

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493
	Revision*: 6
	Page: 1 of 20

INTEC	Technical Procedure	For Additional Info: http://EDMS	Effective Date: 11/06/12
-------	---------------------	---	--------------------------

Manual: INTEC FSV3

USE TYPE 1Change Number: 337592

*The current revision can be verified on EDMS.

1. INTRODUCTION

1.1 Purpose

To alleviate possible explosive conditions occurring inside the Fuel Storage Containers (FSC) during handling by sampling the internal space for combustible gas and, when necessary, vacuum purging the void volume of the containers.

1.2 Scope and Applicability

Fort St. Vrain (FSV) graphite fuel elements stored in the Fuel Storage Containers (FSC) may produce combustible hydrogen or acetylene from radiolysis. This procedure provides instructions to perform combustible gas sampling and vacuum purging of a FSC internal space. Due to the design of the sample/purge system, this procedure tests only one FSC at a time.

2. PRECAUTIONS AND LIMITATIONS

NOTE: *Personal protective equipment (PPE) will be indicated in the RWP as necessary.*

- 2.1 Personnel must follow the applicable hazard mitigations detailed in Appendix C, "Procedure Hazard Analysis."
- 2.2 A Radiation Work Permit (RWP) is required when performing this procedure on a FSC containing spent fuel.
- 2.3 RCT must monitor HEPA filter for radiation when performing this procedure on a FSC containing spent fuel. HEPA filter must be replaced per RWP requirements.
- 2.4 When connected to an FSC containing spent fuel, the sample or purge system must be continuously attended by a Certified Fuel Handler.
- 2.5 Smoking or open flames must NOT be allowed during sampling or purging operations.

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 2 of 20
--	---

3. PREREQUISITES

3.1 Planning and Coordination

Initial/Date

_____ 3.1.1 ISFSI Manager: Ensure the following personnel are available:

2 Certified Fuel Handlers (CFH)
1 radiological control technician (RCT)
OR
1 radiological control monitor (RCM)
1 Quality Inspector (QI)

_____ 3.1.2 ISFSI Manager: Specify the FSC to be sampled or purged.

FSC location: _____

_____ 3.1.3 ISFSI Manager: Conduct a pre-job briefing per MCP-3003, “Performing Pre-Job Briefings and Documenting Feedback.”

_____ 3.1.4 Ensure the training requirements in Appendix C are met.

_____ 3.1.5 Facility Safety Officer: IF performing this procedure on a FSC containing spent fuel, THEN ensure an RWP has been issued for this task.

_____ 3.1.6 Ensure adequate access/egress pathways are established.

_____ 3.1.7 ISFSI Manager: Ensure revision number of this procedure is the current issue.

3.2 Performance Documents

3.2.1 ICP Forms:

- A. Form 433.24, “Task Evolution Feedback Form” (if used)
- B. Form 434.14, “Pre-Job Briefing Checklist”
- C. Form 434.15, “Pre-Job Briefing Attendance Record” (if used)
- D. Form 441.49, “ICP Radiation Work Permit” (if used).

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 3 of 20
--	---

3.3 Special Tools, Equipment, Parts, and Supplies

√	Item	No.	Comments
	Approved extension cord with GFCI protection	1	As needed
	Seal plug removal tool	1	DWG 362A0210, Item 1
	iTX Gas Detector (see Appendix A, Figure 1)	1	Equipment ID No.: _____ Calibration Due Date: _____
	iTX Water Stop(see Appendix A, Figure 1)	1	
	ISP pump (see Appendix A, Figure 1)	1	For use with iTX gas detector.
	Calibration Gas (For bump test) Hydrogen	1	Lot number _____ Expiration Date _____ Gas type and concentration _____ Accuracy _____
	Sample tubing and connector(s)	Per figure 1	For installation of the Gas Analyzer
	HEPA Filters (see Appendix A, Figure 1)	2	
	Vacuum purge tool assembly including gauges (see Appendix A, figure 1)	1	G-1 - Equipment ID: _____ Calibration Due Date: _____ G-2 - Equipment ID: _____ Calibration Due Date: _____
	Vaseline	A/R	
	O-ring for the vacuum purge tool (end seal)	1	(Quality level 3, Bill of Material 510157/34 or 362P0210/8 or equivalent)

3.3.1 ISFSI Manager: Verify that the equipment and tools listed in the table above are in current calibration and that the calibration information has been recorded.

