-M6-UFP-P0001, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0002, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0003, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0004, Rev 1	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0005, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0006, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0007, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0008, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0009, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0010, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0011, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0013, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0015, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0016, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-M6-UFP-P0017, Rev 0	Piping & Instrumentation Diagrams	N/A	8.2
24590-PTF-MV-UFP-P0001, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-UFP-P0002, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-UFP-P0003, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-UFP-P0004, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-UFP-P0005, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-UFP-P0006, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-MV-UFP-P0007, Rev 0	Mechanical Drawings	N/A	8.6
24590-PTF-3PS-MLFP-TP001, Rev 1	Specifications	N/A	8.7
24590-PTF-MLD-UFP-P0007, Rev 1	Mechanical System Data Sheets	N/A	8.6
24590-PTF-MVD-UFP-P0001, Rev 0	Mechanical System Data Sheets	N/A	8.6
24590-PTF-MVD-UFP-P0002, Rev 0	Mechanical System Data Sheets	N/A	8.6
24590-PTF-MVD-UFP-P0005, Rev 0	Mechanical System Data Sheets	N/A	8.6
24590-PTF-MVD-UFP-P0006, Rev 0	Mechanical System Data Sheets	N/A	8.6
24590-PTF-MVD-UFP-P0007, Rev 0	Mechanical System Data Sheets	N/A	8.6

24590-PTF-MVD-UFP-P0014, Rev 0	Mechanical System Data Sheets	N/A	8.6
24590-PTF-MVD-UFP-P0015, Rev 0	Mechanical System Data Sheets	N/A	8.6
24590-PTF-N1D-UFP-P0003, Rev 0	Vessel/Tank Material Selection Data Sheet	N/A	8.9
24590-PTF-N1D-UFP-P0004, Rev 1	Vessel/Tank Material Selection Data Sheet	N/A	8.9
24590-PTF-N1D-UFP-P0005, Rev 0	Vessel/Tank Material Selection Data Sheet	N/A	8.9
24590-PTF-N1D-UFP-P0008, Rev 0	Vessel/Tank Material Selection Data Sheet	N/A	8.9
24590-PTF-3YN-UFP-00001, Rev 0	UFP System Description Change Notice	N/A	Administrative Record
24590-PTF-3YD-UFP-00001, Rev 0	UFP System Description for the UFP	N/A	Administrative Record

PACKAGE LAW-006, Rev 0 - Tank System for the LOP System at El. +3 Ft

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-CM-HC4-HXYG-00138-01-00019, Rev 00A	IQRPE Independent Assessment Report	N/A	9.11
24590-LAW-M5-V17T-P0007, Rev 0	Process Flow Diagram	N/A	9.1
24590-LAW-M5-V17T-P0008, Rev 0	Process Flow Diagram	N/A	9.1
24590-LAW-M6-LOP-P0001, Rev 0	Piping & Instrumentation Diagrams	N/A	9.2
24590-LAW-M6-LOP-P0002, Rev 0	Piping & Instrumentation Diagrams	N/A	9.2
24590-LAW-MV-LOP-P0001, Rev 0	Mechanical Drawing	N/A	9.6
24590-LAW-MV-LOP-P0002, Rev 0	Mechanical Drawing	N/A	9.6
24590-LAW-MVD-LOP-P0004, Rev 0	Mechanical Data Sheets	N/A	9.6
24590-LAW-MVD-LOP-P0005, Rev 0	Mechanical Data Sheets	N/A	9.6
24590-LAW-N1D-LOP-0002, Rev 0	Plant Item Material Selection Data Sheet	N/A	9.9
24590-LAW-3YD-LOP-00001, Rev 0	System Description for LOP & LVP: LAW Melter Offgas	N/A	Administrative Record

PACKAGE LAW-009, Rev 0 - Tank System for the RLD System at El. +3 Ft

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-CM-HC4-HXYG-00138-02-07 Rev 00A	IQRPE Independent Assessment Reports	N/A	9.11
24590-LAW-M6-RLD-P0001 Rev 1	Piping & Instrument Diagram	N/A	9.2
24590-LAW-MV-RLD-P0002 Rev 1 24590-LAW-MV-RLD-P0003 Rev 1	Mechanical Drawings	N/A	9.6
24590-WPT-3PS-MV00-TP001 Rev 1	Specifications for Pressure Vessel Design & Fabrication	N/A	7.7
24590-WTP-3PS-G000-TP002 Rev 2	Specifications for Positive Material Identification	N/A	7.9

24590-LAW-MVD-RLD-P0006 Rev 1 24590-LAW-MVD-RLD-P0007 Rev 2	Mechanical Data Sheets	N/A	9.6
24590-LAW-NID-RLD-P0002 Rev 0 24590-LAW-NID-RLD-P0005 Rev 0	Material Selection Data Sheet	N/A	9.9
24590-LAW-3YD-20-00001	System Description Change Notice	N/A	Administrative Record

PACKAGE LAW-010, Rev 0 - Tank System for the LCP System at El. +3 ft

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-101-SC-HXYG-0074-03-00001, Rev 00A	IQRPE Independent Assessment Report	N/A	9.11
24590-LAW-P1-P01T-P0002, Rev 3	General Arrangement Plan	N/A	9.4
24590-LAW-P1-P01T-P0007, Rev 4	General Arrangement Section	N/A	9.4
24590-LAW-P1-P01T-P0008, Rev 3	General Arrangement Section	N/A	9.4
24590-LAW-P1-P01T-P0009, Rev 4	General Arrangement Section	N/A	9.4
24590-LAW-P1-P01T-P0010, Rev 4	General Arrangement Section	N/A	9.4
24590-LAW-P1-P01T-P0011, Rev 0	General Arrangement Section	N/A	9.4
24590-LAW-M5-V17T-P0001, Rev 0	Process Flow Diagram	N/A	9.1
24590-LAW-M5-V17T-P0002, Rev 0	Process Flow Diagram	N/A	9.1
24590-LAW-M6-LCP-P0001, Rev 1	Piping & Instrumentation Diagram	N/A	9.2
24590-LAW-M6-LCP-P0002, Rev 0	Piping & Instrumentation Diagram	N/A	9.2
24590-WTP-PEN-ENV-03-003	Permit Equivalency Notice, "Change to the Permit P&IDs"	N/A	9.2
24590-LAW-MV-LCP-P0001, Rev 0	Mechanical Drawings	N/A	9.6
24590-LAW-MV-LCP-P0002, Rev 0	Mechanical Drawings	N/A	9.6
24590-WTP-PEN-ENV-03-001	Specifications: Permit Equivalency Notice, "Changes to the Permit Specifications 24590-WTP-3PS-MV00-TP002, Rev 1, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels"	N/A	7.7
24590-WTP-PEN-ENV-03-002	Specifications: Permit Equivalency Notice, "Change to the Permit Specification 24590-WTP-3PS-MV00-TP003, Rev. 1, Engineering Specification for Pressure Vessel Fatigue Analysis"	N/A	7.7
24590-LAW-MVD-LCP-P0004, Rev 0	Mechanical Data Sheet	N/A	9.6
24590-LAW-MVD-LCP-P0005, Rev 0	Mechanical Data Sheet	N/A	9.6
24590-LAW-N1D-LCP-P0001, Rev 0	Material Selection Data Sheet	N/A	9.9

24590-LAW-3YD-LCP-00001, Rev 0	System Description for System LCP LAW Concentrate Receipt Process	N/A	Administrative Record
24590-WPT-PER-PR-03-002, Rev 0	Toxic Vapors & Emissions from WTP Tank System & Miscellaneous Treatment Unit Systems	N/A	Administrative Record

PACKAGE LAW-011, Rev 0 -Tank System for the LFP System at El. +3 ft

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-101-SC-HXYG-0074-03-00002, Rev 00A	IQRPE Independent Assessment Report	N/A	9.11
24590-LAW-M6-LFP-P0001, Rev 0	Piping & Instrument Diagram	N/A	9.2
24590-LAW-M6-LFP-P0003, Rev 0	Piping & Instrument Diagram	N/A	9.2
24590-LAW-MV-LFP-P0001, Rev 0	Mechanical Drawings	N/A	9.6
24590-LAW-MV-LFP-P0002, Rev 0	Mechanical Drawings	N/A	9.6
24590-LAW-MV-LFP-P0004, Rev 0	Mechanical Drawings	N/A	9.6
24590-LAW-MV-LFP-P0005, Rev 0	Mechanical Drawings	N/A	9.6
24590-LAW-MVD-LFP-P0007, Rev 0	Mechanical Data Sheet	N/A	9.6
24590-LAW-MVD-LFP-P0008, Rev 0	Mechanical Data Sheet	N/A	9.6
24590-LAW-MVD-LFP-P0010, Rev 0	Mechanical Data Sheet	N/A	9.6
24590-LAW-MVD-LFP-P0011, Rev 0	Mechanical Data Sheet	N/A	9.6
24590-LAW-N1D-LFP-P0004, Rev 0	Plant Item Material Selection Data Sheet	N/A	9.9
24590-LAW-3YD-LFP-00001, Rev 0	System Description for the LFP System	N/A	Administrative Record
24590-LAW-3YD-LFP-00001	System Description Change Notice for LAW LFP	N/A	Administrative Record

PACKAGE LAW-017, Rev 0 - Miscellaneous Treatment Unit Subsystem for the LOP System at +3 ft (WESP & SBS)

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-CM-HC4-HXYG-00138-02-00011, Rev 00A	IQRPE Independent Assessment Report	N/A	9.11
24590-LAW-MK-LOP-P0001001, Rev 0	Mechanical Drawings: SBS	N/A	9.6
24590-LAW-MK-LOP-P0001002, Rev 0	Mechanical Drawings: SBS	N/A	9.6
24590-LAW-MK-LOP-P0001003, Rev 0	Mechanical Drawings: SBS	N/A	9.6
24590-WTP-3PS-MKE0-TP001, Rev 0	Specification for WESP	N/A	7.7
24590-LAW-MKD-LOP-P0008, Rev 0	Mechanical Data Sheets for SBS	N/A	9.6

24590-LAW-N1D-LOP-P0001, Rev 0	Material Selection Data Sheet for SBS	N/A	9.9
24590-LAW-N1D-LOP-P0003, Rev 0	Material Selection Data Sheet for WESP	N/A	9.9
24590-LAW-PER-PR-03-001, Rev 0	Mechanical Data Sheets: LAW Vit Offgas System Bypass Analysis	N/A	9.18
24590-WTP-PER-CON-02-001, Rev 2	Installation of Tank System & Miscellaneous Treatment Systems	N/A	7.12

PACKAGE HLW-009, Rev 0 - Tank System Ancillary Equipment for HOP (SBS Condensate Receiver Vessel)

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-CM_HC4-HXYG-00138-02-08 Rev A	IQRPE Independent Assessment Report	N/A	10.11
24590-HLW-PER-J-02-001 Rev 1	System Logic Description for HLW Facility-Melter Offgas Treatment Process (HOP) System	N/A	10.13

PACKAGE HLW-010, Rev 0 - Miscellaneous Treatment Units for HLW Facility El. -21 ft (Silver Mordenite)

DOCUMENT/ DRAWING NUMBER	TITLE	REPLACES	PERMIT LOCATION
24590-101-SC-HXYG-0074-03-00003, Rev A	IQRPE Independent Assessment Reports	N/A	10.11
24590-HLW-M5-V17T-P0004, Rev 1	Process Flow Diagrams for Melter 1 HOP System	N/A	10.1
24590-HLW-M5-V17T-P20004, Rev 0	Process Flow Diagrams for Melter 2 HOP System	N/A	10.1
24590-HLW-M6-HOP-P0003, Rev 0	Piping & Instrumentation Diagram for Melter 1 HOP System, Sheet 1 of 2	N/A	10.2
24590-HLW-M6-HOP-P0008, Rev 0	Piping & Instrumentation Diagram for Melter 1 HOP System, Sheet 2 of 2	N/A	10.2
24590-HLW-M6-HOP-P20003, Rev 0	Piping & Instrumentation Diagram for Melter 2 HOP System, Sheet 1 of 2	N/A	10.2
24590-HLW-M6-HOP-P20008, Rev 0	Piping & Instrumentation Diagram for Melter 2 HOP System, Sheet 2 of 2	N/A	10.2
24590-HLW-3PS-MBT0-TP001, Rev 1	Specifications: Silver Mordenite Column Design & Fabrication	N/A	10.7
24590-HLW-PEN-ENV-04-002	Maximum Operating Pressure Correction: Silver Modenite Column Specification for HLW-101	N/A	10.7
24590-HLW-MKD-HOP-P0014, Rev 1	Mechanical Systems Data Sheets	N/A	10.6
24590-HLW-MKD-HOP-P0017, Rev 0	Mechanical Systems Data Sheets	N/A	10.6

24590-HLW-NID-HOP-P0006, Rev 1	Material Selection Data Sheet: Silver Mordenite Column	N/A	10.9
24590-HLW-3YN-HOP-00003, Rev 0	System Description Change Notice	N/A	Administrative Record
24590-HLW-PER-PR-03-001, Rev, 0	Description of HLW Vit System Bypass Events	N/A	10.18

PACKAGE HLW-038, Rev 0 - Double-Wall Pipe in the RLD and HCP Systems, El. -21 Ft.			
DOCUMENT/ DRAWING NUMBER	**TITLE**	**REPLACES**	**PERMIT LOCATION**
24590-CM-HC4-HXYG-00138-01-15, Rev B	IQRPE Independent Assessment Report	N/A	10.11
24590-HLW-M6-RLD-P0001, Rev 0	Piping & Instrumentation Diagrams for the RLD System (Active Effluent Collection)	N/A	10.2
24590-HLW-M6-RLD-P0002, Rev 0	Piping & Instrumentation Diagrams for the RLD System (Plant Wash & Drains Vessel)	N/A	10.2
24590-HLW-M6-HCP-P0001, Rev 0	Piping & Instrumentation Diagrams for the HCP System (Concentrate Receipt Vessel 1)	N/A	10.2
24590-HLW-M6-HCP-P0002, Rev 0	Piping & Instrumentation Diagrams for the HCP System (Concentrate Receipt Vessel 2)	N/A	10.2
24590-WPT-PER-PL-02-001, Rev 3	Piping Material Class Description	24590-WTP-PER-PL-02-001, Rev 2	7.2

NOTES:

FRP = Waste Feed Receipt Process System
HCP = HLW Condensate Receipt Process System
HLP = HLW Lag Storage and Feed Blending Process System
HLW = High Level Waste
HOP = HLW Vit Primary Offgas Treatment System
IQRPE = Independent, Qualified, Registered Professional Engineer
LAB = WTP Laboratory Building
LAW = Low Activity Waste
LCP = LAW Concentrate Receipt Process System
LFP = LAW Melter Feed Process System
LSM = Locally Shielded Melter
LOP = LAW Melter Offgas System
LVP = LAW Secondary Offgas/Vessel Vent Process System
MTU = Miscellaneous Treatment Units
PTF = Pretreatment Building
PVV = Process Vessel Vent System
PWD = Plant Wash and Disposal System
RLD = Radioactive Liquid Waste Disposal System
SBS = Submerged Bed Scrubber
UFP = Ultrafiltration Process System
WESP = Wet Electrostatic Precipitator

Waste Treatment and Immobilization Plant
Attachment 51

Page Changes to Interim Compliance Schedule

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Appendix 1.0

WTP Interim Compliance Schedule

Any procedure, method, data, or information contained in this document that relates solely to radionuclides or to the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) is not provided for the purpose of regulating the radiation hazards of such components under the authority of this permit and Chapter 70.105 RCW.

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
	III.10.C.2	
1.	Submit documentation stating the WTP has been constructed in compliance with the Permit.	~~11/30/07~~ 03/01/08
2.	Submit updated Site Transportation Report for incorporation into the Administrative Record.	12/31/03
	III.10.C.3	
3.	Revise and Submit Waste Analysis Plan and associated Quality Assurance Project Plan to Ecology for review and approval	~~08/12/05~~ 04/01/07
	III.10.C.5.	
4.	Update and submit for approval "Procedures to Prevent Hazards", Chapter 6.0 Sections 6.3, 6.4, 6.5 and the Inspection Schedule.	~~08/01/06~~ 04/01/07
	III.10.C.6	
5.	Update and submit the Contingency Plan	~~08/01/06~~ 04/01/07
	III.10.C.7	
6.	Update and resubmit for review and approval Training Program description in Chapter 8 of the Permit.	~~08/01/06~~ 04/01/07
7.	Submit under separate cover the actual WTP Dangerous Waste Training Plan for incorporation into Administrative Record.	~~08/01/06~~ 04/01/07
	III.10.C.8	
8.	Update and resubmit the Closure Plan for approval	~~08/01/06~~ 04/01/07
	III.10.C.11	
9.	Submit Risk Assessment Workplan, revised in consultation with Ecology.	08/15/03
	CONTAINERS	
10.	Submit detailed information associated with	~~10/01/04~~

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
	containers and container management areas	03/22/06
11.	Submit descriptions of container management practices	~~08/01/06~~ 04/01/07
12.	Submit engineering information for each secondary containment and leak detection system for the WTP Tank System to be included in the permit	~~11/03/03~~ 9/18/04
13.	Submit engineering information for each dangerous waste tank and primary sump to be included in the permit	~~05/01/04~~ 04/29/06
14.	Submit engineering information for each tank system ancillary equipment to be included in the permit	~~05/01/04~~ 04/29/06
15.	Submit descriptions of tank management practices	~~08/01/06~~ 04/01/07
	CONTAINMENT BUILDINGS	
16.	Submit engineering information for each containment building to be included in the permit	~~02/01/04~~ 12/16/04
17.	Submit descriptions of containment building management practices	~~08/01/06~~ 04/01/07
	PRETREATMENT PLANT MISC. UNITS SYSTEMS	
18.	Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems	01/31/05
19.	Submit engineering information for Pretreatment Plant Miscellaneous Unit Systems	~~10/01/04~~ 02/11/06
20.	Submit engineering information for Pretreatment Plant Miscellaneous Unit Systems equipment	~~10/01/04~~ 01/24/05
21.	Submit descriptions of management practices for the Pretreatment Miscellaneous Treatment System	~~07/01/07~~ 04/01/07
	LAW SHORT TERM MELTER UNIT	
22.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit secondary containment	03/01/04
23.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit sub-system	~~05/01/04~~ 08/18/05
24.	Submit engineering information for equipment for each LAW Vitrification Miscellaneous Treatment Unit sub-system	~~05/01/04~~ 06/02/05

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
25.	Submit descriptions of management practices for the LAW Vitrification Miscellaneous Treatment System	~~08/01/06~~ 04/01/07
26.	Submit LAW Vitrification Environmental Performance Demonstration Test Plan for Ecology review and approval	~~08/01/06~~ 10/02/06
	HLW SHORT TERM MELTER UNIT	
27.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit secondary containment	01/22/05
28.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit sub-system	06/18/05
29.	Submit engineering information for equipment for each HLW Vitrification Miscellaneous Treatment Unit sub-system	06/18/05
30.	Submit descriptions of management practices for the HLW Vitrification Miscellaneous Treatment System	~~01/02/07~~ 04/01/07
31.	Submit HLW Vitrification Environmental Performance Demonstration Test Plan for Ecology review and approval	~~01/02/07~~ 10/02/06
32.	Final Compliance Date	~~12/31/07~~ 02/28/09

Waste Treatment and Immobilization Plant
Unit Specific Permit Conditions

Page Changes to Conditions

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Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or mixed waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Waste Feed Receipt Vessels FRP-VSL-00002-A through D (Waste Feed Receipt Process System)	FRP	**24590-PTF** -M2-FRP-P0001 -M2-FRP-P0002 -M2-FRP-P0003 -M2-FRP-P0004 -M5-V17T-P0003 -M6-FRP-P0001 -M6-FRP-P0002 -MVD-FRP-00001 -MVD-FRP-00002 -MVD-FRP-00003 -MVD-FRP-00004 -MVD-FRP-P0005 -MVD-FRP-P0006 -MVD-FRP-P0007 -MVD-FRP-P0008 -P1-P01T-P0001 -P1-P01T-P0002 -P1-P01T-P0008 -P1-P01T-P0009 -P1-P01T-P0010	Section 4.1.2.1; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-5, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	FRP-VSL-00002-A = 474,000 FRP-VSL-00002-B = 474,000 FRP-VSL-00002-C = 474,000 FRP-VSL-00002-D = 474,000
Evaporator Feed Vessels V11001A-B, Evaporator Process Condensate Pot V11005, (Waste Feed Evaporation Process System)	FEP	RESERVED	Section 4.1.2.2; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-6, 4A-61, 4A-62, 4A-63, 4A-78, 4A-79, 4A-80 of Attachment 51, Chapter 4.0 of this	V11001A = 59,070 V11001B = 90,070 V11005 = 1,190

Dangerous and/or mixed waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
			Permit.	
Ultrafilter Permeate Vessel UFP-VSL-00062A, Ultrafilter Permeate Vessel UFP-VSL-00062B, Ultrafilter Permeate Vessel UFP-VSL-00062C ~~LAW Permeate Hold Vessels V12015A-C~~, Ultrafilteration Feed Preparation Vessel UFP-VSL-00001A, Ultrafiltration Feed Vessel UFP-VSL-00002A Ultrafilteration Feed Preparation Vessel UFP-VSL-00001B, Ultrafilteration Feed Vessel UFP-VSL-00002B, ~~Evaporator Concentrate Buffer Vessels V12010A-B, Ultrafiltration Feed Vessels V12011A-B~~, Ultrafilters UPF-FILT-00001A, UPF-FILT-00001B, UPF-FILT-00002A, UPF-FILT-00002B, UPF-FILT-00003A, and UPF-FILT-00003B ~~G12002A-B, G12003A-B, and G12004A-B~~ (Ultrafiltration Process System)	UFP	~~RESERVED~~ **24590-PTF** -M6-UFP-P0001 -M6-UFP-P0002 -M6-UFP-P0003 -M6-UFP-P0004 -M6-UFP-P0005 -M6-UFP-P0006 -M6-UFP-P0007 -M6-UFP-P0008 -M6-UFP-P0009 -M6-UFP-P0010 -M6-UFP-P0011 -M6-UFP-P0015 -MV-UFP-P0001 -MV-UFP-P0002 -MV-UFP-P0003 -MV-UFP-P0004 -MV-UFP-P0005 -MV-UFP-P0006 -MV-UFP-P0007 -MVC-UFP-00001 -MVC-UFP-00002 -MVC-UFP-00003 -MVC-UFP-P0001	Section 4.1.2.3; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-7, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	~~V12015A = 28,390~~ ~~V12015B = 28,390~~ ~~V12015C = 28,390~~ ~~V12010A = 62,340~~ ~~V12010B = 62,340~~ ~~V12011A = 26,840~~ ~~V12011B = 26,840~~ UFP-VSL-00062A = 34,700 UFP-VSL-00062B = 34,700 UFP-VSL-00062C = 34,700 UFP-VSL-00001A = 75,593 UFP-VSL-00002A = 40,783 UFP-VSL-00001B = 75,593 UFP-VSL-00002B = 40,783 UPF-FILT-00001A= RESERVED UPF-FILT-00001B= RESERVED UPF-FILT-00002A= RESERVED UPF-FILT-00002B= RESERVED UPF-FILT-00003A= RESERVED UPF-FILT-00003B= RESERVED ~~G12002A = 140~~ ~~G12002B = 140~~ ~~G12003A = 140~~ ~~G12003B = 140~~ ~~G12004A = 140~~

Dangerous and/or mixed waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MVC-UFP-P0002 -MVC-UFP-P0005 -MVC-UFP-P0006 -MVC-UFP-P0007 -MVC-UFP-P0014 -MVC-UFP-P0015		~~G12004B = 140~~
HLW Feed Receipt Vessel HLP-VSl-00022, HLW Feed Blending Vessel HLP-VSL-00028 ~~V12007~~, Sr/TRU Lag Storage Vessels HPL-VSL-00027A&B, ~~V12001A & C~~, Lag Storage Vessels V12001D & E (HLW Lag Storage and Feed Blending Process system)	HLP	**24590-PTF-** -M6-HLP-P0001 -M6-HLP-P0002 -M6-HLP-P0003 -MV-HLP-P0003 -MV-HLP-P0004 -MV-HLP-P0005 -MV-HLP-P0006 MVD-HLP-P0006 MVD-HLP-P0007 MVD-HLP-P0008 MVD-HLP-P0009	Section 4.1.2.4; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-8, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	HLP-VSl-00022 = 270,600 ~~V12007 = 18,070~~ HLP-VSL-00028 = 142,200 ~~V12001A = 96,900~~ ~~V12001C = 96,900~~ HPL-VSL-00027A = 127,260 HPL-VSL-00027B = 127,260 V12001D = 96,900 V12001E = 96,900

Dangerous and/or mixed waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Cesium Ion Exchange Columns C13001-4, LAW Feed Vessel V13001, Caustic Rinse Collection Vessel V13008, Cs IX Gas Separation Vessels (ID RESERVED), Cesium Reagent Tank (ID RESERVED) (Cesium Ion Exchange Process System)	CXP	RESERVED	Section 4.1.2.5; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-9, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	C13001 = 680 C13002 = 680 C13003 = 680 C13004 = 680 V13001 = 61,200 V13008 = 2,400 Cs IX Gas Separation Vessels = RESERVED Cesium Reagent Tank = RESERVED
Eluate Contingency Storage Vessel V13073, Recovered Nitric Acid Vessel V13028, Cesium Concentrate Lute Pot V13030, (Cesium Nitric Acid Recovery Process System)	CNP	RESERVED	Section 4.1.2.6; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-10, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	V13073 = 11,060 V13028 = 5,410 V13030 = 70
Technetium Ion Exchange Buffer Vessel V43001, Cs Treated LAW Collection Vessel (ID RESERVED), Technetium Ion Exchange Columns C43006-9, Caustic Rinse Collection Vessel V43056, Treated LAW Buffer Vessels V43110A-C, Tc Reagent Vessels (ID's RESERVED) (Technetium Ion Exchange Process System)	TXP	RESERVED	Section 4.1.2.8; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-12, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	V43001 = 18,100 Cs Treated LAW Collection Vessel (ID RESERVED) C43006 = 680 C43007 = 680 C43008 = 680 C43009 = 680 V43056 = 3,300 V43110A = 33,050 V43110B = 33,050 V43110C = 33,170 Tc Reagent Vessels (ID's RESERVED)

Dangerous and/or mixed waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Recovered Technetium Eluant Vessel V43071, Technetium Concentrate Lute Pot V43072 (Technetium Eluant Recovery Process System)	TEP	RESERVED	Section 4.1.2.9; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-13, 4A-61, 4A-78 of Attachment 51, Chapter 4.0 of this Permit.	V43071 = 7,900 V43072 = 70
Process Condensate Hold Vessel V41013, Plant Wash Vessels V45009A-B, LAW SBS Purge Receipt Vessels (ID RESERVED) (Treated LAW Evaporation Process System (TLP)), ~~LAW Buffer Storage Vessel V41001~~ Treated LAW Concentrate Storage Process System TCP-VSL-00001	TLP TCP	~~RESERVED~~ **24590-PTF** -M6-TCP-P0001 -MV-TCP-P0002 -MVD-TCP-00001 -MVD-TCP-P0002	Section 4.1.2.11 & 4.2.2.12; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-16, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	V41013 = 450 V45009A = 88,920 V45009B = 88,920 LAW SBS Purge Receipt Vessels (ID RESERVED) ~~V41001 = 117,000~~ TCP-VSL-00001 = 146,740
Spent Resin Collection Vessels V43135A-B, Resin Flush Collection Vessel V43136, Spent Resin Dewatering Moisture Separation Vessel (ID RESERVED) (Spent Resin and Dewatering Process System)	RDP	RESERVED	Section 4.1.2.13; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-15, 4A-61, 4A-78 of Attachment 51, Chapter 4.0 of this Permit.	V43135A = 8,720 V43135B = 8,720 V43136 = 11,220 Spent Resin Dewatering Moisture Separation Vessel= RESERVED
Process Condensate Vessels V45028A-B (Pretreatment Plant Radioactive Liquid Waste Disposal System)	RLD	RESERVED	Section 4.1.2.16; Table 4-3; and Figures 4A-1, 4A-2, 4A-18, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	V45028A = 321,720 V45028B = 321,720
Ultimate Overflow Vessel PWD-VSL-00033, HLW Effluent Transfer Vessel PWD-VSL-00043, Primary Acidic/Alkaline Effluent Vessel V45013, Secondary Acidic/Alkaline Effluent Vessel V45018, Alkaline Effluent Vessels V15013 & V15018, Plant Wash Vessel V15009A, C3 Floor Drain	PWD	**24590-PTF** -M5-V17T-P0022002 -M6-PWD-P0002 -M6-PWD-P0043, -MV-PWD-P0001001 -MV-PWD-P0003001	Section 4.1.2.15; Table 4-3 and 4-11; and Figures 4A-1, 4A-2, 4A-17, 4A-60, 4A-61, 4A-62, 4A-78, 4A-79 of Attachment 51, Chapter 4.0 of this Permit.	PWD-VSL-00033 = 41,650 PWD-VSL-00043 = 41,650 V45013 = 49,850 V45018 = 49,850 V15013 = 93,180 V15009A = 73,860

Dangerous and/or mixed waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Collection Vessel PWD-VSL-00046 (Pretreatment Plant Wash and Disposal System)		-MV-PWD-P0005 -MVC-PWD-00029 -MVC-PWD-00030 -MVD-PWD-P0001 -MVD-PWD-P0003 -MVD-PWD-P0010 -P1-P01T-P0006 -P1-P01T-P0009 -P1-P01T-P0012 -P1-P01T-P0014 -P1-P01T-P0015		PWD-VSL-00046 = 4982 V15018 = 93,180
Vessel Vent Header Collection Vessel V15052, Condensate Collection Vessel V15038, HEME Drain Collection Vessels V15326-7 (Pretreatment Vessel Vent Process System)	PVP	RESERVED	Section 4.1.2.17; Table 4-3; and Figures 4A-1, 4A-2, 4A-19, 4A-61, and 4A-78 of Attachment 51, Chapter 4.0 of this Permit.	V15052 = 900 V15038 = 1,230 V15327 = 2,760 V15326 = 820

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Table III.10.E.B – Law Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Unit Description	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Melter 1 Concentrate Receipt Vessel LAW-MV-LCP-VSL-00001 ~~V21001~~, Melter 2 Concentrate Receipt Vessel MV-LCP-VSL-00002 ~~V21002~~ , Melter 3 Concentrate Receipt Vessel V21003 (LAW Concentrate Receipt Process System)	LCP	~~RESERVED~~ **24590-LAW** -M6-LCP-P0001 -M6-LCP-P0002 -MV-LCP-P0001 -MV-LCP-P0002 -MVD-LCP-00001 -MVD-LCP-00002 -MVD-LCP-P0004 -MVD-LCP-P0005	Section 4.1.3.1; Table 4-4 and 4-11; and Figures 4A-1, 4A-3, 4A-20,of Attachment 51, Chapter 4.0 of this Permit.	~~V21001 = 14,392~~ ~~V21002 = 14,392~~ V21003 = 14,392 LCP-VSL-00001 = 18,130 LCP-VSL-00002 = 18,130
Melter 1 Feed Preparation Vessel LAW-LFP-VSL-00001~~V21101~~ , Melter 1 Feed Vessel LAW-LFP-VSL-00002 ~~V21102~~ , Melter 2 Feed Preparation Vessel LAW-LFP-VSL-00003 ~~V21201~~ , Melter 2 Feed Vessel LAW-LPF-VSL-00004 ~~V21202~~ , Melter 3 Feed Preparation Vessel V21301 , Melter 3 Feed Vessel V21302 (LAW Melter Feed Process System)	LFP	~~RESERVED~~ **24590-LAW** M6-LFP-P0001 M6-LFP-P0002 M6-LFP-P0003 M6-LFP-P0004 MV-LFP-P0001 MV-LFP-P0002 MV-LFP-P0004 MV-LFP-P0005 MVD-LFP-00001 MVD-LFP-00002 MVD-LFP-00003 MVD-LFP-00004 MVD-LFP-P0007 MVD-LFP-P0008 MVD-LFP-P0010 MVD-LFP-P0011	Section 4.1.3.1; Table 4-4 and 4-11; and Figures 4A-1, 4A-3, 4A-20, 4A-67, and 4A-83 of Attachment 51, Chapter 4.0 of this Permit.	~~V21101 = 6,221~~ ~~V21102 = 6,221~~ ~~V21201 = 6,221~~ ~~V21202 = 6,221~~ V21301 = 6,221 V21302 = 6,221 LFP-VSL-00001 = 9,123 LFP-VSL-00002 = 9,123 LFP-VSL-00003 = 9,123 LFP-VSL-00004 = 9,123

Mixed Waste Tank Systems Name	Unit Designation	Unit Description	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LAW Caustic Scrubber Blowdown Vessel V22001 (LAW Secondary Off-gas/Vessel Vent Process System)	LVP	RESERVED	Section 4.1.3.3; Table 4-4 and 4-11; and Figures 4A-1, 4A-3, 4A-23 of Attachment 51, Chapter 4.0 of this Permit.	V22001 = 12,191
LAW Melter 1 SBS Condensate Vessel ~~V22101~~ LAW-MV-LOP-VSL-00001, LAW Melter 2 SBS Condensate Vessel ~~V22201~~ LAW-MV-LOP-VSL-00002, Melter 3 SBS Condensate Vessel V22301, (LAW Primary Off-gas Process System)	LOP	**24590-LAW** -M6-LOP-P0001 -M6-LOP-P0002 -MV-LOP-P0001 -MV-LOP-P0002 MVD-LOP-P0004 MVD-LOP-P0005	Section 4.1.3.3; Table 4-4 and 4-11; and Figures 4A-1, 4A-3, 4A-22, 4A-67, and 4A-83 of Attachment 51, Chapter 4.0 of this Permit.	~~V22101 = 6,833~~ LOP-VSL-00001 = 9,056 ~~V22201 = 6,833~~ LOP-VSL-00002 = 9,056 V22301 = 6,833 LOP-SCB-00001 = 4,948 LOP-SCB-00002 = 4,948
Plant Wash Vessel LAW-MV-RLD-VSL-00003 ~~V25001~~, C3/C5 Drains/Sump Collection Vessel RLD-VSL-00004, SBS Condensate Collection Vessel LAW-MV-RLD-VSL-00005 ~~V25003~~ (LAW Vitrification Plant Radioactive Liquid Waste Disposal System)	RLD	**24590-LAW** -M6-RLD-P0001 -M6-RLD-P0002 -MV-RLD-P0001 -MV-RLD-P0002 -MV-RLD-P0003 -MVD-RLD-P0001 -MVD-RLD-P0006 -MVD-RLD-P0007 -MVD-RLD-00002 -MVD-RLD-00003 -MVD-RLD-00004	Section 4.1.3.4; Table 4-4 and 4-11; and Figures 4A-1, 4A-2, 4A-25, 4A-66, 4A-67, 4A-82, and 4A-83 of Attachment 51, Chapter 4.0 of this Permit.	~~V25001 = 25,130~~ RLD-VSL-00003 = 25,780 RLD-VSL-00004 = 7696 RLD-VSL-00005 = 25,780 ~~V25003 = 24,704~~

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Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Unit Description	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Concentrate Receipt Vessel V31001 , Concentrate Receipt Vessel2 V31002 (HLW Cave Receipt Process System)	HCP	RESERVED	Section 4.1.4.1; Table 4-5 and 4-11; and Figures 4A-1, 4A-4, 4A-26, 4A-71, 4A-72, 4A-73, 4A-86, and 4A-87 of Attachment 51, Chapter 4.0 of this Permit.	V31001 = 17,900 V31002 = 17,900
Feed Preparation Vessel V31101 , HLW Melter Feed Vessel V31102 (HLW Melter Feed Process System)	HFP	RESERVED	Section 4.1.4.1; Table 4-5 and 4-11; and Figures 4A-1, 4A-4, 4A-26, 4A-72, 4A-73, 4A-86,and 4A-87, of Attachment 51, Chapter 4.0 of this Permit.	V31101 = 8,800 V31102 = 8,800
SBS Condensate Receiver Vessel HOP-VSL-00903 (Melter Off-gas Treatment Process System-Primary System),	HOP	**24590-HLW** -M6-HOP-P0004 -M6-HOP-P0006 -MV-HOP-P0001 -MVD-HOP-P0001 -MVD-231-00001	Section 4.1.4.3; Table 4-5 and 4-11; and Figures 4A-1, 4A-4, 4A-28, 4A-71, and 4A-86 of Attachment 51, Chapter 4.0 of this Permit.	HOP-VSL-00903 = 9891
Canister Bogie Decontamination Vessel V33004, Waste Neutralization Vessel V33002 , Canister Decontamination Vessel V33001 (HLW Canister Decontamination Handling System)	HDH	RESERVED	Section 4.1.4.5; Table 4-5 and 4-11; and Figures 4A-1, 4A-4, 4A-30, 4A-71, 4A-72, 4A-86, 4A-87 of Attachment 51, Chapter 4.0 of this Permit.	V33004 = 2,500 V33002 = 5,300 V33001 = 580
Acidic Waste Vessel V35002 , Plant Wash and Drains Vessel V35003, Decontamination Effluent Collection Vessel V35009, Off-gas Drains Collection Vessel V35038 (HLW Vitrification Plant Radioactive	RLD	RESERVED	Section 4.1.4.4; Table 4-5 and 4-11; and Figures 4A-1, 4A-4, 4A-31, 4A-71, 4A-72, 4A-73,4A-86, 4A-87 of Attachment 51, Chapter 4.0 of this Permit.	V35002 = 16,700 V35003 = 13,200 V35009 = 7,300 V35038 = 7,280

Liquid Waste Disposal System)				

Table III.10.E.D – Analytical Laboratory Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Unit Description	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Lab Liquid Effluent Collection Vessel V60001a, Lab Liquid Effluent Collection Vessel V60001b (Analytical Laboratory Tank System)	LAB	RESERVED	Section 4.1.5; Table 4-6 and 4-11; and Figures 4A-1, 4A-2, and 4A-113 of Attachment 51, Chapter 4.0 of this Permit.	V60001a = 12,063 V60001b = 12,063

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00071 P-B005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00040 P-B002[a]	Not Applicable	Bubbler Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00001 P-0108B[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00001A P-0108C[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00002 P-0108A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

PWD-SUMP-00002A P-0108[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00003 P-0106[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00004 P-0104[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00005 P-0102A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00006 P-0102[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00007 P-0109[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00008 P-0111[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00009 P-0112[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00010 P-0113[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00011 P-0114[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00012 P-0117[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00013 P-117A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-	Not	Radar Leak	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

00031 P-0119[a]	Applicable	Detector							
PWD-SUMP-00034 P-0121A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00035 P-0122A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00036 P-0118[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Sump locator and name (including P&ID designator) is located on Permit Table III.10.E J – Pretreatment Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.

Table III.10.E.F – LAW Vitrification Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
RLD-SUMP-00028 L-B001B[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00029 L-0123[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00030 L-0123[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00031 L-0124[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00032 L-0124[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

RLD-SUMP-00033 L-0125[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00034 L-0125[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00035 L-0126[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00036 L-0126[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Sump locator and name (including P&ID designator) is located on Permit Table III.10.E L - LAW Vitrification Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.

Table III.10.E.G - HLW Vitrification Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
HCP-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HOP-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HOP-SUMP-00008[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HDH-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HDH-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

HDH-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RWH-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RWH-SUMP-00005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RWH-SUMP-00006[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HPH-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HPH-SUMP-00005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HMH-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HMH-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HFP-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HFP-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00007[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00008[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00009[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Sump locator and name (including P&ID designator) is located on Permit Table III.10.E N - HLW Vitrification Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.

Table III.10.E.H – Laboratory Tank System Process and Leak Detection System Instruments and Parameters

Tank System Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
RLD-SUMP-00041[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00042[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Sump locator and name (including P&ID designator) is located on Permit Table III.10.E P - Laboratory Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.

Table III.10.E.I – Pretreatment Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.

Table III.10.E J – Pretreatment Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications No.'s, etc.)
PWD-SUMP-00071 P-B005 (Pit-19, El. –19')	112.2	Dry Sump[a]	24"x30"x36" Coating Type (RESERVED)	**24590-PTF** -M6-PWD-P00041 -P1-P01T-P0006 -P1-P01T-P0012
PWD-SUMP-00040 P-B002 (Pit-45, El. –45')	233.7	Wet Sump/ 140.3	60"x30"x30" 6Mo	**24590-PTF** -M6-PWD-P00012 -P1-P01T-P0006 -P1-P01T-P0009
PWD-SUMP-00001 P-0108B (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00008 -P1-P01T-P0001 -P1-P01T-P0009
PWD-SUMP-00001A P-0108C (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00010 -P1-P01T-P0001 -P1-P01T-P0010
PWD-SUMP-00002 P-0108A (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00008 -P1-P01T-P0001 -P1-P01T-P0008
PWD-SUMP-00002A P-0108 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00010 -P1-P01T-P0001 -P1-P01T-P0008
PWD-SUMP-00003 P-0106 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00008 -P1-P01T-P0001 -P1-P01T-P0008
PWD-SUMP-00004 P-0104 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00008

				-P1-P01T-P0001 -P1-P01T-P0008
PWD-SUMP-00005 P-0102A (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00008 -P1-P01T-P0001 -P1-P01T-P0008
PWD-SUMP-00006 P-0102 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00008 -P1-P01T-P0001 -P1-P01T-P0008
PWD-SUMP-00007 P-0109 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00009 -P1-P01T-P0001 -P1-P01T-P0010
PWD-SUMP-00008 P-0111 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00009 -P1-P01T-P0001 -P1-P01T-P0010
PWD-SUMP-00009 P-0112 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00009 -P1-P01T-P0001
PWD-SUMP-00010 P-0113 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00009 -P1-P01T-P0001 -P1-P01T-P0010
PWD-SUMP-00011 P-0114 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00009 -P1-P01T-P0001 -P1-P01T-P0010
PWD-SUMP-00012 P-0117 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00009 -P1-P01T-P0001 -P1-P01T-P0010
PWD-SUMP-00013 P-0117A (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00014 -P1-P01T-P0001

				-P1-P01T-P0010
PWD-SUMP-00031 P-0119 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00010 -P1-P01T-P0001 -P1-P01T-P0010
PWD-SUMP-00034 P-0121A (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00012 -P1-P01T-P0001 -P1-P01T-P0010
PWD-SUMP-00035 P-0122A (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00012 -P1-P01T-P0001
PWD-SUMP-00036 P-0118 (El. 0')	73.5	Dry Sump[a]	30" Dia. By ~28" deep 304L	**24590-PTF** -M6-PWD-P00012 -P1-P01T-P0001 -P1-P01T-P0010
PJV-ZF-00027-S11B-02 P-0101 (PJV-BULGE-00001 Drain, El. 0')	60	N/A	2" Dia. 316L	24590-PTF-M6-PJV-P0002
PWD-ZF-00004-S11B-02 P-0105 (PVP-BULGE-00001 Drain, El. 0')	60	N/A	2" Dia. 316L	24590-PTF-M6-PVP-P0003
PWD-ZF-00005-S11B-02 P-0101A (PVP-BULGE-00002 Drain, El. 0')	60	N/A	2" Dia. 316L	24590-PTF-M6-PVP-P0003
RDP-ZF-00016-S11B-02 P-0110A (RDP-BULGE-00010 Drain, El. 0')	60	N/A	2" Dia. 316L	24590-PTF-M6-RDP-P0001
TCP-PH-00032-S11B-02 P-0116 (TCP-BULGE-00004 Drain, El. 0')	60	N/A	2" Dia. 316L	24590-PTF-M6-TCP-P0001
TEP-ZF-02066-S11B-011/2 P-0110A (TEP-BULGE-00006 Drain, El. 0')	40	N/A	1-1/2" Dia. 316L	24590-PTF-M6-TEP-P0001

TXP-ZF-00022-S11M-011/2 P-0110B (TXP-BULGE-00001 Drain, El. 0')	40	N/A	1-1/2" Dia. 316L	24590-PTF-M6-TXP-P0001
TXP-ZF-00021-S11M-011/2 P-0110C (TXP-BULGE-00002 Drain, El. 0')	40	N/A	1-1/2" Dia. 316L	24590-PTF-M6-TXP-P0001
TXP-ZF-00042-S11M-011/2 P-0110C (TXP-BULGE-00004 Drain, El. 0')	40	N/A	1-1/2" Dia. 316L	24590-PTF-M6-TXP-P0001
TXP-ZF-00019-S11M-011/2 P-0110C (TXP-BULGE-00005 Drain, El. 0')	40	N/A	1-1/2" Dia. 316L	24590-PTF-M6-TXP-P0004
CNP-ZF-00043-S11B-03 P-0207 (CNP-BULGE-00008 Drain, El. 28')	160	N/A	3" Dia. 316L	24590-PTF-M6-CNP-P0002
PWD-FD-00432 P-0201 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00452 P-0201 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00456 P-0201A Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00341 P-0201A Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00351A P-0201A Drain, El. 28'	52	N/A	3" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00451 P-0203 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00339 P-0203 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00450 P-0203 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0044

PWD-FD-00450A P-0203 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00449A P-0203 Drain, El. 28'	52	N/A	3" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00449 P-0203A Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00338 P-0203A Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00337 P-0203B Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00448 P-0203B Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00447A P-0203B Drain, El. 28'	52	N/A	3" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00447 P-0204 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00336 P-0204 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0044
PWD-FD-00397 P-0206 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00443 P-0206 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00398A P-0207 Drain, El. 28'	52	N/A	3" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00398 P-0207 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00399 P-0208 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00400 P-0209 Drain, El. 28'	52	N/A	3" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00444 P-0209 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00401 P-0209 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00402 P-0210 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0043

PWD-FD-00445 P-0210 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00445A P-0212 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00442 P-0212 Drain, El. 28'	52	N/A	3" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00404 P-0212 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00404A P-0212 Drain, El. 28'	155	N/A	6" Dia. 316L	24590-PTF-M6-PWD-P0043
PWD-FD-00446 P-0212 Drain, El. 28'	706	N/A	8" Dia. 316L	24590-PTF-M6-PWD-P0043
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]This sump is routinely accessible for inspections and maintenance.

