

S.P.P.E

USDOT Bureau of Transportation
Statistics

Safety and Pollution Prevention Equipment

November 15, 2017



Reporting Guidance Document

Table of Contents

1.0	Background, Scope, and Purpose.....	4
1.1	Background	4
1.2	Scope.....	5
1.3	Purpose.....	6
2.0	Acronyms and Definitions.....	7
2.1	Definitions	7
2.2	Acronyms	7
3.0	Accessing the SafeOCS Database	8
4.0	Submitting a SPPE Failure Notification	10
5.0	Submit a SPPE Failure Notification through file uploading.....	15
6.0	Update and add files to an existing SPPE component failure notification	18
7.0	Delete files attached to an existing SPPE component failure notification	23
8.0	Detailed Instructions on How to complete the SPPE Component Notification online.....	23
8.1	Notification Identification, Operator Data, and SPPE Detail.....	24
8.2	SPPE Details Cont.....	26
8.3	SSC Details, BDSVs, SSVs and USVs, and SPPE Design Criteria	28
8.4	SPPE Design Criteria Cont. and Well data	30
8.5	Well data Cont.....	32
8.6	Corrective Action.....	34
9.0	Investigation and Failure Analysis.....	36
9.1	Failure Causes.....	36
9.1.1	Physical Causes.....	36
9.1.2	Human Factor Causes.....	36
9.1.3	Systemic Causes.....	37
9.2	Analysis Overview	37
9.3	Failure Cause Known	37
9.3.1	Example of Failure Cause Known.....	38
9.3.2	Resources.....	38
9.3.3	Closure	38
9.4	Root Cause Failure Analysis Required (RCFA)	38

9.5.1	Physical Evidence.....	39
9.5.2	Resources	39
9.5.3	Closure.....	39
10.	Compliance	40
11.	Capture and Share Lessons Learnt.....	40
12.	Reporting Design and Procedural Changes.....	40
APPENDIX 1. DEFINITIONS		42

1.0 Background, Scope, and Purpose

1.1 Background

Congress has established a National policy of making the Outer Continental Shelf (OCS) available to development and “subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other National needs.” (43 U.S.C. 1332(3).) The Secretary of the Interior (Secretary) administers the Outer Continental Shelf Land Act (OCSLA) provisions relating to the leasing of the OCS and regulation of mineral exploration and development operations on those leases. The Secretary is authorized to prescribe “such rules and regulations as may be necessary to carry out [OCSLA’s] provisions . . . and may at any time prescribe and amend such rules and regulations as [s]he determines to be necessary and proper in order to provide for the prevention of waste and conservation of the natural resources of the [OCS].” BSEE adopts regulations and performs offshore regulatory oversight and enforcement.

In August 2013, the U.S. Department of the Interior's Bureau of Safety and Environmental Enforcement (BSEE) and the U.S. Department of Transportation's Bureau of Transportation Statistics (BTS) signed an Interagency Agreement (IAA) to develop and implement SafeOCS, as a voluntary program for confidential reporting of 'near misses' occurring on the Outer Continental Shelf (OCS). BSEE and the BTS entered into a Memorandum of Understanding (MOU) in August 2016 to allow BTS to collect equipment failure data required under BSEE rules for reporting blowout preventer (BOP) system or component failures (30 C.F.R. § 250.730(c)) and safety and pollution prevention equipment (SPPE) failures (30 C.F.R. § 250.803). On October 26, 2016, the BSEE director announced the expansion of the SafeOCS program beyond near miss reporting to include the confidential collection of equipment failure data pursuant to regulations 30 C.F.R. § 250.730(c) and 30 C.F.R. § 250.803.

Data collected by BTS under the IAA may only be used for statistical purposes and is therefore protected under the Confidential Information Protection and Statistical Efficiency Act of 2002 (CIPSEA) (44 U.S.C. §3501 note). This requires the following: a) only summary statistics and data analysis results will be made available to interested parties and b) micro-data on near miss incidents collected by BTS may not be used for regulatory purposes. Information submitted under this statute is also protected from release to other government agencies, including BSEE, Freedom of Information Act (FOIA) requests, and subpoena.

1.2 Scope

This document applies to submissions of safety and pollution prevention equipment failures to SafeOCS in accordance with 30 C.F.R. § 250.803. The scope has been expanded to include all American National Standards Institute, American Petroleum Institute, and American Society of Mechanical Engineers (ANSI/API Spec Q1 and ANSI/ASME SPPE-1) equipment components:

- Surface Safety Valve
- Boarding Shutdown Valve
- Underwater Safety Valve
- Surface Controlled Safety Valve
- Subsurface Controlled Safety Valve
- Subsea Safety Valve

This document establishes the criteria and provides guidance on:

- Accessing the SafeOCS data system **(Section 3)**
 - On-line link to the SafeOCS website
 - Creating a new account
 - Starting the online reporting process
- Reporting SPPE component failure online **(Section 4)**
- Reporting SPPE component failure through file notification **(Section 5)**
- Updating and adding files to an existing SPPE failure notification **(Section 6)**
- Deleting files attached to an existing SPPE failure notification **(Section 7)**
- Detailed instructions on how to complete the SPPE failure notification online form **(Section 8)**
- Conducting component investigation plus failure analysis and documentation **(Section 9)**
- Reporting supplemental information to support learning **(Section 10)**
 - Communicating information about component failures to appropriate stakeholders
- Reporting design and procedural changes **(Section 11)**
 - Reporting design changes
 - Reporting changes in operating and repair procedures.

1.3 Purpose

This document was developed to assist the petroleum and natural gas industry with the completion and submission of the SPPE failure notification form pursuant to regulation 30 C.F.R. § 250.803.

Federal regulation 30 C.F.R. § 250.803 was established to ensure accurate reporting of SPPE systems and components failure from initial notification; investigation and failure analysis; communication of failure information and lessons learned; to design and procedural changes.

2.0 Acronyms and Definitions

2.1 Definitions

A list of definitions is provided in Appendix 1.

2.2 Acronyms

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
API	American Petroleum Institute
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BSDV	Boarding Shutdown Valves
BSEE	Bureau of Safety and Environmental Enforcement
BTS	Bureau of Transportation Statistics
CO ₂	Carbon Dioxide
ESD	Emergency Shutdown
GOM	Gulf of Mexico
HPHT	High Pressure High Temperature
H ₂ S	Hydrogen Sulfide
HSE	Health Safety Equipment
IOGP	International Association of Oil & Gas Producers
JIP	Joint Industry Project
OEM	Original Equipment Manufacturer
PTA	Pressure Transient Analysis
RCFA	Root Cause Failure Analysis
RWP	Rated working pressure
SCSSV	Surface Controlled Subsurface Safety Valve
SPPE	Safety and Pollution Prevention Equipment
SSCSV	Subsurface Controlled Safety Valve
SSSV	Subsurface Safety Valve
SSV	Surface Safety Valve
TFL	Through flowline
TSE	Temperature Safety Element
USV	Underwater Safety Valve
WCR	Well Control Rule

3.0 Accessing the SafeOCS Database

The SafeOCS Reporting System is accessed through the website of the SafeOCS program at www.safeocs.gov. (Figure 3.1)