Signature

Date

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 4 of 20
--	---

3.4 Field Preparations

Initial/Date

_____ 3.4.1 Record date that the internal O-rings in the vacuum purge tool were last replaced.

DATE: _____

_____ 3.4.2 IF the internal O-rings in the vacuum purge tool have NOT been replaced in the last 12 months,
OR the ISFSI Manager directs the O-rings to be replaced,
THEN replace O-rings as follows:

_____ 3.4.2.1 Ensure the following are available:

Quantity	Description
2	O-rings for vacuum purge tool (internal seals) (Quality Level 3, Bill of Material 362P0210/9) QA No: _____ OR O-rings for vacuum purge tool (internal seals) (Quality Level 3, Bill of Material 510157/33) QA No: _____
A/R	“Loctite 222 Screwlock” or equivalent
1	Calibrated torque wrench capable of torquing to 10.5 ft · lbs (126 in. · lb). Upper range of torque wrench _____ Calibration due date: _____ ID no.: _____
A/R	Replacement cap-screws, ¼ -20 UNC × 7/8 inch (Consumer Grade)

3.4.2.2 QI: Verify the O-rings have a QA acceptance tag and the QA number has been correctly recorded.

_____ Signature _____ Date

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 5 of 20
--	---

3.4.2.3 Ensure the internal O-rings are replaced and the vacuum purge tool is assembled per Drawing 510157 and GEC Alsthom Technical Specification 362F0336, and the following was done:

- A. “Loctite 222 Screwlock” or equivalent was applied to the cap-screws prior to assembly.
- B. Cap-screws were torqued to 10.5 ft • lb (126 in. • lb).

Signature Date

3.5 Approval and Notifications

3.5.1 FSV ISFSI Manager: Verify prerequisites completed.

FSV ISFSI Manager: _____

Signature Date

3.5.1.1 Log the procedure in the FSV Daily Operations Log and release it to commence work.

**FORT ST. VRAIN FUEL STORAGE CONTAINER GAS
SAMPLE/VACUUM PURGE PROCEDURE**

Identifier: TPR-6493

Revision*: 6

Page: 6 of 20

4. INSTRUCTIONS

NOTE 1: *Unless otherwise designated in front of step, a CFH is the person performing the steps.*

NOTE 2: *Section 4.1 may be performed concurrently with Section 4.2.*

NOTE 3: *For training purposes, the use of the Test Tank Assembly (Drawing 510839) may be used in lieu of a FSC.*

NOTE 4: *Steps that are not required may be marked “N/A”.*

4.1 Install the Vacuum Purge Tool.

Initial/Date

WARNING

Failure to follow RWP requirements could result in spread of contamination outside a controlled area and/or personnel contamination.

NOTE 1: *Step 4.1.1 may be performed concurrently with Steps 4.1.2 and 4.1.3.*

NOTE 2: *The FSC inner volume port faces east.*

_____ 4.1.1 RCT/RCM: Perform a radiation or contamination survey of the plugs as they are removed and a radiation survey of the port with the plugs removed.

_____ 4.1.2 Remove the test plug from the inner volume port in the shield plug.

CAUTION

Failure to properly seat the seal plug in the seal plug removal tool could result in dropping the seal plug causing damage to equipment.

_____ 4.1.3 Remove the seal plug from the FSC lid using the seal plug removal tool.

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 7 of 20
--	---

- _____ 4.1.4 Examine the vacuum purge tool (end seal) O-ring for wear or damage.
- 4.1.4.1 IF replacing the O-ring,
THEN replace the vacuum purge tool (end seal) O-ring with
(Bill of Material 362P0210/8, or 510157/34, or an
equivalent).

- _____ 4.1.4.1.1 QI: Verify that the O-rings have a QA
acceptance tag and record the QA number
below.