Table III.10.E K - LAW Vitrification Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-SUMP-00028 L-B001B (C3/C5 Drains/Sump Collection Vessel Cell, El. –21')	59	Dry Sump[a]	24" Dia. By 30" deep 304L or higher grade	24590-LAW-M6-RLD-P0002
RLD-SUMP-00029 L-0123 (Process Cell, El. +3'	46	Dry Sump[a]	30" Dia. By 15" deep 304L or higher grade	24590-LAW-M6-RLD-P0003
RLD-SUMP-00030 L-0123 (Process Cell, El. +3')	46	Dry Sump[a]	30" Dia. By 15" deep 304L or higher grade	24590-LAW-M6-RLD-P0003
RLD-SUMP-00031 L-0124 Process Cell Sump, El. +3')	46	Dry Sump[a]	30" Dia. By 15" deep 304L or higher grade	24590-LAW-M6-RLD-P0003
RLD-SUMP-00032 L-0124 (Process Cell, El. +3')	46	Dry Sump[a]	30" Dia. By 15" deep 304L or higher grade	24590-LAW-M6-RLD-P0003
RLD-SUMP-00033 L-0125 (Process Cell, El. +3')	46	Dry Sump[a]	30" Dia. By 15" deep 304L or higher grade	24590-LAW-M6-RLD-P0003

RLD-SUMP-00034 L-0125 (Process Cell, El. +3')	46	Dry Sump[a]	30" Dia. By 15" deep 304L or higher grade	24590-LAW-M6-RLD-P0003
RLD-SUMP-00035 L-0126 (Effluent Cell, El. +3')	46	Dry Sump[a]	30" Dia. By 15" deep 304L or higher grade	24590-LAW-M6-RLD-P0003
RLD-SUMP-00036 L-0126 (Effluent Cell, El. +3')	46	Dry Sump[a]	30" Dia. By 15" deep 304L or higher grade	24590-LAW-M6-RLD-P0003
Drain Line ID# = RESERVED L-B001B (RLD-BULGE-00001 Drain, El. -21')	60	N/A	2" Dia. 316L	24590-LAW-M6-RLD-P0002
Drain Line ID# = RESERVED L-B001B (Double-Walled Piping Outer Containment Drain, El. -21')	30	N/A	1" Dia. 316L	24590-LAW-M6-RLD-P0002
Drain Line ID# = RESERVED L-0123 [Primary Offgas (LOP) Melter 1 Valve Bulge Drain, El. +3']	60	N/A	2" Dia. 6 Mo	24590-LAW-M6-LOP-P0001
Drain Line ID# = RESERVED L-0123 (Concentrate Feed Receipt LCP-VSL-00001 Valve Bulge Drains, El. +3')	60	N/A	2" Dia. 316L	24590-LAW-M6-LCP-P0001
Drain Line ID# = RESERVED L-0123 (Melter 1 Feed Prep/Feed Vessel Valve Bulge Drain, El. +3')	60	N/A	2" Dia. 316L	24590-LAW-M6-LFP-P0001
Drain Line ID# = RESERVED	60	N/A	2" Dia. 6 Mo	24590-LAW-M6-LOP-P0002

L-0124 [Primary Offgas (LOP) Melter 2 Valve Bulge Drain, El. +3']				
Drain Line ID# = RESERVED L-0124 (Concentrate Receipt Vessel LCP-VSL-00002 Valve Bulge Drain, El. +3')	60	N/A	2" Dia. 316L	24590-LAW-M6-LCP-P0002
Drain Line ID# = RESERVED L-0124 (Melter 2 Feed Prep/Feed Vessel Valve Bulge Drain, El. +3')	60	N/A	2" Dia. 316L	24590-LAW-M6-LFP-P0003
Drain Line ID# = RESERVED L-0125 [Primary Offgas (LOP) Melter 3 Valve Bulge Drain, El. +3']	60	N/A	2" Dia. 6 Mo	24590-LAW-M6-LOP-P0003
Drain Line ID# = RESERVED L-0125 (Melter 3 Feed Prep/Feed Vessel Valve Bulge Drain, El. +3')	60	N/A	2" Dia. 316L	24590-LAW-M6-LFP-P0005
Drain Line ID# = RESERVED L-0125 (Concentrate Receipt Vessel LCP-VSL-00003 Valve Bulge Drain, El. +3')	60	N/A	2" Dia. 316L	24590-LAW-M6-LCP-P0002
Drain Line ID# = RESERVED L-0126 (Plant Wash Vessel/SBS Condensate Collection Vessel Valve Bulge Drain, El. +3')	60	N/A	2" Dia. 6 Mo	24590-LAW-M6-RLD-P0001

RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.E M - HLW Vitrification Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.

Table III.10.E N - HLW Vitrification Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
HCP-SUMP-00001 H-B014 (Wet Process Cell, El. –21')	70	Wet Sump / 60	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0015
RLD-SUMP-00001 H-B014 (Wet Process Cell, El. –21')	70	Wet Sump / 60	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0015
HOP-SUMP-00003 H-B021 (SBS Drain Collection Cell No. 1, El. –21')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0015
HOP-SUMP-00008 H-B005 (SBS Drain Collection Cell No. 2, El. -21	70	Dry Sump	30" Dia. X 18" Deep 6Mo	24590-HLW-M6-RLD-P20004

HDH-SUMP-00001 H-B039B (Canister Rinse Tunnel, El. –16.5')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0016
HDH-SUMP-00002 H-B039A (Bogie Decon/Maint. Tunnel-Canister Rinse, El. –16')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0004
HDH-SUMP-00003 H-B035 (Canister Decon Cave, El. –16')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0015
RWH-SUMP-00001 H-B015 (Drum Transfer Tunnel, El. –9.5')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0017
RWH-SUMP-00005 H-B015 (Drum Transfer Tunnel, El. –9.5')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0017
RWH-SUMP-00006 H-B015 (Drum Transfer Tunnel, El. –9.5')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0017
HPH-SUMP-00001 H-0136 (Canister Handling Cave, El. –3')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0016
HPH-SUMP-00005 H-0136 (Canister Handling Cave, El. –3')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0004
HMH-SUMP-00002 H-0116B (Melter Cave No. 1-C3/C5Airlock, El. 0')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0003
HMH-SUMP-00003 H-0105B (Melter Cave No. 2-C3/C5Airlock, El. 0')	10.8	Dry Sump	18" in. x 11.5" x 12" Deep 6Mo	24590-HLW-M6-RLD-P0003
HFP-SUMP-00001 H-0308 (Active Services Duct Melter No.1 El. 37')	70	Gravity Drain	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0015
HFP-SUMP-00002 H-0117 (Melter Cave No. 1, El. 5')	70	Wet Sump / 60	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0008
HFP-SUMP-00004 H-0302 (Active Services Duct Melter No.2 El. 37')	70	Gravity Drain	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0004

HFP-SUMP-00005 H-0106 (Melter Cave No. 2 El. 5')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0005
HOP-SUMP-00004 H-0117 (Melter Cave No. 1, El. 3')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0017
HSH-SUMP-00003 H-0117 (Melter Cave No. 1, El. 3')	70	Dry Sump	30" Dia. x 18" Deep 6Mo	24590-HLW-M6-RLD-P0008
HSH-SUMP-00007 H-0106 (Melter Cave No. 2El. 3')	37.4	Dry Sump	24" x 18" x 20" Deep 6Mo	24590-HLW-M6-RLD-P0005
HSH-SUMP-00008 H-0310A (Melter No. 1 Equip. Decon. Area El. 0')	70	Dry Sump	30" Dia x 18" Deep 6Mo	24590-HLW-M6-RLD-P0003
HSH-SUMP-00009 H-0304A (Melter No. 2 Equip. Decon. Area El. 0')	70	Dry Sump	30" Dia x 18" Deep 6Mo	24590-HLW-M6-RLD-P0003
RLD-ZF-00330-S11B-03 H-B021 (SBS Drain Collection Cell No. 1)	20	Floor Drain	Overflow Line Size Pipe Diam 3" 316L Stainless Steel	24590-HLW-M6-RLD-P0015
RLD-ZF-03447-S11B-03 H-B005 (SBS Drain Collection Cell No. 2)	20	Floor Drain	Overflow Line Size Pipe Diam 3" 316L Stainless Steel	24590-HLW-M6-RLD-P20004
HCP-PC-00057-S12A-011/2 H-B014 (Wet Process Cell	5	Floor Drain	Overflow Line Size Pipe Diam 1.5" 316L Stainless Steel	24590-HLW-M6-RLD-P0015
HCP-PC-00061-S12A-011/2 H-B014 (Wet Process Cell	5	Floor Drain	Overflow Line Size Pipe Diam 1.5" 316L Stainless Steel	24590-HLW-M6-RLD-P0015
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.E O – Laboratory Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.

Table III.10.E P – Laboratory Tank Systems Secondary Containment Systems Including Sumps and Floor Drains

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Type/Nominal Operating Volume (gallons)	Sump Dimensions (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-SUMP-00041 A-B003 (C3 Effluent Vessel Cell, El. -18'7')	30	Dry	30" Dia. X ~12" Deep 304L or higher grade	**24590-LAB** -M6-RLD-P0002 -P160-P0007
RLD-SUMP-00042 A-B004 (C5 Effluent Vessel Cell, El. -19'2')	30	Dry	30" Dia. X ~12" Deep 304L or higher grade	**24590-LAB** -M6-RLD-P0001 -LAB-P160-P0007
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A. – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
Pretreatment Hot Cell Containment Building	414x54x46	RESERVED	Section 4.3.4 Fig. 4A-78	RESERVED	RESERVED	RESERVED	Yes
Pretreatment Maintenance Containment Building	(98x56x18) + (54x5x18) + (54x78x18) + (18x98x18)	RESERVED	Section 4.3.4 Fig. 4A-78	RESERVED	RESERVED	RESERVED	Yes
Pretreatment Air Filtration Containment Building	234x54x19	RESERVED	Section 4.3.4 Fig. 4A-80, -81	RESERVED	RESERVED	RESERVED	No
LAW LSM Gallery Containment Building	151x62x25	RESERVED	Section 4.3.4 Fig. 4A-83	RESERVED	RESERVED	RESERVED	Yes
ILAW Container Finishing Containment Building	98x31x25	RESERVED	Section 4.3.4 Fig. 4A-83	RESERVED	RESERVED	RESERVED	No
Law Vitrification Plant C3 Workshop Containment Building	35x40x20	RESERVED	Section 4.3.4 Fig. 4A-85	RESERVED	RESERVED	RESERVED	Yes
HLW Melters 1 and 2 Containment Buildings	35x107x49	RESERVED	Section 4.3.4 Fig. 4A-87	RESERVED	RESERVED	RESERVED	No
IHLW Container Weld Containment Building	140x18x48	RESERVED	Section 4.3.4 Fig. 4A-88	RESERVED	RESERVED	RESERVED	No
IHLW Container Decontamination Building	10x80x58	RESERVED	Section 4.3.4 Fig. 4A-88	RESERVED	RESERVED	RESERVED	No
HLW Vitrification Plant C3 Workshop Containment Building	30x27x19 + 33x15x19	RESERVED	Section 4.3.4 Fig.4A-89	RESERVED	RESERVED	RESERVED	No
HLW Air Filtration Containment Building	104x38x19	RESERVED	Section 4.3.4 Fig. 4A-88	RESERVED	RESERVED	RESERVED	No
~~HLW Drum Transfer Containment Building~~	~~220x10x10~~	~~RESERVED~~	~~Section 4.3.4 Fig. 4A-86~~	~~RESERVED~~	~~RESERVED~~	~~RESERVED~~	~~Yes~~
HLW Pour Tunnel No. 1 Containment Building	140x11x21	RESERVED	Section 4.3.4 Fig. 4A-86	RESERVED	RESERVED	RESERVED	No
HLW Pour Tunnel No. 2 Containment Building	140x11x21	RESERVED	Section 4.3.4 Fig. 4A-86	RESERVED	RESERVED	RESERVED	No

a. Containment Building Units include associated process systems and equipment
b. Requirements pertaining to the containers in the Containment Building Units are specified in Section III.10.D. of this Permit.
c. Requirements pertaining to the tanks in the Containment Building Units are specified in Section III.10.E. of this Permit.

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Table III.10.H.A - LAW Vitrification System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures	Maximum Capacity (gallons)
Melter Feed [a] Systems-Melter 1,2, & 3	LFP LCP	RESERVED	Section 4.2.3.1; Tables 4-4 and 4-11, and Figures 4A-1, 4A-3, and 4A-20 of Attachment 51, Chapter 4 of this Permit	N/A
LAW Melters 1,2, & 3	LMP	RESERVED	Section 4.2.3.2; Tables 4-4, and Figure 4A-21 of Attachment 51, Chapter 4 of this Permit	N/A
LAW Glass Product Systems-Melter 1,2, & 3	LMP	RESERVED	Section 4.2.3.2 of Attachment 51, Chapter 4 of this Permit	N/A
Primary & Secondary Film Coolers-Melter 1, 2, & 3	LOP	RESERVED	Section 4.2.3.3 and Figure 4A-21 of Attachment 51, Chapter 4 of this Permit	N/A
Melter 1 & 2 Submerged Bed Scrubbers LAW-MK-LOP-SCB-00001 & -00002, Melter 1 & 2 SBS Condensate Vessels LAW-MV-LOP-VSL-00001 [a] & -00002 [a], Submerged Bed Scrubbers/Condensate Vessels [a]-Melter 1, 2, & 3	LOP	~~RESERVED~~ **24590-LAW** -M6-LOP-P0001 -M6-LOP-P0002 -MK-LOP-P0001001 -MK-LOP-P0001002 -MK-LOP-P0001003 -MKD-LOP-P0002 -MKD-LOP-P0004 -MKD-LOP-P0008	Section 4.2.3.3; Tables 4-4 and 4-11, and Figure 4A-22 of Attachment 51, Chapter 4 of this Permit	LOP-SCB-00001 = 4,948 LOP-SCB-00002 = 4,948

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures	Maximum Capacity (gallons)
Wet electrostatic Precipitators-Melter 1, 2, & 3	LOP	RESERVED	Section 4.2.3.3 and Figure 4A-22 of Attachment 51, Chapter 4 of this Permit	N/A
High Efficiency Particulate Air Filters	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Thermal Catalytical Oxidation Unit	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Selective Catalytical Reduction Units	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Caustic Scrubber/Blowdown Vessel [a]	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Electric Heaters	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Heat Exchangers	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Pumps	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Exhaust Fans	LVP	RESERVED	Section 4.2.3.3 of Attachment 51, Chapter 4 of this Permit	N/A
Mist Eliminators	LVP	RESERVED	Section 4.2.3.3 of Attachment 51, Chapter 4 of this Permit	N/A
LAW Stack	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A

1 **Table III.10.I.A - LAW Vitrification System Description**

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Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables and Figures	Maximum Capacity (gallons)
Melter Feed [a] Systems-Melter 1,2, & 3	LFP LCP GFR	RESERVED	Section 4.2.3.1; Tables 4-4 and 4-11, and Figures 4A-1, 4A-3, and 4A-20 of Attachment 51, Chapter 4 of this Permit	N/A
LAW Melters 1,2, & 3	LMP	RESERVED	Section 4.2.3.2; Tables 4-4, and Figure 4A-21 of Attachment 51, Chapter 4 of this Permit	N/A
LAW Glass Product Systems-Melter 1,2, & 3	LMP	RESERVED	Section 4.2.3.2 of Attachment 51, Chapter 4 of this Permit	N/A
Primary & Secondary Film Coolers-Melter 1, 2, & 3	LOP	RESERVED	Section 4.2.3.3 and Figure 4A-21 of Attachment 51, Chapter 4 of this Permit	N/A
~~Submerged Bed Scrubbers/Condensate Vessels [a] Melter 1, 2, & 3~~	~~LOP~~	~~RESERVED~~	~~Section 4.2.3.3; Tables 4-4 and 4-11, and Figure 4A-22 of Attachment 51, Chapter 4 of this Permit~~	N/A
Melter 1 & 2 Submerged Bed Scrubbers LAW-MK-LOP-SCB-00001 & -00002, Melter 1 & 2 SBS Condensate Vessels LAW-MV-LOP-VSL-00001 [a] & -00002 [a], Submerged Bed Scrubbers/Condensate Vessels [a]-Melter 1, 2, & 3	LOP	~~RESERVED~~ **24590-LAW** -M6-LOP-P0001 -M6-LOP-P0002 -MK-LOP-P0001001 -MK-LOP-P0001002 -MK-LOP-P0001003 -MKD-LOP-P0002 -MKD-LOP-P0004 -MKD-LOP-P0008	Section 4.2.3.3; Tables 4-4 and 4-11, and Figure 4A-22 of Attachment 51, Chapter 4 of this Permit	LOP-SCB-00001 = 4,948 LOP-SCB-00002 = 4,948
Wet electrostatic Precipitators-Melter 1, 2, & 3	LOP	RESERVED	Section 4.2.3.3 and Figure 4A-22 of Attachment 51, Chapter 4 of this Permit	N/A
High Efficiency Particulate Air Filters	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Thermal Catalytical	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-	N/A

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables and Figures	Maximum Capacity (gallons)
Oxidation Unit			23 of Attachment 51, Chapter 4 of this Permit	
Selective Catalytical Reduction Units	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Caustic Scrubber/Blowdown Vessel [a]	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Electric Heaters	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Heat Exchangers	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Pumps	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A
Exhaust Fans	LVP	RESERVED	Section 4.2.3.3 of Attachment 51, Chapter 4 of this Permit	N/A
Mist Eliminators	LVP	RESERVED	Section 4.2.3.3 of Attachment 51, Chapter 4 of this Permit	N/A
LAW Stack	LVP	RESERVED	Section 4.2.3.3 and Figure 4A-23 of Attachment 51, Chapter 4 of this Permit	N/A

a. Requirements pertaining to the tanks in LAW Vitrification System Melter Feed System, Submerged Bed Scrubbers/Condensate Vessels, and Caustic Scrubber/Blowdown Vessel are specified in Permit Section III.10.E.

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Table III.10.J.A - HLW Vitrification System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
Melter Feed [a] System –Melter 1	HFP HCP		Section 4.2.4.1; Table 4-5 & 4-11, Figures 4A-1, 4A-4, 4A-26
HLW Melter 1	HMP		Section 4.2.4.2; Figures 4A-1, 4A-4, 4A-27
HLW Glass Product System-Melter 1	HMP		Section 4.2.4.2; Figures 4A-1, 4A-4, 4A-27
Film Cooler - Melter 1	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-27
Submerged Bed Scrubber /Condensate Collection Vessels [a] -Melter 1	HOP		Section 4.2.4.3; Table 4-5 & 4-11, Figures 4A-1, 4A-4, 4A-28
Wet Electrostatic Precipitator-Melter 1	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-28
High Efficiency Particulate Air Filters	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
High Efficiency Mist Eliminator	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-28
Thermal Catalytical Oxidation Unit	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
Selective Catalytical Reduction Unit	HOP	**24590-HLW**	Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29

Sub-system Description	**Sub-system Designation**	**Engineering Description (Drawing Nos., Specification Nos., etc.)**	**Narrative Description, Tables, and Figures**
~~Silver Mordenite Column~~ Melter 1 Silver Mordenite Column HLW-MV-HOP-ABS-00002, Melter 2 Silver Mordenite Column HLW-MV-HOP-ABS-00003	HOP	-M6-HOP-P0008 -M6-HOP-P20008 -MKD-HOP-P0014 -MKD-HOP-P0017 -3PS-MBTO-TP001	Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
Electric Heaters	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
Heat Exchangers	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
Pumps	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-27, 4A-28, 4A-29
Booster Fans	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
HLW Stack	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29

a. Requirements pertaining to the tanks in HLW Vitrification System Melter Feed System, Submerged Bed Scrubber/Condensate Vessels are specified in Permit Section III.10.E.

Table III.10.K.A - HLW Vitrification System Description

Sub-system Description	Subsystem Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
Melter Feed [a] System –Melter 1	HFP HCP		Section 4.2.4.1; Table 4-5 & 4-11, Figures 4A-1, 4A-4, 4A-26
HLW Melter 1	HMP		Section 4.2.4.2; Figures 4A-1, 4A-4, 4A-27
HLW Glass Product System-Melter 1	HMP		Section 4.2.4.2; Figures 4A-1, 4A-4, 4A-27
Film Cooler - Melter 1	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-27
Submerged Bed Scrubber /Condensate Collection Vessels [a] -Melter 1	HOP		Section 4.2.4.3; Table 4-5 & 4-11, Figures 4A-1, 4A-4, 4A-28
Wet Electrostatic Precipitator-Melter 1	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-28
High Efficiency Particulate Air Filters	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
High Efficiency Mist Eliminator	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-28
Thermal Catalytical Oxidation Unit	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
Selective Catalytical Reduction Unit	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
~~Silver Mordenite Column~~ Melter 1 Silver Mordenite Column HLW-MV-HOP-ABS-00002, Melter 2 Silver Mordenite Column HLW-MV-HOP-ABS-00003	HOP	**24590-HLW** -M6-HOP-P0008 -M6-HOP-P20008 -MKD-HOP-P0014 -MKD-HOP-P0017 -3PS-MBTO-TP001	Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
Electric Heaters	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
Heat Exchangers	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
Pumps	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-27, 4A-28, 4A-29
Booster Fans	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29
HLW Stack	HOP		Section 4.2.4.3; Figures 4A-1, 4A-4, 4A-29

a. Requirements pertaining to the tanks in HLW Vitrification System Melter Feed System, Submerged Bed Scrubber/Condensate Vessels are specified in Permit Section III.10.E.

Waste Treatment and Immobilization Plant
Unit Specific Permit Conditions

Page Changes to Attachment 51, Chapter 4.0

(New text is double underlined
Deleted text is struck out)

contaminated materials. Limited personnel access and controlled movement of equipment into and out of the unit will decrease the possibility that waste will be tracked from the unit.

Personnel access to the HLW vitrification plant air filtration containment building, which is classified as a C3 contamination area, will be limited due to radiological concerns. Access to the unit will be allowed only under limited circumstances, thereby limiting the potential for contacting the waste and tracking it from the unit.

Control of Fugitive Dust from the HLW Vitrification Plant Air Filtration Containment Building
The following measures will be used to prevent fugitive dust from escaping the HLW vitrification plant air filtration containment building unit.

- A cascading air flow from areas of least to greatest potential contamination (i.e., C2 to C3 to C5)
- Greater negative air pressure in the unit, compared with adjacent C2 units, to pull air into the unit and prevent backflow
- Intake air through controlled air in-bleed units, with backflow prevention dampers
- HEPA filtration of exhaust air before discharge to the atmosphere through a monitored stack
- A multiple fan extraction system designed to maintain negative pressure, and cascading air flow, even during fan maintenance and repair
- Personnel ingress and egress through airlocks and subchange rooms

Procedures in the Event of Release or Potential for Release from the HLW Vitrification Plant Air Filtration Containment Building
Conditions that could lead to a release from the HLW vitrification plant air filtration containment building will be corrected as soon as possible after they are identified. The ventilation system and airlocks, the most likely sources of potential releases, will be designed with backup HEPA filters to facilitate repairs and replacement.

In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to the start of operations.

Inspections of the HLW Vitrification Plant Air Filtration Containment Building
An inspection program will be established to detect conditions that could lead to a release of wastes from the HLW vitrification plant air filtration containment building. The inspection and monitoring schedule, and methods that will be used to detect releases from the unit, are included in Chapter 6.

~~4.2.4.12 HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~

~~The HLW vitrification plant drum transfer tunnel containment building stretches east to west, nearly the entire length of the HLW vitrification plant. Typical waste management activities~~

~~performed in this containment building include size reduction, storage of uncontainerized waste, and packaging of failed and spent equipment.~~

.2.4.13 Pour Tunnels No. 1 and No. 2 (H-B032 and H-B005A)

Pour Tunnels 1 and 2 contain bogies that transport empty canisters to the melter pour spout. Each of the two pour tunnels are 11' wide by 85'-2" long extending from the South end of the melter caves in a North-South direction to an area below the canister handling cave. The glass pouring into canisters takes place in the north half of the Pour Tunnels 1 and 2. After filling with glass, the canisters are allowed to cool down prior to being transported to the south portion of the Pour Tunnels 1 and 2 and transferred through the hatch to the canister handling cave located above. The south portion of the Pour Tunnels 1 and 2 can be used for bogie decontamination, if required, prior to handling in the bogie maintenance area. Bogie maintenance area is segregated from Pour Tunnel 1 and 2 by a shield door. Bogie decontamination is not considered a dangerous waste management activity performed within the boundary of Pour Tunnel 1 and 2.

Pour Tunnel Containment Building Design

The pour tunnel containment buildings will be completely enclosed within the HLW vitrification facility, and will be designed to prevent the release of dangerous constituents and their exposure to the outside environment. The design and construction of the HLW vitrification facility exterior will prevent water from running into the facility. Unit dimensions are summarized in Table 4-12.

The containment buildings' design requirements of 40 CFR 264.1101 (b) do not apply because there are no liquid wastes managed in the pour tunnels.

Pour Tunnel Containment Building Structure

Because the pour tunnels will be concrete-walled structures fully enclosed within the HLW vitrification facility, their structural requirements will be met by the design standards of the HLW vitrification facility. The design will ensure that the units have sufficient structural strength to prevent collapse of failure. The seismic requirement that the buildings must address are presented in the *RPP-WTP Compliance with Uniform Building Code Seismic Deign Requirements*, found in Supplement 1.

Pour Tunnel Containment Building Unit Materials

The pour tunnel containment buildings will be constructed of steel-reinforced concrete. The interior floors and portions of the walls of the units will be lined with stainless steel to protect the insulation and concrete from the effects of high temperatures. The roof of the HLW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Run-off will be collected by roof drains and a drainage system with overflow roof drains.

Use of Incompatible Materials for the Pour Tunnel Containment Buildings

There are no liquid dangerous wastes managed within the pour tunnel containment buildings.

Primary Barrier Integrity in the Pour Tunnel Containment Buildings

The pour tunnel containment buildings are designed to withstand loads from the movement of wastes and handling equipment. The seismic design criteria found in Supplement 1, ensures appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the Waste Handling Room Containment Building

Prior to the start of operations, certification by a qualified registered professional engineer that the pour tunnel containment buildings meet the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because no free liquids are managed in the unit.

Operation of the Pour Tunnel Containment Buildings

Operational and maintenance controls and practices will be established to ensure containment of the wastes within the pour tunnel containment buildings, as required by 40 CFR 264.1101(c)(1).

Maintenance of the Pour Tunnel Containment Buildings

A stainless steel liner will be installed in the pour tunnel containment buildings to protect insulation and concrete from the effects of high temperatures. Waste canisters will not be stacked within the unit.

Measures to Prevent Tracking Wastes from the Pour Tunnel Containment Buildings

The HLW vitrification plant C5 pour tunnel containment buildings will be designed to isolate failed equipment from the accessible environment and to prevent the spread of contaminated materials. Very little dust is expected to be generated in the unit.

Personnel access to the containment building will not be allowed because of high radiation.

Control of Fugitive Dust from the Pour Tunnel Containment Buildings

Operational controls of the HLW vitrification facility ventilation system will be used to control fugitive dust emissions from the units to meet the requirements of 40 CFR 264.1101(c)(1)(iv). The following measures will be used to prevent fugitive dust from escaping the pour tunnel containment buildings.

- A cascading air flow from areas of lest to greatest potential contamination (i.e., C2 to C3 to C5)
- Greater negative air pressure in the unit, compared to adjacent C3 units, to pull air into the unit and prevent backflow
- Intake air through controlled air in-bleed units with backflow prevention dampers
- Safety interlocks to shut down C3 extract fans to prevent backflow if the C5 system shuts down
- Dual HEPA filtration of exhaust air before discharge to the atmosphere through a monitored stack
- A multiple fan extraction system, designed to maintain negative pressure and cascading air flow, even during fan maintenance and repair
- Personnel ingress and egress through airlocks and subchange rooms

Procedures in the Event of Release or Potential for Release from the Pour Tunnel Containment Buildings

Conditions that could lead to a release from the pour tunnel containment buildings will be corrected as soon as possible after they are identified. The ventilation system, the most likely source of potential releases, is designed with two stages of HEPA filters with backup HEPA filters to facilitate repairs and replacement.

In the unlikely event of a release of dangerous wastes from the containment buildings, actions required by 40 CFR 264.1101(c)(3)(I) through (iii) will be taken. Administrative and operating methods to satisfy this requirement will be developed prior to the start of operations.

Inspections of the Pour Tunnel Containment Buildings

An inspection program will be established as required under WAC 173-303-695, to detect conditions that could lead to the release of wastes from the HLW pour tunnel containment buildings. The inspection and monitoring schedule and methods that will be used to detect a release is included in Chapter 6.

~~HLW Vitrification Plant Drum Transfer Tunnel Containment Building Design~~

~~The HLW vitrification plant drum transfer containment building will be completely enclosed within the HLW vitrification plant, and will be designed to prevent the release and exposure of dangerous constituents to the outside environment. The design and construction of the HLW vitrification plant exterior will prevent water from running into the plant. The approximate dimensions of the containment building are summarized in Table 4-12.~~

~~HLW Vitrification Plant Drum Transfer Tunnel Containment Building Structure~~

~~Because the HLW vitrification plant drum transfer tunnel containment building will be a concrete-walled structure fully enclosed within the HLW vitrification plant, its requirements will be met by the design standards of the HLW vitrification plant. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. The seismic requirements for the HLW vitrification plant are presented in the *RPP-WTP Compliance with Uniform Building Code Seismic Design Requirements*, found in Supplement 1.~~

~~HLW Vitrification Plant Drum Transfer Tunnel Containment Building Materials~~

~~The HLW vitrification plant drum transfer tunnel containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls will be lined with a protective coating. The roof of the HLW vitrification plant will consist of metal roofing, roof insulation, and a vapor barrier. Run-on will be collected by roof drains and a drainage system with overflow drains.~~

~~Use of Incompatible Materials for the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~

~~A protective coating will be provided for the containment building. The coating will be compatible with the wastes that will be managed in the unit, which will include out-of-service process equipment, including pumps, valve, filters, jumpers, and maintenance equipment. Reagents that could cause the liner to leak, corrode, or otherwise fail will not be used within the unit.~~

~~Primary Barrier Integrity in the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~

~~The HLW vitrification plant drum transfer tunnel containment building will be designed to withstand loads from the movement of wastes and handling equipment. The seismic design criteria found in Supplement 1, ensures appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.~~

~~Certification of Design for the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~

~~Prior to the start of operations, certification by a qualified registered professional engineer that the HLW vitrification plant drum transfer tunnel containment building meets the design requirements of 40 CFR 264.1101(a), (b), and (c) will be obtained.~~

~~Operation of the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~
~~Operational and maintenance controls and practices will be established to ensure containment of the waste within the HLW vitrification plant drum transfer tunnel containment building, as required by 40 CFR 264.1101(c)(1).~~

~~Maintenance of the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~
~~The protectively-coated concrete floor and walls of the unit will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The protective coating will be compatible with materials that will be managed in the containment building, which will include the out-of-service process equipment and containerized waste and equipment. No decontamination chemicals that are incompatible with the coated concrete will be used.~~

~~Measures to Prevent Tracking Wastes from the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~
~~The HLW vitrification plant drum transfer tunnel containment building is designed to provide a means to dispose of spent equipment by providing lifting, holding, and transporting of disposal containers. The unit also supports size reduction and packaging of waste containers. Conducting these activities in a C3 zone will prevent the spread of contaminated materials. Limited personnel access and controlled movement of equipment into and out of the unit will decrease the possibility that waste will be tracked from the unit.~~

~~Personnel access to the HLW vitrification plant drum transfer tunnel containment building, which is classified as a C3 contamination area, will be limited due to radiological concerns. Access to the unit will be allowed only under limited circumstances, thereby limiting the potential for contacting the waste and tracking it from the unit.~~

~~Control of Fugitive Dust from the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~
~~The following measures will be used to prevent fugitive dust from escaping the HLW vitrification plant drum transfer tunnel containment building unit:~~

- ~~A cascading air flow from areas of least to greatest potential contamination (i.e., C2 to C3 to C5)~~
- ~~Greater negative air pressure in the unit, compared with adjacent C2 units, to pull air into the unit and prevent backflow~~
- ~~Intake air through controlled air in-bleed units, with backflow prevention dampers~~
- ~~Dual HEPA filtration of exhaust air before discharge to the atmosphere through a monitored stack~~
- ~~A multiple fan extraction system designed to maintain negative pressure, and cascading air flow, even during fan maintenance and repair~~
- ~~Personnel ingress and egress through airlocks and subchange rooms~~

~~Procedures in the Event of Release or Potential for Release from the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~

~~Conditions that could lead to a release from the HLW vitrification plant drum transfer tunnel containment building will be corrected as soon as possible after they are identified. The ventilation system and airlocks, the most likely sources of potential releases, will be designed with backup HEPA filters to facilitate repairs and replacement.~~

~~In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to the start of operations.~~

~~Inspections of the HLW Vitrification Plant Drum Transfer Tunnel Containment Building~~

~~An inspection program will be established to detect conditions that could lead to a release of wastes from the HLW vitrification plant drum transfer tunnel containment building. The inspection and monitoring schedule, and methods that will be used to detect releases from the unit, are included in Chapter 6.~~

4.3 OTHER WASTE MANAGEMENT UNITS

Sections 4.3.1 through 4.3.5 discuss the applicability of the requirements for waste management units that have not been discussed up to this point in the DWPA. Sections 4.3.6 through 4.3.9 describe the applicability of air emission controls, waste minimization, groundwater monitoring, and functional design requirements to the WTP. References to other sections of the DWPA are provided as appropriate.

4.3.1 Waste Piles [D-3]

The operation of the WTP does not involve the placement of dangerous waste in waste piles. Therefore, the requirements of WAC 173-303-660, "Waste Piles," do not apply to the WTP.

4.3.2 Surface Impoundments [D-4]

The operation of the WTP does not involve the placement of dangerous waste in surface impoundments. Therefore, the requirements of WAC 173-303-650, "Surface Impoundments," do not apply to the WTP.

4.3.3 Incinerators [D-5]

The WTP does not include a dangerous waste incinerator. Therefore, the requirements of WAC 173-303-670, "Incinerators," do not apply to the WTP.

4.3.4 Landfills [D-6]

The operation of the WTP does not involve the placement of dangerous waste in landfills. Therefore, the requirements of WAC 173-303-665, "Landfills," do not apply to the WTP.

1

Table 4-12 Containment Buildings Summary

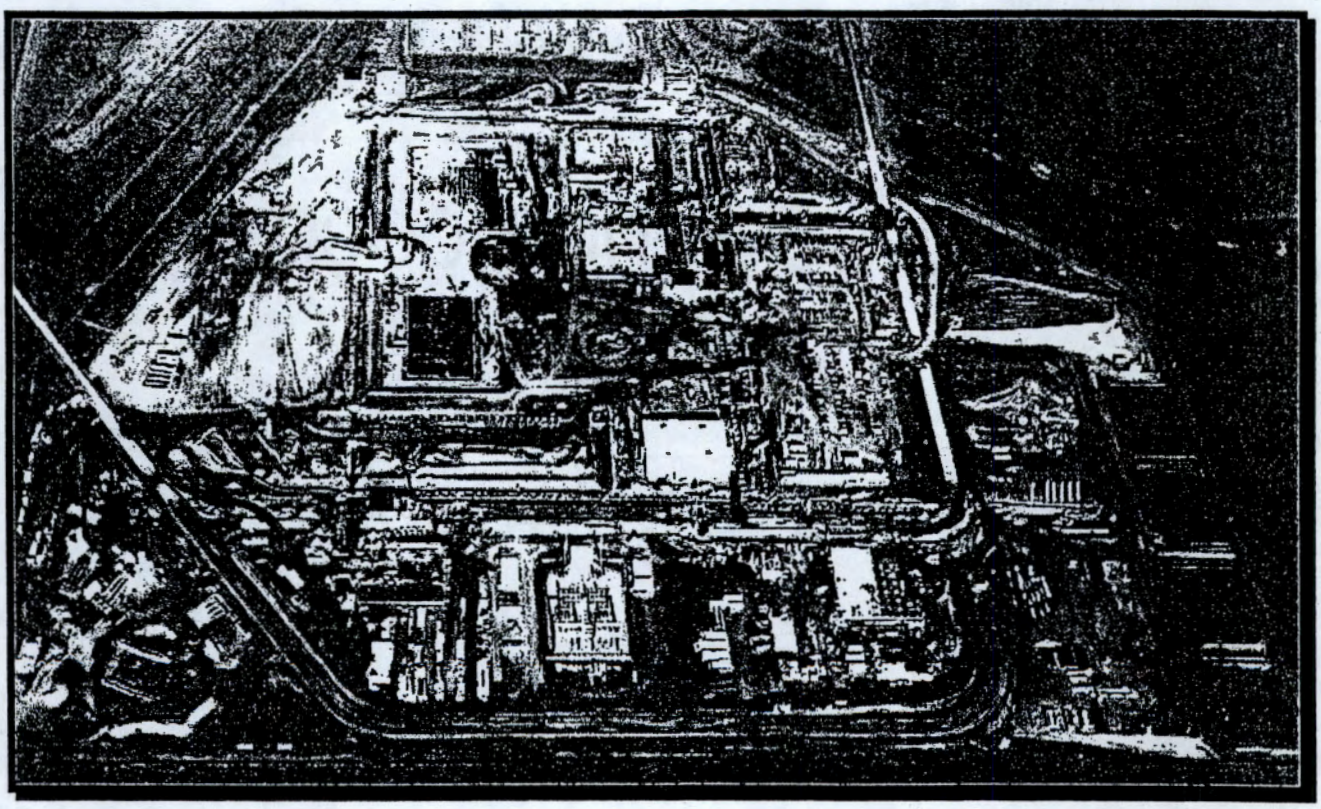
Location	Approximate Dimensions (L × W × H, in feet)
Pretreatment Plant	
Pretreatment Hot Cell Containment Building	414 × 54 × 46
Pretreatment Maintenance Containment Building	(98 × 56 × 18) + (54 × 5 × 18) + (54 × 78 × 18) + (18 × 98 × 18)
Pretreatment Air Filtration Containment Building	234 × 54 × 19
LAW Vitrification Plant	
LAW LSM Gallery Containment Building	151 × 62 × 25
ILAW Container Finishing Containment Building	98 × 31 × 25
LAW Vitrification Plant C3 Workshop Containment Building	35 × 40 × 20
HLW Vitrification Plant	
HLW Melters No. 1 and 2 Containment Buildings	35 × 107 × 49
IHLW Container Weld Containment Building	140 × 18 × 48
IHLW Container Decontamination Building	10 × 80 × 58
HLW Vitrification Plant C3 Workshop Containment Building	(30 × 27 × 19) + (33 x 15 x 19)
HLW Air Filtration Containment Building	104 × 38 × 19
HLW Pour Tunnel No. 1 (H-B032)	140 x 11 x 21
HLW Pour Tunnel No. 2 (H-B005A)	140 x 11x 21
~~HLW Drum Transfer Tunnel Containment Building~~	~~220 × 10 × 10~~

2

HANFORD TANK WASTE TREATMENT AND IMMOBILIZATION PLANT

POST CONSTRUCTION TRAFFIC ANALYSIS

FINAL PROJECT REPORT



Washington

December 15, 2003

Bechtel National, Inc.

Job No. 24590

SUPPLIER DOCUMENT STATUS

1. Work may proceed.
2. Revise and resubmit. Work may proceed subject to resolution of indicated comments.
3. Revise and resubmit. Work may not proceed.
4. Review not required. Work may proceed.

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligations.

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G-321 Document Category _____
[From Supplement A to G-321 (E) or G-321-V (V), as applicable, or "N/A" if SSRS is used]

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[When applicable]

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PURCHASE ORDER SUBMITTAL

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EXECUTIVE SUMMARY

Goals and Objectives

The Hanford Tank Waste Treatment and Immobilization Plant (WTP) is a new facility designed to process, store, treat and transport mixed waste. The new plant is a planned facility within the existing Hanford Site (**Exhibit 1**). The general goal of this study is to determine the transportation needs of the Hanford Tank Waste Treatment and Immobilization Plant (WTP) facility and develop a transportation plan to meet those requirements. The specific objectives of this analysis are to examine the security barricades, the roadway access system, the internal street layout and the parking facilities for their ability to accommodate the anticipated increase in overall travel demands and to provide information to support acquisition of WTP Environmental Permits.

The WTP site's steady-state commissioning staff (e.g. post-construction) is expected to number between 1,000 and 1,500 people, with about 600 of the total staff assigned to four shifts. Except for parking lot sizing, this post-construction traffic analysis assumes a staff of 1,500. Parking lots are currently sized based on a post-construction staff of 1,200. After completion of the construction phases, a staff size of 1,500 will create up to 2,300 daily vehicle trips to the Hanford area roadways.

Site Specific Recommendations

No improvements are needed to accommodate the existing traffic volumes. The existing roadway system has adequate capacity to serve the existing traffic volumes. At the project post-construction traffic volumes the existing roadway system is over capacity if the existing Hanford Site population and traffic remains constant. The project team developed the following alternatives to mitigate the capacity problems:

- modify the WTP day shift start/end times,
- implement a carpooling or shuttle bus system,
- divert traffic to Route 2S/11A, and
- widen Route 4S.

The need for the above mitigation alternatives will be reduced or eliminated if the Hanford Site population and traffic volumes are reduced at project post-construction.

The project team developed a prioritized list of the alternatives by ease of implementation, impact to employees, operational and capital cost, and other factors. It was concluded modifying the WTP day shift start/end times was the most desirable alternative. This option is the least expensive and is the easiest to implement from total operational and construction standpoint.

The current planned permanent parking lots will accommodate 745 spaces and are adequate for a projected staffing of 1,200 with 600 of the staff assigned to shifts.

The existing two, 2-lane access roads (one south to Route 4S and one north to Route 11A) are adequate for the post-construction condition.

There are two potential improvements to the WTP site's (**Exhibit 2**) internal roadway system.

- Extend B Road north from M Road to C Road. This one segment is the last portion of the internal ring road system. The connection will improve overall circulation and minimize the traffic volumes on the internal roadways.
- Extend D Road from K Road to B Road. The intersection of D Road, M Road and K Road is atypical. The project team recommends shifting the northern switchgear building to the north, and extending D Road eastward to B Road.
- The project team recommends providing a turnaround outside each of the security gates if they are to be located more than 100-feet from the adjacent internal roadway. The design should provide a minimum 45-foot turning radius.

The planned truck loading and unloading facilities should be upgraded to support the planned operations. The recommended upgrades include:

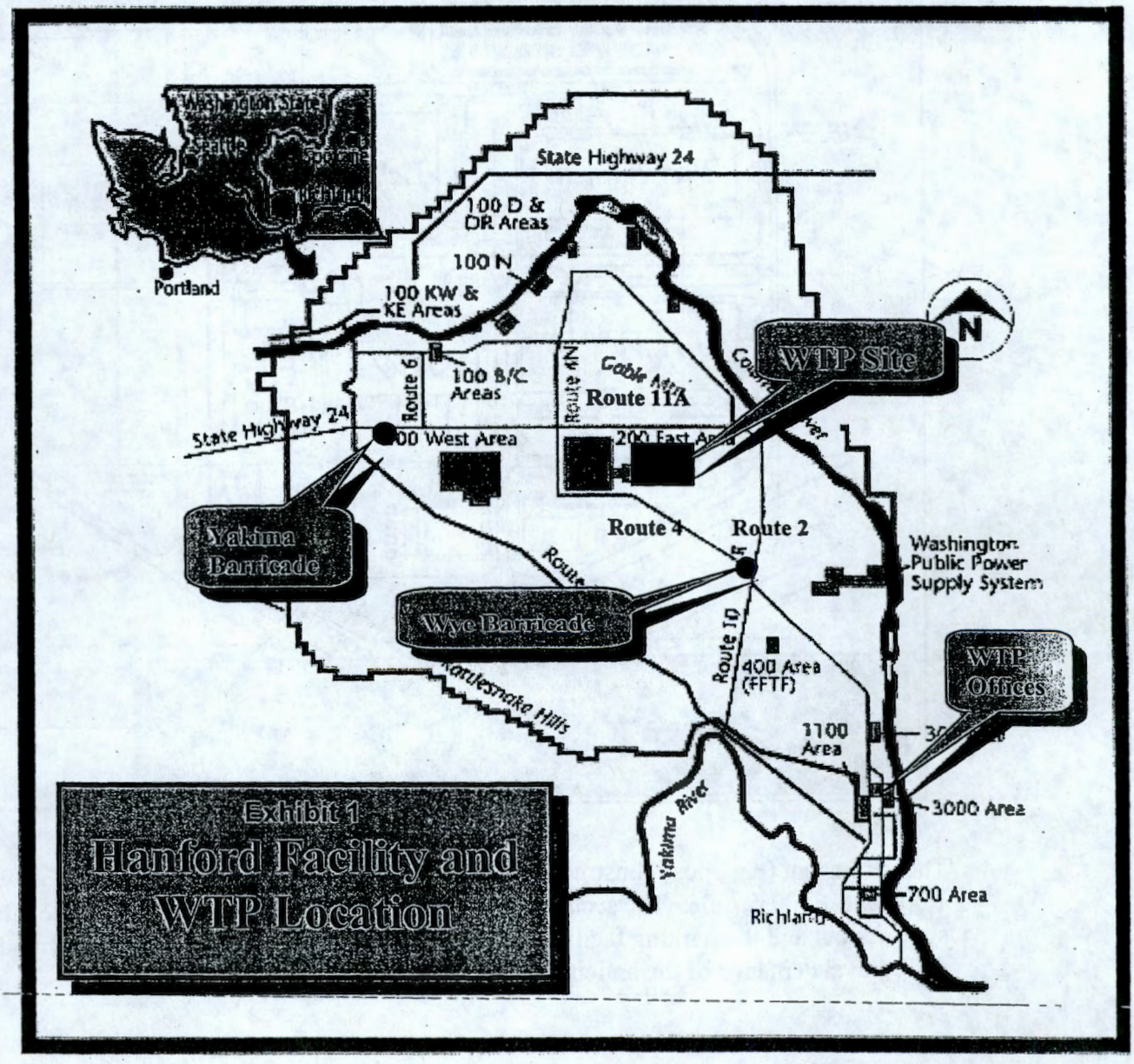
- The fuel oil unloading site is not adequate for the anticipated truck volume. Provide two unloading stations plus one truck waiting station if the delivery trucks arrive at random times and require a two-hour unloading period.
- The glass former unloading site is not adequate for the anticipated truck volume. Provide one unloading station plus one truck waiting station if the delivery trucks arrive at random times and require a one-hour or two-hour unloading period.
- The wet chemical unloading site is adequate for the anticipated truck volume.
- The current staffing unloading plan is not adequate for the anticipated truck volume. Three, 2-person teams will be needed if the delivery trucks arrive at random intervals and require a two-hour unloading period. Five, 2-person teams will be needed if the delivery trucks arrive at random intervals and require a three-hour unloading period. Staffing needs can be reduced through scheduled truck arrival times.

PROJECT REPORT

Introduction

The Hanford Tank Waste Treatment and Immobilization Plant (WTP) is a new facility designed to process, store, treat and transport mixed waste . The new plant is a planned facility within the existing Hanford Site. **Exhibit 1** shows the general site location. **Exhibit 2** shows the Waste Treatment Plant's site plan. (Supplemental drawings for **Exhibits 1** and **2** are attached.)

The general goal of this study is to determine the post-construction transportation needs of the Hanford Tank Waste Treatment and Immobilization Plant (WTP) facility and develop a transportation plan to meet those requirements. The operating approval by the Department of Energy requires the submission of the site's transportation plan.