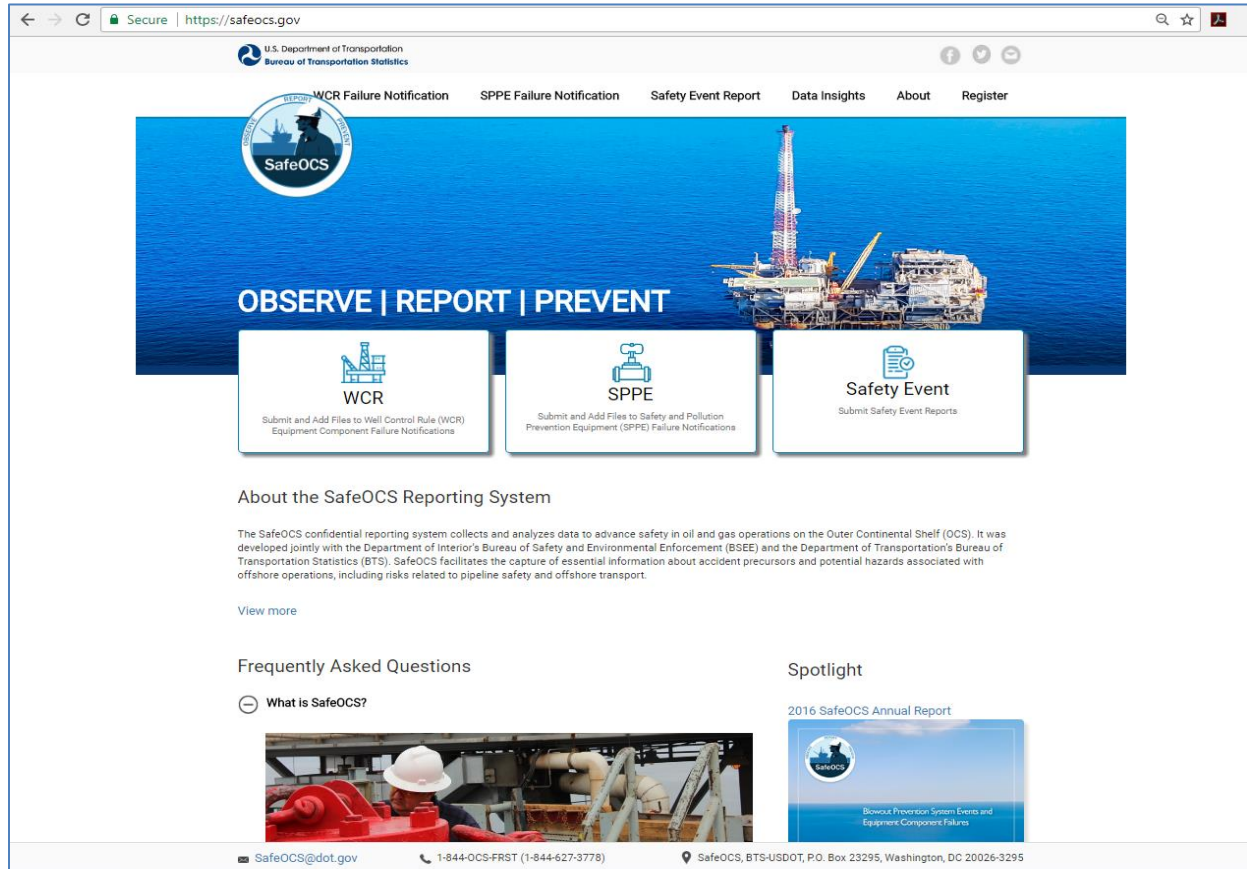


Figure 3.1 SafeOCS Webpage

- To submit a Well Control Rule (WCR) equipment component failure notification, select the WCR button on the home page or the WCR Failure Notification tab on the main navigation bar.
- To submit a Safety and Pollution Prevention Equipment (SPPE) failure notification, select the SPPE button on the home page or the SPPE Failure Notification tab on the main navigation bar.
- To submit a Safety Event report, select the Safety Event button on the home page or the Safety Event Report tab on the main navigation bar.

Since data reported to SafeOCS are confidential and protected under the Confidential Information Protection and Statistical Efficiency Act of 2002 (CIPSEA) (44 U.S.C. §3501 note), a user must register and create an account in the SafeOCS Reporting System before he/she can submit equipment failure notifications or safety event reports.

To register an account in the SafeOCS Reporting System, select the **Register** tab on the main navigation bar of the SafeOCS website (Figure 3.2).

U.S. Department of Transportation
Bureau of Transportation Statistics

WCR Failure Notification SPPE Failure Notification Safety Event Report Data Insights About **Register**

SafeOCS

SafeOCS Account Register

Enter your information to register an account.

Company Name

Your First Name

Middle Name

Last Name

Your E-mail

Choose Password (ex: S@mp1eP@ssw0rd1)

Re-enter Password

Supervisor Name

Supervisor Email

Supervisor Phone Number

Register

SafeOCS@dot.gov 1-844-OCS-FRST (1-844-627-3778) SafeOCS, BTS-USDOT, P.O. Box 23295, Washington, DC 20026-3295

Figure 3.2 SafeOCS Registration page

4.0 Submitting a SPPE Failure Notification

Step 1: Login to your SafeOCS account

Provide your Email and Password to login to your SafeOCS account at the Login page for SPPE Failure Notification submission. (Figure 4.1)

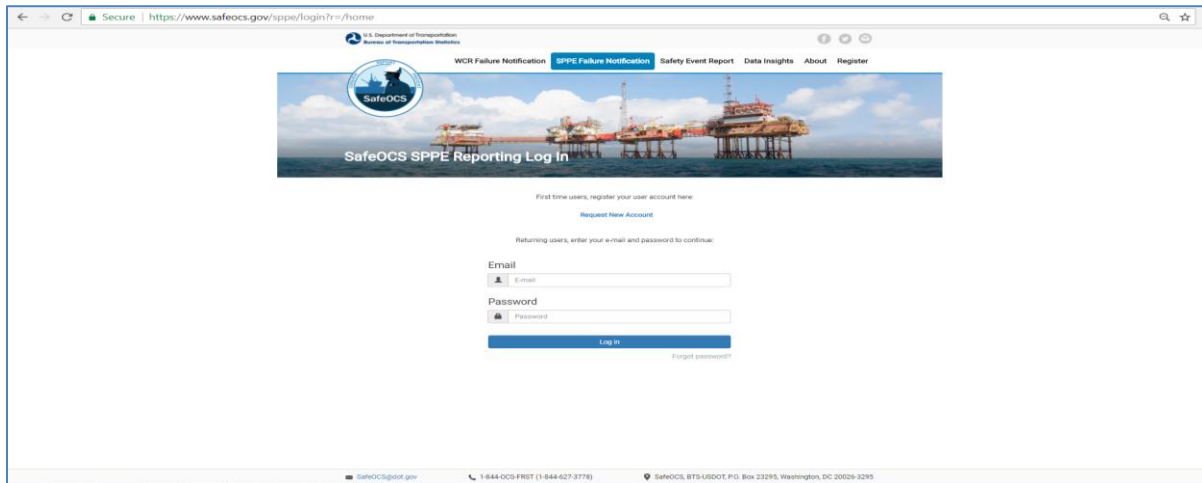


Figure 4.1 SafeOCS login homepage

Step 2: Confirm your agreement to the Confidentiality and Burden Statements

After login, the user is required to read and consent to the Burden Statement and Pledge of Confidentiality. Check the "I have read..." box and select the **Start New Report** button to continue (Figure 4.2).