QA No: _____

Signature Date

- _____ 4.1.5 Verify that valves V-1 and V-2 on the vacuum purge tool are closed.
- _____ 4.1.6 Verify that the thread control screw is in the backed out
counter-clockwise position.
- _____ 4.1.7 Thread vacuum purge tool into the FSC inner volume port.

NOTE: *Once started, the iTX analyzer may be left on through the whole series of
samples or as directed by the ISFSI Manager.*

- 4.2 Start the iTX analyzer.
- _____ 4.2.1 Insert the iTX into the pump.
- _____ 4.2.2 Press and hold the on button until it beeps.
- _____ 4.2.3 Set the iTX analyzer to the zero mode and zero the instrument.
- 4.3 Perform a bump test, to test the LEL sensor to hydrogen gas.
- _____ 4.3.1 Remove the iTX from the pump.
- _____ 4.3.2 Attach iTX to bump test tubing.
- _____ 4.3.3 Open regulator.
- _____ 4.3.4 Check that the sensors are responding to the calibration gas.
- _____ 4.3.5 Set iTX mode to PPM.

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 8 of 20
--	---

- _____ 4.3.6 Monitor the iTX reading for approximately 2 minutes (purge time).
- 4.3.5.1 WHEN the iTX shows no increasing trend for approximately 1 minute
THEN consider the iTX bump test complete.
- 4.3.7 Record iTX temperature and hydrogen concentration (PPM) from bump test

	ppm		
ITX Temperature Reading	iTX reading (Gas Sensor)	Signature	Date

- _____ 4.3.8 Close regulator.
- _____ 4.3.9 Remove iTX from bump test tubing.
- _____ 4.3.10 Verify that the iTX bump-test result is within +/- 1000 PPM of the hydrogen standard.

_____ Signature _____ Date

- 4.3.11 IF iTX test is NOT within range, THEN do the following:
- _____ 4.3.11.1 Return iTX to calibration lab for calibration.
- _____ 4.3.11.2 Notify the facility manager.
- _____ 4.3.12 Set the iTX analyzer to peaks mode and clear the peaks.
- 4.4 Evacuate the FSC and Obtain a Gas Measurement as follows:
- NOTE:** *Additional spaces are for recording and verifying repeats.*
- _____ 4.4.1 IF NOT already configured, THEN configure the sample or purge equipment as shown in Figure 1.
- Initials: Repeat 1 _____ Repeat 2 _____ Repeat 3 _____
- _____ 4.4.2 IF NOT already done, THEN thread control screw clockwise to open check valve in the inner volume port.

<p>FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE</p>	<p>Identifier: TPR-6493 Revision*: 6 Page: 9 of 20</p>
---	--

_____ 4.4.3 Open valve V-1.
Initials: Repeat 1 _____ Repeat 2 _____ Repeat 3 _____

_____ 4.4.4 Insert iTX into pump.

_____ 4.4.5 Evacuate the FSC until the pump low flow alarm sounds or a vacuum of
_____ 50 inches of water is reached.
Initials: Repeat 1 _____ Repeat 2 _____ Repeat 3 _____

_____ 4.4.6 Close valve V-1.
Initials: Repeat 1 _____ Repeat 2 _____ Repeat 3 _____

===== 4.4.7 Remove the iTX from the pump.
Initials: Repeat 1 _____ Repeat 2 _____ Repeat 3 _____

_____ 4.4.8 Monitor vacuum pressure, using G-2, for 4 minutes and ensure that loss
of vacuum is less than or equal to 1 inch of water.
Initials: Repeat 1 _____ Repeat 2 _____ Repeat 3 _____

_____ 4.4.9 IF vacuum loss is greater than 1 inch of water,
THEN notify facility manager.
Initials: Repeat 1 _____ Repeat 2 _____ Repeat 3 _____

4.4.10 Record and verify peak flammable gas concentration.
_____ Peak flammable gas concentration (%LEL)

_____ Signature _____ Date _____

Repeat 1
_____ Peak flammable gas concentration (%LEL)

_____ Signature _____ Date _____

Repeat 2
_____ Peak flammable gas concentration (%LEL)