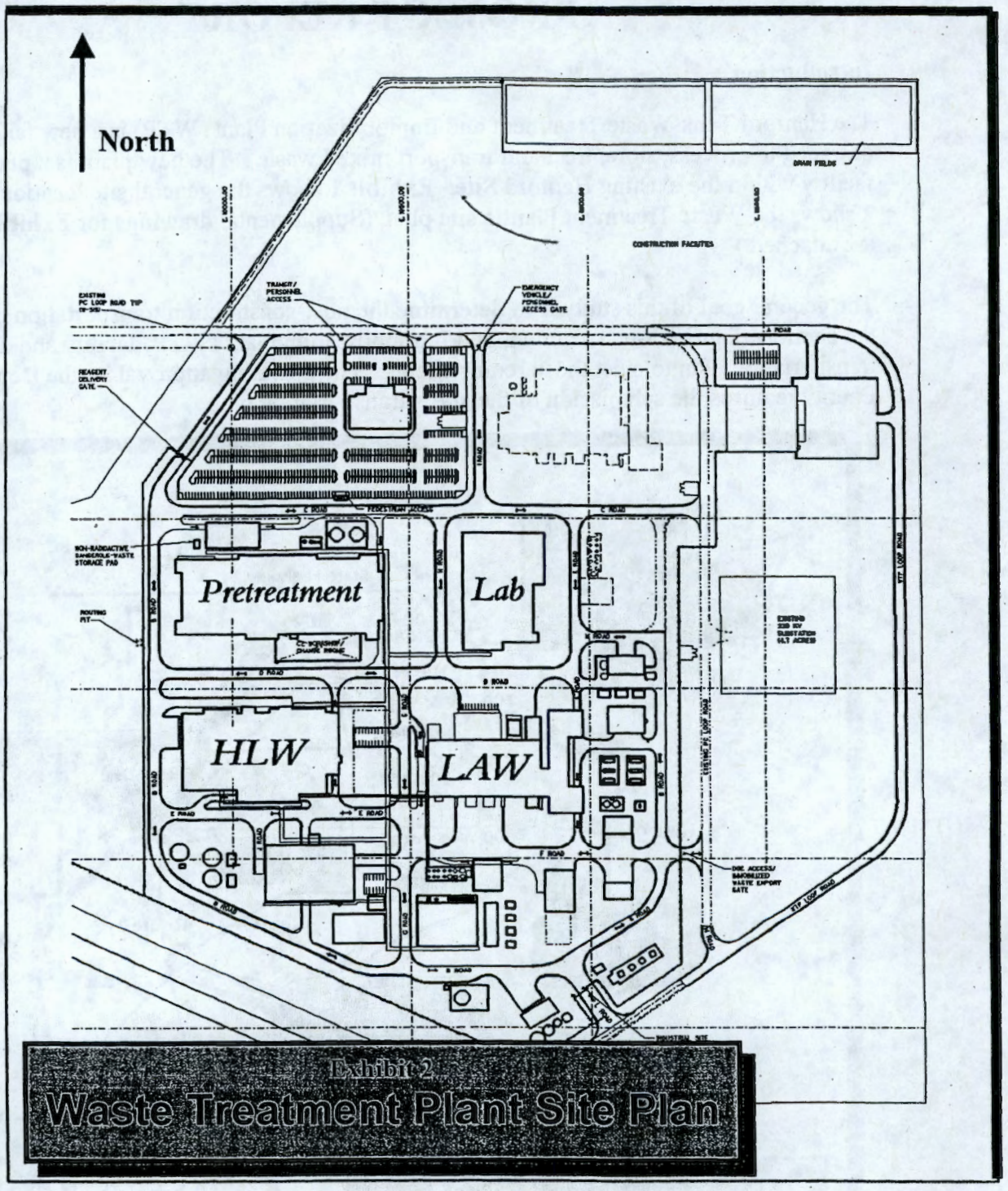


Exhibit 2
Waste Treatment Plant Site Plan

The permanent (e.g., post-construction) WTP site's staff is expected to number between 1,000 and 1,500 people. The security barricades, the roadway access system, the internal street layout and the parking facilities are all examined for their ability to accommodate the daily travel demands of the anticipated staff increase.

This project report includes:

- Evaluating the existing transportation system to determine if the current transportation demands are being met,
- Forecasting traffic volumes for project post-construction conditions,
- Evaluating the existing transportation system to determine if any further improvements are needed to accommodate the anticipated increase in build-out traffic volumes,
- Reviewing on-site circulation for its ability to maintain the forecast traffic volumes,
- Reviewing on-site parking facilities for their ability to support the forecast traffic volumes, and
- Reviewing the truck loading and unloading operations for their ability to provide for the anticipated number of trucks.
- Roadway data to support renewal of the WTP Environmental Permits.

This report includes several sections.

Executive Summary – The executive summary provides an overview of the project and a summary of the key recommendations.

Introduction - The report's introduction explains the reasons for the site transportation study, and outlines the objectives of this planning analysis.

1. **Existing Conditions** - A description of the existing roadways, an analysis of the intersection and roadway traffic volumes, an examination of traffic operations at the security barricades, and a discussion of vehicle occupancy rates are all presented in this first chapter.

2. **Proposed Project** - Chapter 2 identifies the proposed project and lists the transportation elements for the post-construction phase.

3. **Post-construction Project Conditions, Full Build Out** – This third chapter provides the forecast conditions of the transportation system after the construction phase of the WTP project is completed. At completion, the WTP project is expected to include up to 1,500 steady-state commissioning workers. Forecasts are provided for the roadways, intersections and security barricades. The analysis shows the forecast traffic volumes require some transportation system changes.

4. **Access Within the WTP Site** – This chapter reviews the transportation elements of the internal site roadways and access roads from Routes 4S and 11A to the WTP site. Recommendations are provided for roadway width, number of lanes and design.

5. **Parking Lots** – The permanent parking lots are discussed in Chapter 5. The permanent parking lot is reviewed for the number of spaces and internal circulation.

6. **Truck Loading and Unloading Stations** - This chapter provides a review of the three major truck loading/unloading stations within the WTP facility. The wet chemical, glass former and fuel oil delivery stations are each examined in detail. Recommendations are

provided for the number of unloading stations and the number of waiting stations. Additional information is provided for the number of necessary unloading staff.

7. **Recommendations** – The final chapter summarizes the recommendations developed through this study. The summary identifies the key elements of travel within the Hanford Site, accessibility of the WTP site, travel within the WTP and the loading/unloading stations within the WTP under post-construction conditions.

1. Existing Conditions

1.1. Land Use

The Hanford site is a 1,518 square kilometers (586 square miles) United States Department of Energy (DOE) development located in southeastern Washington State. The Hanford Site was originally established during World War II as part of the Manhattan Project and once played a pivotal role in the nation's defense system.

Mixed waste has resulted from more than forty years of reactor operations and plutonium production for national defense. The cleanup of this legacy waste is now a national priority and part of closing the circle on the nuclear weapons production cycle. This waste is now scheduled to be removed, treated (turned to glass or vitrified) and stored or transported to a more secure location.

The proposed Hanford Tank Waste Treatment and Immobilization Plant (WTP) is the method of removing, treating and disposing of the on-site waste . The general layout of the WTP project was shown in **Exhibit 2.** The project is currently under construction.

1.2. Roadways and Traffic Volumes

Exhibit 1 shows the major roads throughout the Hanford Site. These roads are classified as either primary or secondary routes. The primary routes includes Routes 4S, 10, 2S, 3, 6, and 11A, as well as various avenues within each area. The primary routes are constructed of bituminous asphalt (usually 5-centimeters thick, but the thickness of the asphalt layer will vary with each road) with an underlying aggregate base in accordance with U. S. Department of Transportation requirements. The secondary routes are constructed of layers of an oil and rock mixture with an underlying aggregate base. The aggregate base consists of various types and sizes of rock found onsite. The present load-bearing capacities of these roads are unknown; however, loads as large as 9.8 kilograms per square centimeter have been transported without observable damage to road surfaces. All roads originally were constructed to meet the requirements for the American Association of State Highway and Transportation Officials HS-20-44 load rating (AASHTO 1983). An HS-20-44 loading represents a two-axle tractor (front axle loading of 3,630 kilograms and rear axle loading of 14,500 kilograms) plus a single-axle trailer with a 14,500-kilogram axle loading.

The primary roadways within the study area are Route 4S and Route 11A/Route 2S (See **Exhibit 1**). The existing Route 4S has the following description:

- Two-lane primary roadway.
- There are no paved shoulders.
- There is a 7-mile distance between the Wye Barricade and the intersection with the WTP site access road.
- There is an added, westbound climbing lane from Milepost 6 to Milepost 5.
- The route has a signed speed limit of 55 MPH.

Traffic counts on various sections of Route 4S indicate that the daily traffic volumes reach a peak of approximately 5,200 vehicles per day (March, 2002). The traffic count summary data

are summarized in **Exhibit 3**. The following observations were made of the Route 4S traffic counts.

- Route 4S has adequate daily capacity to accommodate the existing traffic volumes. The observed traffic counts show approximately 5,200 vehicles per day. The traffic volume threshold of the roadway is 11,000 vehicles per day.
- The directional, 15-minute traffic counts show 441 vehicles. This volume approaches the roadway's operational capacity of 450 vehicles in 15-minutes.
- The existing, daily and peak hour traffic volumes are within the capacity of the roadway and do not justify any changes to the existing roadways and intersections.
- Little additional traffic can be accommodated without a significant increase in roadway capacity.

Exhibit 3: Route 4S Traffic Volumes (North of the Wye Barricade)			
Traffic Count Category	Volume (Veh)	Roadway Capacity (Veh)	Comments
Daily, two-way volume	5,190	11,000	Volume is within the daily capacity of the roadway.
AM Peak Hour, one-way volume	1,259	1,800	Volume approaches the hourly capacity of the roadway.
AM Peak Hour, one-way volume (peak 15 minutes)	441	450	Volume approaches the 15-minute capacity of the roadway.
PM Peak Hour, one-way volume	900	1,800	Volume is within the hourly capacity of the roadway.
PM Peak Hour, one-way volume (peak 15 minutes)	298	450	Volume is within the 15-minute capacity of the roadway.

The existing Route 11A/Route 2S South has the following description.

- Four-lane, divided roadway. There is a 13-foot gravel median but each of the travel lanes is only 10-feet wide.
- There are no paved shoulders.
- There are several added right-turn lanes at major intersections.
- There is an 11-mile distance between the Wye barricade and the intersection with the WTP site access road.
- 55 MPH signed speed limit.

Traffic count data on Route 11A/Route 2S are summarized in **Exhibit 4**. The daily traffic volumes were found to reach a peak of approximately 800 vehicles per day (March, 2002). The following observations were made of the Route 11A/Route 2S traffic counts.

- Route 11A has adequate daily capacity to accommodate the existing traffic volumes.
- The directional, 15-minute traffic count is well within the capacity of the roadway.
- The existing traffic volumes do not justify any changes to the existing intersection.
- Additional traffic can be accommodated without a significant increase in roadway capacity.

Exhibit 4: Route 11A Traffic Volumes (East of the Yakima Barricade, Two-Lane Roadway)			
Traffic Count Category	Volume (Veh)	Roadway Capacity (Veh)	Comments
Daily, two-way volume	793	11,000	Volume is within the daily capacity of the roadway.
AM Peak Hour, one-way volume	199	1,800	Volume is within the hourly capacity of the roadway.
AM Peak Hour, one-way volume (peak 15 minutes)	57	450	Volume is within the 15-minute capacity of the roadway.
PM Peak Hour, one-way volume	161	1,800	Volume is within the hourly capacity of the roadway.
PM Peak Hour, one-way volume (peak 15 minutes)	60	450	Volume is within the 15-minute capacity of the roadway.

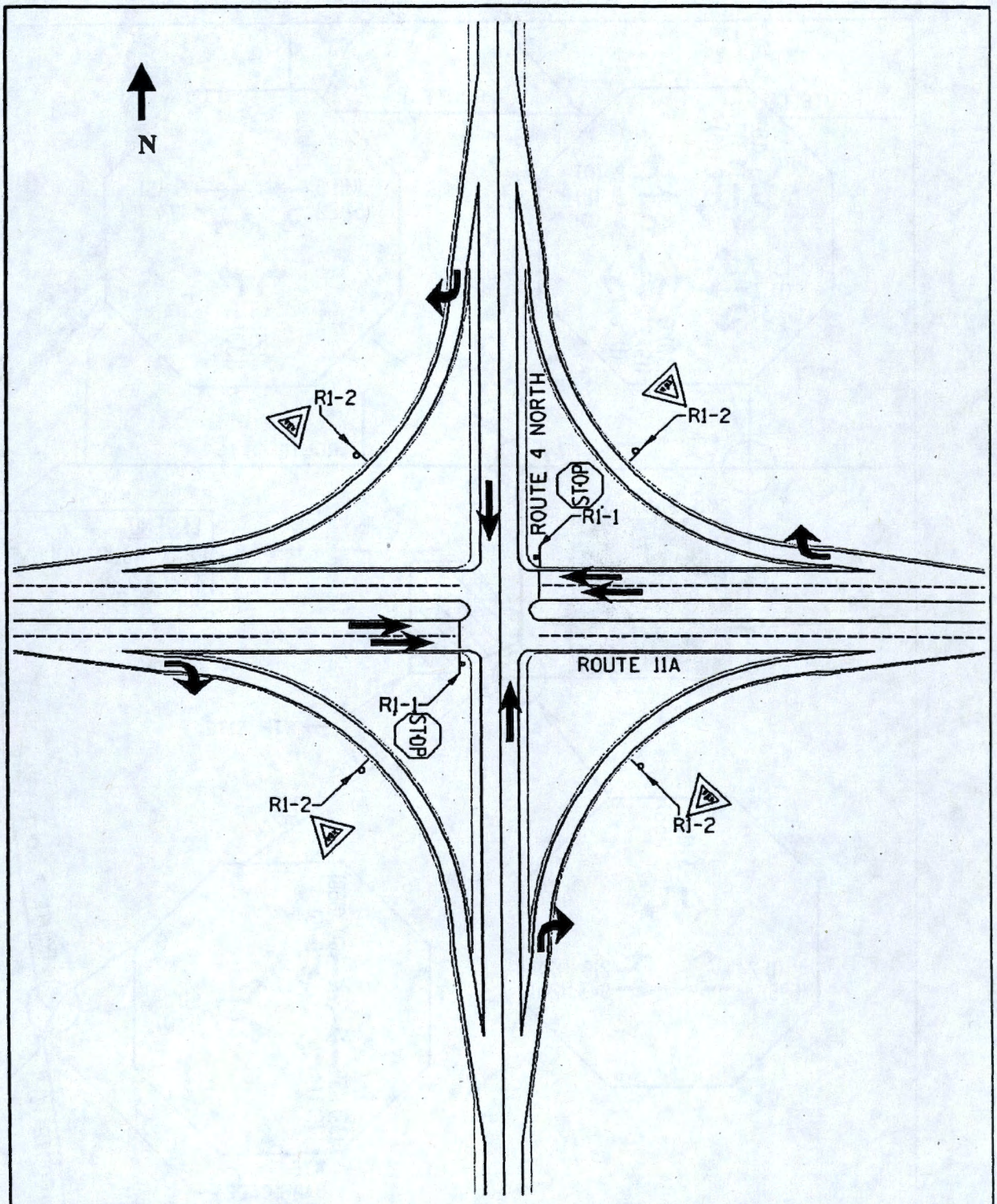
1.3. Intersection Traffic Volumes

One intersection of note within the study area is the junction of Route 4 with Route 11A (See **Exhibit 5**). This intersection is located northwest of the WTP facility. The existing intersection has the following description:

- Two-way STOP control on the Route 11A approaches (east-west).
- No STOP control on the Route 4 approaches (north-south).
- Single lane approaches on Route 4 without any additional left-turn lanes.
- Two-lane approaches on Route 11A without any additional left-turn lanes.
- Free, right-turn lanes on all approaches.

Manual traffic counts were conducted at this intersection (Route 4/Route 11A) under normal, weekday traffic conditions. The traffic count data (**Exhibit 6** and **Appendix A**) indicate the following:

- The intersection provides for good traffic operations at Level of Service (LOS) B or better conditions. Drivers experience little or no travel delay under peak hour operating conditions.
- The north-south traffic volumes are higher than the east-west volumes. The existing two-way STOP control has the proper orientation. The STOP signs should remain on the Route 11A (east-west) approaches.
- A four-way STOP is not justified by the existing traffic volumes.
- Left-turning traffic volumes are too low to justify the construction of additional left-turn lanes.
- The existing traffic volumes do not justify any changes to the existing intersection.



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DESIGN BY: D. SZPLETT	DATE: MAY 2002
APPROVED: K. HAIAR	FILE: P/2567/Drawings/Hanford

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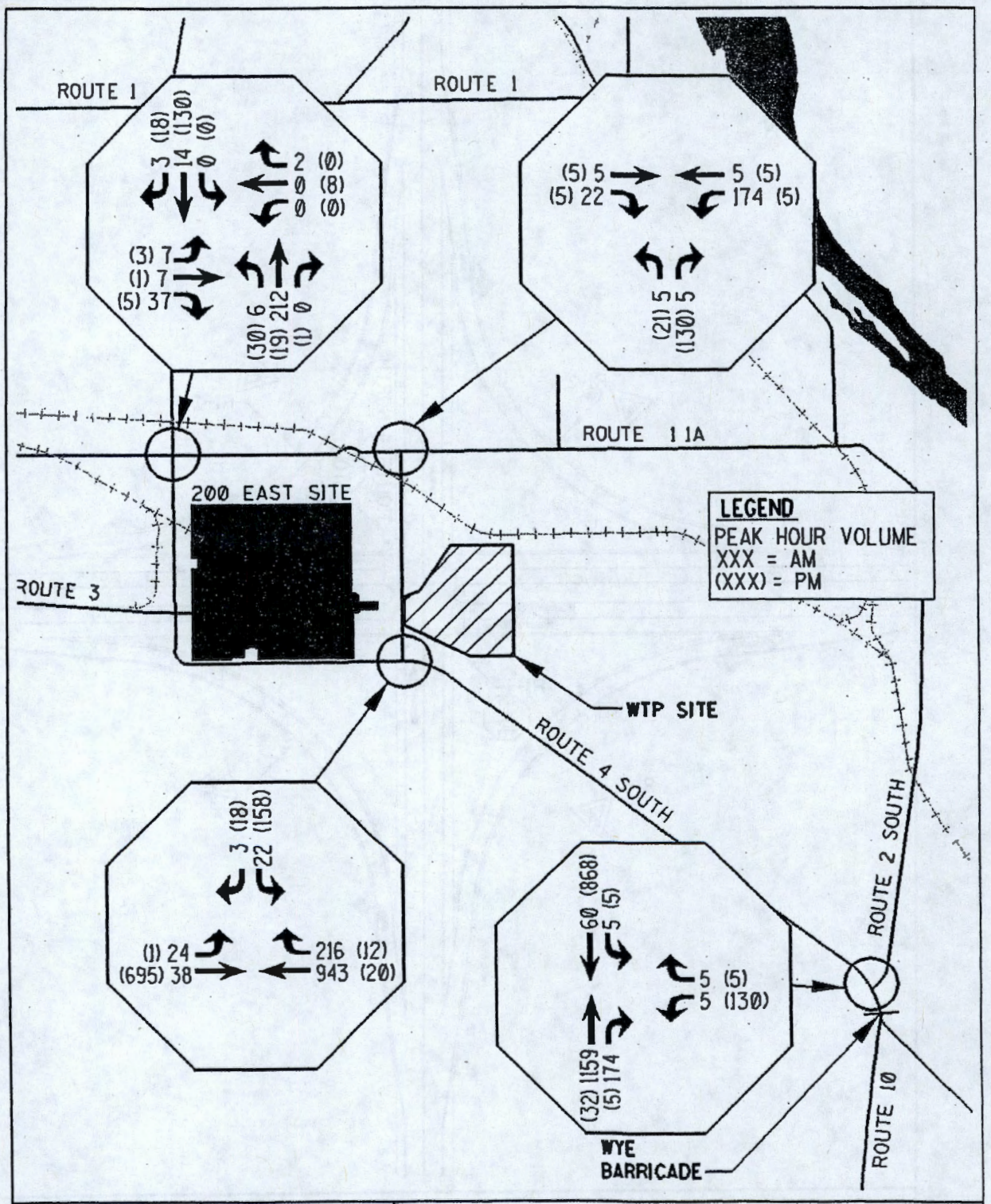
Exhibit 5
Route 11A & Route 4 North Intersection
Existing Conditions
RPP-WTP Hanford Site Traffic Study



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DESIGN BY: K. HAJAR	DATE: MAY 2002
APPROVED: D. SIPLETT	FILE: P/2567/Drawings/Hanford

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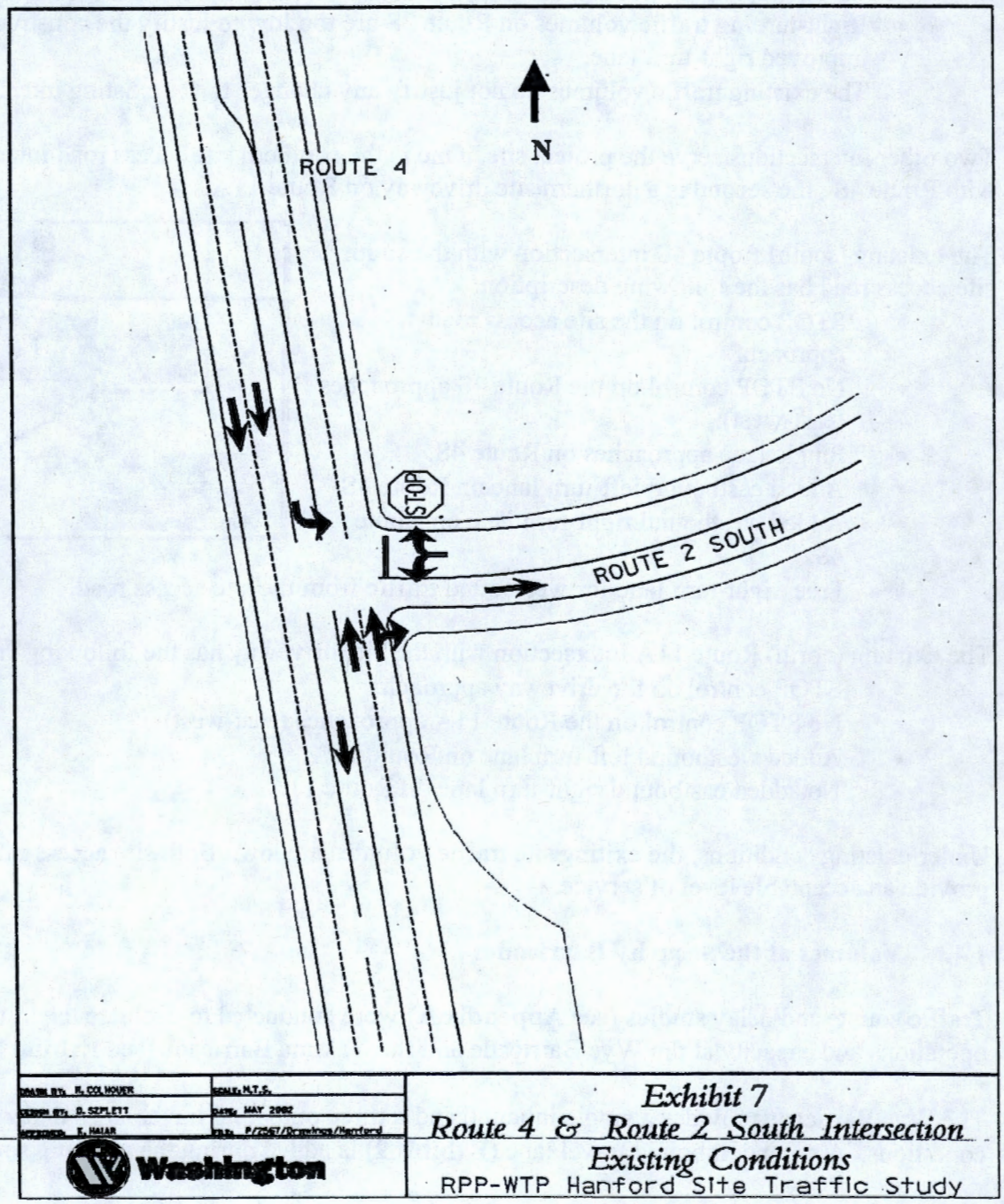
Exhibit 6

Existing Peak Hour Traffic Volumes

RPP-WTP Hanford Site Traffic Study

A second intersection of note is the junction of Route 4S with Route 2S (See **Exhibit 7**). This intersection is located southeast of the WTP facility. The existing intersection has the following description:

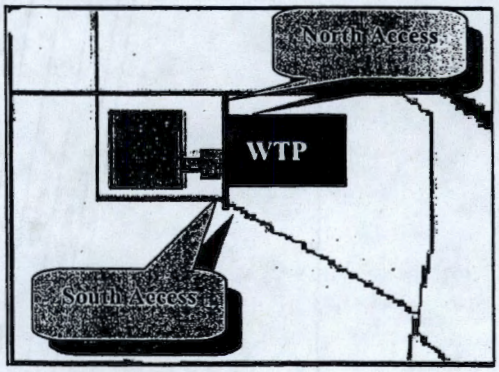
- STOP control on the Route 2S approach only.
- No STOP control on the Route 4S approaches (north-south).
- Single lane approach on Route 2S but the approach is wide enough for a short right-turn queue.
- Two-lane approaches on Route 4S.
- Additional left-turn lane for southbound Route 4S.
- Acceleration lane for left-turning traffic from Route 2S.



Manual traffic counts were conducted at this intersection (Route 4S & Route 2S) under normal, weekday traffic conditions. The traffic count data (**Exhibit 6** and **Appendix A**) indicate the following:

- The intersection provides adequate traffic operations at Level of Service (LOS) B or better conditions. There is very little traffic on Route 2S and drivers experience little or no travel delay under peak hour operating conditions.
- The north-south traffic volumes are much higher than the east-west volumes. The existing STOP control has the proper orientation. The STOP sign should remain on the Route 2S approach.
- An all-way STOP is not justified by the existing traffic volumes.
- Right-turning traffic volumes on Route 2S are too low to justify the construction of an improved right-turn lane.
- The existing traffic volumes do not justify any changes to the existing intersection.

Two other intersections serve the project site. One is the southern site access road intersection with Route 4S , the second is a northern site driveway on Route 11A.



The existing (south) Route 4S intersection with the south site access road has the following description:

- STOP control on the site access road approach.
- No STOP control on the Route 4S approaches (east-west).
- Single lane approaches on Route 4S.
- Added eastbound left-turn lane on Route 4S.
- Added westbound right-turn lane on Route 4S.
- Free, right-turn lane for westbound traffic from the site access road.

The existing (north) Route 11A intersection with the site driveway has the following description:

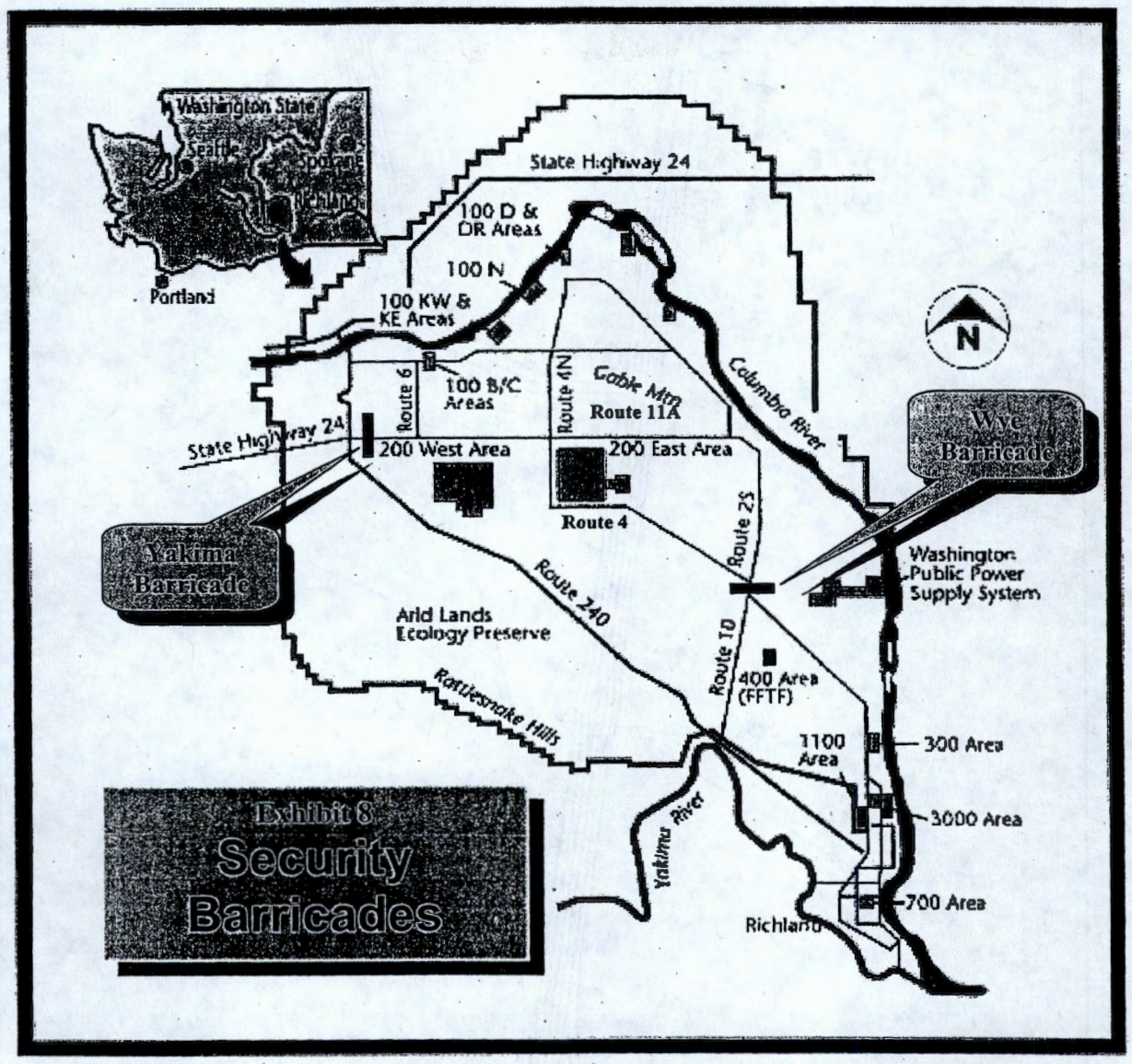
- STOP control on the driveway approach.
- No STOP control on the Route 11A approaches (east-west).
- Added westbound left-turn lane on Route 11A.
- No added eastbound right-turn lane on Route 11A.

Under existing conditions, the exiting site traffic volumes are low. Both site access intersections provide an acceptable level of service.

1.4. Volumes at the Security Barricades

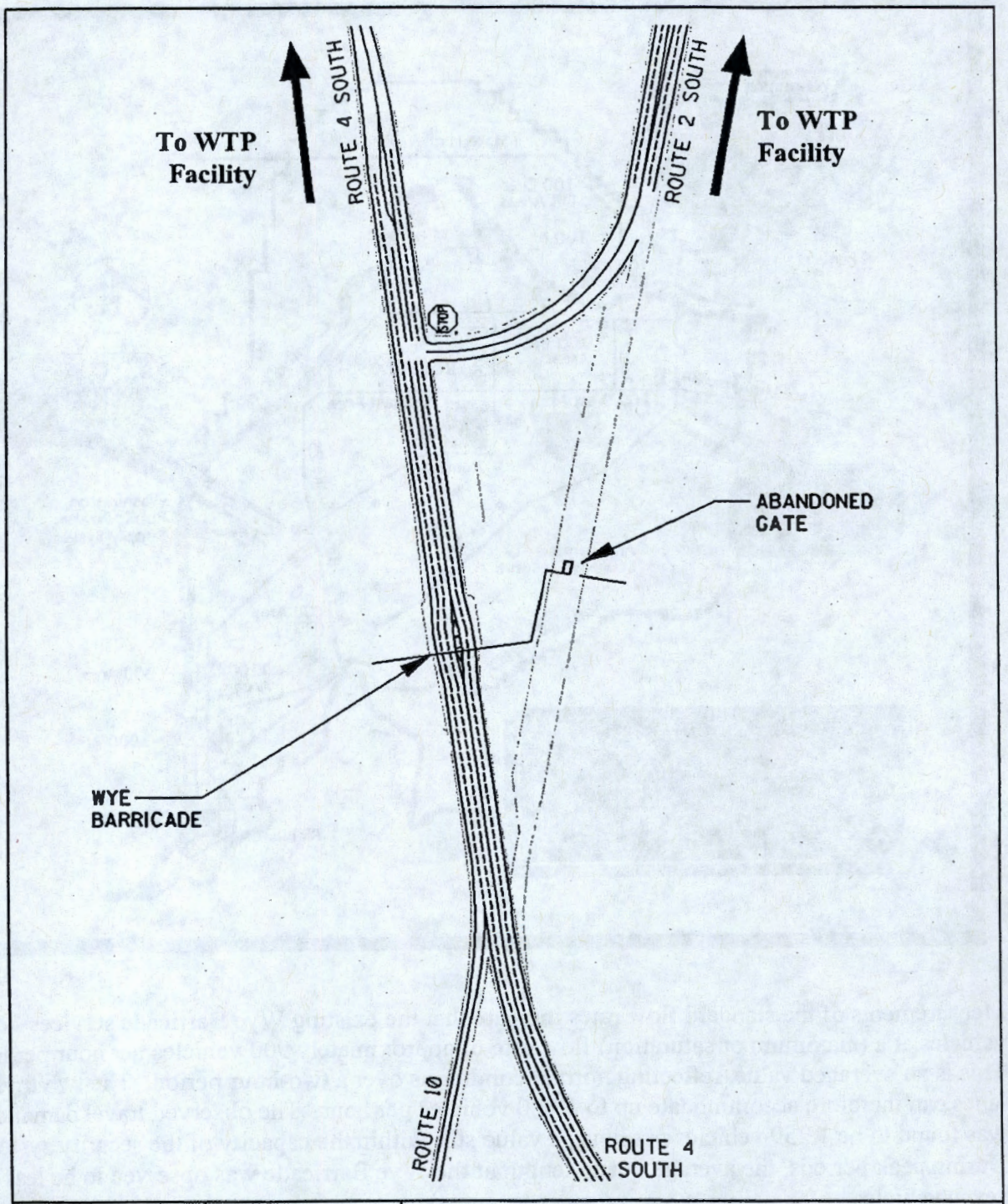
Traffic counts and delay studies (see **Appendix A**) were conducted to evaluate the traffic operations and capacity at the Wye Barricade and the Yakima Barricade (see **Exhibit 8**).

The Wye Barricade provides a single inbound and a three outbound travel lanes under normal conditions. A second, inbound travel lane (**Exhibit 9**) is added during the morning shift change.



Measurements of the standard flow rates indicate that the existing Wye Barricade services vehicles at a (maximum or saturation) flow rate of approximately 900 vehicles per hour per lane. This is an averaged value, reflecting normal conditions over a two-hour period. The two travel lanes can therefore accommodate up to 1,800 vehicles per hour. The observed travel demand was found to be 1,259 vehicles per hour, a value still within the capacity of the security system. During peak periods, the average queue length at the Wye Barricade was observed to be less than seven vehicles.

The Yakima Barricade provides a single inbound and a single outbound travel lane. Measurements of the standard flow rates indicate that the existing Yakima Barricade security checkpoint services vehicles at a (saturation) flow rate of approximately 900 vehicles per hour per lane. The observed travel demand is only 190 vehicles per hour, a value well within the capacity of the security system. During peak periods, the average queue length at the Yakima Barricade was observed to be less than two vehicles.



DRAWN BY: R. COLHOUER	SCALE: N.T.S.
DESIGN BY: D. SZPLETT	DATE: MAY 2002
APPROVED: K. HAIAR	FILE: P/2567/Drawings/Hanford

Washington

Exhibit 9

Wye Barricade Existing Conditions

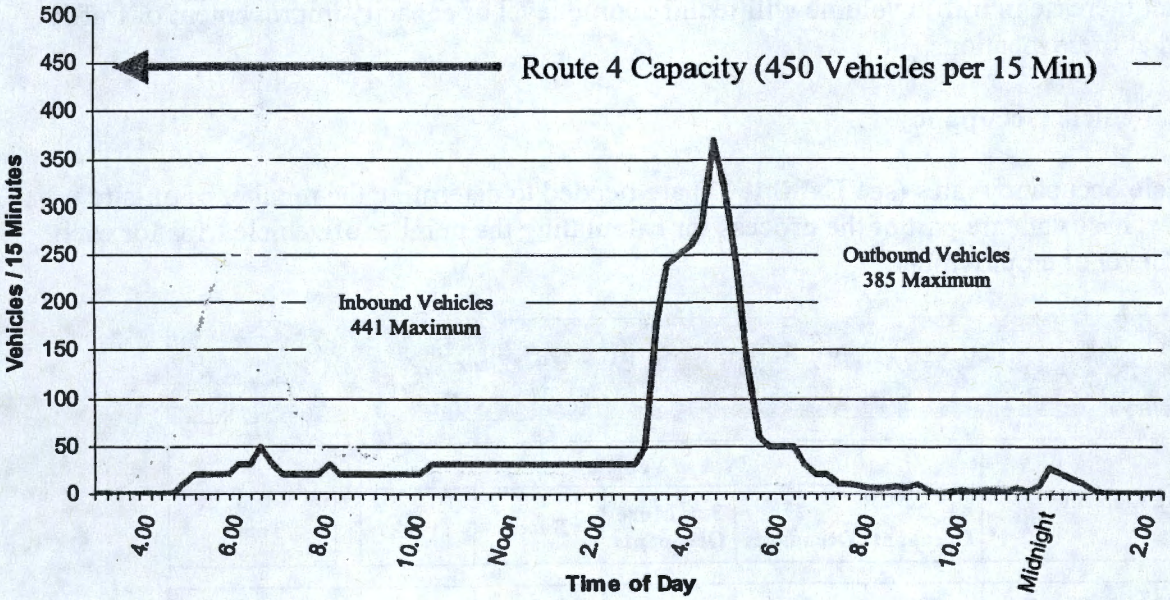
RPP-WTP Hanford Site Traffic Study

1.5. Evaluation of Existing Conditions

1.5.1. Roadway Operations

Traffic operations on Route 4S were found to be generally acceptable. The daily travel demands are well within the capacity of the system. However, conditions during the morning journey-to-work period (**Exhibit 10**) indicate that the observed peak 15-minute volume nearly equals the capacity of the roadway. The observed A.M. peak 15-minute traffic volume of 441 vehicles approaches the peak 15-minute capacity of 450 vehicles. The high volume-to-capacity ratio of 0.98 (e.g. 441 / 450 = 0.98) affords little opportunity to accommodate any potential increase in traffic volume.

Exhibit 10: Existing traffic Volumes on Route 4 (Wye Barricade)



Traffic operations on Route 11A were found to be acceptable with a large reserve capacity available to support a large increase in traffic volume. The observed travel demands on Route 11A are much lower than those of Route 4S. Both the daily and the peak 15-minute traffic volumes are well below the available roadway capacity.

1.5.2. Intersections

The observed travel demands at the four study area intersections are well within the capacity of the system. No major deficiencies were noted. Traffic operations were found to be acceptable at the four site intersections.

1.5.3. Barricade Operations

Traffic operations at the Yakima Barricade were found to be acceptable. The observed travel demands are well within the capacity of the system and no deficiencies were noted.

Traffic operations at the Wye Barricade were also found to be acceptable. Although the observed travel demands are much higher than at the Yakima Barricade, the additional inbound travel lane provides adequate system capacity and no deficiencies were noted. Traffic demands during the peak 15-minute period approach the maximum service rate of the security checkpoint.

The existing transportation system is adequate to accommodate the observed traffic volumes. No system improvements appear to be needed to support the existing traffic volumes. Peak travel demand approaches the operational capacity of Route 4S and the Wye Barricade. Any significant increase in traffic volume will require some level of capacity improvement or traffic diversion at these locations.

1.6. Vehicle Occupancy

The vehicle occupancy rates (see **Exhibit 11**) are needed to determine the number of on-site vehicles. These data are part of the process for calculating the number of vehicle trips for each potential level of employment.

Exhibit 11: Vehicle Occupancy Summary
(Measured at the Hanford Site)

Data Element	Type of Vehicle					Totals
	1 Occupant	2 Occupants	3 or More Occupants	Buses	Trucks	
Total Vehicle Count	308	71	4	8	5	396
Total Occupant Count	308	142	13	54	5	522
Vehicle Occupancy Factor (persons per vehicle)				522/396 =		**1.32**
Vehicle Utilization Factor (vehicles per person)				396/522 =		**0.76**

These data show that the observed traffic generates approximately 0.76 vehicles per person. This number is equivalent to 76 vehicles for every 100 on-site employees. This value will be used to estimate the future number of vehicles in a subsequent section of this report.

2. Proposed Project

The proposed project is a new manufacturing facility for treating liquid, hazardous waste . The project site occupies a 62-acre parcel located between Route 4S and Route 11A on the Hanford site. See **Exhibit 1** for the general location map and **Exhibit 2** for the proposed site plan.

2.1 Trip Generation

Trip generation refers to the number of vehicles entering and leaving the project site during a given time period. Section 1.6 of this report indicated that current workers have a vehicle utilization factor of 0.76 vehicles per person. After completion of the construction phases, a staff size of 1,500 will create up to 2,300 (1500 x 0.76 = 1140 x 2 for trips to and from WTP Site = 2280 or about 2300) daily trips to the Hanford area roadways. **Exhibit 12** summarizes the vehicle trip generation data for project build-out conditions.

Exhibit 12: Vehicle Trip Generation Summary

Level of Development	Number of Employees	Number of Worker's Vehicles	Number of Trucks	Number of New Vehicles
Post Construction (Year 2007)	1,000	760	85	845
	1,500	1,140	85	1,225

2.2 Trip Distribution

Vehicle trip distribution refers to the patterns or routes of vehicles entering and leaving the Waste Treatment Plant site. The distribution for this project is assumed to follow the current traffic conditions. The same distribution was used for project build-out. The site traffic will enter and leave the Hanford Site as follows:

- Wye Barricade = 85%
- Yakima Barricade = 13% (See Note)

Note: The Rattlesnake Barricade is not examined as part of this analysis but includes the remaining 2% of Hanford site traffic.

3. Post Construction Project Conditions

The post construction condition is anticipated for the 1st quarter of 2007. At this time, the construction phase of the project will be completed and up to 1,500 steady state and commissioning staff total will be on site. It is anticipated that approximately 60% of the staff will work the day shift from 8 a.m. to 5 p.m. The remaining 40% are assumed to work on evening and graveyard shift rotations.

3.1 Forecast Roadway Traffic Volumes

The calculated number of new on-site vehicles and resulting roadway traffic volumes under build out conditions are illustrated below in **Exhibits 13 and 14**. The projected traffic volumes for the morning and evening peak hours are based on 900 employees (60% of the 1,500 employee work force) in the day shift. The remaining 40% of the employees do not affect the peak hour volumes as they travel before or after the day shift to provide operational overlap at the site.

Exhibit 13: Number of New On-site Vehicles
Post-construction Conditions

Level of Development	Number of Workers	Number of Worker's Vehicles	Number of Trucks	Number of New Vehicles
Post Construction	1,500	1,140	85	1,225

Exhibit 14: Roadway Traffic Volume Summary
Post-construction Conditions

Roadway Location/ Analysis Time Period	Traffic Volume		Operations Summary
	inbound	outbound	Volume/Capacity Ratio
Route 4S			
am peak hour	1,662	82	1.09
pm peak hour	54	1,371	0.90
Daily	3,133	3,071	
Route 2S			
am peak hour	230	11	0.12
pm peak hour	7	186	0.15
Daily	448	438	
Route 11A West			
am peak hour	240	12	0.18
pm peak hour	17	273	0.16
Daily	519	474	
Three Route Total			
am peak hour	2,132	105	
pm peak hour	78	1,830	
daily	4,100	3,983	

Exhibit 14 above shows the forecast traffic volumes and the volume to capacity ratio for the impacted roadways within the Hanford site. The volume to capacity ratio is calculated from the projected traffic volumes and the ultimate capacity of the roadway. A volume to capacity ratio over 1.0 means the roadway will be unable to handle the projected traffic volume and the traffic operation will breakdown resulting in significant congestion and delay. This ratio is determined using the Highway Capacity Software (HCS2000, McTrans Center, University of Florida, 1990-1995) that takes into account the physical characteristics of the roadway (lane width, shoulder width, etc.) and calculates an ultimate capacity based on adjustment factors for these characteristics. To achieve acceptable operations, the capacity of the roadway should be increased (e.g. increasing the number of travel lanes) or the projected traffic volume should be reduced (e.g. carpooling, shift change, route diversion, etc.).

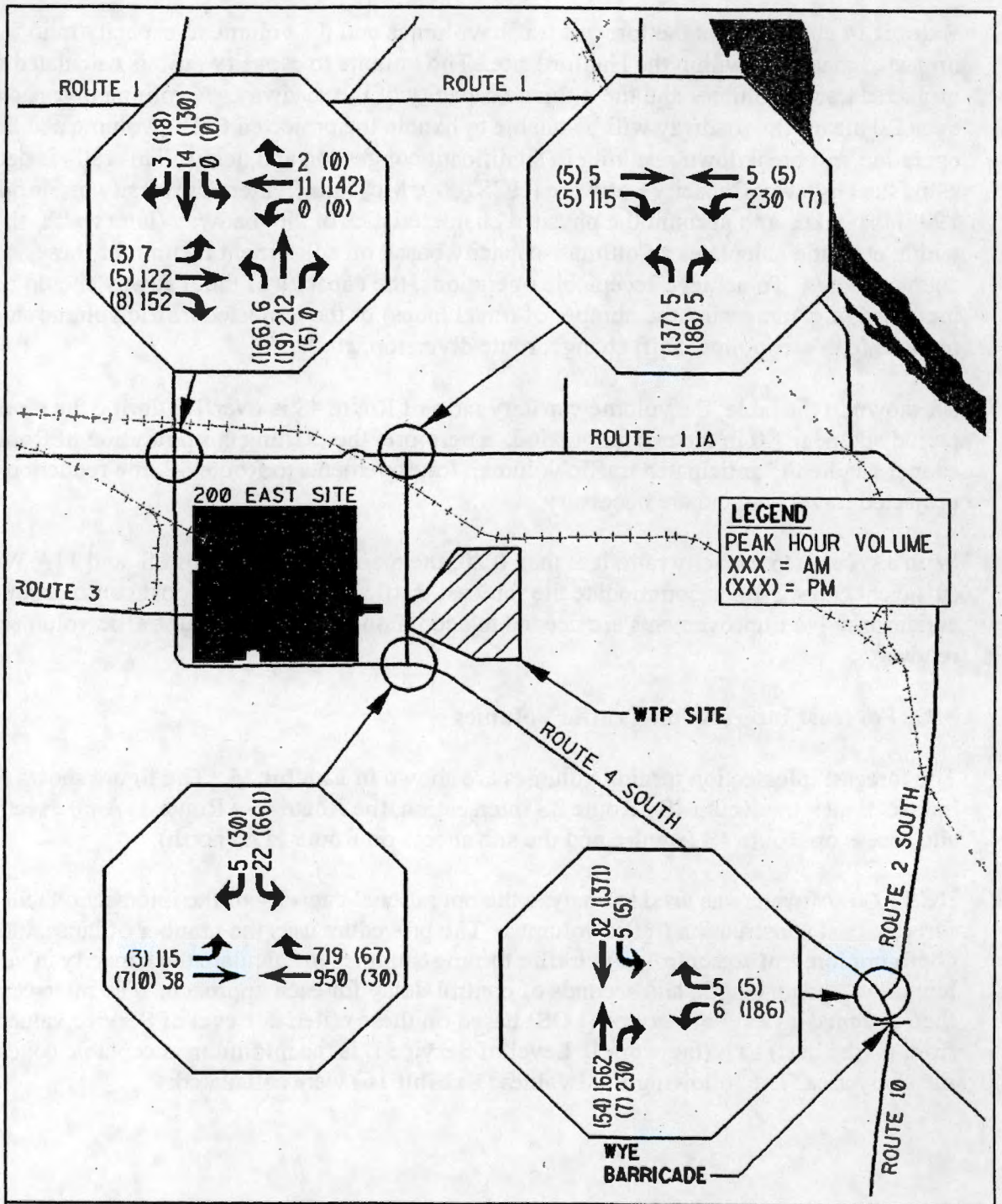
As shown in the table, the volume/capacity ratio of Route 4S is over 1.0 during the morning period and near 1.0 in the evening period. Therefore, the existing configuration of Route 4S cannot handle the anticipated traffic volume. Improvements to Route 4S or a reduction in the projected travel demand are necessary.

With a volume to capacity ratio less than 0.20, the main travel routes of 2S and 11A West have sufficient capacity to accommodate the forecast traffic volumes under post construction conditions. No improvements are needed to accommodate the build out traffic volumes on these roadways.