Figure 4.2 POC and Burden Statement webpage

Step 3: Select a mode of submission

SafeOCS offers three ways to submit SPPE component failure notifications: Online, Upload, and Postal Mail (Figure 4.3). Select “Submit New SPPE Failure Notification” online tab to make a report online.

The screenshot displays the SafeOCS website interface. At the top, there is a navigation bar with the following tabs: "WCR Failure Notification", "SPPE Failure Notification" (which is highlighted), "Safety Event Report", "Data Insights", and "About". The main header area features a large image of a worker in an orange safety vest and white hard hat, with the "SafeOCS" logo overlaid on the left. Below the image, the text "SPPE Failure" is visible. A secondary navigation bar contains links for "Overview", "SPPE Online", "PDF Upload", and "Word Upload", along with a "Log out" button. The main content area is titled "Submit New SPPE Failure Notification" and includes a sub-header: "Use one of the options below (complete online, upload, or send hardcopy) to submit a new SPPE failure notification. To modify a previously submitted notification, use the 'Update and Add Files' option." Below this, there are three main options: 1. "Submit New SPPE Failure Notification Online" with a plus icon in a box. 2. "OR" separator. 3. "Upload:" section with links for "Upload PDF Form (Download PDF Form)" and "Upload Word Form (Download Word Form)". 4. "Send to:" section with contact information for SafeOCS | Bureau of Transportation Statistics, including P.O. Box 23295, Washington, DC 20026-3295, and Fax: (202)366-9898. Below the "Submit New SPPE Failure Notification" section, there is another section titled "Update and Add Files to an Existing SPPE Failure Notification" with a sub-header: "Search by BTS Reference Number to add files to a previously submitted SPPE failure notification. These files can include, but are not limited to, additional information or corrected forms." This section contains a search box with the placeholder text "Select by a BTS Reference Number to add files to a submitted report:" and a "Go" button.

Figure 4.3 safeocs.gov/sppe/home

Step 4: Complete the online SPPE Component Failure Notification form

The selection of the “Submitting New SPPE Failure Notification online” will bring up the SPPE online form (Figure 4.4) for the user to complete.

The screenshot shows a web browser window with the URL <https://www.safeocs.gov/sppe/forms/sppefailureform>. The page header includes the U.S. Department of Transportation Bureau of Transportation Statistics logo and navigation links: WCR Failure Notification, SPPE Failure Notification (highlighted), Safety Event Report, Data Insights, About, and Register. A banner image shows a worker in an orange safety vest and white hard hat in an industrial setting, with the text "SPPE Failure" overlaid. Below the banner is a navigation menu with "Overview", "SPPE Online" (selected), "PDF Upload", and "Word Upload", along with a user profile "Anton Mighty" and a "Log out" button. The main form area is titled "NOTIFICATION RECORD IDENTIFICATION INFORMATION" and contains the following fields: "Operator/Company Assigned Reference No:" (text input), "BTS Reference No (select if assigned):" (dropdown menu with "Select BTS Reference ID" option), "OPERATOR DATA" section with "Date of Failure:" (text input), "Operator Company Name:" (dropdown menu with "Select Operator" option), "Complex ID:" (text input), "Structure Number:" (text input), "API Well Number (if Applicable):" (text input), and "Company Name Submitting Form, if different than the Operator:" (text input). Below this is the "Type of Company Submitting Form" section with radio buttons for "Production Contractor" and "Other, Specify:" (text input). The "SPPE DETAILS" section is partially visible at the bottom. The footer contains contact information: SafeOCS@dot.gov, 1-844-OCS-FRST (1-844-627-3778), and SafeOCS, BTS-USDOT, P.O. Box 23295, Washington, DC 20026-3295.

Figure 4.4 [safeocs.gov/sppe/forms/sppefailureform](https://www.safeocs.gov/sppe/forms/sppefailureform)

Detailed instructions on how to complete the SPPE Failure Notification on-line are provided in section 8. Please refer to that section, if there are questions about the meaning of or the expected values/entries for any of the data fields.

Step 5: Review, edit the SPPE Failure Notification form before submitting

It is important to review and edit the completed notification form before submitting to correct any data-entry errors. Once a notification is submitted, it will not be available for review or edit and errors made in data entries can only be corrected by submitting an update to the original notification.

Step 6: Submit the completed notification form

Submit the completed notification form by selecting the “Submit” button (Figure 4.5).

Please note:

- Only when the “Submit” button is selected, information entered in the online form is saved to the SafeOCS database and a BTS reference number is generated for the notification.
- If the user closes the online form without submitting it, all information entered in the form will be lost.
- Once a notification is submitted, it will not be available for review or edit by the user. Corrections to a submitted notification can only be achieved by submitting an update to the original notification.

The screenshot shows a web browser window with the URL <https://www.safeocs.gov/sppe/forms/sppefailureform>. The form contains the following sections:

- Where was the corrective action accomplished (select one)**
 - Contractor's facility
 - Manufacturer's facility
 - On location
 - Operator's facility
 - Other, specify:
- If the corrective action was accomplished on location, who conducted the corrective action? (select one)**
 - Operator
 - Contractor
 - Manufacturer
 - Not Applicable
 - Other, specify:
- Was the failure associated with an HSE incident?**
 - Yes
 - No
- If yes, what was the type of incident? (select all that apply)**
 - One or More Fatalities
 - Injury to 5 or more persons in a single incident
 - Tier 1 Process Safety Event (API 754/IOGP 456)
 - Loss of Well Control
 - \$1 million direct cost from damage of loss of facility/vessel/equipment
 - Oil in the water >= 10,000 gallons (238 bbbls)
 - Tier 2 Process safety event (API 754/IOGP 456)
 - Collisions that result in property or equipment damage > \$25,000
 - Incident involving crane or personnel/material handling operations
 - Loss of Station-weighing
 - Gas release (H₂S and Other) that result in process or equipment shutdown
 - Muster for evacuation
 - Structural Damage
 - Spill < 10,000 gallons (238 bbbls)
 - Other, specify:

Below the form, there is a note: "Please make sure that data entered is in correct format." and a blue "SUBMIT" button. The footer of the page includes the US Department of Transportation Bureau of Transportation Statistics (BTS) logo and contact information: SafeOCS, BTS-US001, P.O. Box 23295, Washington, DC 20026-3295.

Figure 4.5 safeocs.gov/sppe/forms/sppefailureform

When a notification is successfully submitted, a message will show on the screen of the SafeOCS website to inform the user that the notification has been successfully submitted (Figure 4.6). An email of Acknowledgment of Receipt will also be sent to the reporter's email account registered with SafeOCS (Figure 4.7).