_____ Signature _____ Date _____

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 10 of 20
--	--

Repeat 3

_____ Peak flammable gas concentration (%LEL)

_____ Signature _____ Date

4.4.11 Calculate and record peak flammable gas concentration in PPM using below formula

$$PPM = (5000 \times \%LEL) / 36$$

_____ Peak flammable gas concentration (PPM)

_____ Signature _____ Date

Repeat 1

_____ Peak flammable gas concentration (PPM)

_____ Signature _____ Date

Repeat 2

_____ Peak flammable gas concentration (PPM)

_____ Signature _____ Date

Repeat 3

_____ Peak flammable gas concentration (PPM)

_____ Signature _____ Date

_____ 4.4.11.1 Open valve V-2 until gauge G-2 reads 0 inches of water.

_____ 4.4.11.2 Close valve V-2.

_____ 4.4.11.3 Set the iTX analyzer to peaks mode and clear the peaks.

_____ 4.4.11.4 IF PPM recorded is greater than 9000,
THEN do the following:

_____ 4.4.11.4.1 Wait 15 minutes.

_____ 4.4.11.4.2 Repeat Steps 4.4.1 through 4.4.11.

**FORT ST. VRAIN FUEL STORAGE CONTAINER GAS
SAMPLE/VACUUM PURGE PROCEDURE**

Identifier: TPR-6493

Revision*: 6

Page: 11 of 20

- _____ 4.4.11.5 Close the check valve in FSC inner volume port by unscrewing the top nut on the test probe until it is fully released.
- 4.5 WHEN FSC sampling is completed for the day,
THEN do the following:
- _____ 4.5.1 Measure the flammable gas concentration in air.
- _____ 4.5.1.1 Insert the iTX into the pump.
- _____ 4.5.1.2 IF NOT already positioned to ON,
THEN start the iTX analyzer by pressing and holding the ON button until it beeps.
- _____ 4.5.1.3 Monitor the iTX reading for approximately 2 minutes.
- _____ 4.5.1.3.1 WHEN the iTX shows no increasing trend for approximately one minute,
THEN record the value below.
- _____ _____ flammable gas concentration (PPM)
- _____ 4.5.1.3.2 IF PPM reading is greater than 150 or less than -150,
THEN notify the facility manager.
- _____ 4.5.1.4 Remove the iTX from the pump.
- _____ 4.5.2 Perform bump test.
- _____ 4.5.2.1 Attach iTX to bump test tubing.
- _____ 4.5.2.2 Open regulator.
- _____ 4.5.2.3 Check that the sensors are responding to the calibration gas.
- _____ 4.5.2.4 If not already performed, set iTX mode to PPM.
- _____ 4.5.2.5 Monitor the iTX reading for approximately 2 minutes (purge time).
- _____ 4.5.2.5.1 WHEN the iTX shows no increasing trend for approximately one minute,
THEN consider the iTX bump test complete.

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 12 of 20
--	--

_____ 4.5.2.6 Record iTX temperature and hydrogen concentration from bump test.

_____	_____ ppm	_____	_____
iTX Temperature Reading	iTX reading (LEL Sensor)	Signature	Date

_____ 4.5.2.7 Close regulator.

_____ 4.5.2.8 Remove iTX from bump test tubing.

_____ 4.5.2.9 Verify that the iTX bump-test result is within +/- 1000 PPM of the hydrogen standard.

Signature Date

_____ 4.5.2.10 IF iTX test is NOT within range, THEN do the following:

_____ 4.5.2.10.1 Return iTX to calibration lab for calibration.

_____ 4.5.2.10.2 Notify the facility manager.

_____ 4.5.2.11 Set the iTX analyzer to peaks mode and clear the peaks.

_____ 4.5.2.12 Turn the iTX gas detector off.

4.6 Disassemble and remove equipment.

Initial/Date

NOTE: *Step 4.6.1 may be performed concurrently with Steps 4.6.2 through 4.6.5.*

_____ 4.6.1 RCT/RCM: Survey equipment as it is disassembled or removed.

_____ 4.6.2 Remove the purge tool from the inner volume port.

_____ 4.6.3 Store the purge tool as directed by the RCT/RCM and/or ISFSI manager.

<p>FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE</p>	<p>Identifier: TPR-6493 Revision*: 6 Page: 13 of 20</p>
---	---

CAUTION

Failure to properly seat the seal plug in the seal plug removal tool could result in dropping the seal plug, causing damage to equipment.