3.2 Forecast Intersection Traffic Volumes

The forecast intersection turning volumes are shown in **Exhibit 15**. The figure shows four area intersections: the Route 4S / Route 2S intersection, the Route 4S / Route 11A intersection, the site access on Route 4S (south), and the site access on Route 11A (north).

HCS2000 software was used to analyze the operational capacity of the intersections for the forecast post construction traffic volumes. The procedure uses the number of lanes, intersection configuration, traffic control, and traffic turning volumes to calculate the capacity in vehicles per hour, 95% queue length, and seconds of control delay for each approach. The intersection is then assigned a Level of Service (LOS) based on these criteria. Level of Service values range from A (the best) to F (the worst). Level of Service E is the minimum acceptable condition for the study area. The following LOS values (**Exhibit 16**) were calculated:



DRAWN BY: R. COLHOUER	SCALE: N.T.S.
DESIGN BY: K. HAJAR	DATE: MAY 2002
APPROVED: D. SZPLETT	FILE: P/2567/Drawings/Hanford

Washington

Exhibit 15

Build Out, Peak Hour Traffic Volumes

RPP-WTP Hanford Site Traffic Study

Exhibit 16: Intersection Level of Service - Post-construction Conditions -				
	Route 4S / Route 2S	**Route 4S / Route 11A**	**Route 4S / South WTP Site Access**	**Route 11A / North WTP Site Access**
AM Peak Hour Level of Service	F	B	E	B
PM Peak Hour Level of Service	E	C	F	A

For both the AM and PM peak period, the existing configuration of the Route 4S & Route 2S intersection was determined to have a LOS less than the acceptable level for this study area. This is due to the operation of the minor east leg of the intersection. The volume of north/south traffic prevents drivers from easily turning onto Route 2S from the east.

However, the specific conditions at the intersection do not warrant the improvements at this location. During the A.M. period, the east leg of the intersection handles a low total volume (6 vehicles per hr). During the P.M. period, the east leg of the intersection operates with relatively minor impacts to the drivers, a forecast 95% queue length of 4.6 vehicles and an average delay of 38 seconds per vehicle.

The Route 11A & Route 4S intersection will operate at an acceptable LOS with the existing two-way STOP control. The intersection of Route 11A with the North WTP Site Access road also operates at an acceptable LOS. Modifications are not needed to either intersection.

The Route 4S & South WTP Site Access road intersection will not provide an acceptable LOS with the existing configuration. This is due to the operation of the southbound left-turn movement. As the main shift of employees leave the facility, those turning left onto Route 4S develop a large queue. The HCS2000 forecasts a 95% queue length of 54 vehicles with an average delay of 556 seconds (almost ten minutes) per vehicle. Improvements are required at this location.

3.3 Forecast Traffic Volumes at Security Barricades

The forecast traffic volumes at the security barricades are shown in **Exhibit 17**. The figure shows the Wye and the Yakima Barricade. The two-barricade total is also shown.

The table presents the forecast traffic volumes, the capacity of each gate, and notes any capacity surplus or shortfall at each location. As shown in the table, the Yakima Barricade has surplus capacity (Barricade Capacity – inbound Traffic Volume), as the forecast volumes are lower than the "capacity" volume. However, the Wye Barricade receives a volume slightly higher than its capacity during the AM peak hour. This means the barricade will not be able to handle all the vehicles it receives in that hour. Improvements to the Wye barricade are warranted.

Exhibit 17: Traffic Volume Summary at Security Barricades - Post-construction Conditions -				
Roadway Location/ Analysis Time Period	Traffic Volume		Operations Summary	
	inbound	outbound	Barricade Capacity	Surplus Capacity
Wye Barricade				
am peak hour	1,892	93	1,800	-92
pm peak hour	53	1,340	1,800	1,747
daily	2,941	2,885		
Yakima Barricade				
am peak hour	240	12	900	660
pm peak hour	17	273	900	883
daily	519	474		
Two Gate Total				
am peak hour	2,132	105	2,700	568
pm peak hour	70	1,613	2,700	2,630
daily	3,460	3,359		

3.4 Evaluation of Forecast Traffic Conditions at Post Construction

3.4.1 Roadways

As determined in a Section 3.1, the main travel routes of 2S and 11A West have sufficient capacity to accommodate the forecast traffic volumes under post construction conditions. No improvements are needed to accommodate the build out traffic volumes on these roadways.

However, Route 4S is over capacity. The forecast traffic volumes exceed the roadway's ultimate capacity. The project team has developed four potential improvements to enhance the operation of Route 4S:

1. Modify the shift start/end times to miss the existing peak congestion conditions on Route 4S and at the Wye Barricade.

This first strategy adjusts the temporal demand to better utilize the available reserve capacity. Shifting the employee's day time shift start and end times has the same effect as diverting traffic from the roadway. Scheduling the WTP day-time work period to start one-half to one-hour earlier or later than the rest of the Hanford employees will allow the peak demand to be dispersed over a greater length of time and sets the peak demand at an acceptable rate of 450 vehicles per peak 15-minutes.

2. Implement a carpooling or shuttle bus system.

The anticipated traffic volumes are greater than the capacity of the existing roadway system. Reducing the number of forecast single-occupant vehicles by 300 would allow for efficient operation of the roadway system. One option is a carpooling program to pay employees a fixed rate per trip, week, or month to carpool with fellow employees. Another is a shuttle bus system using a fleet of high-capacity vehicles to transport employees from a park and ride facility to the WTP site.

3. Divert the traffic to Route 2S/Route 11A.
Although Route 4S has insufficient capacity for the anticipated travel demand, Route 2S /Route 11A also connects the Wye Barricade to the project site. Route 2S/11A carries very few vehicles at the present time and can easy accommodate the additional project-related traffic.

The capacity surplus on Route 2S (e.g. 1,450+ vehicles per hour) is greater than the capacity shortfall on Route 4S (e.g. 300 vehicles per hour). Because the Route 2S capacity exceeds the Route 4S shortfall, Route 2S can be used to accommodate the capacity shortfall of Route 4S. In addition, the travel demand will require an additional checkpoint at the Wye barricade.

4. Widen Route 4S .
This alternative increases the roadway system's capacity to accommodate the forecast travel demand. Widening Route 4S would be required to expand the route from two to four lanes between Milepost 4 and Milepost 12 (Wye Barricade).

This option is designed to expand the roadway system's capacity to accommodate the increase in traffic. The travel demand will also require an additional checkpoint at the Wye barricade. Additional discussion of the Wye Barricade is included in Section 3.4.3 of this report.

3.4.2 Intersections

As identified in Section 3.2, the intersections of Route 11A & Route 4S and Route 11A & North WTP Site Access road will operate efficiently under their current layout and control. The intersection of Route 4S & Route 2S was found to have a LOS below the threshold but improvements to the intersection could not be economically justified. The intersection of Route 4S & South WTP Site Access road was found to need improvements to accommodate the anticipated travel demand.

Specific improvements to the intersections depend on the modifications made to the roadway system. Route 4S was identified to have insufficient capacity. The corrective action taken will affect the operation and necessary modifications of both the Route 4S & Route 2S and Route 4S & South WTP Site Access road intersections.

For the intersections identified as over capacity, a detailed study is required when construction of WTP facility is completed. A study is necessary to collect the actual traffic volumes and a detailed layout of the characteristic and dimensions of the intersection. A specific improvement alternative can then be made to address the capacity issue (e.g. installation of a signal, construction of a roundabout or additional merge/diverge lanes) For the purpose of this report, a cost of $100,000 will be used for intersection improvements.

HCS2000 was used to evaluate various combinations of traffic control and intersection configurations to accommodate the projected traffic volumes. The following modifications were developed to provide acceptable intersection operations:

At the Route 4S & Route 2S intersection:

- If the site's work times are shifted or a carpooling/bus system implemented, the intersection will operate under capacity.
- If the site's traffic is diverted to Route 2S, the existing Route 4S & Route 2S intersection will operate over capacity for the PM peak period due to the large left turn volumes from southbound Route 2S to southbound Route 4S. Improvements to the intersection will be necessary.
- If Route 4S is widened, the improvements to the existing Route 4S & Route 2S intersection cannot be economically justified. An all-way stop controlled condition was analyzed and found to have negligible improvement on the operation of the intersection.

At the Route 4S & South WTP Site Access intersection:

- If the site's work times are shifted, the intersection will operate over capacity during the PM peak period. There are too few gaps in the Route 4S traffic to allow egress from the south access road. Improvements to the intersection will be necessary.
- If a carpooling/bus system is implemented, the intersection is over capacity during the PM peak period. Drivers leaving the site, making left turns onto Route 4S, will experience excessive delay. The intersection meets the Peak Hour (traffic analysis tool) signal warrant. Improvements to the intersection will be necessary.
- If the traffic is diverted to Route 2S, the intersection is over capacity during the PM peak period. Drivers leaving the site, making left turns onto Route 4S, will experience excessive delay. The intersection meets the Peak Hour signal warrant. Improvements to the intersection will be necessary.
- If Route 4S is widened, the intersection is over capacity during the PM peak period. Drivers leaving the site, making left turns onto Route 4S, will experience excessive delay. The intersection meets the Peak Hour signal warrant. Improvements to the intersection will be necessary.
- The Route 4S/ South WTP Site Access intersection will require improvements if any of the options are chosen.

3.4.3 Security Barricades

As identified in Section 3.3, the Yakima Barricade was found to have sufficient capacity for the traffic forecasts and no improvements are needed. However, the Wye Barricade was slightly over capacity during the AM peak hour and an improvement to the location is needed.

The Wye Barricade provides one inbound security lane during most of the day. During the AM peak period, traffic volumes increase and a second, inbound security lane is in operation. Specific improvements to the Wye Barricade operation depend on modifications to Route 4S. If the site's work times are shifted, a carpooling/bus system implemented, or traffic routed to the Rattlesnake or Yakima Barricade, no construction changes to the barricade are needed. However, the two-lane operation will be needed for an extended period with additional security personnel hours.

If the traffic is diverted to Route 2S, the Wye Barricade has an unused security kiosk on a temporary roadway a few hundred feet east of the Wye Barricade that leads to Route 2S. This structure could serve to provide one or two additional security checkpoints during periods of peak travel demand. A third inbound security lane will increase the 15-minute gate capacity to

675 vehicles (e.g. to 2,700 vehicle per hour from 1,800 vehicles per hour). The cost of improving this existing facility is minimal. However, the roadway approaches will require upgrades to handle the diverted traffic flows. The pavement is missing in some sections and other portions are in need of repair. If this second facility is opened and traffic desiring to use Route 2S is sent to this gate, the Wye Barricade would have the capacity necessary to handle the traffic in the AM peak hour.

If Route 4S is widened, another checkpoint could be added to handle the volume at the Wye Barricade. The existing security checkpoint could be expanded for approximately the same cost as reconstructing the existing, unused security checkpoint. Expanding the existing checkpoint has a further benefit of maintaining a close proximity between the two sites, minimizing the traffic conflicts on either side of the Wye Barricade, and reducing the amount of new roadway construction.

3.5 System Improvement Alternatives

The potential system improvement options are discussed in detail below. Estimated construction costs are also provided.

1. Modify the shift start/end times to miss the existing peak congestion conditions on Route 4S and at the Wye Barricade. This first strategy adjusts the temporal demand to better utilize the available reserve capacity. As shown in **Exhibit 14 and 17**, the capacity of Route 4S and the Wye barricade are exceeded only during the critical peak 15 minute periods of the morning rush hour. The reserve capacity of the roadway and barricade system could be more fully utilized if the peak traffic demand was leveled and spread over a longer period of time. Shifting the start/end times of the post-construction WTP employees accomplishes this goal.

Scheduling the WTP work period start between one-half to one hour earlier or later than the rest of the Hanford employees will allow the peak demand (see **Exhibit 10**) to be dispersed over a greater length of time and sets the peak demand at an acceptable rate of 450 vehicles per 15-minutes. No new construction is required on Route 4S or the Wye barricade to provide modified start-work times. Modifications to the intersection of Route 4S & South WTP Site Access road will be necessary at an estimated cost of $100,000. Additional staffing hours will be needed to operate the second security lane for extended morning hours. It is estimated the additional security staffing hours will cost approximately $500,000 over five years.

The items necessary for modifying the shift times include additional security staffing hours ($500,000) and intersection improvements at the Route 4S & South WTP Site Access road intersection ($100,000). The total cost for this option is $600,000.

2. Implement a carpooling or shuttle bus system. The anticipated traffic demands are greater than the capacity of the existing roadway system. Reducing the number of forecast single-occupant vehicles by 300 would allow for more efficient operation of the roadway system. Two options are available to reduce traffic volume.

One option is to begin a carpooling program to pay employees a fixed rate per trip, week, or month to carpool with fellow employees. This program could easily be implemented through the

Human Resources department of the company. Based on observation, approximately 220 of the day shift WTP employees will use carpooling or using a shuttle service. Another 300 employees would need to join to provide the necessary reduction in travel demand. If participating employees were given an annual payment of $400, the total cost of the program over five years would be approximately $1 million.

Another option is a shuttle bus system using a fleet of high-capacity vehicles to transport employees from a park and ride facility to the WTP site. The shuttle bus system uses a smaller number of high-capacity vehicles rather than a much larger number of single-occupant vehicles to minimize the impact upon the roadway system.

Buses will need to be purchased and drivers will have to be hired, processed and trained as well. There may be some time savings by purchasing used buses and site-workers might be trained as shuttle drivers. The cost of operating the shuttle bus system is estimated at $1.5 million over five-years to provide this service for 300 on-site employees at a cost of approximately $1,000 per employee per year.

For either option, modifications to the intersection of Route 4S & South WTP Site Access road will be necessary at an estimated cost of $100,000

The items necessary for modifying the shift times include carpooling payments or acquiring a bus fleet ($1 million to $1.5 million) and intersection improvements at the Route 4S & South WTP Site Access road intersection ($100,000). The total cost for this option is ranges between $1.1 million to $1.6 million.

3. Divert the construction traffic to Route 2S/Route 11A. Although Route 4S has insufficient capacity for the anticipated travel demand, Route 2S/Route 11A also connects the Wye Barricade to the project site. Route 2S/11A carries very few vehicles at the present time and can easy accommodate the additional project-related, construction traffic.

The capacity surplus on Route 2S (e.g. 1,450+ vehicles per hour) is greater than the capacity shortfall on Route 4S (e.g. 300 vehicles per hour). Because the Route 2S capacity exceeds the Route 4S shortfall, Route 2S can be used to accommodate the capacity shortfall of Route 4S.

The existing roadway for Route 2S/Route 11A has a substandard cross section. Although striped as a four-lane roadway, the existing road has two, ten-foot lanes for each travel direction plus a 13-foot gravel median. A standard roadway design typically includes a 12-foot lane, a 2-foot inside shoulder, and a 6-foot outside shoulder. **Exhibit 18** illustrates the existing roadway design and a preferred alternative.

If Route 2S/11A is to be used for access to the WTP site, the project team recommends that the existing roadway be restriped to provide a more-typical design (e.g. a 12-foot lane, a 2-foot inside shoulder, and a 6-foot outside shoulder. This is most easily accomplished by chip-sealing the existing roadway, then restriping it. The restriping should be set for the segments between Milepost 7.5 (Route 11A) and Milepost 7 (Route 2S). The cost of this improvement is estimated at $200,000.

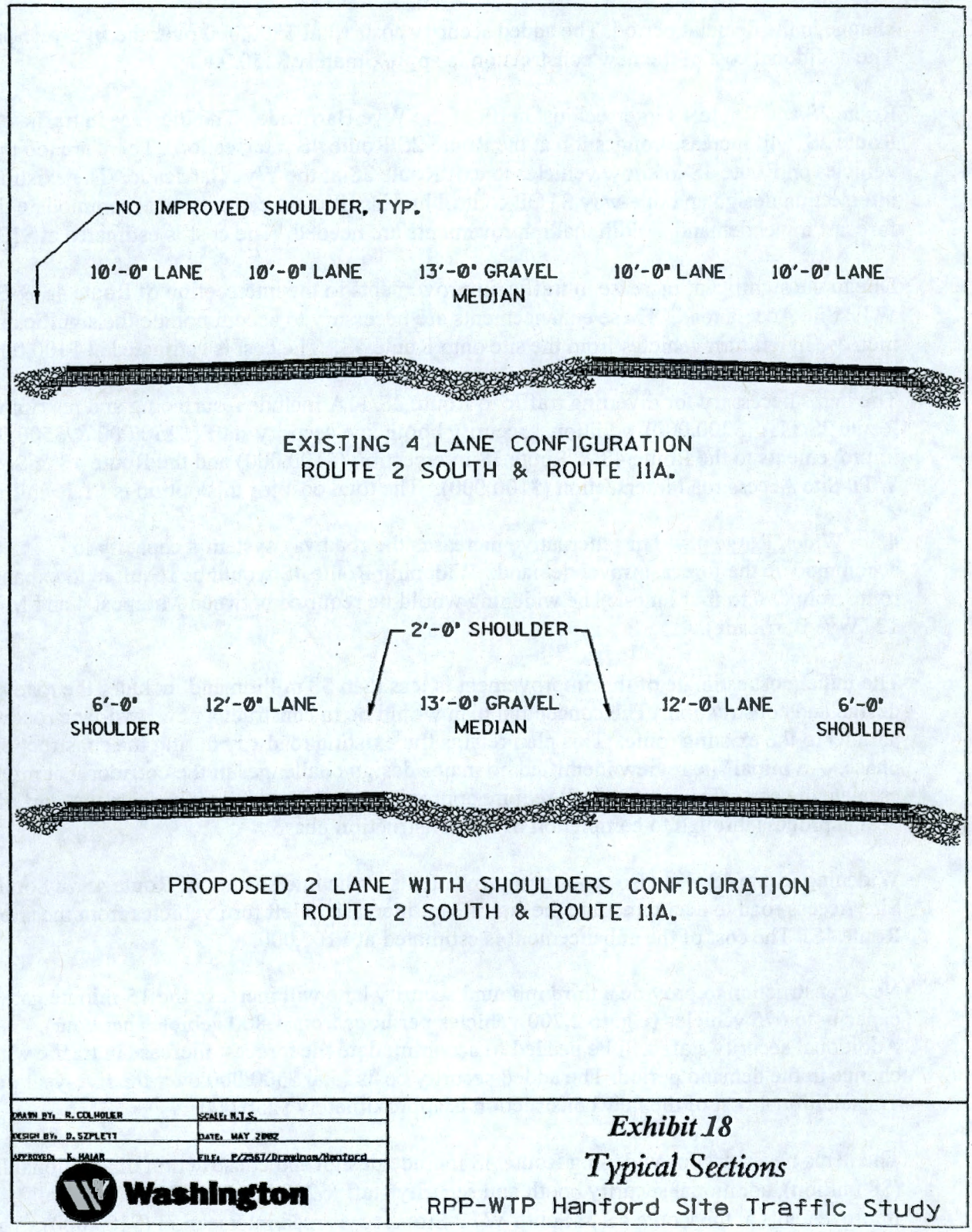


Exhibit 18
Typical Sections
RPP-WTP Hanford Site Traffic Study

New construction to provide a third inbound security lane will increase the 15-minute gate capacity to 675 vehicles (e.g. to 2,700 vehicles per hour from 1,800 vehicles per hour). Additional security staff will be needed to accommodate the forecast increase in traffic without a

change in the demand period. The added security costs total $500,000 over the five-year period. The additional cost of the new construction is approximately $250,000.

Route 2S and Route 4S intersect just north of the Wye Barricade. The increase in traffic on Route 2S will increase congestion at the Route 2S/Route 4S intersection. There are too many vehicles on Route 4S to allow vehicles to exit Route 2S at the Wye Barricade. The existing intersection design and one-way STOP control has insufficient capacity to accommodate the forecast travel demand. Additional improvements are needed. The cost is estimated at $100,000.

Due to the significant increase in traffic, improvements to the intersection of Route 4S & South WTP Site Access road. These enhancements are necessary to accommodate the significant increase in left turn vehicles from the site onto Route 4S. The cost is estimated at $100,000.

The items necessary for diverting traffic to Route 2S/11A include resurfacing and restriping Route 2S/11A ($200,000), additional security booth and security staff ($250,000 & $500,000), improvements to the Route 4S & Route 2S intersection ($100,000) and the Route 4S & South WTP Site Access road intersection ($100,000). The total cost for this option is $1.15 million.

4. Widen Route 4S. This alternative increases the roadway system's capacity to accommodate the forecast travel demand. Widening Route 4S would be required to expand the route from two to four lanes. The widening would be required between Milepost 4 and Milepost 12 (Wye Barricade).

The initial cost estimate of this improvement is less than $8 million and includes the roadway design and construction. The conceptual plan would be to construct a new, two-lane roadway parallel to the existing route. This plan retains the existing roadway during the construction phase. An initial site review identified no major design challenges in the corridor that might escalate the cost. This project will require approximately 12 to 18 months from the start of the design process through to completion of the construction phase.

Widening Route 4S will also require improvements at the intersection of Route 4S & South WTP Site Access road to accommodate the significant increase in left turn vehicles from the site onto Route 4S. The cost of the enhancement is estimated at $100,000.

New construction to provide a third inbound security lane will increase the 15-minute gate capacity to 675 vehicles (e.g. to 2,700 vehicles per hour from 1,800 vehicles per hour). Additional security staff will be needed to accommodate the forecast increase in traffic without a change in the demand period. The added security costs total $500,000 over the five-year period. The additional cost of the new construction is approximately $250,000.

The items necessary for widening Route 4S include design and construction of additional lanes ($8 million), additional security booth and security staff ($250,000 & $500,000), install improvements at the Route 4S & South WTP Site Access road intersection ($100,000). The total cost for this option is $8.85 million.

4 Access Within the WTP Site

The site plan for the Waste Treatment Plant was shown in **Exhibit 2**. The 62-acre site includes several industrial/fabrication buildings, an administrative center, warehouse space, support services, parking lots, and loading/unloading stations.

4.1 Access Roads

An existing two-lane access road connects the WTP site with Route 4S to the south. This access road (one lane inbound and one lane outbound) is adequate for the post-construction condition.

An existing two-lane access road connects the WTP site with Route 11A to the north. This access road (one lane inbound and one lane outbound) is adequate for the post-construction condition.

4.2 Roadway Geometrics

Roadway widths are not specified on the submitted site plan. The standard traffic engineering reference (Traffic Engineering Handbook, 5th Edition, Institute of Transportation Engineers, September, 1999) recommends a minimum 36-foot wide roadway at locations with very high traffic volumes. This width provides two standard 12-foot lanes plus a 6-foot outside shoulder. This roadway width will also allow for three travel lanes at key intersection locations.

Although the 36-foot street section is adequate for most applications, the consulting team recommends a minimum internal roadway width of 40-feet. This recommendation is based upon the following:

- A 40-foot width provides for two, 20-foot lanes: a 12-foot travel lane plus an 8-foot shoulder.
- The 8-foot shoulder allows a parked/broken vehicle to remain on the pavement. The six-foot shoulder is too narrow to accommodate the parked vehicle and the standard 12-foot travel lane.
- The 20-foot width is the minimum needed for a 50-foot semi-trailer to enter/leave a roadway. AASHTO Policy on Geometric Design of Highways and Streets (American Association of State Highways Transportation Officials, May, 2001) indicates that a WB-50 design vehicle (50-foot wheel base length) has a 45-foot minimum turning radius. The 20-foot travel lane allows the vehicle to stay within the paved surface and does not have to cross the roadway centerline. (See **Exhibit 19**)

Curb radii are not specified on the submitted site plan. The curb radius is the arc constructed between two streets at an intersection. AASHTO Policy on Geometric Design of Highways and Streets (American Association of State Highways Transportation Officials, May, 2001) recommends a minimum inside curb radius of 25-foot and a minimum outside curb radius of 45-foot for a WB-50 semi-truck. This radius accommodates even the largest commercial vehicle.

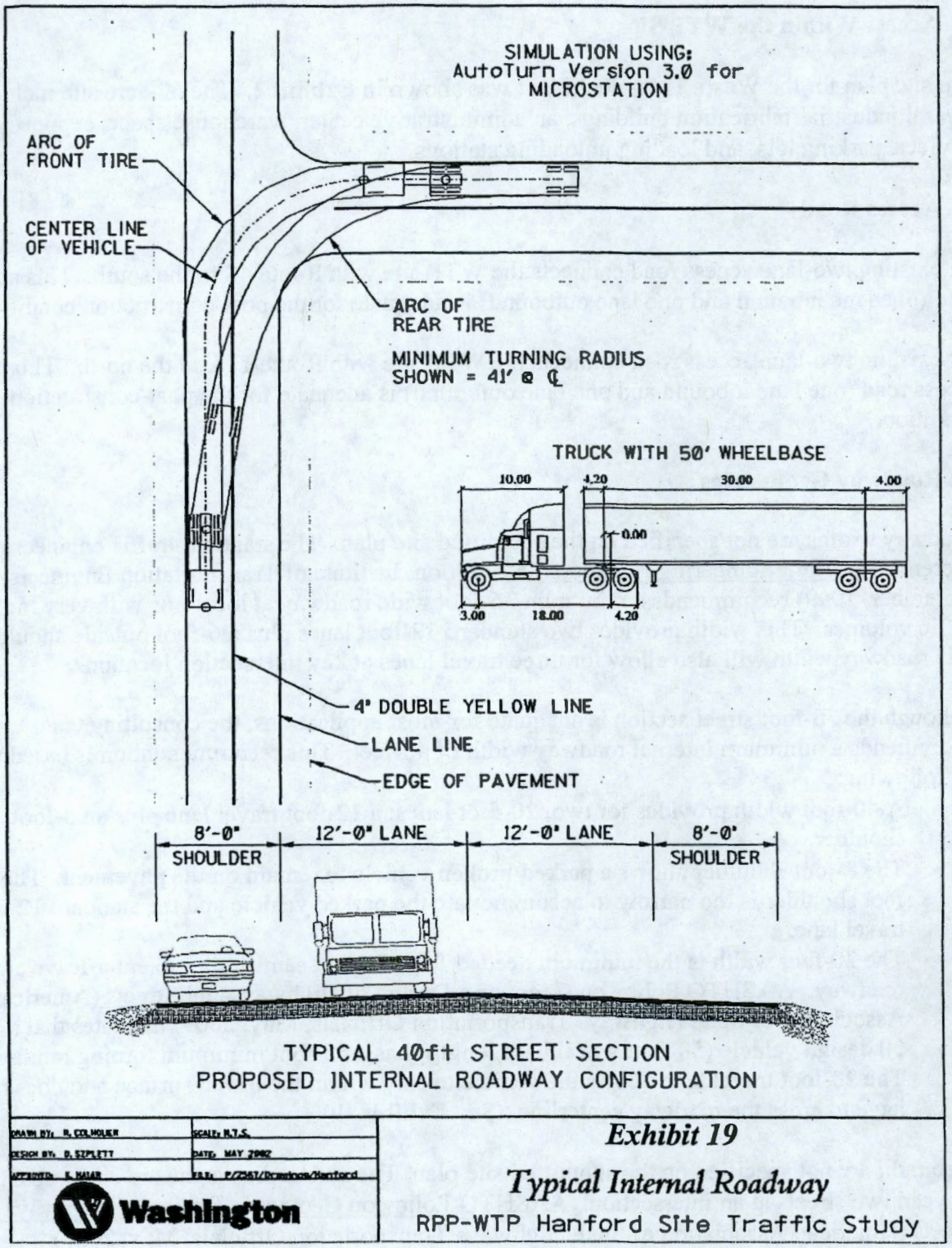


Exhibit 19

Typical Internal Roadway

RPP-WTP Hanford Site Traffic Study

Providing an adequate curb radius at intersections assists in providing proper guidance for vehicles at the intersection. In addition, an adequate amount of pavement is provided for the trailing wheels of a vehicle. When curb radii are inadequate, the wheels of turning trucks can track off the pavement edge, causing damage to the vehicle, discomfort for the driver, and deteriorating the structural integrity of the pavement.

An overhead pipe rack is planned to provide heating and cooling services to the WTP site. The steam plant and the chiller/compressor plant are located near the southern part of the site and provide the heating and cooling services for the WTP facility. The pipe rack crosses several internal roadways, including D, E, G and H Roads, plus a number of driveways and storage areas. The standard AASHTO overhead clearance for a roadway is 16-feet (Policy on Geometric Design of Highways and Streets, American Association of State Highways Transportation Officials, May, 2001). The standard overhead clearance for a rail line is 23.5-feet (Technical Instruction TI 850-02, Railroad Design and Rehabilitation, Unites States Army Corps of Engineers, March 1, 2000).

4.3 Internal Site Circulation

The WTP site (See **Exhibit 20**) was evaluated to determine if the roadway capacity was sufficient for the anticipated truck traffic and the circulation and service potential of the roadway layout.

The anticipated traffic volumes on the internal roadways are very low. There should be no capacity-related issues with internal circulation. A few minor changes were identified to the internal roadway network that can help to improve overall traffic operations.

- A driveway parallels an internal roadway in several on-site locations. Most of these driveways are for truck deliveries. One example is the wet chemical storage facility driveway that is parallel to C Road. It will be necessary to maintain an adequate radius for the design vehicles at all driveway locations.

- The intersection of D Road, M Road and K Road is atypical. The issue is further complicated by the potential for two rail lines within the intersection area. Local traffic operations could be improved if the northern switchgear building was shifted to the north and D Road was extended directly eastward to B Road.

- The western intersection of B Road with C Road is atypical. The two streets intersect with a service driveway and a potential, future rail line is in close proximity. Traffic operations could be improved by minimizing the number of conflict points within such a small area. Several methods of driveway consolidation are summarized below:
    - Relocate the driveway access to intersect C Road (north) rather than B Road (west). B Road will have the higher traffic volumes and the revised driveway intersection will have less impact in the lower volume roadway.
    - Extend the landscaped area farther to the west to better define the intersection. The extended landscaping will simplify the turning movements at the driveway intersection.
    - Sign the driveway for eastbound travel only. The operational concerns are with westbound driveway traffic entering B Road so close to the C Road intersection. Converting the driveway to one-way operation will resolve most of the operational concerns.

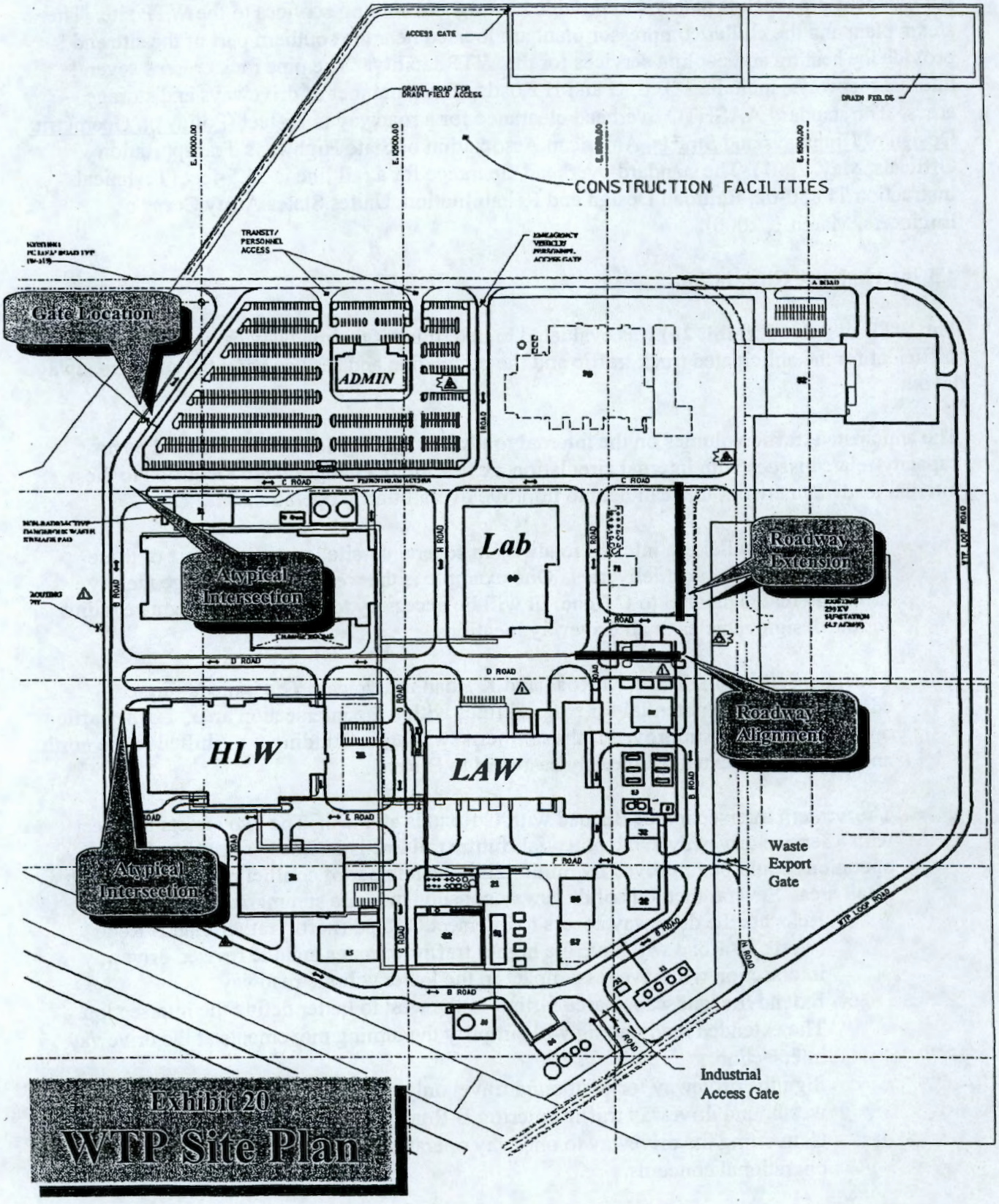


Exhibit 20
WTP Site Plan

- Several of the internal security gates are too far from a roadway to provide an alternative travel route or a turnaround. One notable example is the Reagent Delivery Gate on B Road. At this location, the gate is over 400-feet from the PC Loop Road (WTP Loop Road). This design affords no opportunity for drivers to change direction if they make a travel error or there is a mechanical malfunction at the security gate. Several methods of improvement are summarized below:
    - Relocate the security gates closer to the parallel roadway system. This minimizes the conflicts if drivers have to retreat from the gates. It is recommended that the gates be offset a minimum of 75-feet from the edge line of the access roadway. This allows storage for one, semi-trailer combination vehicle.
    - Provide a turnaround outside each of the security gates. It is recommended that the design provide a 45-foot minimum turning radius.
    - Prescreen the trucks/drivers on the PC Loop Road outside the site's secured area. This ensures that only authorized vehicles will approach the gates and that all drivers will know their assigned access routes.

- The B Road provides almost a continuous internal loop road within the WTP facility. Only a short segment between M Road and C Road is missing. Although the site plan shows a B Road extension north of M Road, there are many potential circulation benefits by extending B Road during the first construction phase.

5 Parking Lots

5.1 Location.

The preliminary site layout has a proposed on-site parking lot for the permanent personnel located at the northwest corner of C Road and I Road, and south of PC Loop Road. **Exhibit 21** shows the proposed locations of the parking area.

5.2 Access

Access to the lot is proposed from the PC Loop Road. Patrons of the parking lot are expected to walk to their destinations via proposed Pedestrian Accesses.

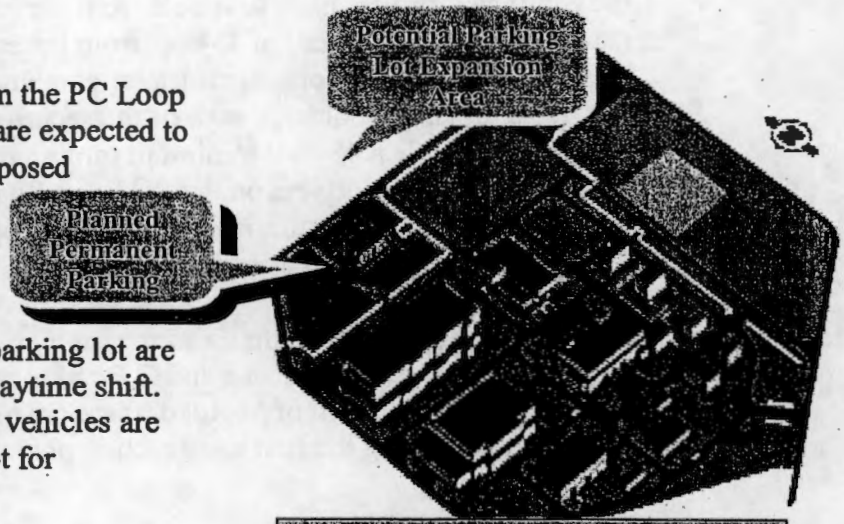


Exhibit 21
Parking Lot Location

5.3 Duration

A majority of the patrons at the parking lot are expected to work in the normal daytime shift. Consequently the majority of the vehicles are expected to stay in the parking lot for approximately an 8-hour period.

5.4 Parking Demand

The preliminary schedule indicates that there will be approximately 1,000 to 1,500 permanent post-construction personnel. Parking lots are currently sized based on a post-construction staff of 1,200 with 600 on four shifts. It is assumed that the day shift and the first evening shift will overlap so that parking must be provided for both shifts that are expected to number 900 people or 75% of the total permanent personnel. Providing parking for an estimated 900 people and based on the existing vehicle-occupancy ratio of 1.32 persons-per-vehicle (or 0.76 vehicles-per-person), parking for 684 (1,200 people x 0.75 x 0.76 vehicles/person) vehicles would be necessary.

5.5 Parking Area Design and Layout

The planned permanent parking lots will accommodate 745 spaces and are adequate for the projected staffing of 1,200 and split between daytime shift and back shifts. The parking areas are planned to be paved, striped, and landscaped. The parking layout is expected to be 90-degree with 2-way isles. Typical standard dimensions of a 90-degree parking are obtained from the standard traffic engineering reference (Traffic Engineering Handbook, 5th Edition, Institute of Transportation Engineers, September, 1999).

6 Truck Loading and Unloading Stations

The site plan shows three major truck unloading stations. The fuel oil delivery station is on B Road west of L Road. The glass former station is on F Road east of G Road. The wet chemical station is on C Road east of B Road. **Exhibit 22** illustrates these three locations.

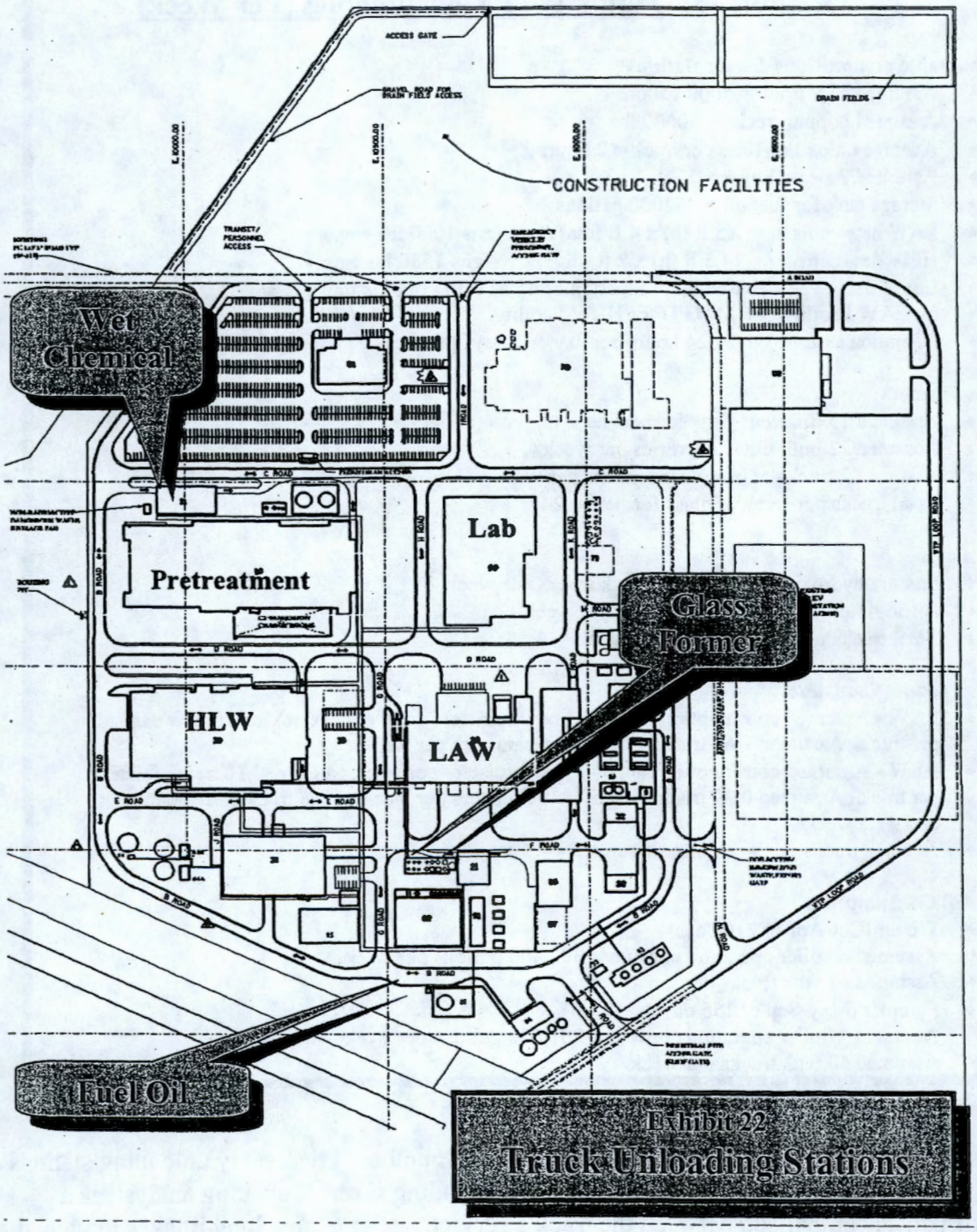


Exhibit 22
Truck Unloading Stations

6.1 Truck Loading and Unloading Facilities

WTP staff provided an overview of the major consumables anticipated for the WTP site. These data are summarized in **Exhibit 23.**

Exhibit 23: Major WTP Consumables (Per Week)

Consumable assumptions & calculations

- Assumed tank truck = 5000 gallons
- Assumed hopper trucks = 40000 lbs
- Average unloading time per truck = 2 hours
- Assumed 7 steam boilers
- Storage tank for fuel oil = 282000 gallons
- LAW new canister = 7.5 ft (h) x 4 ft (dia) & weighs 1000 lbs empty
- HLW new canister = 14.5 ft (h) x 2 ft (dia) & weighs 1550 lbs empty
- Consumable values based on production of 45 MTG/D (metric tons glass/day) for LAW Facility & 6 MTG/D for HLW Facility.
- Operation assumed to be 24 hours per day & 7 days per week

Glass Formers

- Assumed 13 different glass formers used in glass production
- Assumed 22 bulk truck deliveries per week
- Assumed 2 trucks of bag glass formers per week
- Total trucks per week of glass formers = 24

Chemicals

- Sodium hydroxide – Assumed 3 tank trucks per week
- Nitric Acid – Assumed 1 tank truck per week
- Total trucks per week of bulk chemicals = 4

Glass Product Canisters

- LAW - Assumed consumption rate of 53 new canisters per week. Assumed 20 new canisters per truck. Assumed 2.65 truckloads of new canisters per week.
- HLW - Assumed consumption rate of 7 new canisters per week. Assumed 18 new canisters per truck. Assumed 0.39 truckloads of new canisters per week or one truckload about every 2.5 weeks.
- Average trucks per week of new canisters = 3

Fuel Oil Consumption

- Winter (Oct-Apr or 210 days)
  - Assumed 6 boiler operation consumes 302,400 gallons per week
  - Assumed 61 tank trucks per week
- Summer (May-Sep or 155 days)
  - Assumed 4 boiler operation consumes 201,600 gallons per week
  - Assumed 40 tank trucks per week

A queuing analysis was conducted to determine the number of necessary unloading stations and any waiting stations at each of the three major unloading sites. A queuing analysis is a mathematical comparison between the truck's service rate (e.g. how long it takes to unload a vehicle) and the truck's arrival rate (e.g. how often a truck arrives at the project site). The

queuing analysis is used to determine many factors, including the average number of trucks being served, the number of trucks waiting to be served, and the average wait for service.

An iterative process is used to determine each of these factors based upon differing numbers of unloading positions. The required number of unloading stations was determined from the average queue length. Unloading stations were added to keep the average queue length at 2 trucks or less. The following table (**Exhibit 24**) summarizes the information for the three major unloading sites.

Exhibit 24: Truck Queuing Analysis Summary

	Glass	Wet	Fuel Oil		
1 Hour Unloading Time	Former	Chemicals	Summer	Winter	Units
trucks per day	6	1	9	14	
unloading time	1	1	1	1	hours
number of stations	1	1	1	1	
average queue length	0.08	0.00	0.23	0.82	trucks
average total time in system	1.33	1.04	1.60	2.40	hours
probability of idle service position	0.75	0.96	0.63	0.42	

	Glass	Wet	Fuel Oil		
2 Hour Unloading Time	Former	Chemicals	Summer	Winter	Units
trucks per day	6	1	9	14	
unloading time	2	2	2	2	hours
number of stations	1	1	2	2	
average queue length	0.50	0.01	0.12	0.60	trucks
average total time in system	4.00	2.18	2.33	3.03	hours
probability of idle service position	0.50	0.92	0.46	0.26	

	Glass	Wet	Fuel Oil		
3 Hour Unloading Time	Former	Chemicals	Summer	Winter	Units
trucks per day	6	1	9	14	
unloading time	3	3	3	3	hours
number of stations	2	1	2	3	
average queue length	0.12	0.02	0.52	0.47	trucks
average total time in system	3.49	3.43	4.39	3.80	hours
probability of idle service position	0.46	0.88	0.28	0.16	

The truck loading and unloading facilities are not adequate for the anticipated volume and pattern of truck deliveries. For the fuel oil, glass former, and wet chemical facility, the required number of unloading stations was calculated for one, two, and three hour truck unloading times with random arrivals of the trucks. The operations staff should plan for scheduled truck deliveries to minimize travel delay and the number of waiting trucks.

The fuel oil unloading site is not adequate for the anticipated truck volume. The project team recommends adding a second unloading station plus one truck waiting station for a two-hour unloading period. If the unloading period extends to three hours instead of two, then a third unloading station is needed with one truck waiting station.

The glass former truck unloading site is not adequate for the anticipated truck volume. The project team recommends providing a one truck waiting station in addition to the one, planned unloading station. If the unloading period extends to three hours instead of two, then a second unloading station is needed with one truck waiting station.

The wet chemical truck unloading site is adequate for the anticipated truck volume. No additional improvements are needed if the delivery trucks arrive at random times and require a two or three-hour unloading period.

6.2 Staffing at the Truck Unloading Sites

A queuing analysis was also used to determine the number of staff members necessary to operate the unloading stations at the three major unloading sites. A queuing analysis is a mathematical comparison between the employee's service rate (e.g., how long it takes to unload a vehicle) and the truck's arrival rate (e.g., how often a truck arrives at the project site). The current operational plan provides for two, 2-person truck-unloading teams. The WTP Project Unloading time is based on 1 hour per truck using 2 people.

This plan is not adequate for the anticipated truck volume and a two-hour unloading period. Additional unloading teams will be needed if the delivery trucks arrive at random times and require a two-hour or three-hour unloading period.

- Three, 2-person teams will be needed if the delivery trucks arrive at random intervals and require a two-hour unloading period.
- Five, 2-person teams will be needed if the delivery trucks arrive at random intervals and require a three-hour unloading period.