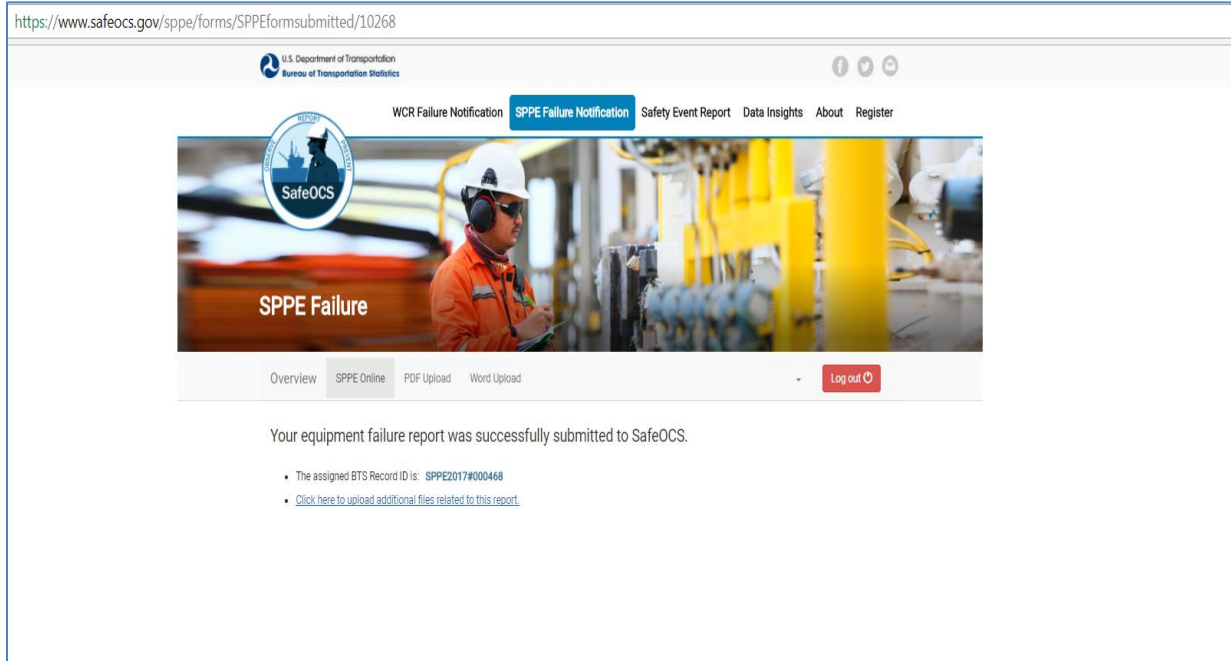


Figure 4.6 safeocs.gov/sppeformsubmitted

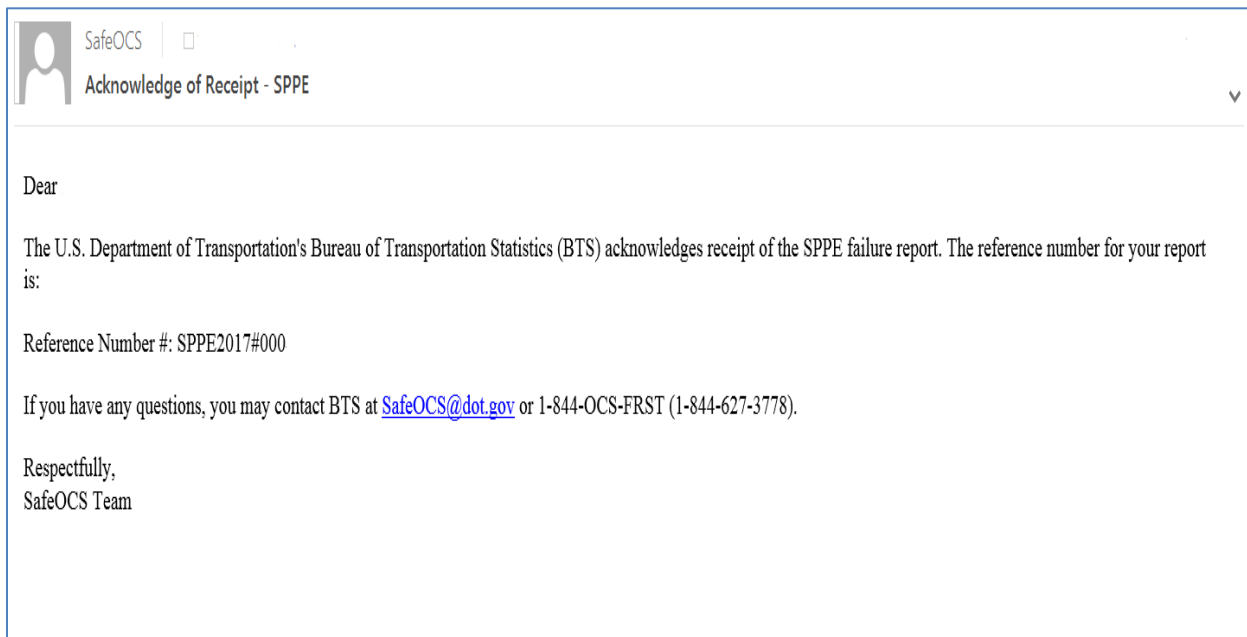


Figure 4.7 safeocs.gov/sppe acknowledgement of receipt

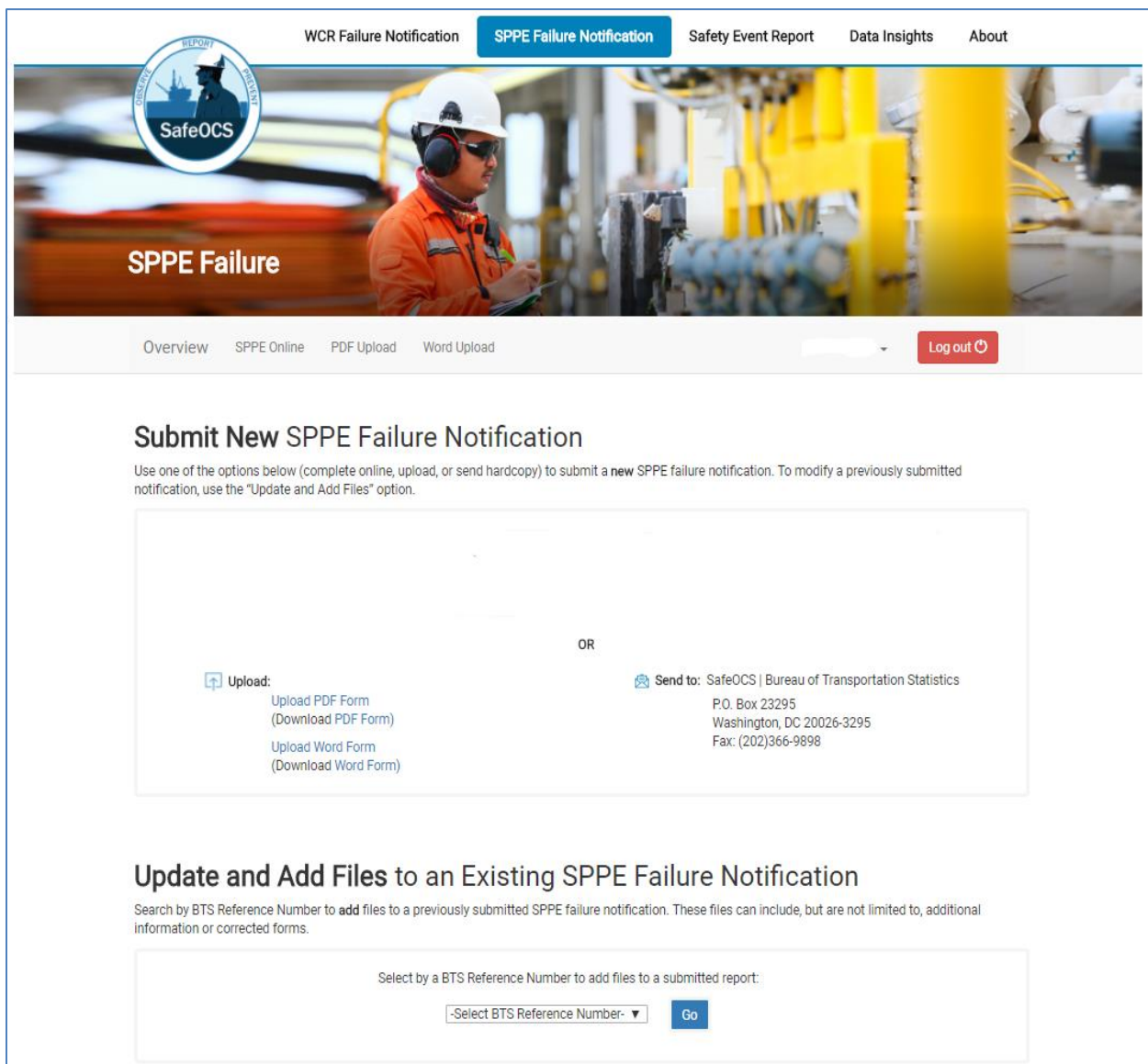
5.0 Submit a SPPE Failure Notification through file uploading