_____ 4.6.4 Reinstall the seal plug in FSC using the seal plug removal tool.

_____ 4.6.5 Reinstall the sample port plug in the shield plug.

4.7 Perform post job performance activities.

4.7.1 Facility Safety Officer: Perform the following:

4.7.1.1 Review test results and document as follows:

4.7.1.1.1 IF the final gas measurement performed in step 4.4 is less than or equal to 9000 ppm AND both bump tests (Steps 4.3 and 4.5.2) are satisfactory (within +/- 1000 ppm of the standard), THEN sign below, indicating that the FSC can be moved.

_____ FSO Signature _____ Date

4.7.1.1.2 IF the initial gas measurement performed in Step 4.4 is greater than 450 ppm, OR the flammable gas concentration in air test (Step 4.5.1) was greater than 150 or less than -150, THEN sign below, indicating that additional sampling (using a sample bomb) is required and the FSC lid must NOT be removed.

_____ FSO Signature _____ Date

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 14 of 20
--	--

4.7.1.1.3 IF the initial gas measurement performed in Step 4.4 is less than 450 ppm, AND the flammable gas concentration in air test (Step 4.5.1) is less than or equal to 150 or greater than or equal to -150, THEN sign below, indicating that the FSC lid can be removed (without additional sampling).

FSO Signature _____
Date

4.7.1.2 Using input from System Engineer, verify that the necessary deficiency recording documents and work performance documents to track and correct any deficiencies have been generated.

Facility Safety Officer _____
Date

4.7.1.3 Request all personnel signing or initialing steps in this procedure to complete the information in the table below:

Printed Name	S Number	Job Function	Initials	Signature

4.7.2 FSV ISFSI Manager: Verify technical procedure is completed and system is operational.

4.7.2.1 Concur with determinations made in Step 4.7.1.1.

FSV ISFSI Manager _____
Signature _____
Date

4.7.2.2 Document completion of technical procedure on FSV Daily Operations Log.

**FORT ST. VRAIN FUEL STORAGE CONTAINER GAS
SAMPLE/VACUUM PURGE PROCEDURE**

Identifier: TPR-6493

Revision*: 6

Page: 15 of 20

5. RECORDS

Records package with completed copy of this procedure and all data sheets and recorded information pertaining to this procedure, including as a minimum:

Form 433.24, “Task Evolution Feedback Form” (if used)

Form 434.14, “Pre-Job Briefing Checklist”

Form 434.15, “Pre-Job Briefing Attendance Record” (if used)

Form 441.49, “ICP Radiation Work Permit” (if used)

NOTE: [MCP-557, “Records Management,”](#) the [INL Records Schedule Matrix,](#) and associated [record types list\(s\)](#) provide current information on the storage, turnover, and retention requirements for these records.

6. REFERENCES

DWG 510157, “Fort St. Vrain Fuel Storage Canister Vacuum Purge Tool Assembly”

DWG 510839, “Fort St. Vrain Fuel Storage Canister Vacuum Purge Mockup”