7 Recommendations

No improvements are recommended to accommodate the existing traffic volumes. Both the existing roadway system and security barricades have adequate capacity to serve the existing traffic volumes. The Route 4S corridor and the Wye Barricade are near their operational capacity serving the existing traffic volumes. Although there is little reserve capacity available to accommodate any additional traffic, no improvements are needed to accommodate the existing traffic volumes.

The study has developed the following recommendations under post-construction conditions when approximately 1,500 (commissioning) workers are anticipated for the WTP site.

1. The roadway system, with the exception of Route 4S, is adequate to accommodate the forecast traffic volumes. The security barricade system, with the exception of the Wye Barricade, is adequate to accommodate the forecast traffic volumes. The intersection of Route 11A with Route 4S has adequate capacity to serve the forecast traffic volumes.

2. The demand volume exceeds the capacity of Route 4S. The project team reviewed the developed alternative based on several factors (ease of implementation, impact to employees, and the operational and capital costs). The team recommends a revised work shift schedule for the post-construction WTP employees to address the road system capacity problems. This option is the easiest to implement, requires only minor capital construction and is the least expensive to implement.

   The next most desirable option is to implement a carpooling or shuttle bus service. This option is more difficult to implement and may require the purchase of vans or buses. However, it is considerably less expensive than widening Route 4S, the impact to the employees is minor as it is voluntary, and requires no capital improvements to the Hanford roadway system.

   The third most desirable option is diversion of traffic into Route 2S/11A. Implementation of this option could be complex, the impact to the employees would be significant, and capital improvements to the Hanford roadway system are necessary. However, it is considerably less expensive than widening Route 4S.

   The least desirable option is the widening of Route 4S. This option is the most expensive, requiring the most capital improvements to the Hanford roadway system and implementation will require between 12 to 18 months for design and construction. However, there is no impact to the employees and extra capacity is available for future project sites.

3. The proposed site plan shows a two-lane site access road as an extension of the existing access road to the 200 East facilities. A single, two-lane access road is sufficient to accommodate site access needs under the build out condition with approximately 500 (assumed minimum number of personnel on WTP Site at any time) employees on-site. The project team recommends that the existing two-lane connection to Route 4S be retained under build-out conditions.

4. The permanent on-site parking layout provides a 671-stall parking area for the permanent employees. The parking area is to be paved, striped, and landscaped. The capacity and design is not adequate to serve the peak demand by employee and visitor's vehicles. The project team recommends retaining the planned 671-space, permanent parking lot and adding an additional 3-acre parking facility north of the PC Road, across from the proposed parking facility.

5. The truck loading and unloading facilities are not adequate for the anticipated volume and pattern of truck deliveries. For fuel oil, glass former, and wet chemical facility, the required number of unloading stations was calculated for two and three hour truck unloading times with random arrivals of the trucks. For all facilities, the potential for scheduled truck deliveries should be examined.

6. The fuel oil unloading site is not adequate for the anticipated truck volume. The project team recommends adding a second unloading station plus one truck waiting station for a two-hour unloading period. If the unloading period extends to three hours instead of two, then a third unloading station is needed with one truck waiting station.

7. The glass former truck unloading site is not adequate for the anticipated truck volume. The project team recommends providing a one truck waiting station in addition to the one, planned unloading station. If the unloading period extends to three hours instead of two, then a second unloading station is needed with one truck waiting station.

8. The wet chemical truck unloading site is adequate for the anticipated truck volume. No additional improvements are needed if the delivery trucks arrive at random times and require a two or three-hour unloading period.

9. The current operational plan provides for two, 2-person truck unloading teams. This plan is not adequate for the anticipated truck volume and a two-hour unloading period. The project team found three, 2-person teams will be needed if the delivery trucks arrive at random intervals and require a two-hour unloading period. Five, 2-person teams will be needed if the delivery trucks arrive at random intervals and require a three-hour unloading period.

10. Several opportunities to improve on-site traffic operations within the planned Waste Treatment Plant site were identified (See **Exhibit 20**).

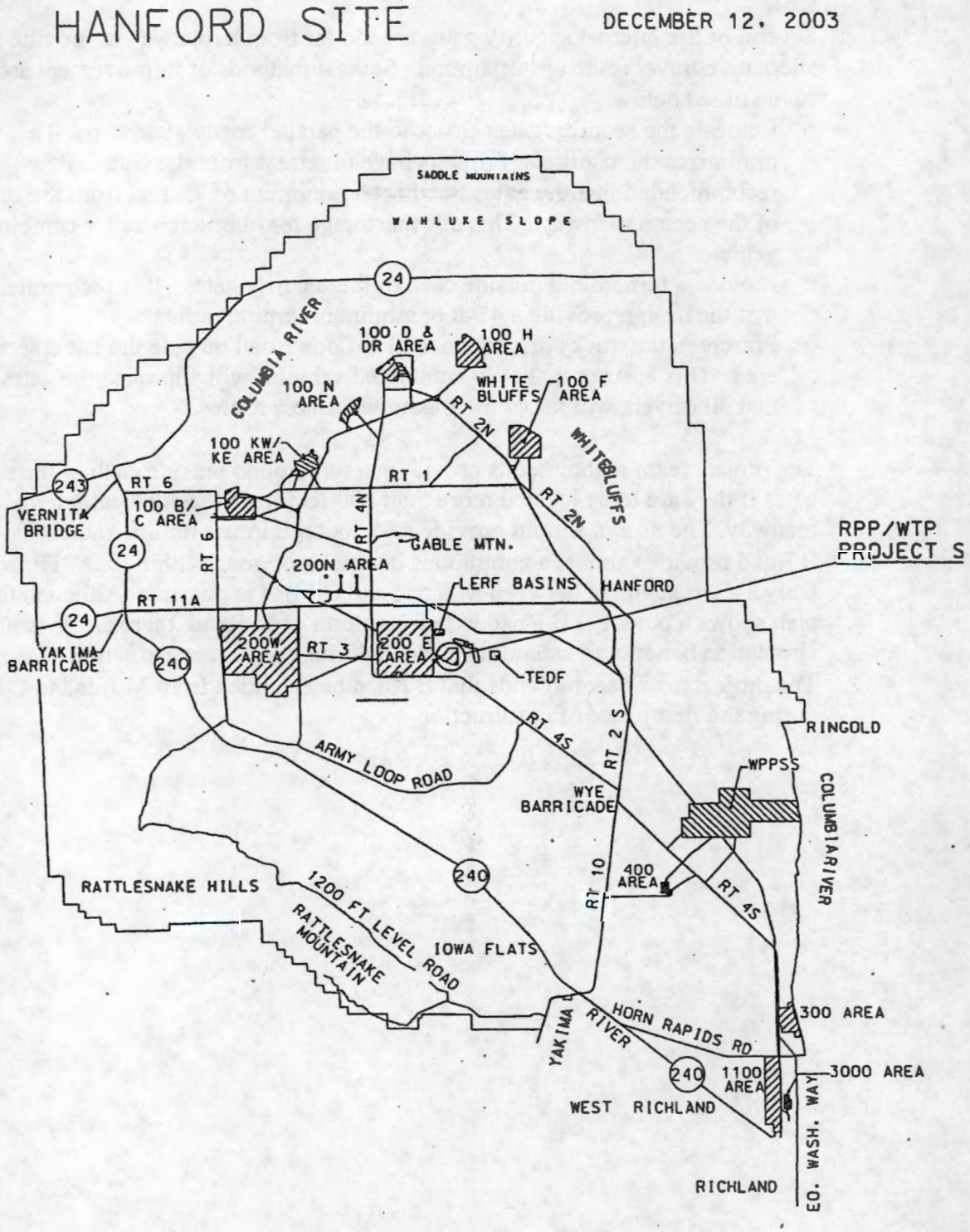
    - The intersection of B Road and D Road is atypical. The project team recommends extending the landscaped area westward to B Road
    - The intersection of D Road, M Road and K Road is atypical. The project team recommends shifting the northern switchgear building to the north, and extending D Road eastward to B Road.
    - An overhead pipe rack is planned to provide heating and cooling services to the WTP site. The pipe rack crosses several internal roadways, including D, E, G and H Roads, plus a number of driveways and storage areas. The standard overhead clearance for a roadway is 16-feet. The standard overhead clearance for a rail line

is 23.5-feet. The project team recommends that the pipe rack be located a minimum of 23.5-feet above any planned roadway surface or parking and loading area.

- Several of the internal security gates are too far from a roadway to provide an alternative travel route or turnaround. Several methods of improvement are summarized below:
  - Relocate the security gates closer to the parallel roadway system. This minimizes the conflicts if drivers have to retreat from the gates. It is recommended that the gates be offset a minimum of 75-feet from the edge line of the access roadway. This allows storage for one, semi-trailer combination vehicle.
  - Provide a turnaround outside each of the security gates. It is recommended that the design provide a 45-foot minimum turning radius.
  - Prescreen the trucks/drivers on the PC Loop Road outside the site's secured area. This ensures that only authorized vehicles will approach the gates and that all drivers will know their assigned access routes.

- The project team recommends providing a turnaround outside each of the security gates if they are to be located more than 100-feet from the adjacent internal roadway. The design should provide a 45-foot minimum turning radius.
- B Road provides almost a continuous internal loop road within the WTP facility. Only a short segment between M Road and C Road is missing. Although the site plan shows a potential B Road extension north of M Road, there are several circulation benefits to extending B Road during the first construction phase.
- The project team recommends that B Road be extended from M Road to C Road during the first phase of construction.

Attachment I



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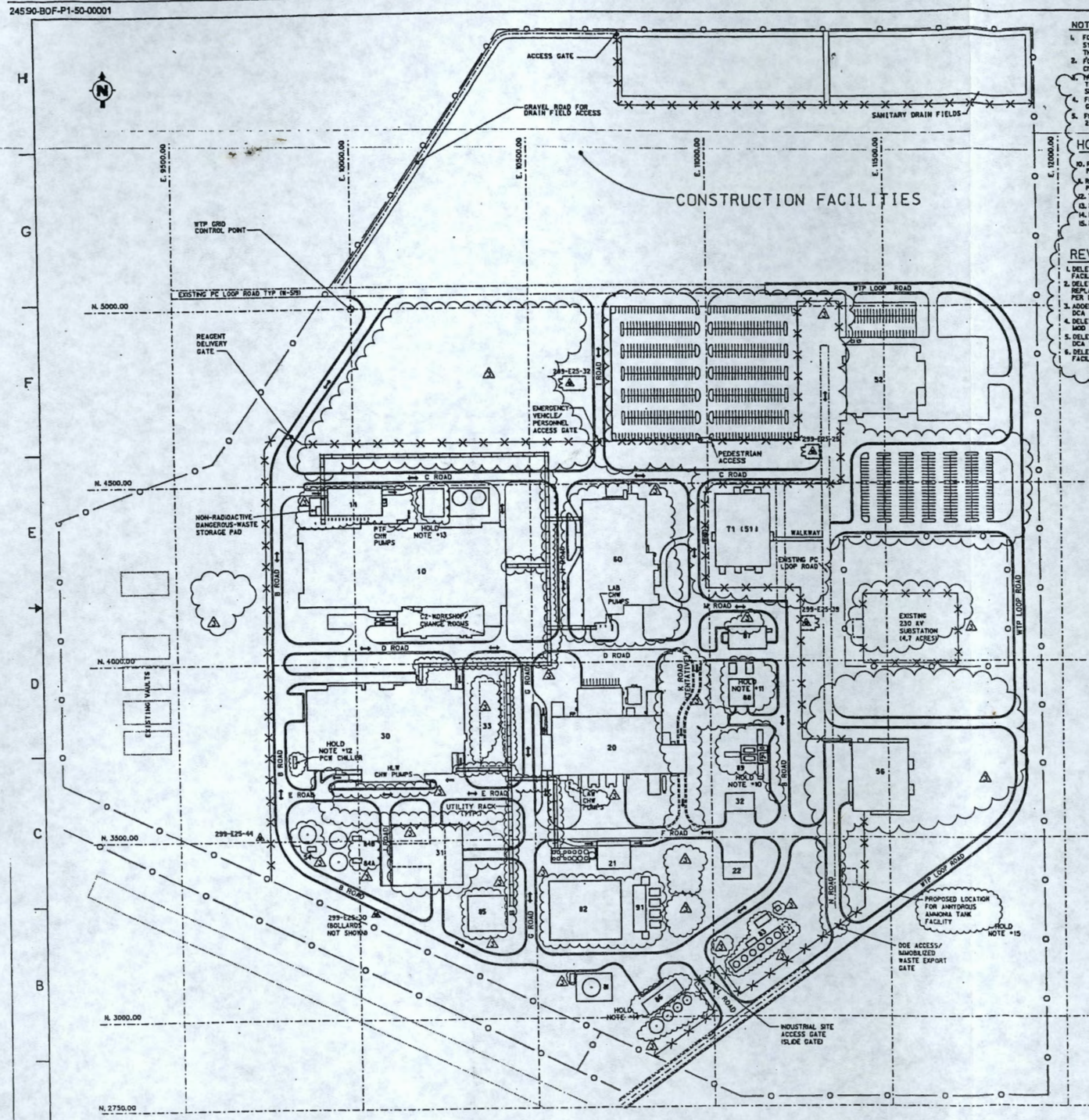


NOTES

4. FOR BELOW GRADE STRUCTURES, PIPING AND INSTRUMENT SYSTEMS, SEE DRAWING 24590-BOF-C2-C2T-00003 THRU 00032.
2. FOR RPP-WTP SITE GENERAL ARRANGEMENT PLAN SEE CIVIL DRAWING 24590-BOF-C2-C2T-00002.
3. THIS DRAWING SHOWS THE BUILDING SIZE IN RELATION TO THE WTP SITE. FOR EXACT BUILDING LOCATION SEE DRAWING 24590-BOF-C2-C2T-00002.
4. FOR ACCURATE BUILDING ARRANGEMENT SEE REFERENCE G.A.'s LISTED ON THIS DRAWING.
5. FOR ROADS, APRONS AND PARKING LOTS SEE DRAWING 24590-BOF-CS-C2T-00004.

HOLD NOTES:

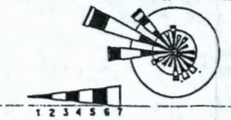
10. REVISED DIESEL GENERATORS FACILITY PENDING ASAR APPROVAL.
11. REVISED ITS SWITCHGEAR BUILDING PENDING ASAR APPROVAL.
12. TO BE DELETED PENDING DCA APPROVAL
13. PENDING DESIGN DEVELOPMENT
14. PENDING DCA APPROVAL
15. PENDING DCA APPROVAL

REVISION 3 CHANGES:

1. DELETED ADMINISTRATION BUILDING * 51 AND ACCESS CONTROL FACILITY * 53 PER DCA * 24590-BOF-DCA-ENG-03-001
2. DELETED MELTER ASSEMBLY BUILDING & REPLACED BY MELTER ASSEMBLY PAD PER DCA * 24590-BOF-DCA-M-02-002
3. ADDED SOUTH NETWORK HUB PER DCA * 24590-BOF-DCA-ENG-03-002
4. DELETED ROUTING PIT PER WTP CONTRACT, MOD A023, LANGUAGE IN SECTION C.7 (c), (5)
5. DELETED CENTRAL WASTE STORAGE * 55 PER DCA * 24590-WTP-DCA-M-03-006
6. DELETED RESERVED SPACE FOR ENCAPSULATION FACILITY * 57 PER DCA * 24590-WTP-DCA-M-03-005

WIND CLASS

WIND ROSE FOR : 200E AREA — PERIOD COVERED
STATION NO. 6 — 1/1/93 - 12/31/93



PADDLES INDICATE DIRECTION WIND IS COMING FROM. RADIAL GRIDS REPRESENT 5.0% AND 10% OCCURRENCE.

WIND CLASS	MILES/HOUR
1	>1.0 - 3.0
2	4.0 - 7.0
3	8.0 - 12.0
4	13.0 - 18.0
5	19.0 - 24.0
6	25.0 - 31.0
7	32.0 +

LEGEND

RPP-WTP SITE SECURITY FENCE
RPP-WTP INTERIOR FENCE
DOE EXISTING FENCE
DOE GROUND WATER MONITORING WELL

REFERENCE DRAWINGS

PROJ. BLDG. NO.	HANFORD SITE BLDG. NUMBER	FACILITIES	GENERAL ARRANGEMENT DRAWING NUMBER
10	2000 WTP	PRETREATMENT FACILITY	24590-PTF-PI-P0T-00001
11	2111 WTP	RET CHEMICAL STORAGE FACILITY	24590-BOF-PI-11-00001
20	2320 WTP	LAW VITRIFICATION BUILDING	24590-LAW-PI-P0T-00002
21	2321 WTP	GLASS FORMER STORAGE FACILITY	24590-BOF-PI-21-00001
22	2422 WTP	SPENT MELTER STAGING	24590-BOF-PI-22-00001
30	2330 WTP	HLW VITRIFICATION BUILDING	24590-HLW-PI-P0T-00001
31	2231 WTP	MELTER ASSEMBLY PAD	24590-BOF-MO-31-00005
32	2432 WTP	FAILED MELTER STORAGE	24590-BOF-PI-32-00001
33	2133 WTP	RESERVED FOR HLW CANISTER STORAGE EXPANSION	TBD
T1(S1)	2731 WTP	CONSTRUCTION OFFICE (FUTURE ADMINISTRATION BUILDING)	TBD
52	2652 WTP	WAREHOUSE	TBD
54	2654 WTP	NON-DANGEROUS, NON-RADIOACTIVE EFFLUENT FACILITY	24590-BOF-PI-54-00001
56	2256 WTP	COMBINATION SHOP (FUTURE SHOP & OFFICE SPACE)	TBD
60	2260 WTP	ANALYTICAL LABORATORY	TBD
81	2681 WTP	FUEL OIL FACILITY	24590-BOF-PI-81-00001
82	2682 WTP	CHILLER/COMPRESSOR PLANT	24590-BOF-PI-82-00002
83	2683 WTP	COOLING TOWER FACILITY	24590-BOF-PI-83-00001
84A	2684A WTP	FIRE WATER PUMP HOUSE FACILITY	24590-BOF-PI-84-00001
84B	2684B WTP	FIRE WATER PUMP HOUSE FACILITY	24590-BOF-PI-84-00001
85	2685 WTP	STEAM PLANT FACILITY	24590-BOF-PI-85-00001
86	2686 WTP	WATER TREATMENT BUILDING	24590-BOF-PI-86-00001
87	2687 WTP	SWITCHGEAR BUILDING	24590-BOF-PI-87-00001
88	2688 WTP	ITS SWITCHGEAR BUILDING	24590-BOF-PI-88-00001
89	2689 WTP	DIESEL GENERATORS FACILITY	24590-BOF-PI-89-00001
91	2691 WTP	BOF SWITCHGEAR BUILDING	24590-BOF-PI-91-00001
TBD	TBD	SOUTH NETWORK HUB	TBD

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
3	DELETED SPACE FOR FUTURE GLASS FORMER & LAW BUILDINGS, HOLD NOTES 1, 2 & 4, ADDED HOLD NOTES, REVISION 3 CHANGES, NOTES 3, 4 & 5, COMBINATION SHOP, CONSTRUCTION OFFICE, EXISTING SUBSTATION, CHW BOOSTER PUMPS, REVISED STEAM PLANT PER VENDOR DWG SUBMITTAL, FENCES, ROADS, PARKING LOTS & UTILITY RACK, INCORPORATED DCN'S 24590-BOF-PIN-50-00001 & 00002					9-2-03
2	REVISED SWG BLDG. PER VENDOR INFO., PIPERACK, CHILLER/COMP. PLANT BLDG., MOVED BOF SWG. BLDG., STEAM PLANT, SPENT MELTER STAGING FACILITY PER CSAA, ADDED PTF DRIVEWAY, CHANGED SITE BLDG. "NP" TO "WTP" PER CCN # 038808 & DELETED BOILER FUEL DAY TANKS PER TN-24590-02-00017	MP	LPV	N/A	WJ/SF	09-10-02
1	REVISED BLDG. OUTLINE & PIPE ROUTING	WEA	EJM	N/A	WJ/SF	05-31-02
0	ISSUED FOR DESIGN	WTP	EJM	N/A	WJ	12-17-01

CM

	BY	DATE
ORIGINATOR	M. PRESTIGIAN	12-17-01
CHECKER	G. WOLAFLOR	12-17-01
APPROVER	M. WYATT	12-17-01
REVIEWER	N/A	

CONTENT APPLICABLE TO ALARA? YES NO
JOB NO. 24590-WTP-ADM-PL-02-002 REV. 0
DM REFERENCE No. 24590-BOF-PIN-50-00001 3

PROJECT No. 24590
SITE HANFORD
AREA 200E
BUILDING No. WTP SITE

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99352

CONTRACT Ref DE-AC27-01RV14136

RPP-WTP PLOT PLAN

SCALE: 1"=100'-0"
24590-BOF-P1-50-00001
REV 3

APPENDICES

A. Traffic Counts

B. Capacity Analyses

C. Delay Studies

A. Traffic Counts

j:\Projects\2567 -RPP-WTP\Survey Data Files\Mitron Counts\WYE BARRICADE030402.TDF
Date: 3/4/2002
Start Time: 3:15 PM15 minute intervals
Intervals: 89
Northbound, Southbound
Project: RPP-WTP
Date: 3/4/02
Counter: #7
Other: Wye Barricade

Time			Northbound	Southbound	Total	Percent of Daily	Reserve Capaci
30	am		0	0	0	0%	462
315			1	1	2	0%	460
330			5	1	6	0%	456
345			10	0	10	0%	452
40			20	0	20	0%	442
415		4.00	30	0	30	0%	432
430			40	1	41	0%	421
445			60	1	61	1%	401
50			70	10	80	1%	382
515			160	20	180	2%	282
530			200	20	220	2%	242
545			230	20	250	2%	212
60			250	20	270	3%	192
615		6.00	270	30	300	3%	162
630			230	30	260	2%	202
645			450	50	500	5%	-39
70			270	30	300	3%	162
715			130	20	150	1%	312
730			80	20	100	1%	362
745			75	20	95	1%	367
80			50	20	70	1%	392
815		8.00	40	30	70	1%	392
830			40	20	60	1%	402
845			50	20	70	1%	392
90			40	20	60	1%	402
915			40	20	60	1%	402
930			30	20	50	0%	412
945			40	20	60	1%	402
100			30	20	50	0%	412
1015		10.00	20	20	40	0%	422
1030			20	30	50	0%	412
1045			20	30	50	0%	412
110			20	30	50	0%	412
1115			20	30	50	0%	412
1130			20	30	50	0%	412
1145			20	30	50	0%	412
120			20	30	50	0%	412
1215		Noon	20	30	50	0%	412
1230			20	30	50	0%	412
1245			20	30	50	0%	412
10			20	30	50	0%	412
115			20	30	50	0%	412
130			15	30	45	0%	417
145			15	30	45	0%	417

20			15	30	45	0%	417
215		2.00	15	30	45	0%	417
230			15	30	45	0%	417
245			15	30	45	0%	417
30			15	30	45	0%	417
315	pm		15	50	65	1%	397
330			15	180	195	2%	267
345			15	240	255	2%	207
40			15	250	265	3%	197
415		4.00	15	260	275	3%	187
430			15	280	295	3%	167
445			15	370	385	4%	77
50			15	320	335	3%	127
515			15	240	255	2%	207
530			15	140	155	1%	307
545			15	60	75	1%	387
60			15	50	65	1%	397
615		6.00	6	50	56	1%	406
630			3	50	53	1%	409
645			3	30	33	0%	429
70			1	20	21	0%	441
715			1	20	21	0%	441
730			1	10	11	0%	451
745			0	10	10	0%	452
80			0	9	9	0%	453
815		8.00	1	7	8	0%	454
830			0	7	7	0%	455
845			0	9	9	0%	453
90			2	6	8	0%	454
915			1	10	11	0%	451
930			1	4	5	0%	457
945			5	0	5	0%	457
100			2	3	5	0%	457
1015		10.00	3	4	7	0%	455
1030			5	3	8	0%	454
1045			5	5	10	0%	452
110			7	4	11	0%	451
1115			7	3	10	0%	452
1130			1	6	7	0%	455
1145			0	3	3	0%	459
120	am		0	9	9	0%	453
1215		Midnight	0	26	26	0%	436
1230			2	21	23	0%	439
1245			0	15	15	0%	447
10			0	10	10	0%	452
115			0	2	2	0%	460
130			0	0	0	0%	462
145			1	0	1	0%	461
20			0	0	0	0%	462
215			0	0	0	0%	462
230		2.00	0	0	0	0%	462
245			2	1	3	0%	459

j:\Projects\2567 -RPP-WTP\Survey Data Files\Mitron Counts\YAKIMA BARRICADE030502.TDF GAP

Date: 3/5/2002

Start Time: 7:15 AM 15 Minute Intervals

Intervals: 203

Eastbound, Westbound

Project: RPP-WTP

Date: 3/5/02

Counter #: 5

Other: Yakima Barricade

Time		Eastbound	Westbound	Total	
7 15	am	23	3	26	3.2%
7 30		0	5	5	0.6%
7 45		0	0	0	0.0%
8 0		5	1	6	0.7%
8 15		1	1	2	0.2%
8 30		0	3	3	0.4%
8 45		1	1	2	0.2%
9 0		1	0	1	0.1%
9 15		1	2	3	0.4%
9 30		1	0	1	0.1%
9 45		0	1	1	0.1%
10 0		1	1	2	0.2%
10 15		0	0	0	0.0%
10 30		2	1	3	0.4%
10 45		1	0	1	0.1%
11 0		2	1	3	0.4%
11 15		6	0	6	0.7%
11 30		2	0	2	0.2%
11 45		2	0	2	0.2%
12 0	Noon	1	0	1	0.1%
12 15		1	0	1	0.1%
12 30		1	3	4	0.5%
12 45		6	5	11	1.4%
1 0		0	1	1	0.1%
1 15		1	0	1	0.1%
1 30		2	2	4	0.5%
1 45		2	1	3	0.4%
2 0		6	1	7	0.9%
2 15		5	1	6	0.7%
2 30		7	1	8	1.0%
2 45		3	5	8	1.0%
3 0		13	1	14	1.7%
3 15		17	3	20	2.5%
3 30		36	1	37	4.6%
3 45		23	0	23	2.9%
4 0		19	0	19	2.4%
4 15		49	1	50	6.2%
4 30		60	0	60	7.5%
4 45		27	2	29	3.6%

5 0		18	4	22	2.7%
5 15		7	1	8	1.0%
5 30		5	1	6	0.7%
5 45		6	3	9	1.1%
6 0		6	0	6	0.7%
6 15		2	0	2	0.2%
6 30		3	0	3	0.4%
6 45		3	0	3	0.4%
7 0		0	0	0	0.0%
7 15		1	0	1	0.1%
7 30		1	0	1	0.1%
7 45		0	0	0	0.0%
8 0		1	1	2	0.2%
8 15		2	0	2	0.2%
8 30		0	0	0	0.0%
8 45		1	0	1	0.1%
9 0		1	1	2	0.2%
9 15		0	0	0	0.0%
9 30		0	1	1	0.1%
9 45		0	0	0	0.0%
10 0		0	1	1	0.1%
10 15		0	0	0	0.0%
10 30		1	1	2	0.2%
10 45		0	2	2	0.2%
11 0		1	5	6	0.7%
11 15		2	1	3	0.4%
11 30		0	0	0	0.0%
11 45		2	0	2	0.2%
12 0	Midnight	0	0	0	0.0%
12 15		3	1	4	0.5%
12 30		7	0	7	0.9%
12 45		2	1	3	0.4%
1 0		0	0	0	0.0%
1 15		0	0	0	0.0%
1 30		1	1	2	0.2%
1 45		0	0	0	0.0%
2 0		0	0	0	0.0%
2 15		0	0	0	0.0%
2 30		0	0	0	0.0%
2 45		0	0	0	0.0%
3 0		0	0	0	0.0%
3 15		0	0	0	0.0%
3 30		0	0	0	0.0%
3 45		0	1	1	0.1%
4 0		0	1	1	0.1%
4 15		0	3	3	0.4%
4 30		0	2	2	0.2%
4 45		0	7	7	0.9%
5 0		0	11	11	1.4%
5 15		0	15	15	1.9%
5 30		0	16	16	2.0%
5 45		1	21	22	2.7%

60	1	38	39	4.9%
615	7	36	43	5.4%
630	3	48	51	6.4%
645	0	57	57	7.1%
70	2	46	48	6.0%
715	0	8	8	1.0%

j:\Projects\2567 -RPP-WTP\Survey Data Files\Mitron Counts\ROUTE4_SITE052902.TDF

Date: 5/29/2002

Start Time: 2:00 PM 15 Minute Intervals 1:00 pm local time

Intervals: 85

Northbound, Southbound

Project: RPP-WTP

Date: 5/29/02

Counter: # 8

Route 4 & Site Rd.

Time	Northbound	Southbound	Total	
1.25	4	12	16	
1.5	18	18	36	
1.75	4	12	16	
2	10	9	19	
2.25	9	11	20	
2.5	11	11	22	
2.75	5	16	21	
3	11	14	25	
3.25	4	11	15	
3.5	6	28	34	
3.75	5	17	22	
4	8	67	75	
4.25	3	25	28	
4.5	8	24	27	
4.75	6	39	45	
5	10	65	75	
5.25	4	38	42	Peak hour of 189
5.5	1	18	19	
5.75	0	21	21	
6	0	12	12	
6.25	0	4	4	
6.5	0	7	7	
6.75	3	3	6	
7	0	4	4	
7.25	1	1	2	
7.5	2	4	6	
7.75	0	5	5	
8	0	0	0	
8.25	0	1	1	
8.5	0	1	1	
8.75	0	1	1	
9	0	1	1	
9.25	0	1	1	
9.5	0	0	0	
9.75	0	0	0	
10	1	0	1	
10.25	1	1	2	
10.5	0	3	3	
10.75	0	3	3	
11	0	1	1	

11.25	2	1	3	
11.5	0	3	3	
11.75	3	0	3	
12	2	1	3	
12.25	0	1	1	
12.5	1	0	1	
12.75	0	1	1	
1	0	0	0	
1.25	0	0	0	
1.5	0	0	0	
1.75	1	0	1	
2	0	0	0	
2.25	0	1	1	
2.5	0	0	0	
2.75	0	0	0	
3	0	0	0	
3.25	0	0	0	
3.5	0	0	0	
3.75	0	0	0	
4	0	1	1	
4.25	0	0	0	
4.5	1	0	1	
4.75	0	0	0	
5	1	0	1	
5.25	3	0	3	
5.5	3	1	4	
5.75	5	1	6	
6	10	0	10	
6.25	23	4	27	
6.5	30	3	33	
6.75	34	4	38	
7	51	9	60	
7.25	76	2	78	
7.5	79	10	89	Peak hour of 265
7.75	36	1	37	
8	26	9	35	
8.25	16	4	20	
8.5	15	7	22	
8.75	11	9	20	
9	9	7	16	
9.25	7	12	19	
9.5	9	10	19	
9.75	10	6	16	
10	12	11	23	
10.25	13	11	24	
10.5	7	9	16	
10.75	9	9	18	

j:\Projects\2567 -RPP-WTP\Survey Data Files\Mitron Counts\ROUTE11_SITE052902.TDF

Date: 5/29/2002

Start Time: 2:00 PM 15 Minute Intervals 1:00 pm local

Intervals: 85

Northbound, Southbound

Project: RPP-WTP

Date: 5/29/02

Counter: # 5

Route 11 & Site Rd.

Time	Northbound	Southbound	Total	Peak
1.25	2	1	3	
1.5	0	0	0	
1.75	4	3	7	
2	3	6	9	
2.25	3	3	6	
2.5	7	0	7	
2.75	7	1	8	
3	6	4	10	
3.25	10	1	11	
3.5	13	1	14	
3.75	9	3	12	
4	1	2	3	
4.25	8	1	9	
4.5	10	2	12	
4.75	38	1	39	
5	30	0	30	
5.25	36	0	36	
5.5	17	0	17	Peak hour of 222
5.75	9	1	10	
6	6	0	6	
6.25	6	0	6	
6.5	0	0	0	
6.75	0	0	0	
7	0	0	0	
7.25	1	0	1	
7.5	0	2	2	
7.75	1	0	1	
8	0	0	0	
8.25	0	0	0	
8.5	1	0	1	
8.75	0	0	0	
9	0	0	0	
9.25	0	0	0	
9.5	0	0	0	
9.75	0	0	0	
10	0	0	0	
10.25	0	0	0	
10.5	0	0	0	
10.75	0	0	0	
11	0	0	0	

11.25	0	0	0	
11.5	0	0	0	
11.75	0	0	0	
12	0	0	0	
12.25	0	0	0	
12.5	0	0	0	
12.75	0	0	0	
1	0	0	0	
1.25	0	0	0	
1.5	0	0	0	
1.75	0	0	0	
2	0	0	0	
2.25	0	0	0	
2.5	0	0	0	
2.75	0	0	0	
3	0	0	0	
3.25	0	0	0	
3.5	0	0	0	
3.75	0	0	0	
4	0	1	1	
4.25	1	1	2	
4.5	0	7	7	
4.75	0	12	12	
5	0	3	3	
5.25	0	4	4	
5.5	0	14	14	
5.75	[redacted]			
6	[redacted]			
6.25	[redacted]			
6.5	[redacted]			Peak hour of 223
6.75	0	15	15	
7	2	11	13	
7.25	1	5	6	
7.5	0	3	3	
7.75	3	2	5	
8	2	3	5	
8.25	2	7	9	
8.5	0	4	4	
8.75	3	2	5	
9	2	3	5	
9.25	1	4	5	
9.5	1	1	2	
9.75	5	2	7	
10	2	1	3	
10.25	1	0	1	
10.5	4	0	4	

B. Capacity Analysis

a. Build-out Stop-controlled Intersection capacity Analysis

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CCW	Intersection	Route 11 & Route 4
Agency/Co.	Washington Group	Jurisdiction	Hanford
Date Performed	11/01/02	Analysis Year	Build Out
Analysis Time Period	AM Peak Hour		
Project Description	Hanford		
East/West Street:	Route 11	North/South Street:	Route 4
Intersection Orientation:	North-South	Study Period (hrs):	1.00

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	6	212	0	0	14	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	6	235	0	0	15	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			1			1
Lanes	0	1	0	0	1	0
Configuration	LT			LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	11	0	7	122	0
Peak-Hour Factor, PHF	0.25	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	12	0	7	135	0
Percent Heavy Vehicles	2	2	0	2	2	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			1
Lanes	0	2	0	0	2	0
Configuration	LT	T		LT	T	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LT	T		LT	T	
v (vph)	6	0	6	6		74	67	
C (m) (vph)	1603	1332	640	640		643	640	
v/c	0.00	0.00	0.01	0.01		0.12	0.10	
95% queue length	0.01	0.00	0.03	0.03		0.39	0.35	
Control Delay	7.3	7.7	10.7	10.7		11.3	11.3	
LOS	A	A	B	B		B	B	
Approach Delay	--	--	10.7			11.3		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CCW	Intersection	Route 11 & Route 4
Agency/Co.	Washington Group	Jurisdiction	Hanford
Date Performed	11/01/02	Analysis Year	Build Out
Analysis Time Period	PM Peak Hour		
Project Description	Hanford		
East/West Street:	Route 11	North/South Street:	Route 4
Intersection Orientation:	North-South	Study Period (hrs):	1.00

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	166	19	0	0	130	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	184	21	0	0	144	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			1			1
Lanes	0	1	0	0	1	0
Configuration	LT			LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	142	0	3	5	0
Peak-Hour Factor, PHF	0.25	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	157	0	3	5	0
Percent Heavy Vehicles	2	2	0	2	2	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			1
Lanes	0	2	0	0	2	0
Configuration	LT	T		LT	T	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LT	T		LT	T	
v (vph)	184	0	78	78		5	2	
C (m) (vph)	1438	1595	394	394		295	394	
v/c	0.13	0.00	0.20	0.20		0.02	0.01	
95% queue length	0.44	0.00	0.74	0.74		0.05	0.02	
Control Delay	7.9	7.3	16.4	16.4		17.4	14.2	
LOS	A	A	C	C		C	B	
Approach Delay	--	--	16.4			16.5		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CCW	Intersection	Site 200 Approach & Route 11
Agency/Co.		Jurisdiction	
Date Performed	11/01/02	Analysis Year	Build Out
Analysis Time Period	AM Peak Hour		

Project Description *Hanford*

East/West Street: *Route 11*	North/South Street: *Site 200 Approach*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	5	115	230	5	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	5	127	255	5	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	6	0	6	0	0	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	6	0	6	0	0	0
Percent Heavy Vehicles		0	2	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (vph)		255	6		6			
C (m) (vph)		1453	392		995			
v/c		0.18	0.02		0.01			
95% queue length		0.64	0.05		0.02			
Control Delay		8.0	14.3		8.6			
LOS		A	B		A			
Approach Delay	--	--	11.5					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CCW	Intersection	Site 200 & Route 11
Agency/Co.		Jurisdiction	
Date Performed	11/01/02	Analysis Year	Build Out
Analysis Time Period	PM Peak Hour		

Project Description	Hanford
East/West Street: Route 11	North/South Street: Site 200 Approach
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	5	5	7	5	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	5	5	7	5	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	137	0	186	0	0	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	152	0	206	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized						0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (vph)		7	152		206			
C (m) (vph)		1610	984		1074			
v/c		0.00	0.15		0.19			
95% queue length		0.01	0.55		0.71			
Control Delay		7.2	9.3		9.1			
LOS		A	A		A			
Approach Delay	--	--	9.2					
Approach LOS	--	--	A					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*CCW*	Intersection	
Agency/Co.	*Washington Group*	Jurisdiction	
Date Performed	*11/01/2002*	Analysis Year	*Build Out*
Analysis Time Period	*AM Peak*		

Project Description	*Hanford*
East/West Street: *Route 2*	North/South Street: *Route 4*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*1662*	*230*	*5*	*82*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*1846*	*255*	*5*	*91*	*0*
Percent Heavy Vehicles	*0*	*--*	*--*	*2*	*--*	*--*
Median Type	*Undivided*					
RT Channelized			*1*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*6*	*0*	*5*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*6*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*Y*			*N*	
Storage		*1*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*		*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (vph)		*5*	*6*		*5*			
C (m) (vph)		*325*	*49*		*224*			
v/c		*0.02*	*0.12*		*0.02*			
95% queue length		*0.05*	*0.39*		*0.07*			
Control Delay		*16.2*	*88.5*		*21.4*			
LOS		*C*	*F*		*C*			
Approach Delay	*--*	*--*	*58.0*					
Approach LOS	*--*	*--*	*F*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*CCW*	Intersection	
Agency/Co.	*Washington Group*	Jurisdiction	
Date Performed	*11/01/2002*	Analysis Year	*Build Out*
Analysis Time Period	*PM Peak*		

Project Description	*Hanford*
East/West Street: *Route 2*	North/South Street: *Route 4*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*54*	*7*	*5*	*1371*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*60*	*7*	*5*	*1523*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*1*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*186*	*0*	*5*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*206*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*Y*			*N*	
Storage		*1*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (vph)		*5*	*206*		*5*			
C (m) (vph)		*1542*	*305*		*1032*			
v/c		*0.00*	*0.68*		*0.00*			
95% queue length		*0.01*	*4.56*		*0.01*			
Control Delay		*7.3*	*38.2*		*8.5*			
LOS		*A*	*E*		*A*			
Approach Delay	--	--	*37.5*					
Approach LOS	--	--	*E*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*KH*	Intersection	
Agency/Co.	*Washington Group*	Jurisdiction	
Date Performed	*11/01/2002*	Analysis Year	*Build Out*
Analysis Time Period	*PM Peak - carpool*		

Project Description *Hanford*	
East/West Street: *Route 2*	North/South Street: *Route 4*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*54*	*7*	*5*	*1071*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*60*	*7*	*5*	*1190*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*1*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*186*	*0*	*5*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*206*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*Y*			*N*	
Storage		*1*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (vph)		*5*	*206*		*5*			
C (m) (vph)		*1542*	*390*		*1032*			
v/c		*0.00*	*0.53*		*0.00*			
95% queue length		*0.01*	*2.97*		*0.01*			
Control Delay		*7.3*	*24.1*		*8.5*			
LOS		*A*	*C*		*A*			
Approach Delay	--	--	*23.7*					
Approach LOS	--	--	*C*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*KH*	Intersection	
Agency/Co.	*Washington Group*	Jurisdiction	
Date Performed	*11/01/2002*	Analysis Year	*Build Out*
Analysis Time Period	*PM Peak - Divert*		

Project Description	*Hanford*		
East/West Street:	*Route 2*	North/South Street:	*Route 4*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*54*	*7*	*5*	*1371*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*60*	*7*	*5*	*1523*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*1*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*486*	*0*	*5*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*540*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*Y*			*N*	
Storage		*1*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (vph)		*5*	*540*		*5*			
C (m) (vph)		*1542*	*305*		*1032*			
v/c		*0.00*	*1.77*		*0.00*			
95% queue length		*0.01*	*35.14*		*0.01*			
Control Delay		*7.3*	*388.8*		*8.5*			
LOS		*A*	*F*		*A*			
Approach Delay	--	--	*385.3*					
Approach LOS	--	--	*F*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*KH*	Intersection	
Agency/Co.	*Washington Group*	Jurisdiction	
Date Performed	*11/01/2002*	Analysis Year	*Build Out*
Analysis Time Period	*PM Peak - shift*		

Project Description *Hanford*

East/West Street: *Route 2*	North/South Street: *Route 4*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*26*	*3*	*5*	*1016*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*28*	*3*	*5*	*1128*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*1*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*93*	*0*	*5*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*103*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*Y*			*N*	
Storage		*1*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (vph)		*5*	*103*		*5*			
C (m) (vph)		*1584*	*429*		*1059*			
v/c		*0.00*	*0.24*		*0.00*			
95% queue length		*0.01*	*0.93*		*0.01*			
Control Delay		*7.3*	*16.0*		*8.4*			
LOS		*A*	*C*		*A*			
Approach Delay	--	--	*15.7*					
Approach LOS	--	--	*C*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CCW	Intersection	
Agency/Co.	Washington Group	Jurisdiction	
Date Performed	11/01/02	Analysis Year	Build Out
Analysis Time Period	AM Peak Hour		

Project Description *Hanford*

East/West Street: *Route 4*	North/South Street: *Site 200 approach*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	115	38	0	0	950	719
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	127	42	0	0	1055	798
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			1
Lanes	1	1	0	0	1	1
Configuration	L	T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	44	0	5
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	48	0	5
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (vph)	127					48		5
C (m) (vph)	660					134		274
v/c	0.19					0.36		0.02
95% queue length	0.71					1.47		0.06
Control Delay	11.7					46.2		18.4
LOS	B					E		C
Approach Delay	--	--				43.5		
Approach LOS	--	--				E		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CCW	Intersection	
Agency/Co.	Washington Group	Jurisdiction	
Date Performed	11/01/02	Analysis Year	Build Out
Analysis Time Period	PM Peak Hour		

Project Description *Hanford*

East/West Street: *Route 4*	North/South Street: *Site 200 approach*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	3	710	0	0	30	67
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	3	788	0	0	33	74
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			1
Lanes	1	1	0	0	1	1
Configuration	L	T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	661	0	136
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	734	0	151
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (vph)	3					734		151
C (m) (vph)	1579					340		1041
v/c	0.00					2.16		0.15
95% queue length	0.01					54.32		0.51
Control Delay	7.3					556.1		9.0
LOS	A					F		A
Approach Delay	--	--				462.8		
Approach LOS	--	--				F		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	KH
Agency/Co.	Washington Group
Date Performed	11/01/02
Analysis Time Period	PM Peak Hour- Carpooling

Site Information

Intersection	
Jurisdiction	
Analysis Year	Build Out

Project Description *Hanford*

East/West Street: *Route 4* | North/South Street: *Site 200 approach*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	3	710	0	0	30	67
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	3	788	0	0	33	74
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			1
Lanes	1	1	0	0	1	1
Configuration	L	T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	361	0	136
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	401	0	151
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (vph)	3					401		151
C (m) (vph)	1579					340		1041
v/c	0.00					1.18		0.15
95% queue length	0.01					16.65		0.51
Control Delay	7.3					141.1		9.0
LOS	A					F		A
Approach Delay	--	--				105.0		
Approach LOS	--	--				F		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KH	Intersection	
Agency/Co.	Washington Group	Jurisdiction	
Date Performed	11/01/02	Analysis Year	Build Out
Analysis Time Period	PM Peak Hour - Shift		

Project Description	Hanford
East/West Street: Route 4	North/South Street: Site 200 approach
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	3	355	0	0	15	35
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	3	394	0	0	16	38
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			1
Lanes	1	1	0	0	1	1
Configuration	L	T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	661	0	136
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	734	0	151
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (vph)	3					734		151
C (m) (vph)	1602					592		1063
v/c	0.00					1.24		0.14
95% queue length	0.01					27.69		0.49
Control Delay	7.3					144.5		8.9
LOS	A					F		A
Approach Delay	--	--				121.3		
Approach LOS	--	--				F		

b. Build-out Proposed Signal-controlled Intersection capacity Analysis

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	CCW	Intersection	Site 200 & Route 4
Agency or Co.	WIS	Area Type	All other areas
Date Performed	11/01/2002	Jurisdiction	
Time Period	AM Peak Hour	Analysis Year	Build Out
		Project ID	

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	1	1	0	0	0	1	0	1
Lane group	L	T			T	R				L		R
Volume, V (vph)	115	38			950	719				44		5
% Heavy vehicles, %HV	2	2			2	2				2		2
Peak-hour factor, PHF	0.90	0.90			0.90	0.90				0.90		0.90
Pretimed (P) or actuated (A)	A	A			A	A				A		A
Start-up lost time, l_1	2.0	2.0			2.0	2.0				2.0		2.0
Extension of effective green, e	2.0	2.0			2.0	2.0				2.0		2.0
Arrival type, AT	3	3			3	3				3		3
Unit extension, UE	3.0	3.0			3.0	3.0				3.0		3.0
Filtering/metering, I	1.000	1.000			1.000	1.000				1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0				0.0		0.0
Ped / Bike / RTOR volumes				0		20	0			0		0
Lane width	12.0	12.0			12.0	12.0				12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0				0		0
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 46.0	G = 0.0	G = 0.0	G = 0.0	G = 10.0	G = 0.0	G = 0.0	G = 0.0
	Y = 4	Y = 0	Y = 0	Y =	Y = 4	Y =	Y = 0	Y =

Duration of Analysis, T = 0.25 Cycle Length, C = 64.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	128	42			1056	777				49		6
Lane group capacity, c	316	1339			1339	1138				277		247
v/c ratio, X	0.41	0.03			0.79	0.68				0.18		0.02
Total green ratio, g/C	0.72	0.72			0.72	0.72				0.16		0.16
Uniform delay, d_1	3.6	2.6			5.8	5.0				23.4		22.9
Progression factor, PF	1.000	1.000			1.000	1.000				1.000		1.000
Delay calibration, k	0.11	0.11			0.34	0.25				0.11		0.11
Incremental delay, d_2	0.9	0.0			3.3	1.7				0.3		0.0
Initial queue delay, d_3												
Control delay	4.4	2.6			9.1	6.7				23.7		22.9
Lane group LOS	A	A			A	A				C		C
Approach delay	4.0			8.1						23.6		
Approach LOS	A			A						C		
Intersection delay	8.1						Intersection LOS			A		

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	CCW	Intersection	Site 200 & Route 4
Agency or Co.	WIS	Area Type	All other areas
Date Performed	11/01/2002	Jurisdiction	
Time Period	PM Peak Hour	Analysis Year	Build Out
		Project ID	