Step 1: Login to your SafeOCS account (Refer to Section 4.0 for details)

Step 2: Confirm your agreement to the Confidentiality and Burden Statements (Refer to Section 4.0 for details)

Step 3: Select a mode of submission:

Among the three modes of submission (Online, Upload, and Postal Mail), select the link “Upload PDF Form” or the link “Upload Excel Form” (Figure 5.1).



The screenshot displays the SafeOCS website interface for submitting a SPPE Failure Notification. The top navigation bar includes links for WCR Failure Notification, SPPE Failure Notification (highlighted), Safety Event Report, Data Insights, and About. A large banner image shows a worker in an orange safety vest and white hard hat in an industrial setting, with the text "SPPE Failure" overlaid. Below the banner, a navigation menu contains "Overview", "SPPE Online", "PDF Upload", and "Word Upload", along with a "Log out" button. The main content area is titled "Submit New SPPE Failure Notification" and provides instructions: "Use one of the options below (complete online, upload, or send hardcopy) to submit a new SPPE failure notification. To modify a previously submitted notification, use the 'Update and Add Files' option." Below this, there are two main sections. The first section, "Submit New SPPE Failure Notification", offers two paths: "Upload" (with links for "Upload PDF Form (Download PDF Form)" and "Upload Word Form (Download Word Form)") and "Send to" (with contact information for SafeOCS | Bureau of Transportation Statistics: P.O. Box 23295, Washington, DC 20026-3295, Fax: (202)366-9898). The second section, "Update and Add Files to an Existing SPPE Failure Notification", instructs users to search by BTS Reference Number to add files to a previously submitted notification. It includes a search box with a dropdown menu labeled "-Select BTS Reference Number-" and a "Go" button.

Figure 5.1 safeocs.gov/sppe/home

Step 4: Select and upload completed SPPE failure notifications to SafeOCS

Selecting the link “Upload PDF Form” or the link “Upload Word Form” will bring up an interface to allow the user to select and upload completed SPPE failure notifications to SafeOCS (Figure 5.2).

The screenshot shows a web browser window with the URL https://www.safeocs.gov/sppe/forms/sppe_offline/pdf. The page header includes the U.S. Department of Transportation Bureau of Transportation Statistics logo and navigation links: WCR Failure Notification, SPPE Failure Notification (highlighted), Safety Event Report, Data Insights, About, and Register. A main banner features the SafeOCS logo and the text "SPPE Failure" over a background image of a worker in an orange safety vest and white hard hat. Below the banner is a navigation menu with "Overview", "SPPE Online", "PDF Upload" (highlighted), and "Word Upload". A user profile "Anton Mighty" is visible with a "Log out" button. The form fields include: "Reporting Operator" with a dropdown menu showing "-Select Operator-"; "Date of Event" with a text input field containing "MM/DD/YYYY"; and "Select File" with a text input field and a "Browse ..." button. A "Submit" button is located below the form fields. The footer contains contact information: SafeOCS@dot.gov, 1-844-OCS-FRST (1-844-627-3778), and SafeOCS, BTS-USDOT, P.O. Box 23295, Washington, DC 20026-3295.

Figure 5.2 [safeocs.gov/sppe_offline/pdf](https://www.safeocs.gov/sppe_offline/pdf)

Upload Instructions:

- “Reporting Operator” in the interface is a required field. If the name of the operator for which you are submitting a failure notification is not in the dropdown list of the field, please select “Other” at the bottom of dropdown list and then type in the operator’s name in the pop-up text field.
- “Select File” is another required field. The “Browse” function allows the user to select and upload only one file at a time. However, multiple failure notifications can be included in one file.
- “Date of Event.” is a required field. The purpose of this field is to allow operators to match their records of failure notifications submitted to SafeOCS.

When a file is successfully uploaded, a message show on the screen of the SafeOCS website to inform the user that notifications included in the file has been successfully submitted (Figure 5.3, with example case). An email of Acknowledgment of Receipt is also sent to the user's email account registered with SafeOCS (Figure 5.4, with example case).