iTX Vendor Manual

7. APPENDIXES

Appendix A, iTX Analyzer Connection to Vacuum Purge Tool

Appendix B, Procedure Discrepancies

Appendix C, Procedure Hazard Analysis

Appendix D, Procedure Basis

**FORT ST. VRAIN FUEL STORAGE CONTAINER GAS
SAMPLE/VACUUM PURGE PROCEDURE**

Identifier: TPR-6493

Revision*: 6

Page: 16 of 20

Appendix A

iTX Analyzer Connection to Vacuum Purge Tool

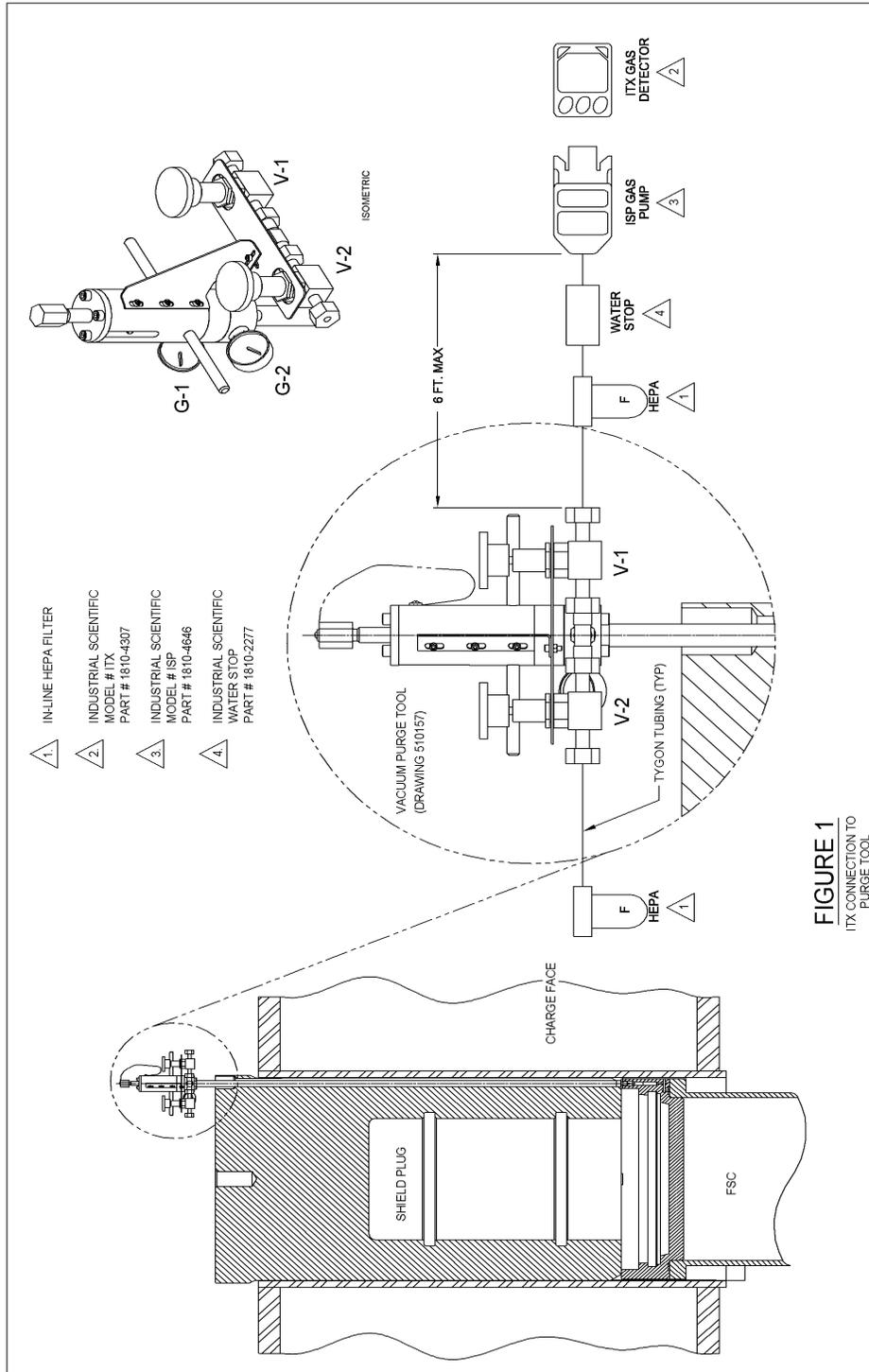


FIGURE 1
 ITX CONNECTION TO
 PURGE TOOL

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 18 of 20
--	--

Appendix C

Procedure Hazard Analysis

Highly Hazardous Activity? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	HPSC No.: TPR-6493
--	--------------------

Disciplines (SMEs) involved in hazard analysis: (Checking the box indicates discipline is/was involved in the hazard analysis for the procedure.)