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	1	1	0	0	0	1	0	1
Lane group	L	T			T	R				L		R
Volume, V (vph)	3	710			30	67				661		136
% Heavy vehicles, %HV	2	2			2	2				2		2
Peak-hour factor, PHF	0.90	0.90			0.90	0.90				0.90		0.90
Pretimed (P) or actuated (A)	A	A			A	A				A		A
Start-up lost time, l_1	2.0	2.0			2.0	2.0				2.0		2.0
Extension of effective green, e	2.0	2.0			2.0	2.0				2.0		2.0
Arrival type, AT	3	3			3	3				3		3
Unit extension, UE	3.0	3.0			3.0	3.0				3.0		3.0
Filtering/metering, I	1.000	1.000			1.000	1.000				1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0				0.0		0.0
Ped / Bike / RTOR volumes				0		20	0			0		50
Lane width	12.0	12.0			12.0	12.0				12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0				0		0
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 46.0	G = 0.0	G = 0.0	G = 0.0	G = 46.0	G = 0.0	G = 0.0	G =
	Y = 4	Y = 0	Y = 0	Y =	Y = 4	Y =	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 100.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	3	789			33	52				734		96
Lane group capacity, c	630	857			857	728				814		728
v/c ratio, X	0.00	0.92			0.04	0.07				0.90		0.13
Total green ratio, g/C	0.46	0.46			0.46	0.46				0.46		0.46
Uniform delay, d_1	14.6	25.3			14.8	15.1				24.9		15.5
Progression factor, PF	1.000	1.000			1.000	1.000				1.000		1.000
Delay calibration, k	0.11	0.44			0.11	0.11				0.42		0.11
Incremental delay, d_2	0.0	15.0			0.0	0.0				13.2		0.1
Initial queue delay, d_3												
Control delay	14.6	40.3			14.9	15.1				38.1		15.6
Lane group LOS	B	D			B	B				D		B
Approach delay	40.2			15.0						35.5		
Approach LOS	D			B						D		
Intersection delay	36.7						Intersection LOS			D		

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	KH	Intersection	Route 4 - South Site Access
Agency or Co.	WIS	Area Type	All other areas
Date Performed	11/01/2002	Jurisdiction	
Time Period	PM Peak Hour	Analysis Year	Build Out
		Project ID	Carpooling

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	1	1	0	0	0	1	0	1
Lane group	L	T			T	R				L		R
Volume, V (vph)	3	710			30	67				361		136
% Heavy vehicles, %HV	2	2			2	2				2		2
Peak-hour factor, PHF	0.90	0.90			0.90	0.90				0.90		0.90
Pretimed (P) or actuated (A)	A	A			A	A				A		A
Start-up lost time, l_1	2.0	2.0			2.0	2.0				2.0		2.0
Extension of effective green, e	2.0	2.0			2.0	2.0				2.0		2.0
Arrival type, AT	3	3			3	3				3		3
Unit extension, UE	3.0	3.0			3.0	3.0				3.0		3.0
Filtering/metering, I	1.000	1.000			1.000	1.000				1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0				0.0		0.0
Ped / Bike / RTOR volumes				0		20	0			0		50
Lane width	12.0	12.0			12.0	12.0				12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0				0		0
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 46.0	G = 0.0	G = 0.0	G = 0.0	G = 46.0	G = 0.0	G = 0.0	G =
	Y = 4	Y = 0	Y = 0	Y =	Y = 4	Y =	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 100.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	3	789			33	52				401		96
Lane group capacity, c	630	857			857	728				814		728
v/c ratio, X	0.00	0.92			0.04	0.07				0.49		0.13
Total green ratio, g/C	0.46	0.46			0.46	0.46				0.46		0.46
Uniform delay, d_1	14.6	25.3			14.8	15.1				18.9		15.5
Progression factor, PF	1.000	1.000			1.000	1.000				1.000		1.000
Delay calibration, k	0.11	0.44			0.11	0.11				0.11		0.11
Incremental delay, d_2	0.0	15.0			0.0	0.0				0.5		0.1
Initial queue delay, d_3												
Control delay	14.6	40.3			14.9	15.1				19.3		15.6
Lane group LOS	B	D			B	B				B		B
Approach delay	40.2			15.0						18.6		
Approach LOS	D			B						B		
Intersection delay	30.8						Intersection LOS			C		

c. Directional Two-lane Highway Segment Analysis Reports

Directional Two-Lane Highway Segment Analysis

Analyst	CCW
Agency/Co.	WIS
Date Performed	11/12/2002
Analysis Time Period	AM Peak Period
Highway	Route 11
From/To	Gate to Route 4 Int.
Jurisdiction	Hanford
Analysis Year	2002
Description	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.90	
Shoulder width	1.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	50	%
Up/down		%	Access points/mi	0	/mi

Analysis direction volume, Vd 240 veh/h
Opposing direction volume, Vo 12 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.986		0.986	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	270	pc/h	14	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	4.2	mi/h
Adj. for access points, (note-3) fA	0.0	mi/h
Free-flow speed, FFSd	55.8	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	51.8	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.998		0.998	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	267	pc/h	13	pc/h

Base percent time-spent-following, (note-4) BPTSFd	41.9	%
Adjustment for no-passing zones, fnp	17.3	
Percent time-spent-following, PTSFd	59.2	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	467	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1680	veh-mi
Peak 15-min total travel time, TT15	9.0	veh-h

Directional Two-Lane Highway Segment Analysis

Analyst	CCW
Agency/Co.	WIS
Date Performed	11/12/2002
Analysis Time Period	PM Peak Period
Highway	Route 11
From/To	Gate to Route 4
Jurisdiction	Hanford
Analysis Year	Build Out
Description	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.90	
Shoulder width	1.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	50	%
Up/down		%	Access points/mi	0	/mi

Analysis direction volume, Vd 273 veh/h
Opposing direction volume, Vo 17 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.2		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.996		0.986	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	305	pc/h	19	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	4.2	mi/h
Adj. for access points, (note-3) fA	0.0	mi/h
Free-flow speed, FFSd	55.8	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	51.5	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.998		0.998	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	304	pc/h	19	pc/h

Base percent time-spent-following, (note-4) BPTSFd	44.7	%
Adjustment for no-passing zones, fnp	17.3	
Percent time-spent-following, PTSFd	62.0	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	531	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1911	veh-mi
Peak 15-min total travel time, TT15	10.3	veh-h

Directional Two-Lane Highway Segment Analysis

Analyst	CCW
Agency/Co.	WIS
Date Performed	11/12/2002
Analysis Time Period	AM Peak Period
Highway	Route 2
From/To	Route 4 to Site Access
Jurisdiction	Hanford
Analysis Year	Build Out
Description	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.90	
Shoulder width	1.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	50	%
Up/down		%	Access points/mi	0	/mi

Analysis direction volume, Vd 230 veh/h
Opposing direction volume, Vo 11 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.986		0.986	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	259	pc/h	12	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	4.2	mi/h
Adj. for access points, (note-3) fA	0.0	mi/h
Free-flow speed, FFSd	55.8	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	51.9	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.998		0.998	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	256	pc/h	12	pc/h

Base percent time-spent-following, (note-4) BPTSFd	41.0	%
Adjustment for no-passing zones, fnp	17.3	
Percent time-spent-following, PTSFd	58.3	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.15	
Peak 15-min vehicle-miles of travel, VMT15	447	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1610	veh-mi
Peak 15-min total travel time, TT15	8.6	veh-h

Directional Two-Lane Highway Segment Analysis

Analyst	CCW
Agency/Co.	WIS
Date Performed	11/12/2002
Analysis Time Period	PM Peak Period
Highway	Route 2
From/To	Route 4 Int. to N. Site Access
Jurisdiction	Hanford
Analysis Year	2002
Description	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.90	
Shoulder width	1.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	50	%
Up/down		%	Access points/mi	0	/mi

Analysis direction volume, Vd 130 veh/h
Opposing direction volume, Vo 5 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.986		0.986	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	146	pc/h	6	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	4.2	mi/h
Adj. for access points, (note-3) fA	0.0	mi/h
Free-flow speed, FFSd	55.8	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	52.9	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.998		0.998	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	145	pc/h	6	pc/h

Base percent time-spent-following, (note-4) BPTSFd	30.3	%
Adjustment for no-passing zones, fnp	17.3	
Percent time-spent-following, PTSFd	47.6	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.09	
Peak 15-min vehicle-miles of travel, VMT15	253	veh-mi
Peak-hour vehicle-miles of travel, VMT60	910	veh-mi
Peak 15-min total travel time, TT15	4.8	veh-h

Directional Two-Lane Highway Segment Analysis

Analyst	CCW
Agency/Co.	WIS
Date Performed	11/01/2002
Analysis Time Period	AM Peak Period
Highway	Route 4
From/To	Wye Barricade to Route 2 Int.
Jurisdiction	Hanford
Analysis Year	Build Out
Description	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.90	
Shoulder width	1.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	50	%
Up/down		%	Access points/mi	0	/mi

Analysis direction volume, Vd 1902 veh/h
Opposing direction volume, Vo 94 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.998		0.986	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	2118	pc/h	106	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	4.2	mi/h
Adj. for access points, (note-3) fA	0.0	mi/h
Free-flow speed, FFSd	55.8	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	36.7	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.0		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		0.998	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	2113	pc/h	105	pc/h

Base percent time-spent-following, (note-4) BPTSFd	88.5	%
Adjustment for no-passing zones, fnp	17.5	
Percent time-spent-following, PTSFd	106.0	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.25	
Peak 15-min vehicle-miles of travel, VMT15	264	veh-mi
Peak-hour vehicle-miles of travel, VMT60	951	veh-mi
Peak 15-min total travel time, TT15	7.2	veh-h

Directional Two-Lane Highway Segment Analysis

Analyst	CCW
Agency/Co.	WIS
Date Performed	11/01/2002
Analysis Time Period	PM Peak Hour
Highway	Route 4
From/To	Wye Barricade to Route 2 Int.
Jurisdiction	Hanford
Analysis Year	Build Out
Description	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.90	
Shoulder width	1.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	50	%
Up/down		%	Access points/mi	0	/mi

Analysis direction volume, Vd 1557 veh/h
Opposing direction volume, Vo 61 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.998		0.986	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	1733	pc/h	69	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	4.2	mi/h
Adj. for access points, (note-3) fA	0.0	mi/h
Free-flow speed, FFSd	55.8	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	40.1	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.0		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		0.998	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	1730	pc/h	68	pc/h

Base percent time-spent-following, (note-4) BPTSFd	84.9	%
Adjustment for no-passing zones, fnp	17.3	
Percent time-spent-following, PTSFd	102.2	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.02	
Peak 15-min vehicle-miles of travel, VMT15	216	veh-mi
Peak-hour vehicle-miles of travel, VMT60	779	veh-mi
Peak 15-min total travel time, TT15	5.4	veh-h

Directional Two-Lane Highway Segment Analysis

Analyst	CCW
Agency/Co.	WIS
Date Performed	11/01/2002
Analysis Time Period	AM Peak Period
Highway	Route 4
From/To	Route 2 Int. to Site Access
Jurisdiction	Hanford
Analysis Year	Build Out
Description	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.90	
Shoulder width	1.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	50	%
Up/down		%	Access points/mi	0	/mi

Analysis direction volume, Vd 1662 veh/h
Opposing direction volume, Vo 82 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.998		0.986	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	1850	pc/h	92	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	4.2	mi/h
Adj. for access points, (note-3) fA	0.0	mi/h
Free-flow speed, FFSd	55.8	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	39.0	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.0		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		0.998	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	1847	pc/h	91	pc/h

Base percent time-spent-following, (note-4) BPTSFd	86.1	%
Adjustment for no-passing zones, fnp	17.3	
Percent time-spent-following, PTSFd	103.5	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.09	
Peak 15-min vehicle-miles of travel, VMT15	3232	veh-mi
Peak-hour vehicle-miles of travel, VMT60	11634	veh-mi
Peak 15-min total travel time, TT15	82.9	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	7.0	mi
Length of two-lane highway upstream of the passing lane, Lu	5.0	mi
Length of passing lane including tapers, Lpl	1.0	mi
Average travel speed, ATSd (from above)	39.0	mi/h
Percent time-spent-following, PTSFd (from above)	103.5	
Level of service,(note-1) LOSd (from above)	F	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.70	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	39.9	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.60	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	93.0	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	80.9	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Directional Two-Lane Highway Segment Analysis

Analyst	CCW
Agency/Co.	WIS
Date Performed	11/01/2002
Analysis Time Period	PM Peak Period
Highway	Route 4
From/To	Route 2 Int. to Site Access
Jurisdiction	Hanford
Analysis Year	Build Out
Description	

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.90	
Shoulder width	1.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	50	%
Up/down		%	Access points/mi	0	/mi

Analysis direction volume, Vd 1371 veh/h
Opposing direction volume, Vo 54 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.998		0.986	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	1526	pc/h	61	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	4.2	mi/h
Adj. for access points, (note-3) fA	0.0	mi/h
Free-flow speed, FFSd	55.8	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	41.7	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.0		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		0.998	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	1523	pc/h	60	pc/h

Base percent time-spent-following, (note-4) BPTSFd	82.4	%
Adjustment for no-passing zones, fnp	17.3	
Percent time-spent-following, PTSFd	99.7	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.90	
Peak 15-min vehicle-miles of travel, VMT15	2666	veh-mi
Peak-hour vehicle-miles of travel, VMT60	9597	veh-mi
Peak 15-min total travel time, TT15	63.9	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	7.0	mi
Length of two-lane highway upstream of the passing lane, Lu	5.0	mi
Length of passing lane including tapers, Lpl	1.0	mi
Average travel speed, ATSd (from above)	41.7	mi/h
Percent time-spent-following, PTSFd (from above)	99.7	
Level of service,(note-1) LOSd (from above)	E	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.70	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane,(note-2) ATSpl	42.8	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.60	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane,(note-3) PTSFpl	89.6	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	62.3	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

d. Multi-lane Highway Analysis Reports

HCS2000: Multilane Highways Release 4.1c

PLANNING ANALYSIS

Analyst:	CCW
Agency/Co:	WIS
Date:	11/01/2002
Analsis Period:	AM Peak Hour
Highway:	Route 4
From/To:	Wye Barricade to Route 2 Int.
Jurisdiction:	
Analysis Year:	Build Out
Project ID:	

INPUT DATA

Total AADT volume, AADT	7091	vpd
Proportion AADT during peak hour, K	0.28	
Percent peak-hour traffic in heaviest direction, D	95	%
Trucks	2	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 7091 x 0.95 x 0.28 = 1886

Volume for :			LOS
4-lane highway = 1886	vph/2 lanes = 943	vphpl	C
6-lane highway = 1886	vph/3 lanes = 628	vphpl	B

HCS2000: Multilane Highways Release 4.1c

PLANNING ANALYSIS

Analyst:	CCW
Agency/Co:	WIS
Date:	11/01/2002
Analsis Period:	PM Peak Hour
Highway:	Route 4
From/To:	Wye Baarricade to Route 2 Int.
Jurisdiction:	
Analysis Year:	Build Out
Project ID:	

INPUT DATA

Total AADT volume, AADT	7091	vpd
Proportion AADT during peak hour, K	0.23	
Percent peak-hour traffic in heaviest direction, D	96	%
Trucks	2	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 7091 x 0.96 x 0.23 = 1566

Volume for :			LOS
4-lane highway = 1566	vph/2 lanes = 783	vphpl	B
6-lane highway = 1566	vph/3 lanes = 522	vphpl	A

HCS2000: Multilane Highways Release 4.1c

PLANNING ANALYSIS

Analyst: CCW
Agency/Co: WIS
Date: 11/01/2002
Analsis Period: AM Peak Hour
Highway: Route 4
From/To: Route 2 Int. to Site Access
Jurisdiction:
Analysis Year: Build Out
Project ID:

INPUT DATA

Total AADT volume, AADT	6204	vpd
Proportion AADT during peak hour, K	0.28	
Percent peak-hour traffic in heaviest direction, D	95	%
Trucks	2	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6204 x 0.95 x 0.28 = 1650

Volume for :			LOS
4-lane highway = 1650	vph/2 lanes = 825	vphpl	B
6-lane highway = 1650	vph/3 lanes = 550	vphpl	A

HCS2000: Multilane Highways Release 4.1c

PLANNING ANALYSIS

Analyst: CCW
Agency/Co: WIS
Date: 11/01/2002
Analsis Period: PM Peak Hour
Highway: Route 4
From/To: Route 2 Int. to Site Access
Jurisdiction:
Analysis Year: Build Out
Project ID:

INPUT DATA

Total AADT volume, AADT	6204	vpd
Proportion AADT during peak hour, K	0.23	
Percent peak-hour traffic in heaviest direction, D	96	%
Trucks	2	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6204 x 0.96 x 0.23 = 1370

Volume for :			LOS
4-lane highway = 1370	vph/2 lanes = 685	vphpl	B
6-lane highway = 1370	vph/3 lanes = 456	vphpl	A

C. Delay Studies

Saturation Flow Rate For Dave and Keith's Traffic Counts

Project: Hanford Project RPP - WTP

Date: 3/06/02

Time: Afternoon

Place: Wye Gate

Number of Vehicles (each)	Clearance Time (second)	Saturation Flow Rate (hour)
28	52	1,938
13	27	1,733
22	39	2,031
19	33	2,073
23	53	1,562
20	32	2,250
12	25	1,728
15	30	1,800
22	43	1,842
18	34	1,906
23	41	2,020
14	27	1,867
22	42	1,886
40	76	1,895
37	78	1,708
29	52	2,008
17	36	1,700
11	23	1,722
25	45	2,000
25	52	1,731
Totals 435	840	
Average Saturation Flow Rate		1,864

Queing Delay Worksheet

Project: Hanford Project RPP - WTP

Date: 3/05/02 By: Haiar / Szplett

Time: Morning Place: Wye Gate

Begin Time	Vehicles In Queue	Total Delay (sec)	Delay Per Vehicle	Flow Rate (hour)
6:32	10	22	2.20	1,636
6:35	5	17	3.40	1,059
6:36	7	14	2.00	1,800
6:45	7	13	1.86	1,938
6:46	10	23	2.30	1,565
6:51	5	12	2.40	1,500
Sub Total	44	101	14.16	
Averages	**7**	**17**	**2.36**	**1,526**

Date: 3/06/02 By: Waite / Colhouer

Time: Morning Place: Yakima Gate

6:08	2	4	2.00	1,800
6:14	2	4	2.00	1,800
6:16	2	25	12.50	288
6:19	2	10	5.00	720
6:44	6	23	3.83	939
6:56	2	6	3.00	1,200
Sub Total	16	72	28.33	
Averages	**3**	**12**	**4.72**	**762**

Date: 3/05/02 By: Waite / Colhouer

Time: Afternoon Place: Wye Gate

2:33	2	8	4.00	900
2:35	2	5	2.50	1,440
2:40	3	35	11.67	309
2:45	3	30	10.00	360
2:50	2	3	1.50	2,400
2:55	4	25	6.25	576
3:01	2	3	1.50	2,400
3:08	2	15	7.50	480
3:09	2	3	1.50	2,400
3:12	2	10	5.00	720
3:13	3	10	3.33	1,080
3:25	2	4	2.00	1,800
3:26	2	5	2.50	1,440
3:39	2	7	3.50	1,029
4:00	3	15	5.00	720
Sub Total	36	178	67.75	
Averages	**2**	**10.47**	**3.99**	**903**

Date: 3/05 & 06/02 Summary of Three Counts

Time: Morning & Afternoon

Begin Time	Vehicles In Queue	Total Delay (sec)	Delay Per Vehicle	Flow Rate (hour)
Wye Morning		16.83	2.36	1,526
Yakima Morning		12.00	4.72	762
Wye Afternoon		10.47	3.99	903
Averages		13.10	3.69	976

Attachment 2
03-ED-171

Bechtel National, Inc. and U.S. Department of Energy,
Certification Statements

U.S. Department of Energy, Office of River Protection Certification

The following certification statement is provided for the Hanford Tank Waste Treatment and Immobilization Plant Dangerous Waste Permit Compliance Schedule submittal, "Hanford Tank Waste Treatment and Immobilization Plant Post Construction Traffic Analysis Final Project Report (24590-100-SC-W000-00003-04-01, Revision 00B)."

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.

Roy J. Schepens

Roy J. Schepens, Manager
U.S. Department of Energy,
Office of River Protection

12/29/03
Date

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 Hanford Tank Waste Treatment and Immobilization Plant Dangerous Waste Permit submittal, *Hanford Tank Waste Treatment Immobilization Plant Post Construction Traffic Analysis Final Project Report* (24590-100-SC-W000-00003-04-01, Rev. 00B).

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

12/17/03
Date

R10180724

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

FIELD APPLIED SPECIAL PROTECTIVE COATINGS FOR SECONDARY CONTAINMENT AREAS

MARK A. SCOTT
STATE OF WASHINGTON
19183
REGISTERED PROFESSIONAL ENGINEER
EXPIRES 04/01/04

Content applicable to ALARA? ☐ Yes ☒ No

ADR No. **Rev**

Quality Designator
CM
DOE Contract No. DE-AC27-01RV14136

NOTE: Contents of this document are Dangerous Waste Permit affecting.

REV	DATE	REASON FOR REVISION	BY	CHECK	REVIEW	QA	APEM/DEM
0	12/15/03	Issue for Permitting Use			NA	NA	

SPECIFICATION No. 24590-WTP-3PS-AFPS-TP006 **Rev** 0

Processed: Data Entry ☐ Copied/ QA ☒ Scanned ☐ Filed 12/16/03 12/16/03

ISSUED BY RPP-WTP PDC 12-16-03
INIT DATE

24590-G04B-F00009 Rev 7

Ref: 24590-WTP-3DP-G04B-00049

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 of provided for process description purposes only.

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Appendices

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Appendix I - Secondary Containment Installation Details I-1

1 Scope

1.1 This specification defines the minimum requirements for the field application of Special Protective Coating's (SPC's) applied onto concrete and steel surfaces that have been identified as a Secondary Containment area. The coating systems for concrete and steel surfaces are identified in Appendix C Table 2 and Appendix D of this specification. The CONTRACTOR shall identify the areas requiring secondary containment coatings in the appropriate room finish schedule for each facility (i.e., LAW, HLW, PTF, LAB & BOF). Unless indicated elsewhere in the subcontract documents, the field coating Work shall include-

- Touch up of shop or field coated carbon steel embeds prior to application of identified secondary containment coating system.
- Surface preparation and application of the applicable coating system for concrete and steel surfaces. Corner coving on floor/wall, wall/wall corners, around concrete, steel embed attachments, grouted anchor bolts and other items that create a corner or sharp transition in coating system direction.
- Saw cutting and chipping concrete as required by applicable installation detail.
- Surface preparation and application of a primer/sealer/barrier coat on shop coated steel embeds that have been determined unsuitable for the installation location exposure conditions in the secondary containment enclosure area or incompatible with the specified secondary containment coating system.

1.2 Finish color shall be as noted in Appendix E.

1.3 All SPC's are designated as Commercial Grade and not important to safety (ITS). SPC quality program requirements must comply with DOE Order 414.1A as identified in Appendix A. The full order is not applicable (also refer to Section 5). **NQA-1 Quality Assurance requirements do not apply to the manufacture or application of SPC's.** However, SPC's used in high radiation areas (>2E8 rads over 40 years) shall be prequalified in accordance with Appendix B.

1.4 The Field application of all concrete and steel coatings will be performed at the WTP project located in the 200 East Area of the Hanford Site in Washington.

2 General

2.1 Responsibility

2.1.1 The SUBCONTRACTOR shall supply all personnel, coating materials and all necessary surface preparation, application, inspection and equipment including all Personal Protection Equipment (PPE), safety, rigging/access (as required), masking protection, containment, environmental control/dehumidification/ventilation equipment, area covering to protect from direct sunlight and inclement weather and all consumables. The SUBCONTRACTOR shall

perform all pre-surface preparation, surface preparation, coating application, inspection and documentation for all SPC work.

2.1.2 The SUBCONTRACTOR shall provide surface preparation of overlap or tie-in areas on stainless steel, concrete and carbon steel surfaces as required.

2.1.3 The SUBCONTRACTOR shall install flexible joint sealant, foam backer rod, bond breaker tape and material where specifically identified for use by the CONTRACTOR.

2.1.4 The SUBCONTRACTOR shall store all coating materials in accordance with this Specification and CONTRACTOR accepted procedures. The coating system and associated coating materials shall be in accordance with Appendix C Table 1 Secondary Containment Coating Systems, Table 2 Secondary Containment Coating Materials and Appendix D Room Finish Schedule Drawing references or as otherwise identified by the CONTRACTOR. All coating materials shall be used on a first in first out basis where the oldest batch of any given material or component is used before batches with a later expiration date.

2.1.5 The SUBCONTRACTOR shall perform all inspections and tests contained in this Specification prior to acceptance by the CONTRACTOR.

2.1.6 The SUBCONTRACTOR shall provide application and inspection documentation for all coating Work accepted by the CONTRACTOR.

2.1.7 The SUBCONTRACTOR shall provide marking materials that are fully compatible with the coating system(s) specified. Marking materials shall be suitable for use on stainless steel.

2.1.8 The SUBCONTRACTOR shall provide environmental control equipment as necessary for surface preparation, coating application and curing.

2.1.9 The SUBCONTRACTOR shall only use inspection equipment that is currently calibrated and controlled by a calibration program accepted by the CONTRACTOR.

2.1.10 The SUBCONTRACTOR shall give CONTRACTOR a minimum of ten (10) working days written notice prior to the start of coating Work and coordinate all field coating Work with the CONTRACTOR on a daily basis prior to the start of daily coating Work.

2.1.11 The SUBCONTRACTOR shall give the CONTRACTOR at least twenty four (24) hours verbal notice for all agreed upon inspection witness and hold points.

2.2 Surfaces Not To Be Coated

2.2.1 The SUBCONTRACTOR shall verify weld hold-back areas on piping, hangers/supports, steel attachments, etc., in areas designated Secondary Containment prior to coating as follows.

- Four(4) inches for <u>field</u> welds

2.2.2 Rubber or similar nonmetallic parts.

2.2.3 Non-Ferrous metals unless otherwise specified.

2.2.4 Stainless Steel surfaces unless specifically required by the CONTRACTOR (areas where stainless steel is welded to carbon steel the coating overlap onto the stainless steel shall be at least 1" or as otherwise specified).

2.3 Definitions

2.3.1 Batch- A quantity of coating made in one production run. A unique batch number is assigned for each production run of the epoxy coating material, the curing agent, fillers and the thinner.

2.3.2 Bug Holes- Small regular or irregular cavities resulting from entrapment of air bubbles in the surface of formed concrete during placement and consolidation.

2.3.3 Curing Membrane - Materials applied to prevent the moisture in uncured concrete from evaporating too rapidly. Where Special Protective Coatings are being applied, the curing membranes or compounds shall not contain paraffin, oil, silicone or other contamination that could compromise proper coating adhesion.

2.3.4 CONTRACTOR- Means BECHTEL NATIONAL, INC. (BNI) and all of its authorized representatives acting in their professional capacities.

2.3.5 Dry Film Thickness (DFT)- The thickness of an applied coating, once dry or cured. Usually expressed in mils (each mil is 1/1000 of an inch). Measured using a wet film thickness gage and calculating dry film thickness based on coating material volume solids. Alternatively measured using an ultra sonic dry film thickness device or using a destructive test that cuts the dry film and optically measures the dry film thickness.

2.3.6 Fish Eyes (cratering)- Formation of holes or visible depression in the coating film. Usually from a contaminated particle on the surface prior to applying the coating.

2.3.7 Efflorescence- A white crystalline or powdery deposit on the surface of concrete. Efflorescence results from leaching of lime or calcium hydroxide out of the permeable concrete mass over time by water , followed by reaction with carbon dioxide and acidic pollutants.

2.3.8 Form Release Agents- Compounds such as glossy paint or other film forming release material applied to forms to allow easy removal of forms. Where Special Protective Coatings are being applied the form release agent shall not impart a residue of paraffin, oil, silicone or other contaminant onto the surface that could compromise proper coating adhesion.

2.3.9 Hydration- The reaction of water with the calcium silicate, aluminate or aluminoferrite components of fine cement grains, necessary for the setting and densifying of concrete. Hydration results in the formation of calcium hydroxide and colloidal gels which occupy a larger volume than the original cement.

2.3.10 Hydrostatic Pressure- The pressure exerted by water at rest.

2.3.11 Holiday- A Pinhole, skip, discontinuity, or void in the applied coating film.

2.3.12 Laitance- A thin, weak, brittle layer of cement and aggregate fines in a concrete surface. The amount of laitance is influenced by the degree of working or amount of water in the concrete.

For the application of Special Protective Coatings all laitance must be removed to sound, dense concrete.

2.3.13 Item- An all inclusive term used in place of any of the following: appurtenance, assembly, component, equipment, material, module, part, structure, sub-assembly, sub-system, system, unit or support systems.

2.3.14 Mfg. Std. Coating- A manufacturer's standard coatings system applied to off the shelf items or standard line items of routine manufacture that are not specifically manufactured for the WTP project.

2.3.15 NIST- National Institute of Standards and Technology.

2.3.16 "Non-Radiation" areas- For the purpose of Special Protective Coating (SPC), this is the quality designation for items "NOT" located in an area where radioactive material or items are transported, processed or stored or where they are located in an area where radioactive material or items are transported, processed or stored that are designated C2 and less, or R2 and less (24590-WTP-GPP-SRAD-0007 Classification of Areas provides the maximum dose for each "R" designation and mean airborne contamination level for each "C" designation).

2.3.17 Outgassing- The upward and outward emission of air or moisture vapor from concrete or coatings.

2.3.18 Pinhole- Minute hole visible in the applied coating without magnification, that appear to penetrate one or more layers of the coating film.

2.3.19 Profile- The surface roughness resulting from surface preparation by abrasive blasting or other CONTRACTOR accepted methods (Refer to Section 7.3.4.3)

2.3.20 "Radiation" areas- For the purpose of Special Protective Coating (SPC), this is the quality designation for items that are located in an area where radioactive material or items are transported, processed or stored that are designated C3 and greater, or R3 and greater. (24590-WTP-GPP-SRAD-0007 Classification of Areas provides the maximum dose value for each "R" designation and mean airborne contamination level for each "C" designation).

2.3.21 Sag- The running of freshly applied coating on a vertical surface due to being applied too thick.(Same definition for runs and drips).

2.3.22 Supplier Deviation Disposition Report (SDDR)- A standard WTP project document that can be used by a vendor or SUBCONTRACTOR to identify an actual or potential deviation or discrepancy that requires engineering evaluation and disposition prior to acceptance.

2.3.23 Surface Hardeners- Compounds applied to a concrete surface to improve hardness, and to decrease permeability.

2.3.24 Surface Porosity- Permeability of the surface that allows absorption of vapors, moisture, chemicals, and coating liquids. Small interconnected voids that allow fluids to penetrate an otherwise impervious material.

2.3.25 SUBCONTRACTOR- Means the company, corporation, partnership, individual, or other entity to which this subcontract (purchase order/material requisition) is issued, its authorized representatives, successors, and permitted assigns.

2.3.26 Training and Certification- Training to include an understanding of the specification, CONTRACTOR accepted Work procedures and manufacturer's published instructions. Certification to include a documented performance test demonstrating quality Work acceptable to the CONTRACTOR. (Refer to Sections 4.6, 5.1.3.2, 5.1.7, 7.1.2, 8.1.1.1 and Appendix A)

2.3.27 RPP-WTP- River Protection Project-Waste Treatment Plant

2.4 Safety

2.4.1 All surface preparation and coatings Work shall comply with all applicable environmental and safety provisions, laws, regulations of the City, County, and State, or the 200 East Area of the Hanford Site in Washington State (as applicable for site work) for the coating materials being used. Work being performed in the United Sates shall be in strict accordance with OSHA 29 CFR 1910, State and local safety and environmental requirements.

2.4.2 The SUBCONTRACTOR shall comply fully with OSHA Hazard Communication Standard 29CFR 1910. Material Safety Data Sheets (MSDS) for all materials, including thinners and cleaning solvents, shall be obtained from the materials manufacturer and made available at the place of application for review.

2.4.3 The Volatile Organic Compound (VOC) content of all materials shall comply with Federal, State and Local or other Regulatory requirements.

2.4.4 The SUBCONTRACTOR shall control safe working and environmental conditions employing items such as but not limited to barricades, masking/tarping, ventilation, dehumidification and safety watches to provide safe quality work from surface preparation through application, curing and inspection activities.

2.4.5 The SUBCONTRACTOR shall be responsible for proper disposal of liquid or solid waste generated during the work described herein (residual coating material, thinners, solvent, wipes, rags, etc.)

3 Applicable Documents

3.1 Codes and Standards

The latest applicable edition of the following codes, standards, specifications or WTP procedures form a part of this Specification.

3.1.1 American Society for Testing and Materials (ASTM)

ASTM E337 Test for Relative Humidity by Wet-and-Dry Bulb Psychrometer

ASTM D3912	Standard Test Method for Chemical Resistance of Coatings Used in Light-Water Nuclear Power Plants
ASTM D3276	Standard Guide for Painting Inspectors (Concrete and Masonry Substrates)
ASTM D4060	Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
ASTM D4082	Standard Test Method for Effects of Gamma Radiation on Coatings for Use in Light-Water Nuclear Power Plants
ASTM D4138	Test Method for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive Means
ASTM D4228	Practice for Qualification of Journeyman Painters for Application of Coatings to Steel Surfaces of Safety Related Areas in Nuclear Facilities
ASTM D4227	Practice for Qualification of Journeyman Painters for Application of Coatings to Concrete Surfaces of Safety Related Areas in Nuclear Facilities
ASTM D4258	Practice for Surface Cleaning of Concrete for Coating
ASTM D4259	Practice for Abrading Concrete
ASTM D4262	Standard Test Method for pH for Chemically Cleaned or Etched Concrete Surfaces
ASTM D4263	Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D4414	Practice for Measurement of Wet Film Thickness of Organic Coatings by Notch Gages
ASTM D4285	Test Method for Indicating Oil or Water in Compressed Air
ASTM D4417	Field Measurement of Surface Profile of Blast Cleaned Steel
ASTM D4537	Standard Guide for Establishing Procedures to Qualify and Certify Inspection Personnel for Coating Work Inspectors in Nuclear Facilities.
ASTM D4541	Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM D4940	Test for Conductimetric Analysis of Water Soluble Ionic Contaminants of Blasting Abrasives
ASTM D5139	Standard Specification for Sample Preparation for Qualification Testing of Coatings Used in Nuclear Power Plants
ASTM D5144	Standard Guide for Use of Protective Coating Standards in Nuclear Power Plants
ASTM D5498	Standard Guide for Developing a Training Program for Coating Work Inspectors in Nuclear Facilities.
ASTM D6132	Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Over Concrete Using an Ultrasonic Gage
ASTM D6237	Standard Guide for Painting Inspectors (Concrete and Masonry Substrates)

3.1.2 The Society for Protective Coatings (SSPC)

SSPC-AB1	Mineral and Slag Abrasive
SSPC-PA2	Measurement of Dry Paint Thickness with Magnetic Gages
SSPC-SP1	Solvent Cleaning

SSPC-SP6	Commercial Blast Cleaning
SSPC-SP7	Brush -Off Blast Cleaning
SSPC-SP10	Near-White Metal Blast Cleaning
SSPC-SP11	Power Tool Cleaning to Bare Metal
SSPC-SP12	Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating
SSPC-SP13	Surface Preparation of Concrete
SSPC-Vis 1	Visual Standard for Abrasive Blast Clean Steel
SSPC-Vis 3	Visual Standard for Power and Hand Tool Cleaning

3.1.3 Occupational Safety and Health Administration (OSHA)

OSHA 29 CFR 1910	Occupational Safety and Health Standards

3.1.4 WTP Project Documents

24590-WTP-GPP-SRAD-~~0007~~ 00007 mR 12-16-13	Classification of Areas
24590-WTP-3PS-AFPS-T0004	Field Applied Special Protective Coatings for Concrete Surfaces
24590-WTP-3PS-AFPS-T0003	Field Applied Special Protective Coating for Steel items and Equipment.
24590-WTP-3PS-AFPS-T0002	Special Protective Coating Limited-Combustible Testing Protocol
24590-WTP-3PS-AFPP-T0001	Painting (Professional Line Products) 09912

3.1.5 Department of Energy (DOE)

DOE Std. 1066-97	DOE STANDARD Fire Protection Design Criteria
DOE Order 414.1A Change 1 Issued 7/12/01	Quality Assurance

3.1.6 National Fire Protection Association (NFPA)

NFPA 801 2003 Edition	Standard For Fire Protection For Facilities Handling Radioactive Materials

4 Submittals

4.1 SUBCONTRACTOR shall submit detailed written procedures for the following-

- Material receiving, marking, storage, handling
- Surface preparation
- Environmental control
- Application
- Curing
- Inspection and testing

- Touch-up/repair
- Application personnel qualification and Inspector qualification (G321-E, category 28.0)
- Proposed documentation forms. The final procedure and documentation forms shall be submitted for the CONTRACTOR's approval (G321-E category 15.0).

(The above items can be grouped into a common procedure where appropriate)

4.2 Only materials that comply with the prequalification testing requirements in Appendix B and have been accepted in advance by the CONTRACTOR shall be used. Appendix C provides the list of prequalified materials/systems. Materials that have not been successfully tested in accordance with the test requirements shall not be used. **Coating material prequalification testing is only required of the coating manufacturer and not the Special Protective Coating Application SUBCONTRACTOR.**

4.3 The SUBCONTRACTOR shall identify the specific products by manufacturer and catalog number and shall submit the coating manufacturer's latest published product data sheet application instructions and Material Safety Data (MSDS). Conflicts, if any, between the SUBCONTRACTOR's normal procedures, the coating manufacturer's recommendations, and this Specification shall be brought to the attention of the CONTRACTOR for resolution and written permission to proceed (G321- E category 11.0). The SUBCONTRACTOR shall submit original Coating Manufacturer's Product Identity Certification Records for each and every batch of coating material purchased for use on the WTP project. (Refer to Appendix F) (Refer to G321 V category 13.0)

4.4 The SUBCONTRACTOR shall complete and submit a daily inspection record as a part of the Work procedures that includes all elements provided in Appendix G as a minimum.(Refer to Section 8.1.9 and 10.2) (G321-V category 13.1)

4.5 The SUBCONTRACTOR shall submit with coating procedures a Supplier Quality Assurance Program Data Sheet (Appendix A) appropriate for the activity being performed (e.g. manufacture of SPC's or application of specified SPC's). The SUBCONTRACTOR shall identify their Quality Assurance Program (QA) Plan documents and paragraph references on the QA Program Data Sheet. All required QA Plan elements and corresponding SUBCONTRACTOR's identified documents are subject to CONTRACTOR's evaluation and verification.

4.6 The SUBCONTRACTOR shall provide a personnel training and certification plan for applicators and inspectors. (Refer to Sections, 5.1.3.2, 5.1.7, 7.1.2, 8.1.1.1 and Appendix A).

4.7 The SUBCONTRACTOR shall supply with his coating procedures a list of previous project case histories, where they applied coating materials similar to the materials specified herein. This list shall include the type of item coated, the project name, a project client contact name and phone number, if possible, for verification.

4.8 Color samples shall be submitted prior to the start of Work. Colors shall be as defined in Appendix E or as otherwise defined by the CONTRACTOR. Color samples shall be 1' x 1' in size. At least five sets of all colors shall be submitted. The type of panel used and the coating material used for the color samples shall be as agreed upon with the CONTRACTOR.

5 Quality Assurance

5.1 General

5.1.1 The SUBCONTRACTOR shall control the quality of items and services to meet the requirements of this Specification, applicable codes and standards referenced herein, and associated subcontract documents. The SUBCONTRACTOR shall prepare and maintain documentation to provide evidence of compliance with CONTRACTOR accepted procedures and this Specification. A copy of the coating inspection documentation shall be included in the shipping documentation.

5.1.2 The SUBCONTRACTOR, including any lower-tier organizations engaged by him, shall be subject to surveillance inspection by the CONTRACTOR's representative until completion or termination of the subcontract. This surveillance inspection does not relieve the SUBCONTRACTOR from the responsibility for conformance to the requirements of procurement documents, this specification and CONTRACTOR accepted procedures.

5.1.3 The SUBCONTRACTOR shall maintain a quality assurance plan for items located in "Non-Radiation and Radiation" areas, as defined in Section 2.3 that addresses as a minimum, the elements and implementing procedures called for in the Supplier Quality Assurance Program Data Sheet, Appendix A.

5.1.3.1 Quality Assurance Plan (QAP)

5.1.3.1.1 A written QAP must be developed, implemented, and maintained.

5.1.3.1.2 The QAP must describe the organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing the Work.

5.1.3.1.3 The QAP must describe management processes, including planning, scheduling, and resource considerations.

5.1.3.2 Personnel Training and Qualification.

5.1.3.2.1 Personnel must be trained and qualified to ensure they are capable of performing their assigned Work.

5.1.3.2.2 Personnel must be provided continuing training to ensure that job proficiency is maintained.

5.1.3.3 Quality Improvement.

5.1.3.3.1 Processes to detect and prevent quality problems must be established and implemented.

5.1.3.3.2 Items, services, and processes that do not meet established requirements must be identified, controlled, and corrected according to the importance of the problem and the Work affected.

5.1.3.3.3 Correction must include identifying the causes of problems and working to prevent recurrence.

5.1.3.3.4 Item characteristics, process implementation, and other quality-related information must be reviewed and the data analyzed to identify items, services, and processes needing improvement.

5.1.3.4 Documents and Records.

5.1.3.4.1 Documents must be prepared, reviewed, approved, issued, used, and revised to prescribe processes, specify requirements, or establish design.

5.1.3.4.2 Records must be specified, prepared, reviewed, approved, and maintained.

5.1.3.5 Work Processes.

5.1.3.5.1 Work must be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means.

5.1.3.5.2 Items must be identified and controlled to ensure their proper use.

5.1.3.5.3 Items must be maintained to prevent their damage, loss, or deterioration.

5.1.3.5.4 Equipment used for process monitoring or data collection must be calibrated and maintained.

5.1.3.6 Design.

5.1.3.6.1 NA

5.1.3.7 Procurement.

5.1.3.7.1 Procured items and services must meet established requirements and perform as specified.

5.1.3.7.2 Prospective suppliers must be evaluated and selected on the basis of specified criteria.

5.1.3.7.3 Processes to ensure that approved suppliers continue to provide acceptable items and services must be established and implemented.

5.1.3.8 Inspection and Acceptance Testing.

5.1.3.8.1 Inspection and testing of specified items, services, and processes must be conducted using established acceptance and performance criteria.

5.1.3.8.2 Equipment used for inspections and tests must be calibrated and maintained.

5.1.3.9 Management Assessment.

5.1.3.9.1 NA

5.1.3.10 Independent Assessment.

5.1.3.10.1 NA

5.1.4 The SUBCONTRACTOR shall provide the CONTRACTOR's representative with a Work activity schedule and shall notify the CONTRACTOR of all required inspection points prior to the scheduled date for coating activities (Refer to Section 2.1.10 and 2.1.11 herein).

5.1.5 If the SUBCONTRACTOR's proposed Work plan or procedures differ from the requirements of this Specification, the SUBCONTRACTOR shall specifically identify and explain all differences in writing, using an SDDR or other appropriate WTP project document, and submitted to the CONTRACTOR for review and approval prior to proceeding with a known deviation after the fact.

5.1.6 All pre-established witness and hold points shall be witnessed by the CONTRACTOR unless a written waiver has been issued.

5.1.7 All personnel shall receive training in the specific project coating requirements and the associated CONTRACTOR accepted work procedures that are relevant to their individual work assignments.

5.1.7.1 Painter/coating application personnel used to prepare the surface and apply coatings shall be trained, qualified and certified in accordance with the SUBCONTRACTOR's procedures accepted by the CONTRACTOR.

5.1.7.2 The SUBCONTRACTOR's coating Work inspectors shall have previous experience in coating inspection and shall receive documented training in the specific project coating requirements, ASTM standards and other relevant standards including the CONTRACTOR accepted Work procedures. All coating inspectors shall be trained, qualified and certified Level I inspectors meeting the requirements of Section 8.1.1.1. Inspector training, qualification and certification shall also comply with the SUBCONTRACTOR's document(s) identified on the submitted Supplier QA Program Data Sheet (Appendix A).

6 Materials

6.1 Coating Materials

6.1.1 All Special Protective Coating (SPC) secondary containment materials applied to concrete or steel items located in "Radiation" areas shall be prequalified in accordance with Appendix B. All SPC's applied to the building structure in "Radiation" areas or in any of the process buildings shall employ Approved coating materials as defined in Appendix B.

6.1.2 The Volatile Organic Compound (VOC) content of all materials shall comply with Federal, State and Local or other Regulatory requirements that have jurisdiction. The maximum allowable VOC for this project is 3.8 lbs./gal (450 gms/liter)

6.1.3 Coating materials including the primer intermediate and finish coat on a given item, shall all be from the same manufacturer as identified in Appendix C.

6.1.4 Secondary Containment repair materials shall be the same as those originally used or shall be those recommended by the manufacturer or shown to be compatible with the original coating and acceptable to the CONTRACTOR. Repair materials shall be in pre-measured units, and only complete kits shall be mixed. Splitting or breaking down pre-measured units of multi-component coating materials may be considered if the SUBCONTRACTOR prepares a procedure that requires accurate measurement of all materials and the SUBCONTRACTOR's QC inspector monitors/verifies each and every mix. This procedure must be submitted to the CONTRACTOR for review and permission to proceed.

6.1.5 Appendix D Room Finish Schedule Drawing References and Appendix C Tables contain the specified Special Protective Coatings for the WTP project. Appendix C contains the generic coating systems and approved coating materials. The generic coating system (primarily Epoxy or Epoxy Novolac materials) used on concrete and steel in secondary containment areas shall be coordinated with the generic coating materials indicated in the Architectural Room Finish Schedules (Appendix D Drawing Reference) for LAW, HLW, PTF, LAB and selected areas of BOF and their physical location. The Architectural Room Finish Schedules will identify coating materials for Secondary containment based on evaluation of chemical exposure , temperature and mechanical abuse based on a case by case criteria and specifically tailored for the conditions / exposure that is to be expected.

6.1.6 Appendix F is the Coating Manufacturer's Product Identity Certification Record. This document is required from the coating manufacturer for each component of each batch of coating material (manufactured coating material not individual ingredients).

6.1.7 Appendix G is an example for a Surface Preparation and Coating Inspection Form. This form or a form that contains the same information is required for daily inspection documentation.

6.1.8 Appendix H is the Manufacturer's Standard Coating Data Sheet. This is a sheet that must be completed when submitting an alternate material or coating system. A coating material technical data sheet and MSDS is required for each coating material included. All alternate materials must be reviewed and accepted by the CONTRACTOR prior to use.

6.2 Patching/Filler Materials

6.2.1 Materials used to patch or fill holes, shrinkage cracks, and defects in the concrete shall meet the following requirements:

6.2.1.1 For holes larger than 1/2" in its largest dimension, the filler may be a non-shrink structural concrete grout with a slump sufficient to fill holes on a vertical or overhead surface while staying flush with the surface plane. The concrete structural grout shall be compatible with the SPC system specified for use on the concrete surface. Compatibility shall be verified by applying the SPC over a cast sample of the structural concrete grout followed by a pull off adhesion of at least 200 psi per ASTM D4541 using test procedures applicable for type II and type IV instruments listed in Annex A.2 and A.4.