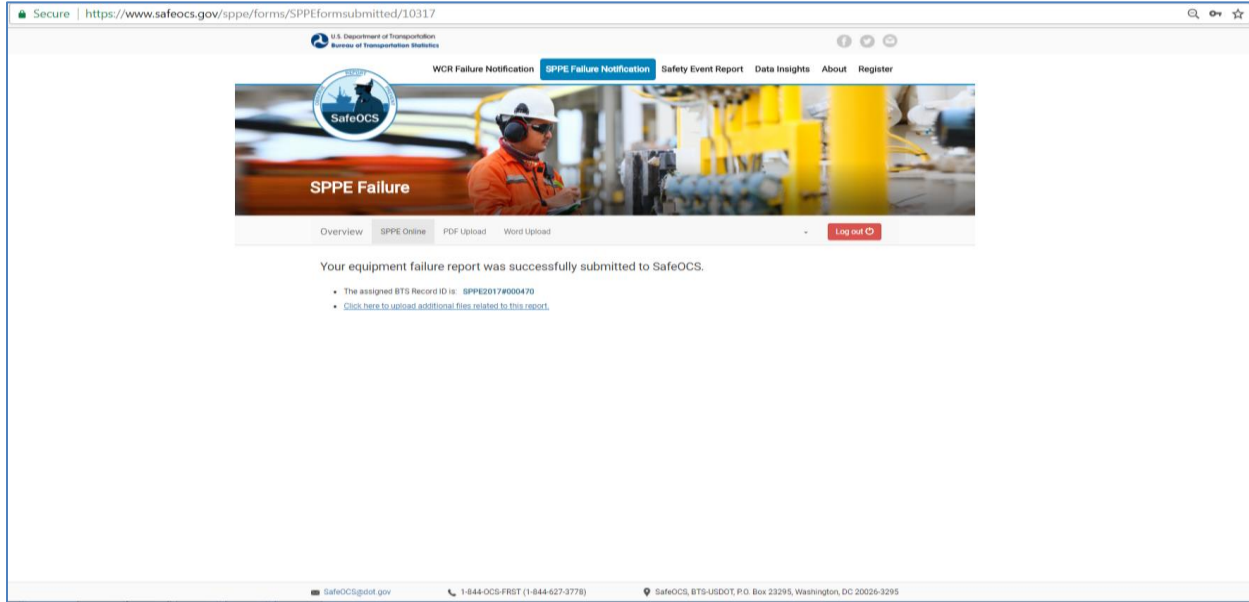


Figure 5.3 safeocs.gov/SPPEformsubmitted webpage

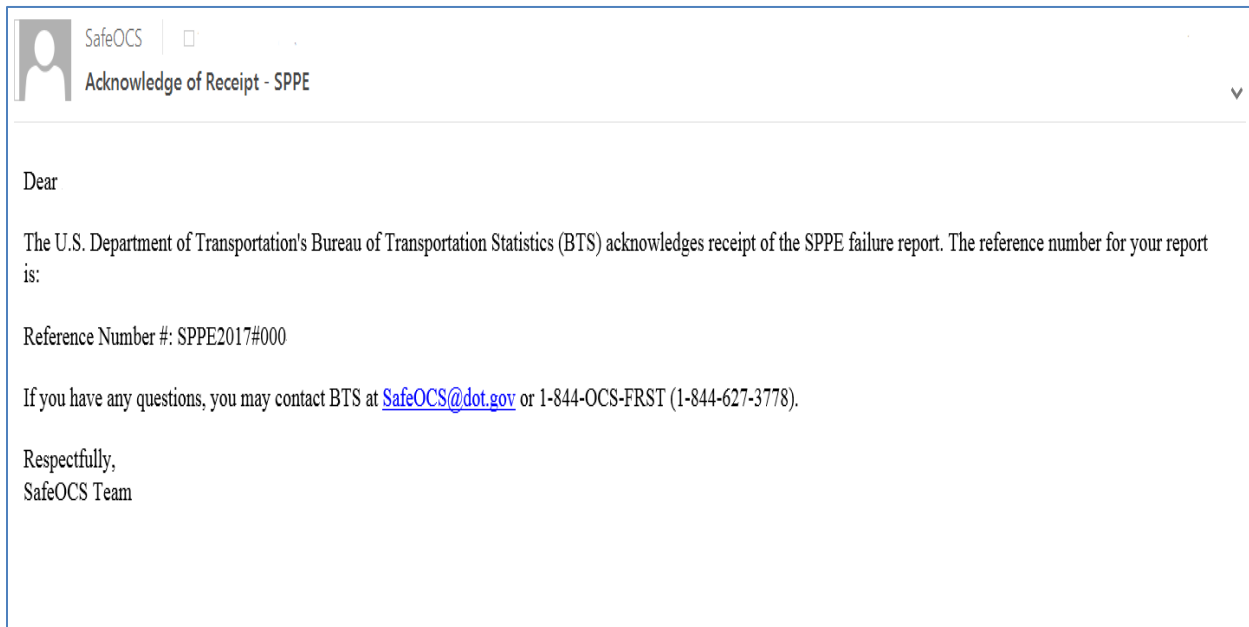


Figure 5.4 safeocs.gov/sppe acknowledgement of receipt

6.0 Update and add files to an existing SPPE component failure notification

Additional information, such as pictures, graphs, detailed descriptions, or updates, can be added to the record of a notification after the original notification has been submitted. This can be done by using the **Update and Add Files** function (Figure 6.1).

The screenshot displays the SafeOCS website interface. At the top, there is a navigation bar with the following items: 'WCR Failure Notification', 'SPPE Failure Notification' (highlighted in blue), 'Safety Event Report', 'Data Insights', and 'About'. Below the navigation bar is a large banner image of a worker in an orange safety vest and white hard hat, with the 'SafeOCS' logo overlaid on the left. The banner also contains the text 'SPPE Failure'. Below the banner is a secondary navigation bar with 'Overview', 'SPPE Online', 'PDF Upload', and 'Word Upload', along with a 'Log out' button. The main content area is titled 'Submit New SPPE Failure Notification' and includes instructions: 'Use one of the options below (complete online, upload, or send hardcopy) to submit a new SPPE failure notification. To modify a previously submitted notification, use the "Update and Add Files" option.' Below this, there are two main sections. The first section, 'Upload:', offers 'Upload PDF Form (Download PDF Form)' and 'Upload Word Form (Download Word Form)'. The second section, 'Send to:', provides the contact information for SafeOCS | Bureau of Transportation Statistics: P.O. Box 23295, Washington, DC 20026-3295, and Fax: (202)366-9898. The second section is titled 'Update and Add Files to an Existing SPPE Failure Notification' and includes instructions: 'Search by BTS Reference Number to add files to a previously submitted SPPE failure notification. These files can include, but are not limited to, additional information or corrected forms.' Below these instructions is a search form with a dropdown menu labeled '-Select BTS Reference Number-' and a 'Go' button.

Figure 6.1 safeocs.gov/sppe/home

To ensure that the additional information is attached to the correct notification, the user must select the BTS reference number from the dropdown list of the BTS Reference Number field (Figure 6.2) before clicking on the “Go” button to bring up the file uploading interface.