	Discipline		Discipline		Discipline
<input checked="" type="checkbox"/>	Industrial Safety	<input type="checkbox"/>	RCT/RAD Eng.	<input type="checkbox"/>	Engineering
<input type="checkbox"/>	Industrial Hygiene	<input type="checkbox"/>	Env. Protection	<input checked="" type="checkbox"/>	Operations
<input type="checkbox"/>	Fire Protection	<input checked="" type="checkbox"/>	Quality Assurance	<input type="checkbox"/>	Other:

Required Job Training/Required Personal Protective Equipment

Training	PPE
Certified Fuel Handler	Safety glasses
Quality inspector	Substantial footwear
RCT/RCM	Leather gloves

Sequence Of Basic Job Steps	Potential Hazards	Hazard Control/PPE
1. General to all procedure	1a. Uneven walking surfaces	1a. Personnel must wear substantial footwear and be aware of hazard.
	1b. Heat/cold	1b. Personnel must follow MCP-2704.
	1c. Access/egress	1c. Personnel must ensure pathways are established.

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 19 of 20
--	--

Appendix D

Procedure Basis

Procedure Review Table							
Review Discipline	Rev.	DFC Intent ^b Change	DFC Nonintent ^c Change	Review Discipline	Rev.	DFC Intent ^b Change	DFC Nonintent ^c Change
FSV ISFSI Manager	X ^a	X	X	Industrial Safety	X	X	X
Qualified Operator	X	X	X	Engineering			
Radiological Engineering				Industrial Hygiene			
Environmental			*				
Quality	X	X	*	Other			

a. X = review required.
 b. Reviews for intent DFCs require the same discipline reviews required for a revision.
 c. Reviews for nonintent DFCs can be performed with only Operations management and a qualified operator’s review and then implemented for immediate use. However, the remaining discipline reviews, as indicated by an asterisk (*), must be obtained within two (2) weeks. See MCP-2985, “Chapter XVI – Operations Procedures,” for definitions of intent and nonintent changes.

Step	Basis	Source	Citation
Entire Procedure	Provide procedure to purge the FSV Fuel Storage Containers of hydrogen.	FSV Safety Analysis Report	Sections 4.2.3.2, 4.4.4.1, 5.1.1.1
Entire Procedure	Required inspections, function tests, and component operational tests are performed.	SAR 9.2.4	Table 9.2-1
2.1	Personnel must follow the applicable hazard mitigations detailed in Appendix C, “Procedure Hazard Analysis.”	Procedure hazard analysis	
2.2	A Radiation Work Permit (RWP) is required when performing this procedure on a FSC containing spent fuel.	Company policy	

FORT ST. VRAIN FUEL STORAGE CONTAINER GAS SAMPLE/VACUUM PURGE PROCEDURE	Identifier: TPR-6493 Revision*: 6 Page: 20 of 20
--	--

Step	Basis	Source	Citation
2.3	RCT must monitor HEPA filter for radiation when performing this procedure on a FSC containing spent fuel. HEPA filter must be replaced per RWP requirements.	Company policy	
2.4	When connected to an FSC containing spent fuel, the sample or purge system must be continuously attended by a Certified Fuel Handler.	Best management practice	
2.5	Smoking or open flames must not be allowed during sampling or purging operations.	Best management practice	
3.1.4	Ensure the training requirements in Appendix C are met.	Procedure hazard analysis	
3.1.6	Ensure adequate access/egress pathways are established.	Procedure hazard analysis	
4.3.10 4.5.2.9	Bump Test result within +/- 1000 ppm verifies iTX operation.	EDF 5209	Pg 9/27
4.4.8	Vacuum loss of less than or equal to 1 inch H ₂ O verifies system leakage is acceptable	EDF 5209	Pg 7/27
4.4.11	Conversion formula (%LEL to PPM)	Calibration laboratory instrument set-up process	
4.4.11.4	9000 ppm action limit. FSC can be moved when gas samples are below limit.	EDF 5209	Pg 7/27
4.4.11.4.1	15 minute wait time for FSC gas space to become well mixed.	EDF 5209	Pg 6/27
4.5.1.3.2	150 ppm open air measurement requirement verifies iTX operation.	EDF 5209	Pg 8/27
4.7.1.1.2 4.7.1.1.3	450 ppm action limit. If initial gas measurement is greater than 450 ppm, additional sampling with a sample bomb will be required prior to FSC lid removal.	EDF-5209	Pg 8/27