6.2.1.2 For holes up to 2" in its largest dimension, the filler may be a 100% solids proprietary polymeric filler material as recommended by the SPC manufacturer with a slump sufficient to fill holes on a vertical or overhead surface while staying flush with the surface plane. Polymeric fillers using a curing compound, catalyst or accelerator that develop heat during

the cure process shall not cause blowholes in the applied filler that requires subsequent repair. The polymeric filler may be applied in more than one application to fill large voids flush with the concrete surface plane of concrete to steel embed surface plane. The proprietary polymeric filler material shall be compatible with the SPC system specified for use on the concrete surface. Compatibility shall be verified by applying the SPC over a cast sample of the proprietary filler material followed by a pull off adhesion of at least 200 psi per ASTM D4541 using test procedures applicable for type II and type IV instruments listed in Annex A.2 and A.4.

6.2.1.2.1 Polymeric filler materials used in R5 areas where the 40 year accumulated radiation level will be greater than 2E8 rads that are not made with the same generic resin type shall be radiation tolerance tested in combination with the SPC system specified for use in that particular area. The specimens shall be prepared for testing as follows:

- Using the standard concrete test blocks identified in Appendix B, drill a hole 1/2" x 1/2" in each face of each block. Fill the hole with the proposed filler material flush with the surface plane of the block. Apply the SPC systems identified for use in the R5 areas. Perform radiation tolerance testing per Appendix B.

6.2.1.3 For stable non moving cracks fill flush with the surface plane using a 100% solids proprietary polymeric filler material recommended by the SPC manufacturer as defined in section 6.2.1.2. Large cracks shall be routed out as shown on Appendix I installation details.

6.2.1.4 For control joints that are formed or created after the concrete is placed and cured, apply the floor or wall coating down into the joint at least ½". Install a foam backer rod setting the depth of the joint at half the width. Install a bond breaking tape over the backer rod. Install a flexible polymeric sealant that is compatible with the coating system and the expected chemical exposure in that area. Refer to Appendix I for an installation detail.

6.2.1.5 For coving in corners (filler material with 2" radius) use the same rigid polymeric filler material defined in section 6.2.1.2 or a filler material as recommended by the coating manufacturer and accepted by the CONTRACTOR.

6.3 Batch Information

6.3.1 Each container of coating material received and used by the SUBCONTRACTOR shall be marked with the following:

- The manufacturer's name
- The product designation
- Batch/lot number
- Location and date of manufacture
- The shelf life expiration date

6.4 Abrasives

6.4.1 Abrasives for blast cleaning shall be clean, free of oil or contaminants, and dry. The particle size shall be capable of producing the specified surface texture or surface profile. Mineral and

slag abrasives shall meet the requirements of SSPC AB-1. The First batch/lot of non packaged abrasives shall be tested for water soluble contaminants and the conductivity shall not exceed 1,000 microsiemens/cm when tested in accordance with ASTM D4940 Section 1.0-2.0. Abrasives used at the RPP-WTP project site shall be < 1% silica.

6.4.2 When using reclaimed steel grit/shot abrasive, the particle size shall be capable of producing the specified surface texture . All reclaimed abrasives shall be tested for water-soluble contaminants and conductivity. Conductivity shall not exceed 1000 microsiemens when tested in accordance with ASTM D 4940 Section 1.0-2.0. All reclaimed abrasives shall be tested for oil and grease contamination using the water floatation test at the beginning of each shift.

6.4.3 Reclaimed grit used for abrasive cleaning shall be tested for the presence of oil by immersing a sample in clean tap water and checking for oil flotation. Tests shall be made at the start of blasting and every four (4) hours thereafter. If oil is evident, the contaminated abrasive shall be cleaned or replaced. All surfaces blasted since the last successful test shall be completely re-blasted using clean abrasive.

6.4.4 Expendable abrasive (Green Diamond / Black Beauty) shall be used on a once only basis and then discarded.

6.5 Water Quality

6.5.1 Water used for wet abrasive blasting or high pressure water jetting shall be clean tap or potable water and shall not exhibit any evidence of an oily sheen.

6.6 Coating Over Stainless Steel (SS)

6.6.1 All coating materials, thinners, solvents and cleaning materials used on SS shall be shown to have low leachable chlorides (<200ppm) and only trace amounts of low melting point metals. One of the approved coating materials listed in Appendix C/Table 1 shall be used or an equivalent submitted to the CONTRACTOR for review and approval. The submittal shall include an independent laboratory test report that verifies the above parameters, a copy of the Manufacturer's latest published data sheet and Material Safety Data Sheet (MSDS). All proposed materials shall be evaluated for possible use by the CONTRACTOR.

7 Application

7.1 General

7.1.1 It shall be the SUBCONTRACTOR's responsibility to stop the surface preparation and coating at any time when conditions exist that might adversely affect the quality. The CONTRACTOR's representative may reject any prepared or coated surfaces not in compliance with this Specification.

7.1.2 All painters and other personnel used to apply coatings on to concrete and steel items shall be individually qualified and certified in accordance with the SUBCONTRACTOR's accepted

written procedures that includes classroom training on the WTP Project Specification. Guidance for qualifying painters/application personnel are contained in ASTM D4228 and ASTM 4227 Section 1-10 and Figure #2 or other as accepted by the CONTRACTOR.

7.1.3 The secondary containment coating Mock ups shall have been satisfactorily completed and accepted by the CONTRACTOR prior to starting production work on a given area. That does not mean that all mock ups for all coating systems must be completed prior to the start of work, but at least the mock ups for the coating systems that are scheduled for facility production shall be completed prior to start of work with those coating systems.

7.2 Pre-Surface Preparation

7.2.1 Prior to mechanical cleaning, the surfaces to be coated shall be cleaned in accordance with SSPC SP1 to remove oil, grease, dirt, silicone, marks made with waxy or greasy makers, graffiti, curing compounds or form release residue or other foreign matter that could interfere with the proper bonding of the coating contamination of this type shall be removed by steam cleaning or solvent washing in accordance with ASTM D4258 Section 1.0 - 9.0. The SUBCONTRACTOR shall inspect floor for surface hardeners. Surface hardeners shall be removed prior to applying Special Protective Coatings.

7.2.2 Inspection of surfaces exhibiting fins, ridges, and sharp projections or surfaces that require repair of honeycomb areas, tie rod holes, and cavities that are greater than 1/2" in its largest dimension (i.e., length, width or depth) or cracks wider than 1/8" shall be performed by the SUBCONTRACTOR and includes a written report to the CONTRACTOR. These defects must be removed or corrected prior to applying any coating.

7.2.3 All sharp corners that are scheduled to receive Special Protective Coatings shall be rounded to a radius of no less than 1/8"

7.2.4 The SUBCONTRACTOR shall inspect all joint details and the configuration of the finished concrete sections in relation to the application of materials as shown in installation details shown in Appendix I Secondary Containment Installation Details and the requirements of this specification.

7.2.5 Any remaining sharp edges, weld spatter, or burrs, fins, ridges, tie rods, projections found after the start of coating Work shall be completely removed by grinding or other means. Pneumatic tools shall not be used unless they are fitted with effective oil and water traps on the exhaust air. If the steel embeds develop salt deposits or were shipped or stored so that the surface could have been contaminated with soluble salts (e.g., above deck ship transport, truck transport on dirt roads close to ocean, storage), the area shall be pressure water washed (e.g., 2,000-5,000 psi) with demineralized water to remove the soluble salt contamination as possible prior to abrasive blasting/water jetting.

7.2.6 Floor/Wall and Wall/Wall coving shall be installed using the same rigid filler material defined in section 6.2.1.2 or a filler material as recommended by the coating manufacturer and accepted by the CONTRACTOR. Coving shall be installed after concrete surface preparation and shall comply with the installation details in Appendix I.

7.2.7 To insure a seal and a smooth transition from concrete surfaces onto steel embed plates, the concrete shall be chipped away from the edge of the embed plate at least ½" and at least ¼" below the surface plane of the embed plate. The chipped away area shall be filled flush between the concrete and steel embed plate using the same rigid filler material defined in section 6.2.1.2 or a filler material as recommended by the coating manufacturer and accepted by the CONTRACTOR. (refer to Appendix I).

7.2.8 To provide a structurally sound termination of a floor coating, a perimeter key shall be placed in the floor (refer to Appendix I).

7.3 Surface Preparation

7.3.1 Prior to the start of Work, the SUBCONTRACTOR shall examine all surfaces to be coated to determine their acceptability for the specified coating application Work. If the surfaces are found to be unacceptable, the SUBCONTRACTOR shall either return the surface to an acceptable condition or immediately notify the CONTRACTOR in writing if the repairs are outside the scope of work. Coating Work shall not commence until corrective action has been taken. Starting Work prior to completion of corrective action shall preclude any subsequent claim by the SUBCONTRACTOR. The CONTRACTOR may require corrective action at the SUBCONTRACTOR's expense.

7.3.2 The abrasive mixture and the compressed air shall be clean, dry and oil free. Moisture traps, in addition to oil and water separators mounted on the compressor, shall be used in compressed air lines to remove oil and moisture from air close to the point of use. (refer to Section 7.3.4.4 and 8.1.6)

7.3.3 Concrete Surfaces

7.3.3.1 Floors, walls shall be free of curing compounds, laitance, dirt or other residue that could interfere with proper adhesion of the coating system. Shop or field primers applied to steel embeds that are not compatible with the intended secondary containment coating system shall be removed and primed with a compatible primer.

7.3.3.2 To achieve a clean roughened surface suitable for the specified coating systems, surfaces may be dry abrasive blasted, wet abrasive blasted (Refer to ASTM D4259 Sections 1.0-10.0) or cleaned and roughened by high pressure (10,000 psi to 25,000 psi) water jetting using a rotating head hand lance or self propelled robot (Refer to SSPC SP12 Appendix C and D for a description and operation and SSPC SP13 Sections 3.0-6.0). Small areas may be prepared using grinders or sanders as accepted for use during mock-ups. Needle guns may only be used if followed by full abrasive blasting or water jetting to remove weakened/crushed concrete surface layer to sound dense concrete and only when the procedure has been shown to result in a coating adhesion of 200 psi minimum.

7.3.3.3 In addition, floors may be acid etched using 20 % citric acid solution when accepted by the CONTRACTOR. Acid etched surfaces shall be pH tested in accordance with ASTM D4262 Sections 1.0-8.0. The pH shall be no more than 1.0 pH lower or 2.0 pH higher than the pH of the potable rinse water. A suitable texture shall be achieved that will be agreed upon during the mock up coating application. A detailed procedure on the use, clean up and

disposal of acid etching materials/rinse must be provided for review and acceptance by the CONTRACTOR.

7.3.4 Carbon Steel Surfaces

7.3.4.1 Prior to blast cleaning, items to be coated shall be visibly dry with the surface temperature of at least 5°F above the dew point. Concrete surfaces shall be determined suitably cured as defined by the CONTRACTOR.

7.3.4.2 Carbon steel surfaces to be coated shall be blast cleaned in accordance with the surface preparation requirements specified in Appendix D. Where abrasive blasting will damage the items or is impractical, SSPC-SP11 Power Tool Cleaning to Bare Metal may be substituted only in limited areas and only with CONTRACTOR's written permission to proceed.

7.3.4.3 Abrasive blasting of carbon steel shall result in an angular surface profile 1.5 to 3.0 mils as measured using a Testex Press-O-Film replication tape in accordance with ASTM D4417 method C. Concrete shall be suitably roughened and textured using one of the specified methods of surface preparation during the coating system mock-ups performed and accepted by the CONTRACTOR..

7.3.4.4 The recycled abrasive mix shall be maintained clean of contaminants by continuous effective operations of cleaning machine scalping and air wash separators. Reclaimed grit used for abrasive cleaning shall be tested for the presence of oil/grease by immersing a sample of spent abrasive in clean tap water and checking for oil flotation. Tests shall be made at the start of blasting, and at a minimum of every four (4) hours thereafter. If oil is evident, the contaminated abrasive shall be cleaned or replaced. All surfaces blasted since the last successful test shall be completely cleaned of contamination then re-blasted using clean abrasive. Blast cleaning shall not be performed in the immediate area where coating or curing of coated surfaces is in progress unless a vacuum system is employed that contains dust. All surfaces and equipment which are not to be coated shall be suitably protected from blast cleaning.

7.3.4.5 Burrs, slivers, scabs, lamination, and weld spatter fins, ridges, sharp protrusions which become visible after blasting shall be removed. The tools and manner employed to remove defects and sharp edges, shall not burnish or destroy the profile the surface. If the profile or roughness is reduced, it shall be re-blasted to produce the profile and roughness as required. The exhaust of pneumatic grinders shall not impinge on the cleaned surface. If the surface becomes contaminated, it shall be cleaned of contamination then re-blasted as required. Carbon steel tools or implements shall not be used on stainless steel surfaces.

7.3.4.6 If visible rust occurs or if the cleaned surface becomes wet or otherwise contaminated, these surfaces shall be re-cleaned to the specified standard. Cleaned surfaces remaining un-coated overnight shall be re-cleaned to the specified cleanliness prior to applying the coating. Where Concrete and Carbon Steel interface and are proposed to be coated in one operation every effort will be made to apply coating to the steel before surface deterioration.

7.3.4.7 After surface preparation is complete and before coating, pressurized air or a vacuum cleaning shall be used to remove all dust and abrasive residue. The air shall be clean and

dry as verified in accordance with Section 8.1.6 so as not to contaminate the prepared surface. The operator shall ensure that all dust and abrasive residues are removed from the surface of blast profiles when vacuum cleaning is carried out.

7.3.4.8 Machined surfaces shall be protected from damage due to blasting and coating operations.

7.3.4.9 Equipment shall have all openings plugged, masked, and/or blinded sufficiently to protect internals before abrasive blasting. After the coating operation is complete all internals shall be blown clean and/or vacuumed to remove any dust or abrasive blast media that may have entered the coated equipment.

7.3.5 The abrasive mixture and the compressed air shall be clean, dry and oil free. Moisture Traps, in addition to oil and water extractor mounted on the compressor, shall be used in compressed air lines to remove oil and moisture from air close to the point of use. (refer to Section 7.3.4.4 and 8.1.6)

7.3.6 Where galvanized steel falls into secondary containment areas and requires a coating, the surface shall be cleaned per SSPC SP1 and allowed to dry. The galvanizing shall then be pretreated using a phosphoric acid solution (e.g., Amchem Galva-Prep) or brush blasted per SP7 as recommended by the manufacturer of the coating material intended for use. After flushing the acid off using potable water, the surface area contacted by the acid and the rinse water shall be tested for pH. The pH shall be as indicated in specification section 7.3.3.3.

7.3.7 Damaged galvanized steel shall be cleaned per SSPC SP11 using a 3M Clean-N-Strip disc and wheel, a flapper wheel with a 60-80 grit size or a slow variable speed sander using 60-80 grit sanding disc. All galvanizing to be coated shall be pretreated as indicated in specification section 7.3.6.

7.4 Coating Application

7.4.1 Prior to applying Special Protective Coatings (SPC's) the concrete surface shall be dry as determined by the plastic sheet method in accordance with ASTM D4263 sections 1.0-8.0.

7.4.2 Coatings shall be applied in accordance with CONTRACTOR accepted procedures (refer to Section 4.1). The coating manufacturer's recommendations for the application temperature and curing temperatures versus times (between coats and after last coat) of the specified material shall be considered when determining minimum and maximum cure to recoat time intervals. Application and curing temperatures above or below the limits allowed by this specification (Refer to Section 7.4.5) shall be submitted to the CONTRACTOR for review and permission to proceed.

7.4.3 Coatings shall be applied using properly sized and type of equipment for the size and complexity of the item being coated. The equipment shall be clean with all components in good working order.

7.4.4 Bug holes, cracks and control joints shall be filled flush with the concrete surface plane or as identified in Appendix I Secondary Containment Installation Details using a structural concrete grout, Five Star V/O or Five Star Vertical patch or CONTRACTOR accepted alternate structural concrete grout or polymeric filler. Structural Concrete grout shall be

applied prior to applying the first coat or by applying the proprietary polymeric filler listed in Appendix C Table 2 for the selected coating system or CONTRACTOR accepted equal. Proprietary filler materials may be applied before or after the primer sealer coat where acceptable to the specific coating manufacturer. The filler technique shall be developed during the mock up to minimize the occurrence of pinholes in the finish coats.

7.4.5 Coatings shall be applied only when the surfaces to be coated are clean and dry. The substrate temperature shall be a minimum of 5°F above the dew point during coating application and until the applied coating is no longer moisture sensitive per the coating manufacturer's published data or written recommendations. The substrate temperature during coating application and curing shall be a minimum of 50°F and a maximum of 110°F. The relative humidity during coating application shall not exceed 85 percent. Measure humidity in accordance with ASTM E 337 Sections 1.0-19.0.

7.4.6 The SUBCONTRACTOR shall record all batch numbers for each coating component used along with other information necessary for the CONTRACTOR to relate the batch to the area or item for which it was applied. (Refer to Appendix G)

7.4.7 All coatings shall be thoroughly mixed until they are smooth and free from lumps, then strained through a screen of at least 30 mesh. Heavy bodied materials that will not flow through a 30-mesh screen are exempt from straining. All coatings that could settle in the container during application must be kept under continuous mechanical agitation to ensure coatings expend their solid contents and do not settle during application.

7.4.8 Alternating coats shall have a visible color difference to insure full coverage over previous coats.

7.4.9 Dry film thickness of each coating shall be in accordance with Appendix C Table 2 Secondary Containment Prequalified Coating Materials or as specified in the subcontract document. (Refer to Section 8.3.6)

7.4.10 The minimum and maximum drying times between coats shall be in strict accordance with the coating manufacturer's latest published technical data sheets or written recommendations.

7.4.11 Runs, sags, voids, drips, overspray, loss of adhesion, bubbling, peeling, pinholes or inadequate cure are not permitted and shall be corrected using CONTRACTOR accepted repair procedures.

7.4.12 Application equipment that will be reused such as spray equipment, brushes and rollers shall be cleaned using the coating manufacturer's recommended solvents/cleaners.

7.5 Remedial Work

7.5.1 The completed coating on each item shall have the correct dry film thickness and shall be free of damage and visible defects.

7.5.2 Repair of Dry Film Thickness (DFT) deficiencies

7.5.2.1 Defects such as runs, sags, overspray and embedded particles shall be corrected by sanding to remove the defect. When the defects are in the finish coat, all areas sanded must be overcoated with the finish coat. If the DFT of primer or intermediate coat is reduced to less than the specified minimum, the area shall be abraded with 60-80 grit sand paper or flapper wheel and an additional layer of coating shall be applied until sufficient thickness is achieved. If noticed during application, the sags or runs may be brushed out.

7.5.3 Repair of Damage

7.5.3.1 All damaged and loosely adhering coating shall be removed and the surface thoroughly cleaned using a vacu-blaster or high pressure water jetting, 60-80 grit sanding disc, 60 - 80 grit sandpaper, 60-80 grit flapper wheel or 3M Clean-N-Strip. Edges of the breaks shall be feathered to insure a smooth transition and the designated number of prime and finish coats shall be applied. Care shall be taken to insure adjacent coatings are not heat damaged, polished or burnished.

7.5.4 Loss of adhesion, delamination, blisters, bubbling and fish eyes in the applied coating requires the coating to be removed and reapplied in accordance with this Specification.

7.5.5 Pinholes shall be filled or otherwise repaired prior to the application of the final coat. Pinhole repairs in the final coat shall blend in and not be visually obvious.

8 Inspection

8.1 General

8.1.1 The SUBCONTRACTOR shall have the full responsibility for the coating application quality in accordance with this Specification and shall be responsible for stopping Work activities when conditions develop that could adversely affect the quality. All Work is subject to the CONTRACTOR's inspection surveillance.

8.1.1.1 All coating Work inspection personnel shall be trained, qualified and certified in accordance with the SUBCONTRACTOR's accepted procedures. The inspectors shall meet or exceed the minimum requirements for a Level I coatings inspector as described in ASTM D4537 Section 6.0. At least one inspector shall meet the minimum requirements for a Level II inspector as described in ASTM D4537 Section 1.0-8.0. The SUBCONTRACTOR shall conduct an examination, a performance evaluation and issue a certification for each inspector in accordance with ASTM D4537 Section 9.0. The Level II inspector shall supervise the Work of all Level I's. The SUBCONTRACTOR's inspector must demonstrate his/her capability of using the inspection equipment and performing all the required inspections. The SUBCONTRACTOR's inspector training, qualification and certification plan and associated procedures shall satisfy the requirements of ASTM D4537, Sections 1.0-8.0 using the guidelines provided in ASTM D5498 including classroom training on the WTP specifications applicable to coating inspection. Additional coating work inspection guidance is found in ASTM D6237 and ASTM D3276 which shall be used in developing procedures for training and certifying coating work inspectors.

8.1.2 The CONTRACTOR's representative shall be the final authority on the specification compliance for surface preparation and material application. Any coating which, in the judgment of the CONTRACTOR's representative has not been applied in conformance with this Specification, shall be rejected.

8.1.3 The CONTRACTOR representative shall have access to each part of the process and shall have the right and opportunity to witness any of the Quality Control Tests.

8.1.4 The SUBCONTRACTOR shall furnish the necessary testing and inspection instruments, properly calibrated and certificates maintained. If equipment is suspected of being out of calibration, it shall be re-calibrated and certificates made available for verification by the CONTRACTOR. Such equipment shall be available for use by the CONTRACTOR in conducting surveillance of the Work.

8.1.5 The SUBCONTRACTOR shall halt the coating Work and make corrections to the procedures, as necessary to correct repetitive faults found in the Work.

8.1.6 Prior to using compressed air, the quality of the air downstream of the separator shall be tested in accordance with the requirements of ASTM D4285 by blowing the air onto a clean white blotter or cloth for two (2) minutes at a distance of no more than twelve (12) inches to check for any contamination, oil, or moisture. This test shall be performed at the beginning of each shift and at not more than four (4) hour intervals. The test shall also be made after any interruption of the air compressor operation or as required by the CONTRACTOR. The air shall be used only if the test indicates no visible contamination, oil, or moisture. If contaminants are evident, the equipment deficiencies shall be corrected and the air stream shall be re-tested. Moisture separators shall be bled continuously. All lines shall be tested individually prior to use. Surfaces determined to have been blown down or blasted with contaminated air shall be cleaned of all contamination then re-blasted with clean air and abrasive. Coatings determined to have been applied using contaminated air shall be removed and reapplied using clean air.

8.1.7 Inspection points shall be established as follows:

- Prior to the start of Work
- Immediately following the surface preparation
- Immediately prior to the coating application
- Following the application of each coat
- Following the curing of the coating
- Final inspection and sign-off, in accordance with the project requirements

8.1.8 Any defects disclosed by inspection shall be re-inspected after correction.

8.1.9 The SUBCONTRACTOR shall keep the records indicated below, and submit these records to the CONTRACTOR (refer to Section 4.4 and Appendix G). The following lists the frequencies:

Coating/Inspection Step	Required Frequency
1. Pre-Surface Prep and Surface Preparation/Profile/Texture	100% visual on Pre-Surface/100% on Surface Prep Cleanliness/Steel profile first item of each type per shift and

		every 20 items thereafter/Concrete 100% visual for cleanliness and texture.
2.	Environmental/Air Quality	At the start of each shift and every 4 hours thereafter or more often during changing conditions.
3.	Recirculated Abrasive	At the start of work and as required with a minimum of every 4 hours thereafter
4.	Thickness	SSPC-PA2- 5 spot readings per 100 sq.ft. on large surfaces or steel items; surfaces or steel items < 100 sq.ft. 4 spot readings on each separate surface and 2 spot reading on steel items less than 4 inches. (e.g., valves, fittings, components, etc.)
5.	Visual on Applied Coating	100% of all items

8.2 Surface Preparation Inspection

8.2.1 Verify bug holes , voids ,cracks and control joints are properly filled. This is not necessary if filler is applied after surface preparation and sealer coat application.

8.2.2 Verify environmental conditions and compressed air quality (refer to Section 7.3.5, 7.3.4.1, 8.3.1)

8.2.3 Verify recycled abrasive is grease and oil free (refer to Section 7.3.5).

8.2.4 Verify surface cleanliness and texture.(refer to Sections 7.3.3.2, 7.3.4.2. 7.3.4.3 and 8.1.9).

8.2.5 Grease free chalk shall be used to mark local areas which do not meet the specified requirements (e.g., soapstone and crayons are not acceptable).

8.3 Coating Application

8.3.1 Environmental conditions and compressed air quality shall be verified per Sections 7.4.5 and 8.1.9.

8.3.2 Dry coating thickness (DFT) on steel items shall be measured with a magnetic film thickness gage such as an Elektro-Physik "Mikrotest" or Positector 2000, 6000 or CONTRACTOR accepted equal in accordance with SSPC PA2. Steel items and individual items on equipment less than one hundred (100) sq.ft. in surface area shall have at least four (4) evenly spaced spot readings per item. Equipment or equipment components less than four (4) inches in its largest dimension only require two (2) evenly spaced spot reading per item.

8.3.3 Dry coating thickness (DFT) on concrete shall be measured using a Wet Film Thickness (WFT) gage (Refer to ASTM D4414 Sections 1.0-10.0 applicable to procedure A) and calculating thickness based on coating material volume solids (added thinners required recalculation of volume solids) or by using a nondestructive ultrasonic tester such as the Positector 100 or accepted equivalent (Refer to ASTM D6132 Sections 1.0-11.0). Each 100 sq.ft. shall receive 5 evenly spaced gage readings. Areas less than 100 sq.ft. in surface area shall have at least 2 evenly spaced spot readings per area.

8.3.4 Wet film thickness gages shall be of high quality steel or stainless steel, with a maximum blade width of 1.5", that can be purchased with calibration certifications. Wet film thickness

gages shall be visually inspected for paint residue and physical damage at the start of each shift and every 4 hours thereafter during use.

8.3.5 The Dry Film Thickness gage shall have a minimum of a zero to 40 mil or zero to 60 mil working range and shall be checked for calibration accuracy in accordance with SSPC-PA2 at the start of each shift against certified coating thickness calibration standards for non-magnetic coating of steel traceable to NIST or CONTRACTOR's accepted alternative standards. The calibration standards shall be in the 1.5 mil to 40.0 mil range, unless otherwise specified. Any surface with a measured thickness outside of the limits described in section 7.4.9 shall be rejected. These areas shall be reworked or re-cleaned and re-coated at the SUBCONTRACTOR's expense prior to acceptance by the CONTRACTOR.

8.3.6 When dry film thickness becomes debatable or indeterminate, the CONTRACTOR reserves the right to require the use of destructive testing using a Tooke gage in accordance with ASTM D4138 Sections 1.0-9.0 or by nondestructive ultrasonic testing in accordance with ASTM D6132 Sections 1.0-11.0 to verify dry film thickness. All areas damaged by destructive testing shall be repaired by the SUBCONTRACTOR.

8.3.7 Runs, sags, voids, drips, overspray, loss of adhesion, bubbling, pinholes, peeling, or inadequate cure are not permitted and shall be repaired or reworked.

9 Storage, Handling and Shipping

9.1 Coating Materials

9.1.1 Coating materials shall not be stored in direct sunlight or exposed to inclement weather (e.g., rain, snow, sleet, freezing rain, dew point condensation, see also section 9.1.5). Materials shall remain under cover until ready to use.

9.1.2 Coatings, thinners, cleaning solvents and other flammable materials stored at any location, shall be kept away from combustion sources and shall be stored in metal flammable material storage cabinets meeting NFPA and OSHA standards. Thinners and solvents shall be transported to the point of use in approved safety containers meeting OSHA standards.

9.1.3 Coating material shall be delivered in manufacturer's original unopened containers. Each container shall be clearly identified with the manufacturer's name, product designation, batch number, date of manufacture and shelf life expiration date.

9.1.4 Coating materials must have a minimum of 80% of its shelf life remaining at the time of shipment to the project site or SUBCONTRACTOR's warehouse. Items with a normal shelf life less than 12 months shall have a minimum of 85% of its shelf life remaining at the time of shipment to the project site or SUBCONTRACTOR's warehouse.

9.1.5 Coating materials that are older than twenty four (24) months from the date of manufacture or that exceed the manufacturer's shelf life, if less than twenty four (24) months, shall not be used and shall be placed on HOLD and segregated from other coating materials. Where the coating material has exceeded its shelf life and can be shown to have been stored as specified herein, a one-time extension for no less than three (3) months and no more than six (6) months

may be issued by the coating manufacturer. The shelf life extension shall be based on laboratory testing of retain samples taken at the time of manufacture or by testing a sample of the actual coating material in question. Where testing verified an outdated coating material still complies with its original design criteria, it is acceptable for shelf life extension. Expiration date stickers, provided by the coating manufacturer, shall be affixed to each container prior to release from HOLD. The stickers shall include the product number, batch/lot number, the new expiration date and suitably marked to indicate that they came from the coating manufacturer. A new Appendix F shall be provided by the coating manufacturer that includes the test results and specifically indicate that the new Appendix F was provided to document shelf life extension including new expiration date. Coating materials that have not been stored or handled in accordance with sections 9.1.5, 9.1.6, 9.1.7 and 9.1.8, may not have their shelf life extended.

9.1.6 Coating material shall be protected from moisture, direct sunlight and temperatures below 40°F or above 100°F unless otherwise allowed by the coating manufacturer's latest published instructions and accepted by the CONTRACTOR.

9.1.7 Coating material containers where the airtight seal has been broken or any of the contents are lost, shall not be used.

9.1.8 Coating material containers shall not be opened except for immediate use.

9.1.9 Unused material shall be returned to storage as soon as possible at the end of each Workday. Materials left out for more than ten (10) hours in an uncontrolled storage area (areas without environmental controls or environmental monitoring that are exposed to ambient weather) shall not be used and shall be placed in a segregated hold area until final disposition then removed from the job site if rejected. No water borne coatings shall be stored in areas where the temperatures are below 40°F.

9.1.10 All required coating material certifications for each batch of material delivered to the job site shall be available at the time of material receipt. Materials delivered to the shop or field without the required documentation shall not be used and the SUBCONTRACTOR shall tag and place discrepant materials into a hold area clearly separated from acceptable material. Once the required documentation is received or otherwise corrected and found to be acceptable, the discrepant material may then be taken off hold status and used.

10 Documentation

10.1 The SUBCONTRACTOR shall provide a record of all materials used (Regarding individual batch numbers, refer to Appendix F).

10.2 The SUBCONTRACTOR shall provide a record of all required daily inspections (Example-Appendix G) that includes pre-surface preparation, compressed air cleanliness, environmental conditions, surface preparation and roughness, location of field repairs coated, application, visual inspection, dry film thickness, and all touch up/repair. This record shall include the coating and thinner materials used and the ID of the items coated to provide traceability.

10.3 All quality documentation shall be available for review by the CONTRACTOR representative within twenty four (24) hours from the time it is generated.

10.4 SUBCONTRACTOR documentation forms or the way that the actual Work will be documented shall be provided by the SUBCONTRACTOR as part of the procedures submittal for review by the CONTRACTOR.

11 Design Changes Incorporated by Reference

11.1 The following is a listing of design changes that are identified by reference and do not require modification to the specification.

Design Change Document
(none at this time)

* Denotes a new entry for this revision of the specification.

Appendix A
Supplier Quality Assurance Program Requirements Data Sheet

DOE ORDER 414.1A REQUIREMENTS

The following marked QA Program Elements of DOE ORDER 414.1A apply and are subject to CONTRACTOR evaluation and verification (see also exhibit J in subcontract documents)

DOE O 414.1A	N/A	PROGRAM ELEMENTS	SUPPLIER DOCUMENT AND PARAGRAPH REFERENCES TO BE COMPLETED BY THE SUPPLIER
X		PROGRAM	
X		PERSONNEL TRAINING & QUALIFICATION	
X		QUALITY IMPROVEMENT	
X		DOCUMENTS & RECORDS	
X		WORK PROCESSES	
	X	DESIGN	Coating manufacturers and coating applicators "Design" for Special Protective Coatings provided by 24590-WTP-3PS-AFPS-T0006
X		PROCUREMENT	
X		INSPECTION & ACCEPTANCE TESTING	
	X	MANAGEMENT ASSESSMENT	
	X	INDEPENDENT ASSESSMENT	

SIGNATURE OF SUPPLIER REPRESENTATIVE _____

0		Issue for Use				
REV.	DATE	REASON FOR REVISION	BY	CHECKED	APPROVED	QA
Special Protective Coatings For Secondary Containment Areas.			JOB NO. 24590-101 DATA SHEET NO. REV. 0			

Appendix B
WTP Project Special Protective Coating (SPC) Material Prequalification Requirements for Secondary Containment.

1.0 Prequalification Testing for Radiation Areas

1.1 All the coating material prequalification testing shall be performed by the coating manufacturers listed in Appendix C. Coating systems listed as "Prequalified" have been fully tested and all data has been reviewed and accepted. Only those systems listed as Prequalified may be used.

1.2 Coating systems that will be applied on items that will be located inside "Radiation" areas shall satisfy the following test requirements:

1.2.1 Radiation Tolerance Testing: Coating systems shall be tested for tolerance to radiation exposure as a complete system in accordance with the requirements of ASTM D4082 and as follows:

1.2.1.1 For coating systems to be used in areas where the total anticipated accumulate dose will not exceed 2E8 rads, no radiation tolerance testing is required.

1.2.1.2 For coating systems to be used in areas where the total anticipated accumulated dose is >2E8 rads up to 1E9 rads, test the coatings at 1E9 rads.

1.2.1.3 For coating systems to be used in areas where the total anticipated accumulated dose is >1E9 rads, the test radiation level shall equal or exceed the highest anticipated accumulated dose.

1.2.1.4 The acceptance criteria for the irradiation test shall be "no defects" as described in ASTM D4082. In addition to the defects stated in ASTM D4082, also check the coating on the test specimens for softening. The coating shall not soften because of the irradiation exposure.

1.2.2 Decontamination Testing: Generic Special Protective Coating materials such as two component or three component Epoxy, and Epoxy Novolac's, type have historically shown very good decontamination and chemical resistance properties and are suitable for use on the WTP project. Other generic coating materials located in areas that will require operational decontamination must be able to withstand the decontamination chemicals and temperatures that will be used as part of the decontamination process.

1.2.3 Abrasion Resistance Testing: In addition to radiation tolerance testing of coating systems that will be applied to surfaces inside "Radiation" areas or on items that will be located inside "Radiation" areas, those coating systems and

selected "Non-Radiation" area coating systems shall satisfy the following test requirements:

1.2.3.1 Coating systems for use -in secondary containment areas, where abrasion will be a factor in the in-service performance of the coating system, shall be tested in accordance with ASTM D4060. The weight loss shall not exceed 175 mg per 1000 cycles when a CS-17 wheel is used with a 1000-g load.

1.2.4 Adhesion Testing: Coating systems shall be tested for adhesion in accordance with the requirements of ASTM D4541 and ASTM D5144 Section 5.5.1. The minimum adhesion value shall be 200 psi for coatings applied to concrete or steel substrates.

1.2.5 Chemical Resistance Testing: Perform chemical resistance testing on coating systems in chemical exposure areas in accordance with the requirements of ASTM D3912 Section 6.3. The test reagents and test duration of the tests shall be governed by the anticipated service conditions. The test shall last for 5 days for secondary containment coating systems and for coating systems where cleanup of spills will not be immediate, for 24 hours.

If the test duration exceeds 24 hours, examine the test specimens after each 24-hour period and report the condition of the specimens after each 24-hour interval. Examine and report the condition of the specimens in accordance with the requirements of ASTM D3912, Sections 7 and 8. The test reagents and concentrations shall be as follows:

1.2.5.1 Chemical Reagents and Concentrations that may require testing

- 2.0, 5.0 & 12.2 Molar HNO3
- 0.25, 2.0, 5 & 19 Molar NaOH
- 3.27 Molar Sr(NO3)2
- 7.4 Molar NaNO2
- 4.4 Molar NaMnO4

1.2.6 Test Specimen Preparation: Test specimens shall be prepared in accordance with the requirements of ASTM D5139. The surface preparation methods utilized for radiation tolerance, adhesion and chemical resistance testing shall be representative of those proposed for use. If more than one surface preparation method is proposed for use, each proposed surface preparation method shall be tested independently. The size of the test specimens shall be appropriate for the test being carried out. The minimum size of test specimens shall be 2" X 4" X ¼" for steel substrates and 2" X 2" X 4" for concrete substrates.

1.2.7 Infra Red (IR) Scan: The coating manufacturer shall run an IR scan of the prequalification batch of the liquid component of each coating system to maintain as a record of that formulation. The IR scans shall be maintained indefinitely for all coating systems that are accepted for use by RPP/WTP and

shall be identified and submitted with the test documentation for each coating system. Thereafter, the manufacturer shall certify that each subsequent batch of an accepted coating system was manufactured with the same formulation, raw materials, production methods, and quality control standards as the coating materials originally tested and accepted for use by the RPP/WTP (refer to the statement included on the Coating Manufacturer's Product Identity Certification Record in Appendix F).

1.2.8 Flame Spread and Smoke Developed: All Special Protective Coatings that will be applied on the building structures for secondary containment located in the LAW, HLW, PTF, LAB and areas of BOF that transport, process or store radioactive materials or items shall comply with the requirements of NFPA 801 and DOE Standard 1066 as defined in specification 24590-WTP-3PS-AFPS-T0002 Special Protective Coatings Limited-Combustible Testing Protocol. The Maximum allowable flame spread is 25 and the maximum allowable smoke developed is 50. Equipment, piping, steel items installed in the building is exempt from this flame spread requirement.

1.2.9 Volatile Organic Compounds (VOC): The VOC content of all Special Protective Coatings shall not exceed 3.8 lbs./gal (450 grams/liter). If the VOC requirement in the location where the coating is being applied is less than the 3.8 lbs./gal, the local (e.g., a facility offsite in Tri-Cities area) requirements take precedence and must be met.

2.0 Prequalification Testing for Non-Radiation Areas

Special Protective Coating materials or systems that will be applied on items that will be located in "Non-Radiation" areas have the same prequalification requirements as listed in Appendix "B" Section 1.0 except no radiation tolerance testing is required.

Appendix C
Table 1- Secondary Containment Coating Systems

Usage Type	Thickness Groups Concrete/ Steel	Resin Type/ Surface Type	Coating System Description	Prequalified Coating Systems						
				Ameron	Carboline	ICI-Devoe	Dudick	Inter-National	Sherwin Williams	Remarks
FLOOR COATING SYSTEMS										
SC	T4	ECF	Heavy Spray or Self Leveling Epoxy Floor Coatings (Epoxy primer and one coat of epoxy finish)	AM07	CA07	DE07	DD07	IN07	SW07	
SC	T4	NCF	Heavy Spray or Self Leveling Epoxy Novolac Floor Coatings (Epoxy Novolac primer and one coat of epoxy Novolac finish)	AM08	CA08	DE08	DD08	(none)	SW08	
WALL and SUMP COATING SYSTEMS										
SC	T2	ECW	Epoxy Wall & Sump Coatings (Fill bug holes flush, apply 1 coat of epoxy primer and two coats of epoxy finish)	AM15	CA15	(none)	(none)	IN15	SW15	
SC	T2	NCW	Epoxy Novolac Wall & Sump Coatings (Fill bug holes flush, apply 1 coat of epoxy Novolac primer and two coats of epoxy Novolac finish)	AM16	CA16	(none)	(none)	IN16	SW16	
STEEL EMBED COATING SYSTEMS										
SC	T4	ESE	Epoxy Coatings for Embed Plates and Support Steel, (Touch up existing shop coating or abrasive blast and apply two coats of Epoxy Finish)	AM19	CA19	(none)	(none)	IN19	SW19	
SC	T5	NSE	Epoxy Novolac Coatings for, Embed Plates and Support Steel (Touch up existing shop coating or abrasive blast and then apply two coats of Epoxy Novolac Finish)	AM20	CA20	(none)	(none)	IN20	SW20	

SC = Secondary Containment

ECF = Epoxy Concrete Floors; NCF = Epoxy Novolac Concrete Floors; ECW = Epoxy Concrete Walls; NCW = Epoxy Novolac Concrete Walls

ESE = Epoxy Steel Embeds; NSE = Epoxy Novolac Steel Embeds

Appendix C
Table 2 Secondary Containment Prequalified Coating Materials

WTP Concrete System Code	Surface Type	Appendix C Table 1 Mfg. System Code	Coating Mfg.	Concrete Filler (flush)	Mfg. Products	Required Dry Film Thickness (Mils) **
SC-T4-ECF	Concrete Floors	AM07	Ameron	None	X00701 / Nu Klad 120A	1-2 / 40-60 = 41-62 mils
SC-T4-ECF	Concrete Floors	CA07	Carboline	None	Semstone 5401 / Semstone 140SL+SAND / 140SL	4-6 / 10-15 / 30-50 =44-71 mils
SC-T4-ECF	Concrete Floors	DE07	Devoe	Futura- Bond 320 Gel	Pre Prime 167/ Devmat 111	1-2 / 40-60 = 41-62 mils
SC-T4-ECF	Concrete Floors	DU07	Dudick	None	Primer 67 / Polymer Alloy 2500 FR	4-6 / 40-60 = 44-66 mils
SC-T4-ECF	Concrete Floors	IN07	International	Intercryl 320	Interseal 670HS / Interzone 954	2-4 / 45-55 = 47-59 mils
SC-T4-ECF	Concrete Floors	SW07	Sherwin Williams	Kem Cati-Cote HS or Steel-Seam FT910	Macropoxy 920 / Cor-Cote HP SL Mortar	1.5-2 / 38.5-58 = 40-60 mils
SC-T4-NCF	Concrete Floors	AM08	Ameron	None	X00701 / Nu Klad 120A / Amercoat 91	1-2 / 34-50 / 6-10 = 41-62 mils
SC-T4-NCF	Concrete Floors	CA08	Carboline	None	Semstone 5401 / 145SL+SAND / 145SL.	4-6 / 40-60 = 44-66 mils
SC-T4-NCF	Concrete Floors	DE08	Devoe	Futura- Bond 320 Gel	Pre Prime 167/ Devmat 111	1-1.5 / 40-60 = 41-61.5 mils
SC-T4-NCF	Concrete Floors	DU08	Dudick	None	Primer 67 / Polymer Alloy 2100 FR	4-6 / 40-60 = 44-66 mils
SC-T4-NCF	Concrete Floors	SW08	Sherwin Williams	Kem Cati-Cote HS or Steel-Seam FT910	Cor Cote HCR / Cor Cote HCR SL Mortar.	4-6 / 36-54 = 40-60 mils
SC-T2-ECW	Concrete Walls	AM15	Ameron	Nuclad 114A	Amerlock 400 / Amerlock 400	4-8 / 4-8=8-16 mils
SC-T2-ECW	Concrete Walls	CA15	Carboline	Semstone 195	Carbogard 1340 / Carbog890C705 / C890S800	1-2 / 4-5 / 4-5=10-14 mils
SC-T2-ECW	Concrete Walls	IN15	International	Intercyrl 320	Intergard 345 / 345 / 345	4-6 / 4-6 / 4-6=12-18 mils

WTP Concrete System Code	Surface Type	Appendix C Table 1 Mfg. System Code	Coating Mfg.	Concrete Filler (flush)	Mfg. Products	Required Dry Film Thickness (Mils) **
SC-T2-ECW	Concrete Walls	SW15	Sherwin Williams	Kem Cati-Cote HS or Steel-Seam FT910	Macropoxy 920 / Macropoxy 646 / Macropoxy 646	1-2 / 3-7 / 4 -7=8-16 mils
SC-T2-NCW	Concrete Walls	AM16	Ameron	Nu Klad 114A	Amercoat 91 / Amercoat 91	4-8 / 4-8=8-16 mils
SC-T2-NCW	Concrete Walls	CA16	Carboline	Semstone 195	Carbogard 1340 / Phenoline1205FR0700 / 1205FRS800	1-2 / 5-6 / 5-6=12-16 mils
SC-T2-NCW	Concrete Walls	IN16	International	Intercyrl 320	Intertherm 228 / 228 / 228	2-4 / 4-6 / 4-6=10-16 mils
SC-T2-NCW	Concrete Walls	SW16	Sherwin Williams	Kem Cati-Cote HS or Steel-Seam FT910	Macropoxy 920 / Phenicon HS / Phenicon HS /	1.5-2.0 / 3-7 / 4-7=8.5-16 mils

WTP Concrete System Code	Surface Type	Appendix C Mfg. System Code	Coating Mfg.	Steel Primer	Mfg. Products	Required Dry Film Thickness (Mils) **
SC-T4-ESE	Steel Embeds	CA19	Carboline	*Carbozinc 859	Carbogard 890 / 890	3-5 / 4-6 / 4-6 = 11-17 mils
SC-T4-ESE	Steel Embeds	IN19	International	*Interzinc 52	Intergard 475HS / 475HS	3-5 / 4-6 / 4-6 = 11-17 mils
SC-T4-ESE	Steel Embeds	SW19	Sherwin Williams	*Zinc Clad IV	Macropoxy 646 / 646	3-5 / 4-6 / 4-6 = 11-17 mils
SC-T4-ESE*	Steel Embeds	AM19	Ameron	*Amercoat 68HS	Amerlock 385 / 385	3-5 / 4-6 / 4-6 = 11-17 mils
SC-T5-NSE	Steel Embeds	AM20	Ameron	* Amercoat 68 HS	Amercoat 91 / 91	3-5 / 6-12 / 6-12 = 15-29 mils
SC-T5-NSE	Steel Embeds	CA20	Carboline	*Carbozinc 859	Phenoline1205 / 1205	3-5 / 5-6 / 5-6 =13-17 mils
SC-T5-NSE	Steel Embeds	IN20	International	*Interzinc 52	Intertherm 228 / 228	3-5 / 4-6 / 4-6 = 13-17 mils
SC-T5-NSE	Steel Embeds	SW20	Sherwin Williams	*Zinc Clad IV	Phenicon HS / Phenicon HS	3-5 / 6-8 / 6-8 = 16-21 mils***

NOTES TO APPENDIX C Table 2

* Note 1- This is a steel coating system shown on the room finish schedule for steel embedded in concrete and structural steel that requires the listed touch up primer and finish coating for chemical resistance. The steel coating system shall be from the same coating manufacturer as the concrete coating system.

** Note 2- The dry film thickness limitations listed in this column are based on testing to the NFPA 801-2003 and DOE STD 1066 flame spread and smoke developed requirements. The listed dry film thicknesses are the maximum allowed for wall coatings. The maximum total film thickness listed in this column includes the residual filler. Differences in dry film thickness from one coating manufacturer's system to another is due to NFPA 801 and DOE STD 1066 flame and smoke independent laboratory testing results.

*** Note 3- Using system SC-T5-NSE (SW20) from Sherwin Williams as an example, the required dry film thickness is determined by reading from left to right, the first coat is Zinc Clad IV applied at 3-5 mils, the slash separates the second coat which is Phenicon HS applied at 6-8 mils, the slash separates the third coat which Phenicon HS applied at 6-8 mils. An additional slash would define a fourth coat and so on. The total dry film thickness is listed after the equal sign.

Appendix D
Room Finish Schedule Drawing References

The tables below list the drawing numbers for the Architectural index and the Architectural Room Finish Schedules for each process facility. The latest issued revision of these drawings shall be used.