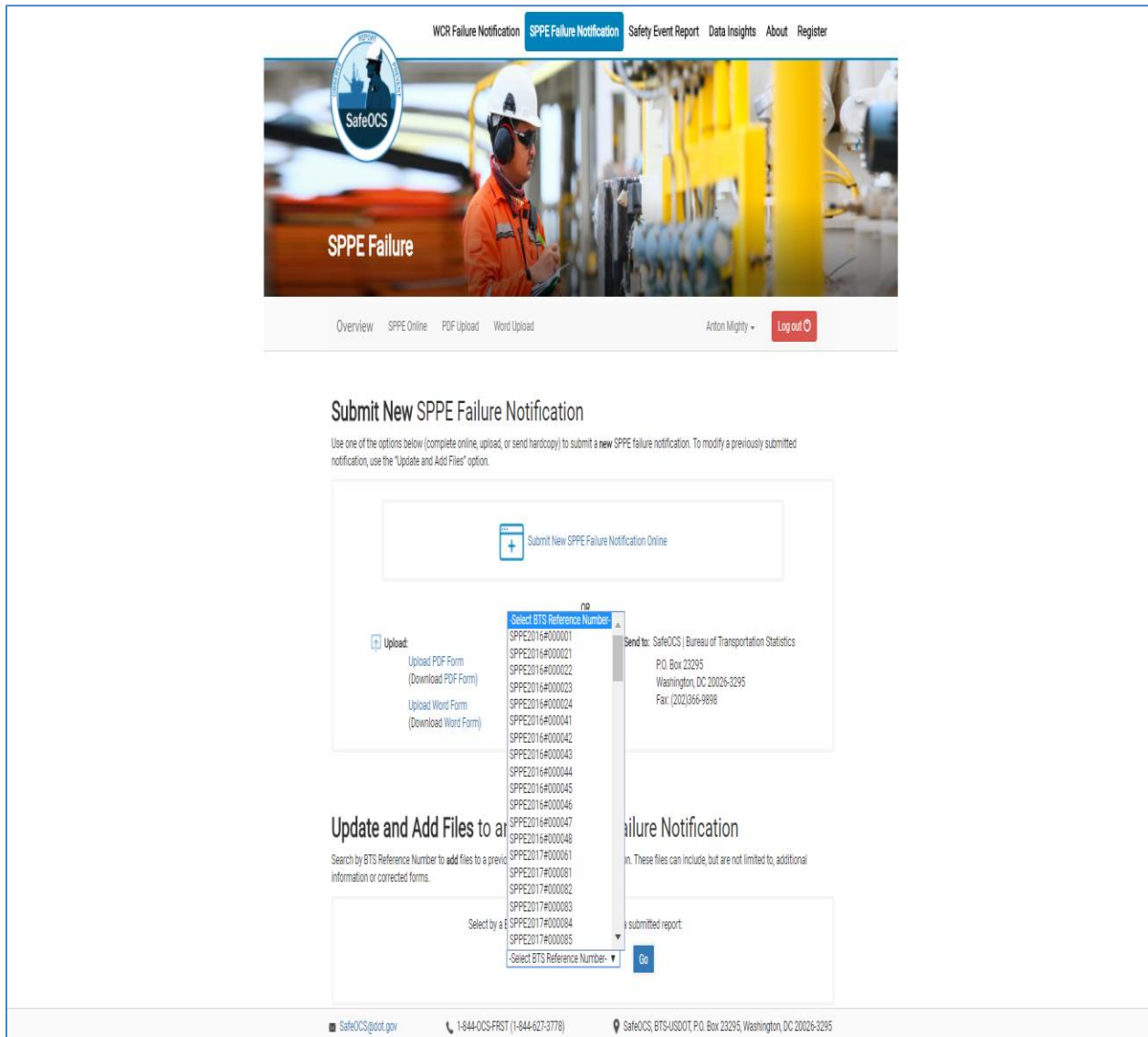


Figure 6.2 safeocs.gov/sppe/home

Please note:

- To protect confidentiality, a registered user will only be able to see the BTS reference numbers of the notifications he/she submitted, unless he/she is authenticated to be the operator’s representative by a duly authorized official of the concerned operator. An operator’s representative will be able to see BTS reference numbers of all notifications submitted under the operator’s name and add additional information to those notifications.

When the “Go” button is selected, the file uploading interface will be brought up (Figure 6.3). Clicking on the “Add files” button in the interface will bring up the libraries folder to allow the user to select files in any folder/directory that is accessible to the user’s computer. (Note: Multiple files maybe selected.)

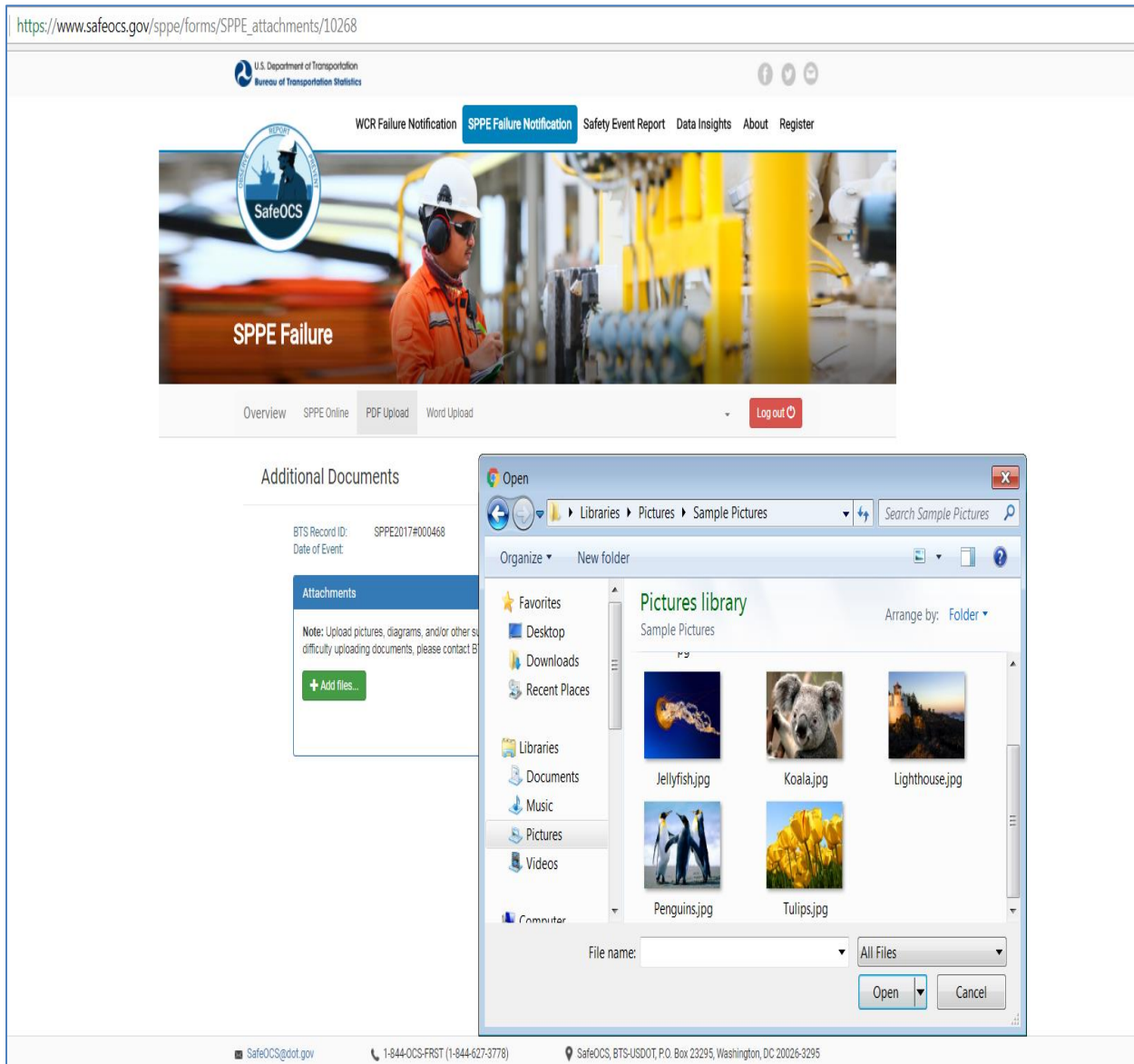


Figure 6.3 safeocs.gov/sppe/forms/SPPE_attachments

When the selection is done, the selected files will be listed in the file upload interface (Figure 6.4). From the list, click on the “Upload” button to upload a selected file to SafeOCS. Select the “Cancel” button to delete a file from the list.