LAW DRAWING NO.	EL.	LAW DRAWING TITLE
24590-LAW-A0-A10T-00100001	--	LAW Vitrification Building Architectural Drawing Index
24590-LAW-A5-A19T-05200001	(-)21'	LAW Vitrification Building Architectural Room Finish Schedule EL (-)21'-0"
24590-LAW-A5-A19T-05200002	(-)21'	LAW Vitrification Building Architectural Room Finish Schedule EL (-)21'0"
24590-LAW-A5-A19T-05201001	0' & 3'	LAW Vitrification Building Architectural Room Finish Schedule EL 0'-0" & 3'-0"
24590-LAW-A5-A19T-05201002	3'	LAW Vitrification Building Architectural Room Finish Schedule EL 0'-0" & 3'-0"
24590-LAW-A5-A19T-05202001	15' & 22'	LAW Vitrification Building Architectural Room Finish Schedule EL 15'-0" & 22'-0"
24590-LAW-A5-A19T-05203001	28'	LAW Vitrification Building Architectural Room Finish Schedule EL 28'-0"
24590-LAW-A5-A19T-05204001	48'	LAW Vitrification Building Architectural Room Finish Schedule EL 48'-0"
24590-LAW-A5-A19T-05205001	68'	LAW Vitrification Building Architectural Room Finish Schedule EL 68'-0"

HLW DRAWING NO.	EL.	HLW DRAWING TITLE
24590-HLW-A0-A10T-00100001	--	HLW Vitrification Building Architectural Drawing Index
24590-HLW-A5-A19T-05200001	(-)21'	HLW Vitrification Building Architectural Room Finish Schedule EL (-)21'-0"
24590-HLW-A5-A19T-05200002	(-)21'	HLW Vitrification Building Architectural Room Finish Schedule EL (-)21'0"
24590-HLW-A5-A19T-05201001	0'	HLW Vitrification Building Architectural Room Finish Schedule EL 0'-0"
24590-HLW-A5-A19T-05201002	0'	HLW Vitrification Building Architectural Room Finish Schedule EL 0'-0"
24590-HLW-A5-A19T-05201003	0'	HLW Vitrification Building Architectural Room Finish Schedule EL 0'-0"
24590-HLW-A5-A19T-05202001	11'	HLW Vitrification Building Architectural Room Finish Schedule EL 11'-0
24590-HLW-A5-A19T-05202002	11'	HLW Vitrification Building Architectural Room Finish Schedule EL 11'-0"
24590-HLW-A5-A19T-05203001	30'	HLW Vitrification Building Architectural Room Finish Schedule EL 30'-0"
24590-HLW-A5-A19T-05204001	49', 62", 76'	HLW Vitrification Building Architectural Room Finish Schedule EL 49'-0" & 62'-0" & 76/-0"

PTF DRAWING NO.	EL.	PTF DRAWING TITLE
24590-PTF-A0-A10T-00100001	--	PTF Vitrification Building Architectural Drawing Index
24590-PTF-A5-A19T-05200001	(-)45'	PTF Vitrification Building Architectural Room Finish Schedule EL (-)45'-0"
24590-PTF-A5-A19T-05201001	0'	PTF Vitrification Building Architectural Room Finish Schedule EL 0'-0"
24590-PTF-A5-A19T-05201002	0'	PTF Vitrification Building Architectural Room Finish Schedule EL 0'-0"
24590-PTF-A5-A19T-05201003	0'	PTF Vitrification Building Architectural Room Finish Schedule EL 0'-0"
24590-PTF-A5-A19T-05202001	28'	PTF Vitrification Building Architectural Room Finish Schedule EL 28'-0"
24590-PTF-A5-A19T-05202002	28'	PTF Vitrification Building Architectural Room Finish Schedule EL 28'-0
24590-PTF-A5-A19T-05202003	28'	PTF Vitrification Building Architectural Room Finish Schedule EL 28'-0"
24590-PTF-A5-A19T-05203001	56'	PTF Vitrification Building Architectural Room Finish Schedule EL 56'-0"
24590-PTF-A5-A19T-05204001	77'	PTF Vitrification Building Architectural Room Finish Schedule EL 77'-0"
24590-PTF-A5-A19T-05205001	98'	PTF Vitrification Building Architectural Room Finish Schedule EL 98'-0"

Appendix E
Color Scheme

1.0 The finish coat on all steel items and equipment other than electrical shall be ANSI* 70 Gray or approved substitute to ANSI color standard. (*American National Standards Institute)

2.0 The finish coat on standard electrical components and cabinets shall be ANSI 61 Gray or approved substitute to ANSI color standard.

3.0 Floor coatings and sumps shall match Benjamin Moore color 2143-50 Old Prairie or approved substitute.

4.0 Wall coatings shall match Benjamin Moore color 2143-60 Moonlight White or approved substitute.

5.0 Floor coatings color shall transition over the standard coving and up the wall 6". The thickness on the floor/wall coving and wall above the floor coating shall match the wall coating thickness. For gypsum board walls refer to drawing 24590-WTP-A3-A10T-04200002, WTP process Building Architectural Common Interior Wall Details, using detail #4, Detail for typical rated wall base at concrete floor.

Appendix F
Coating Manufacturer's Product Identity Certification Record

Project Name: _____ Coating Manufacturer: _____
Project Number: _____ Purchase Order Number: _____
Project Location: _____ Contract Number: _____
Coating Applicator: _____ Generic Coating Type: _____
Product Name: _____ Product Number: _____

(For multi-component products, provide data for all components. Provide the standard range and actual batch values for each test)

TEST RESULTS		Component A Batch No.		Component B Batch No.	
Test	**Test Method Used**	**Standard Range**	**Batch Actual**	**Standard Range**	**Batch Actual**
Weight per Gallon					
Viscosity					
Flash Point (Typical)					
% Solids by volume (Typical)					
Cure to recoat time @ 60F, 70F, 80F & 90F (Mfg. recommended)					
Batch Size					
Date of Mfg.					
Shelf Life (months)					
Expiration Date					

COMMENTS:

I hereby certify that the coating materials described above were manufactured with the same formulation, raw materials, production methods, and quality control standards as the coating materials originally tested and/or accepted for use at the River Protection-Waste Treatment Plant (WTP) Project site, located in the 200 East Area of the Hanford Site in Washington State in accordance with the requirements of Specifications 24590-WTP-3PS-AFPS-T0001, 24590-WTP-3PS-AFPS-T0003, 24590-WTP-3PS-AFPS-T0004 & 24590-WTP-3PS-AFPS-T0006.

Signed: _____ Date: _____
Title: _____ Company: _____

Appendix G
Surface Preparation and Coating Inspection Form

Page __ of ___

REPORT NO:_____ DATE: _____
PROJECT:_____ DAY: M T W T F S S
SUBCONTRACTOR:_____ SHIFT: _____
EQUIPMENT/AREA:_____ INSPECTOR: _____
SUBSTRATE: STEEL/CONCRETE/OTHER- _____ COATING SPEC NO/REV:_____
ENVIRONMENTAL CONDITIONS:

WORK ACTIVITY						
TIME						
DRY BULB TEMP. °F						
WET BULB TEMP. °F						
RH %						
DEW POINT °F						
SURFACE TEMP. °F						
BLOTTER TEST						

PRE-SURFACE PREPARATION:
SP-1:_____ MASKING/PROTECTION:_____ SURFACE DEFECTS:_____

SURFACE PREPARATION:
METHOD:_____ ABRASIVE TYPE/SIZE/STORAGE:_____
RECYCLED ABRASIVE OIL FLOATATION TEST:_____ABRASIVE CONDUCTIVITY TEST:_____
CLEANLINESS SPEC:_____ ACTUAL:_____PROFILE SPEC:_____ ACTUAL:_____
EQUIPMENT:_____

COATING MATERIALS & MIXING:
PRODUCT(S)_____
BATCH NO(S)/QUANTITIES/EXPIRATION DATE:_____/_____/_____
THINNERS/BATCH NO(S)/THINNING RATIO:_____/_____/_____
STORAGE:_____ MIXING: _____ INDUCTION TIME:_____
MATERIAL TEMPERATURE:_____ POT LIFE EXPIRATION TIME:_____
COATING/LINING APPLICATION START TIME:_____ FINISH TIME:_____
COAT: PRIMER/PRIMER T.U./SECOND/SECOND T.U./THIRD/THIRD T.U./OTHER
METHOD:_____ WFT:_____ RECOAT TIME/TEMP:_____ CURE TIME/TEMP:_____
EQUIPMENT:_____

APPLIED COATING:
VISUAL INSPECTION (FILM IMPERFECTIONS):_____
DRY FILM THICKNESS: SPEC:_____ ACTUAL:_____ METHOD:_____
HOLIDAY TEST:_____ METHOD:_____ OTHER TESTING:_____ METHOD:_____
TOUCH-UP AND REPAIR:_____ FINAL CURE:_____

COMMENTS: (*Use reverse side or attach extra pages*)

_____/_____
INSPECTOR'S SIGNATURE/DATE

Appendix H
Manufacturer's Standard Coating Data Sheet

The SUBCONTRACTOR proposes the following Manufacturer's Standard (Mfg. Std.) or alternate coating system that is suitable for the exposure conditions of steel items and equipment in radiation and non-radiation areas.

1. **Equipment Description:** _____
   A. Tag Number _____
   B. Part(s) i.e. skirt, shell, channels, lugs, etc.* _____
   C. Design/Operating Temperatures, designate °F or °C..... _____ °F _____ °C
   D. Does Equipment Receive Steam out (Yes/No), Temperature _____ °F _____ °C
   E. Insulated/Uninsulated _____
   F. Fireproofing (Yes/No) _____
   G. Carbon Steel (CS), Stainless Steel (SS), other (List) _____
2. **SUBCONTRACTOR:**
3. **Surface Preparation:** SSPC No./Profile _____ / _____
4. **Coating System Designation:** (Code)

	First Coat	Second Coat	Third Coat
A. Type of Coating.....			
B. Coating Mfg./No.**			
C. Dry Film Thickness (Min/Max in mils)/(μm) ...			
D. Wet/Film Thickness (Min/Max in mils)/(μm)			
E. Curing Method.....			
F. Color.....			
G. Dry to Recoat			
H. Pot Life.....			
L. Thinner / %			

5. **Total DFT of System:** (Mils/μm)(Min/Max)..... _____ / _____ Min. _____ /Max.
6. **Material Storage:** Temperature Requirements (Min/Max) _____ / _____
7. **Shelf Life:**..... _____ Months
8. **Application Environmental Limits:**
   A. Temperature Ambient and Surface (Min/Max)..... _____ / _____ _____ / _____
   B. Humidity (Min/Max)..... _____ / _____
   C. Dew Point ≥5°F above surface temp. (Yes/No)..... _____
9. **Protection of surfaces that will be inaccessible after equipment installation (such as underside of base plates, interior of fans, vessels or equipment housings)** _____
10. **Rust Preventative for machined faces:** (**Mfg./No.) _____
11. **Quantity of touch-up coating supplied:** _____
12. **Additional information:** (attach extra page as necessary) _____

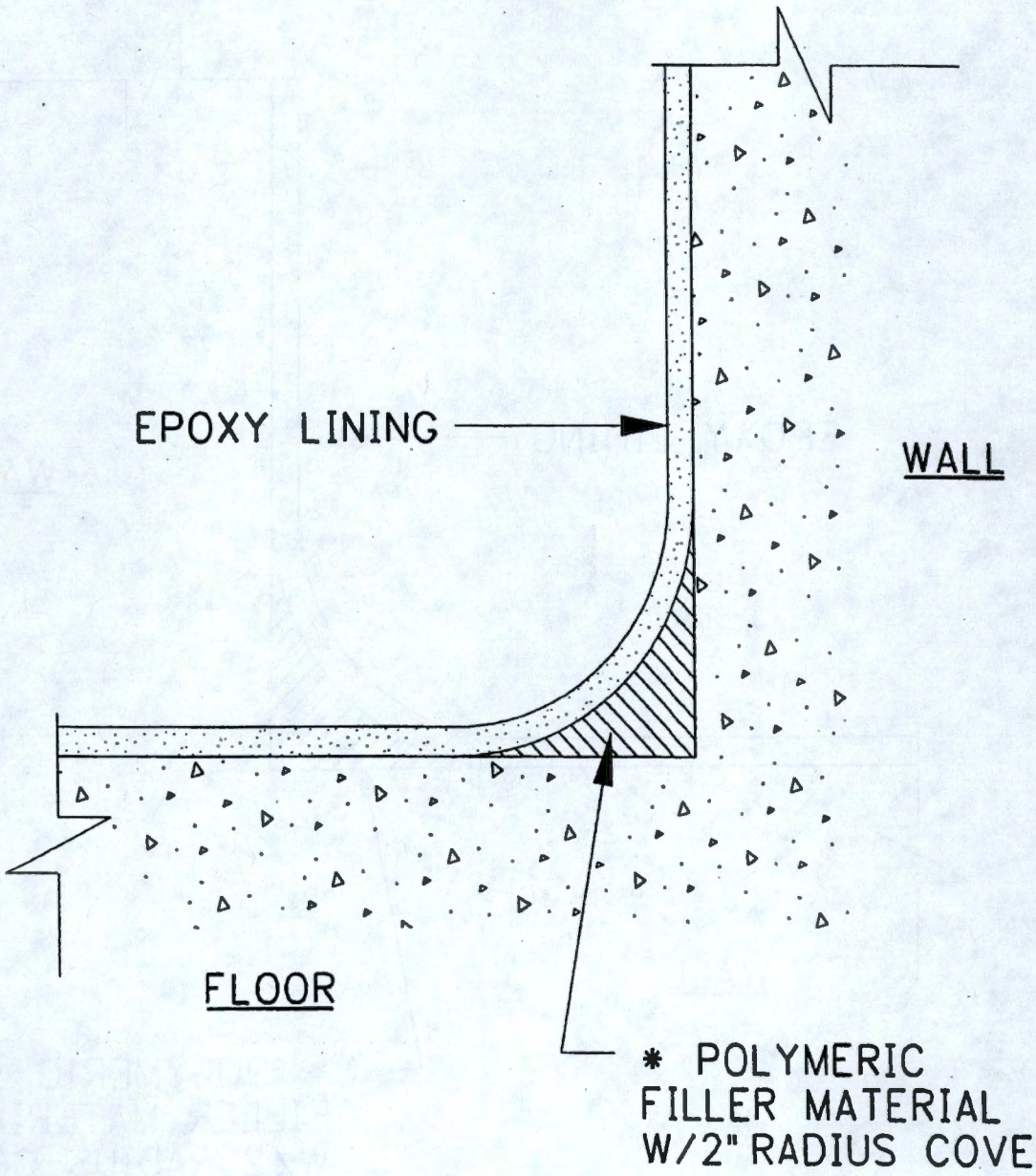
* Use additional copies of this form for each part described in 1 above that requires a different coating system. A completed copy of this data sheet shall be submitted to CONTRACTOR with the initial vendor data submittal.

** Include manufacturer's technical data sheets and MSDS' for each proposed coating, preservative & solvent

Appendix I- Secondary Containment Installation Typical Details

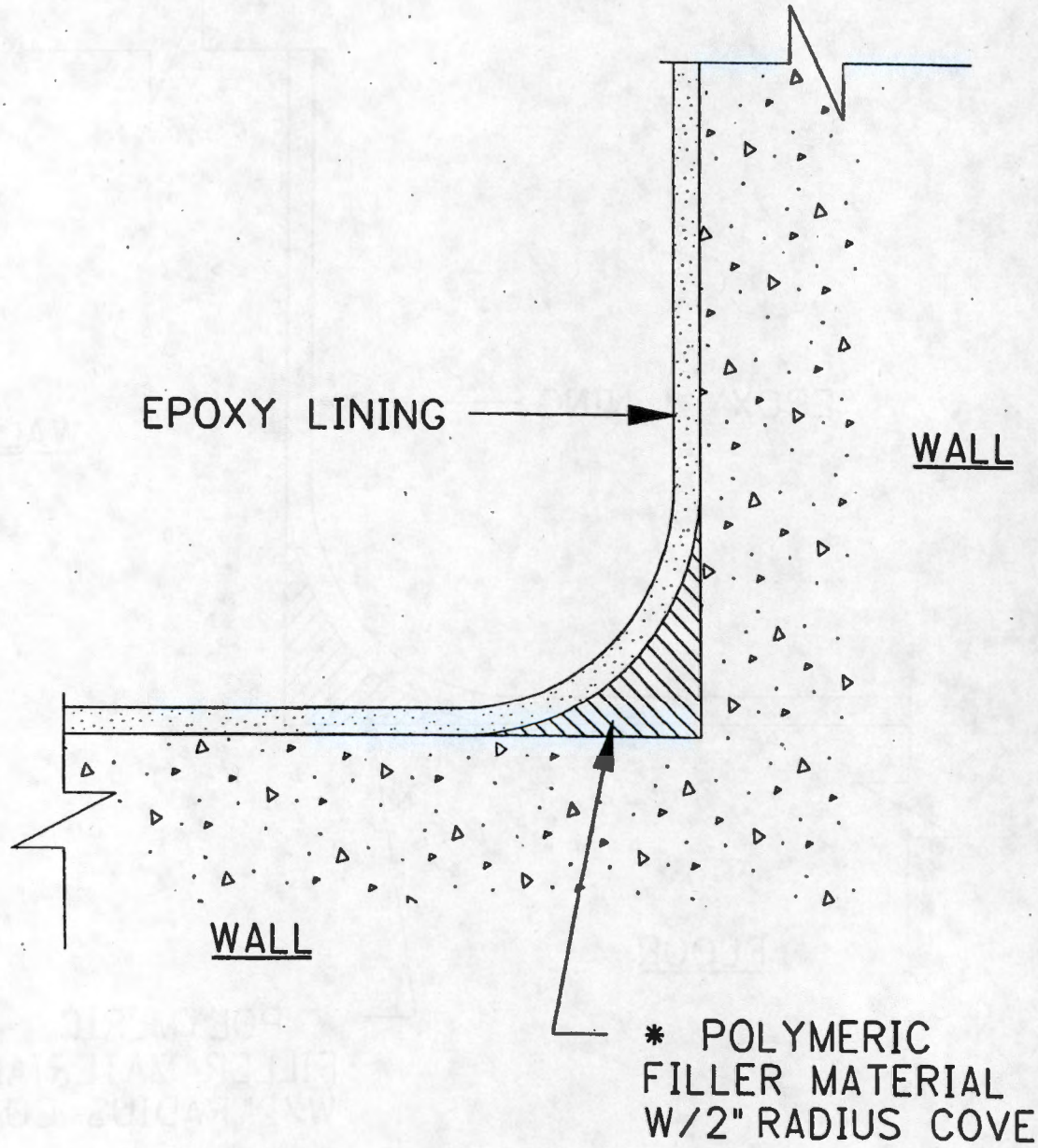
- **Installation Detail 1A-Floor /Wall Junction**
- **Installation Detail 1B-Wall/Wall Junction**
- **Installation Detail 2A-Reinforced Floor/Wall Junction**
- **Installation Detail 2B-Reinforced Wall/Wall Junction**
- **Installation Detail 3-Control Joint**
- **Installation Detail 4-Crack Repair**
- **Installation Detail 5A-Embed Plates without Steel Attachment**
- **Installation Detail 5B-Embed Plates with Steel Attachment**
- **Installation Detail 6-Perimeter Key**
- **Installation Detail 7-Floor or Wall Steel Embed With Stainless Steel Plate Overlay**

INSTALLATION DETAIL 1A - FLOOR/WALL JUNCTION



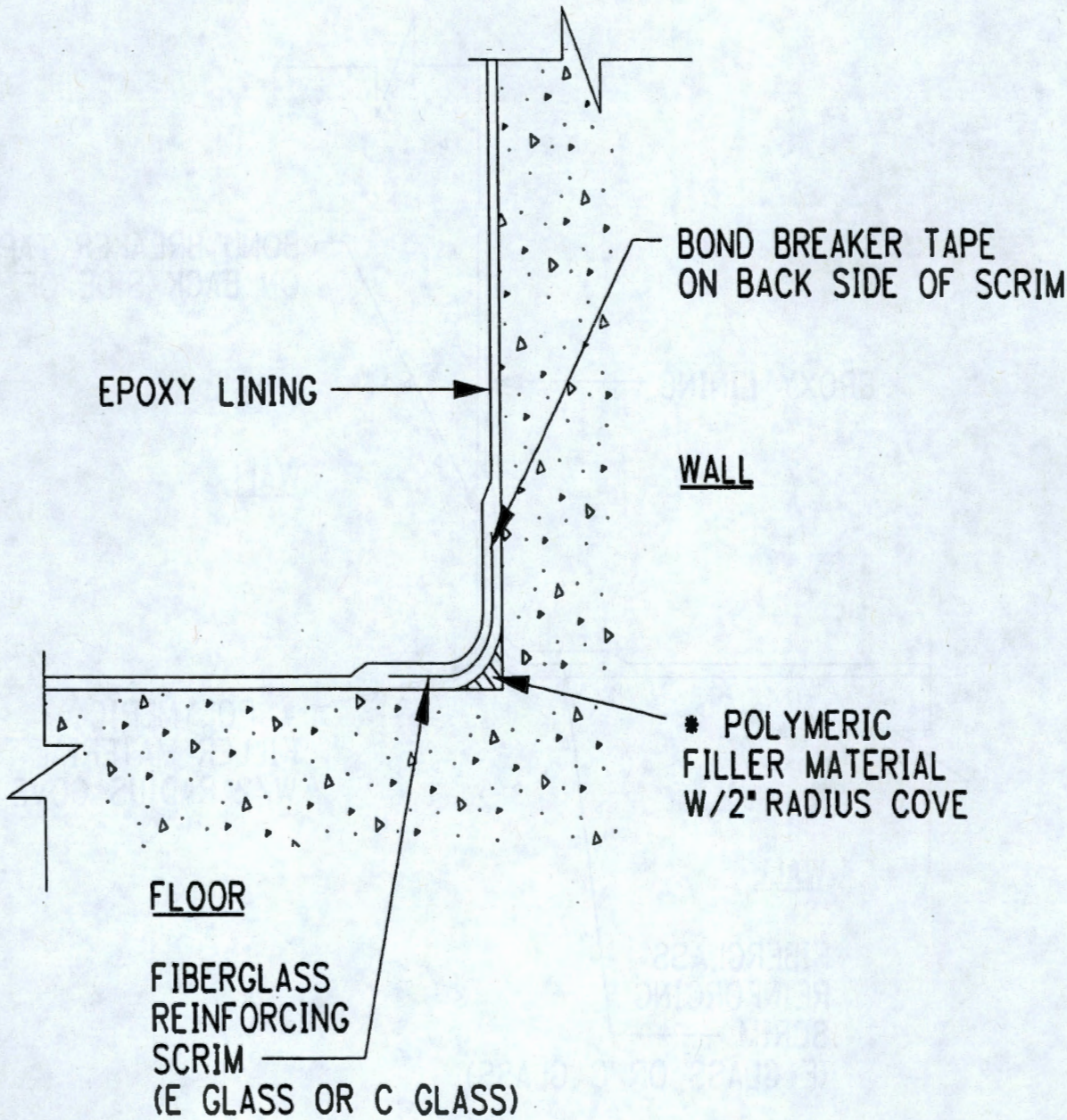
* REFER TO SPEC SECTION 6.2.1.2

INSTALLATION DETAIL 1B - WALL/WALL JUNCTION



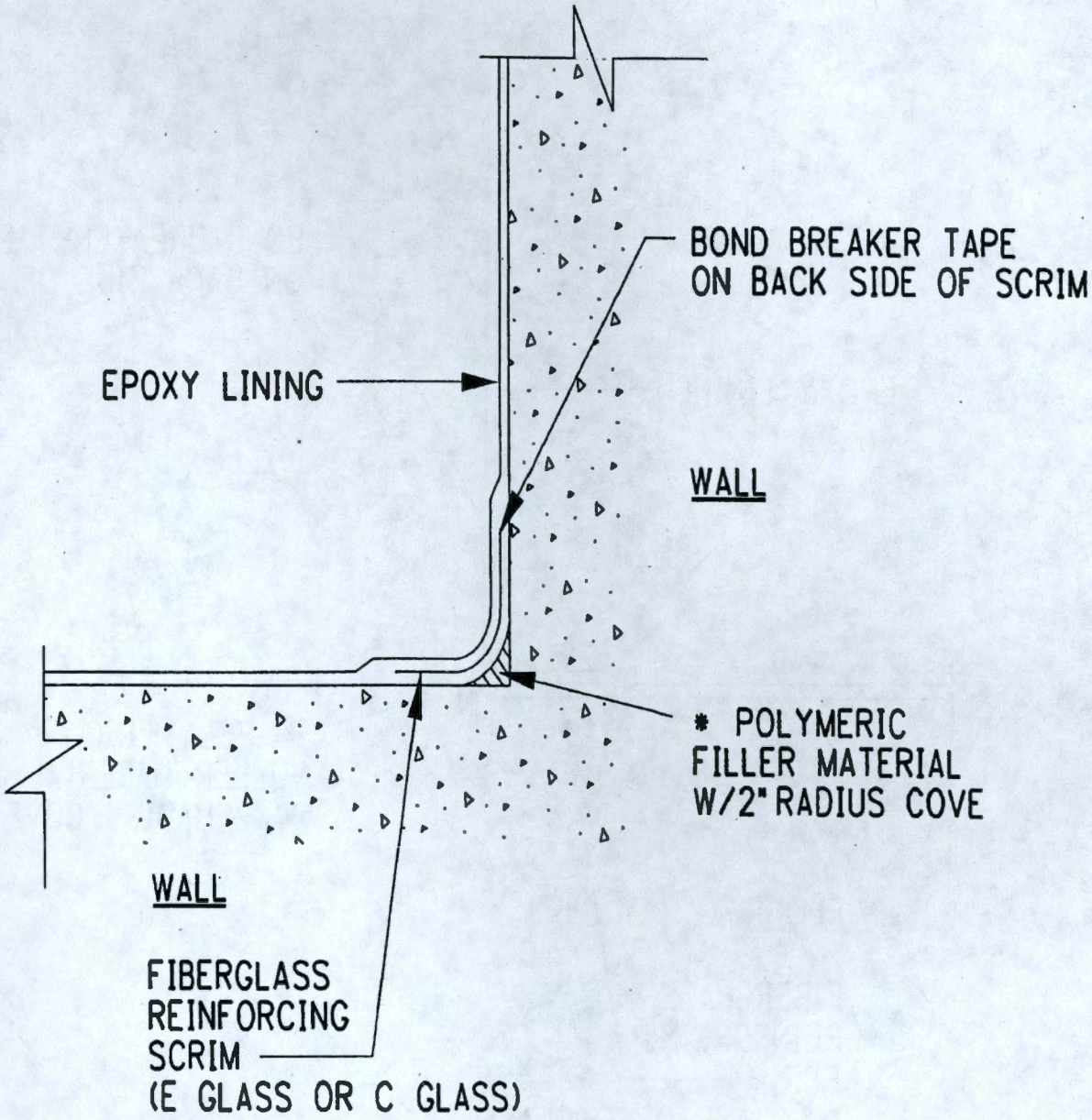
* REFER TO SPEC SECTION 6.2.1.2

INSTALLATION DETAIL 2A - REINFORCED FLOOR/WALL JUNCTION



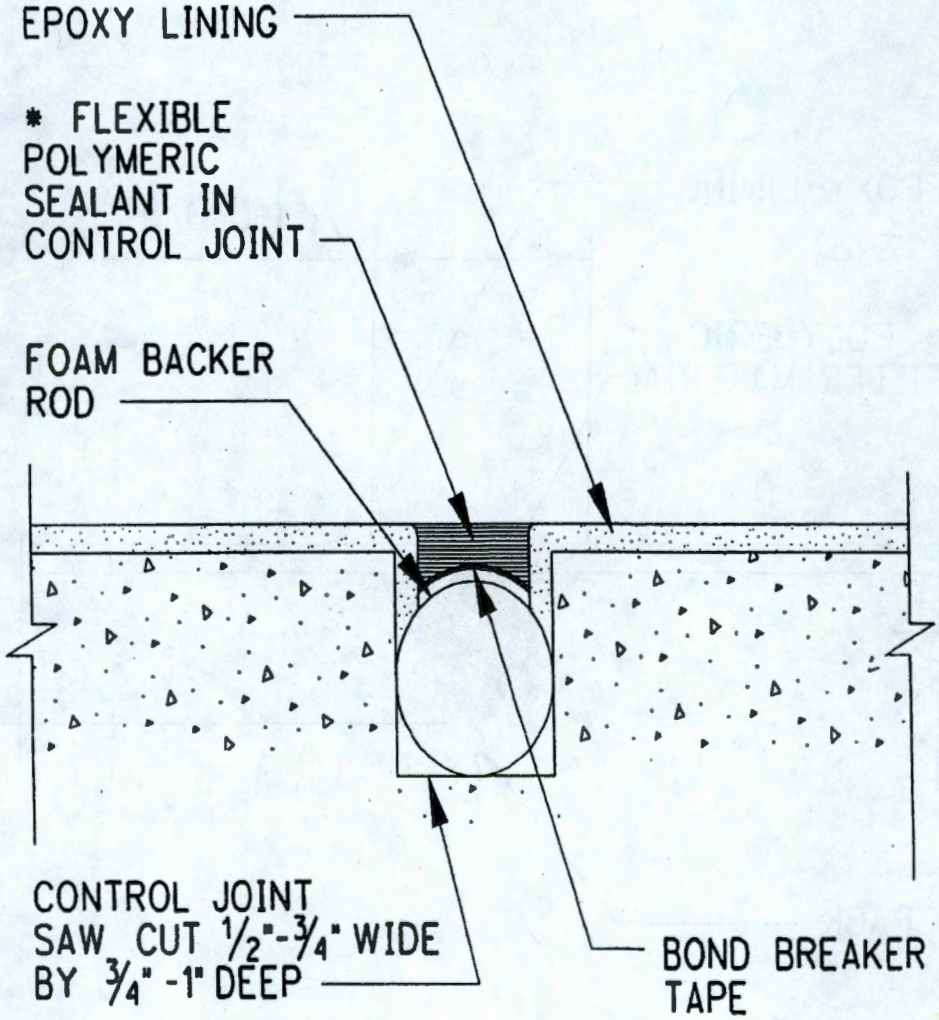
* REFER TO SPEC SECTION 6.2.1.2

INSTALLATION DETAIL 2B - REINFORCED WALL/WALL JUNCTION



* REFER TO SPEC SECTION 6.2.1.2

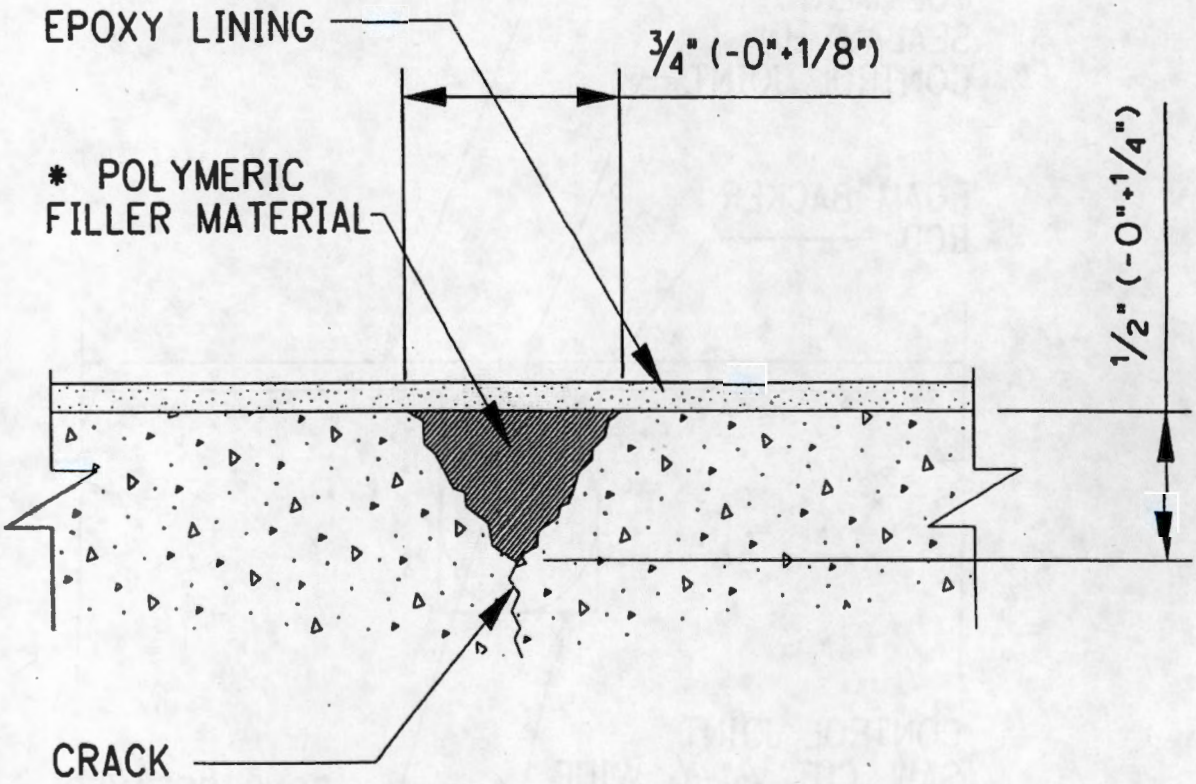
INSTALLATION DETAIL 3 - CONTROL JOINT, NO CRACK FAILURE



* REFER TO SPEC SECTION 6.2.1.4

CONCRETE FLOOR/WALL

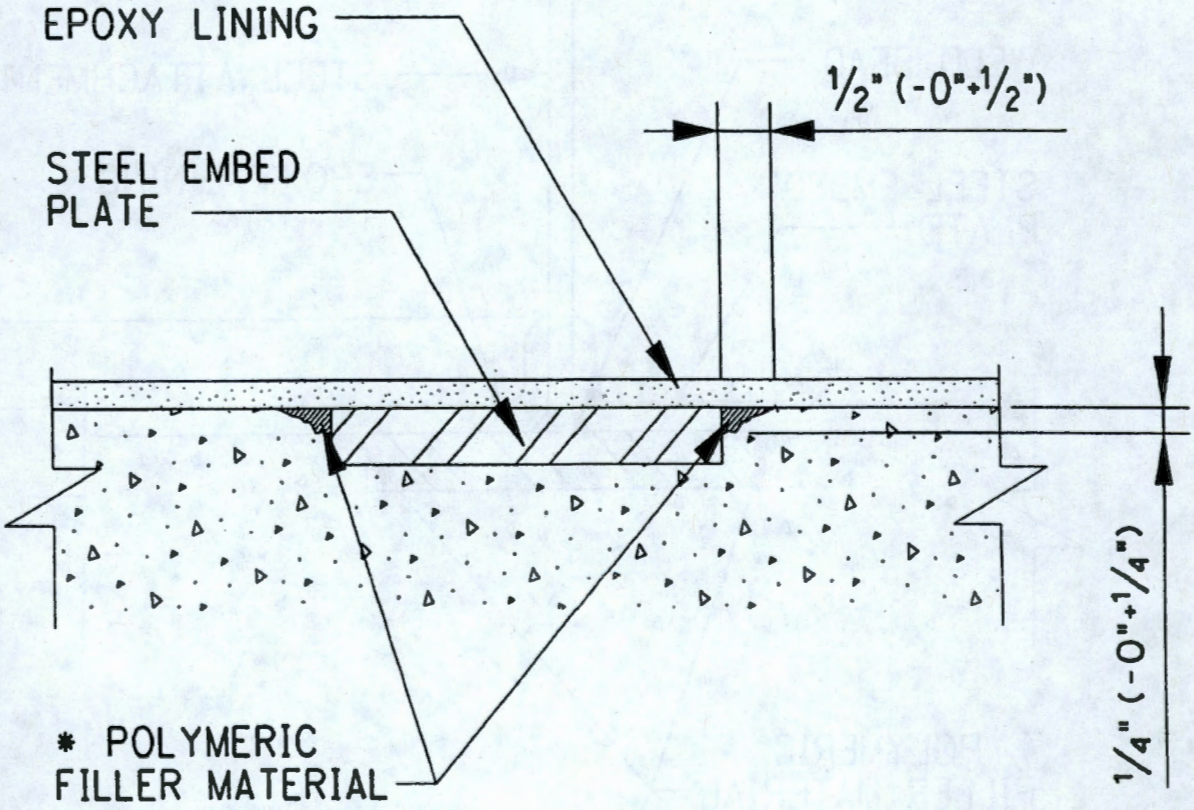
INSTALLATION DETAIL 4 - CRACK REPAIR



* REFER TO SPEC SECTION 6.2.1.2

CONCRETE FLOOR/WALL

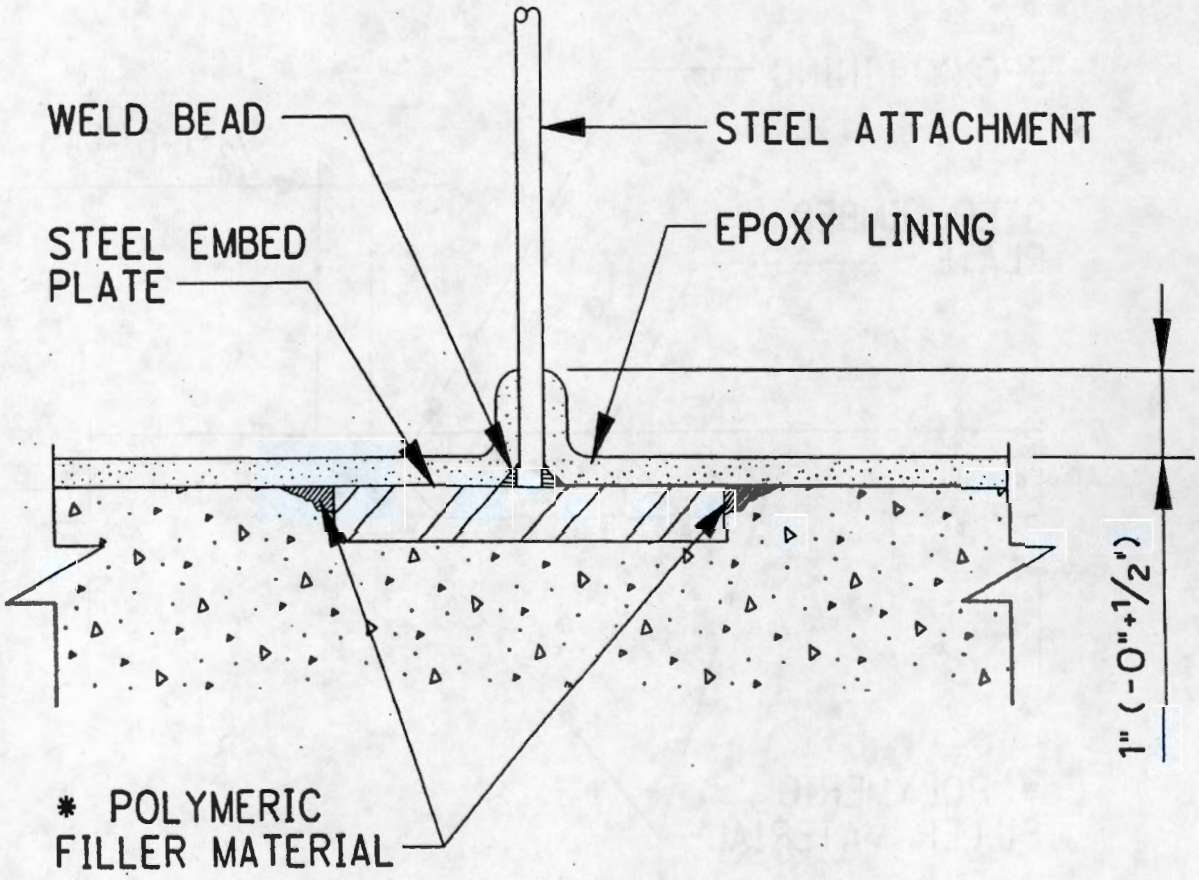
INSTALLATION DETAIL 5A - EMBED PLATES WITHOUT STEEL ATTACHMENT



* REFER TO SPEC SECTION 6.2.1.2

CONCRETE FLOOR/WALL

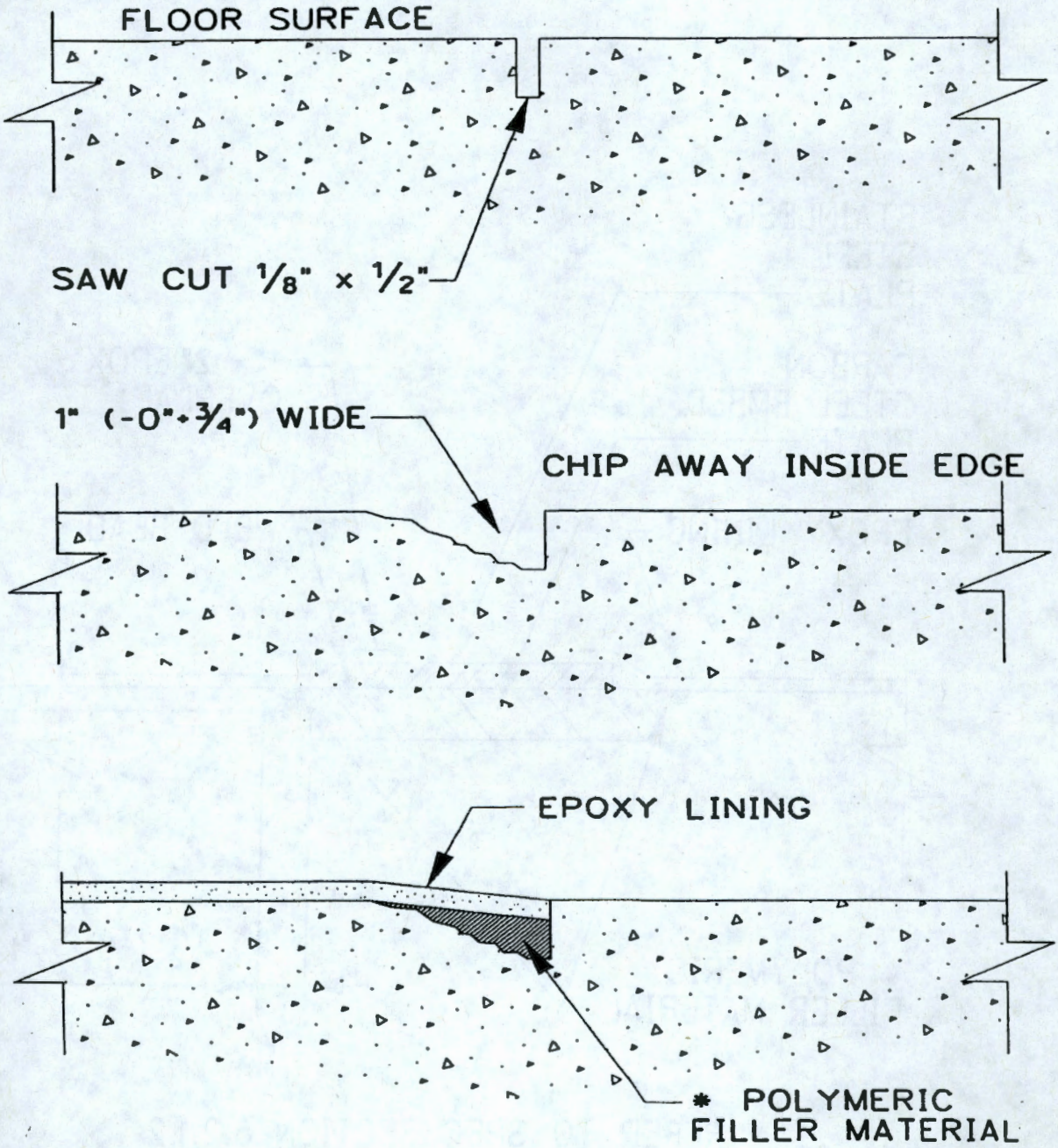
INSTALLATION DETAIL 5B - EMBED PLATES WITH STEEL ATTACHMENT



* REFER TO SPEC SECTION 6.2.1.2

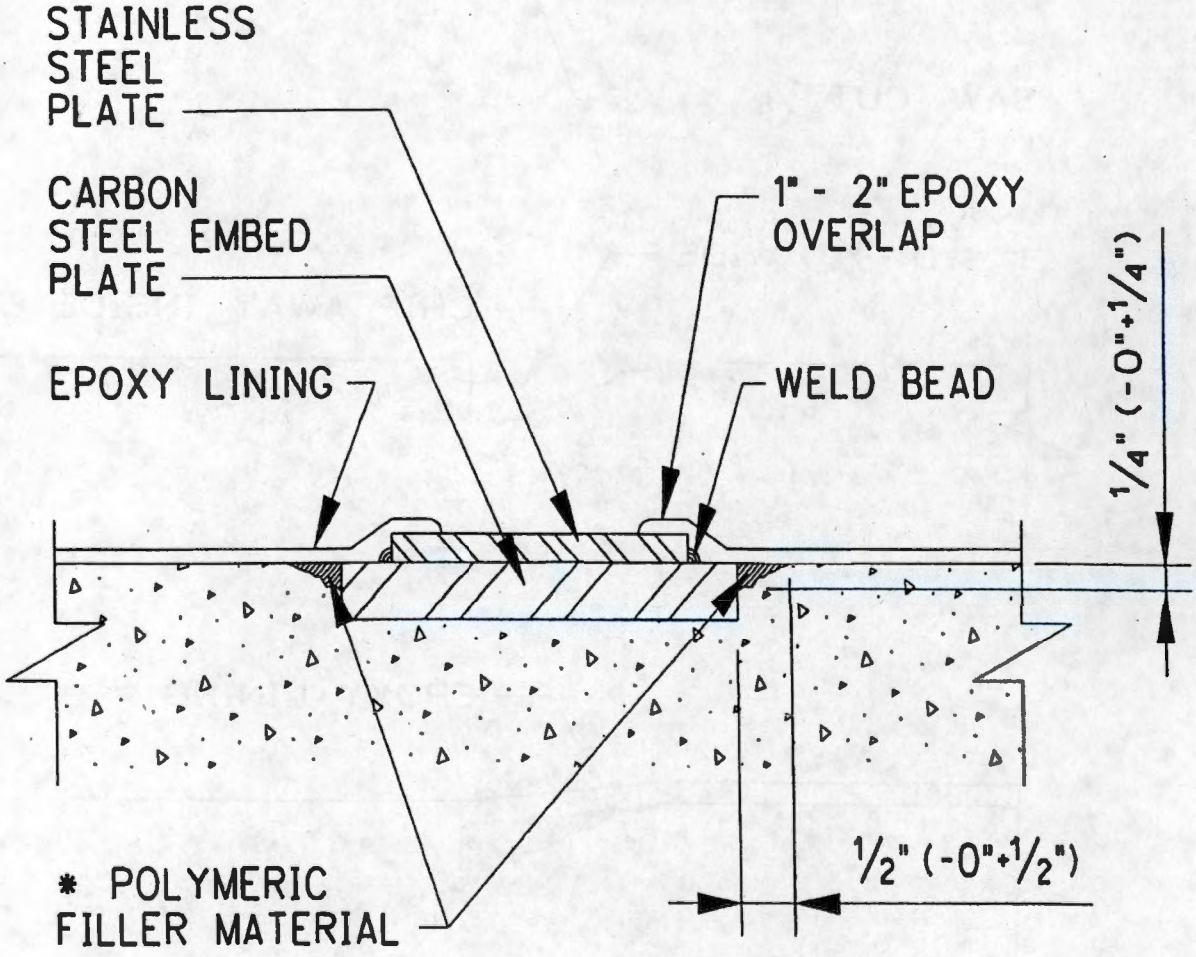
CONCRETE FLOOR/WALL

INSTALLATION DETAIL 6 - PERIMETER KEY



* REFER TO SPEC SECTION 6.2.1.2

INSTALLATION DETAIL 7 - FLOOR OR WALL STEEL EMBED WITH STAINLESS STEEL PLATE OVERLAY



* REFER TO SPEC SECTION 6.2.1.2

CONCRETE FLOOR/WALL