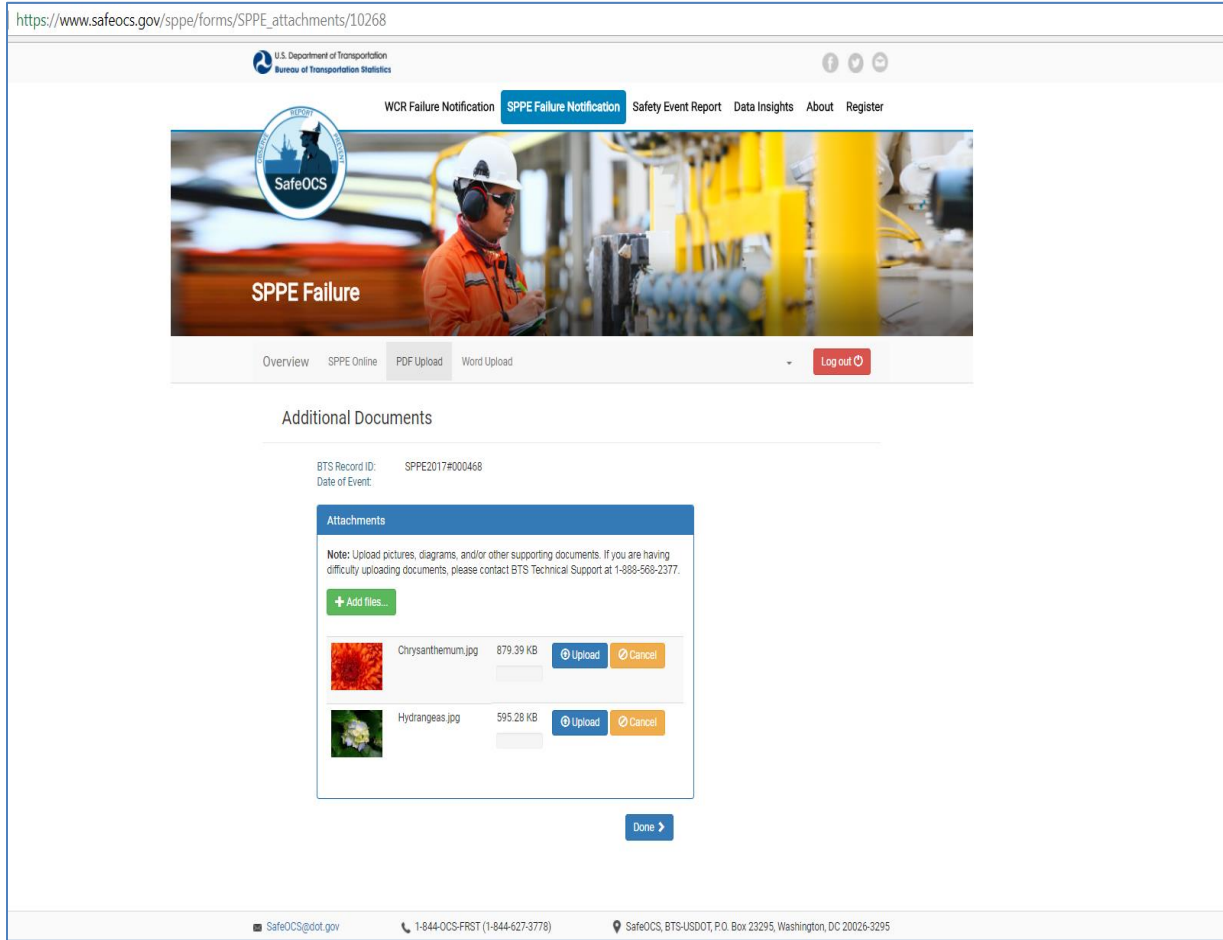


Figure 6.4 [safeocs.gov/sppe/forms/SPPE_attachments](https://www.safeocs.gov/sppe/forms/SPPE_attachments)

Once a file is uploaded, the user can remove a file that has been added to the record of a notification if he/she desires so (Figure 6. 5).

By selecting the delete button, all uploaded files will be listed in the interface and can be deleted (removed) from the records of the notification later.

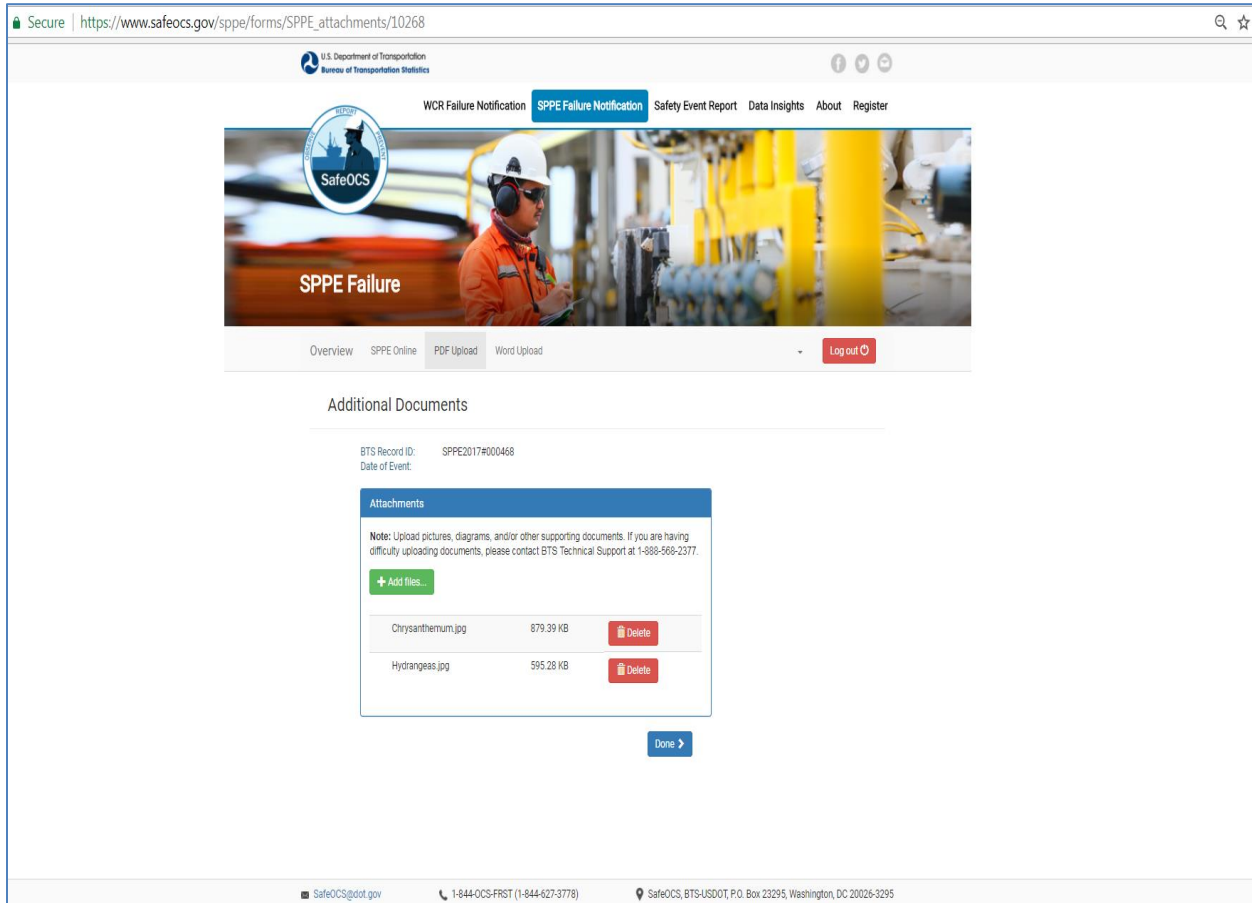


Figure 6.5 safeocs.gov/SPPE_attachments

When all the selected files have been uploaded, clicking on the "Done" button will return the user to the interface of the Update and Add File function.

7.0 Delete files attached to an existing SPPE component failure notification

The Update and Add Files function can be used to delete files that have been attached to the record of a notification. Here are the steps:

- At the page of the Update and Add Files function, select the BTS Reference Number of the notification from which an attached file is to be deleted and then select “Go”, which will bring up a page similar to figure 6.5 and with a list of all the files attached to the notification.
- Select the “Delete” button associated with a file to delete the file from the database.
- Select the “Done” button to return to the interface of the Update and Add Files function.

8.0 Detailed Instructions on How to complete the SPPE Component Notification online

Detailed instructions and information on completing the WCR Failure Notification Form are provided below. The failure notification form should be completed as much as possible (fields marked with an asterisk* are mandatory). After completing the form, press the ‘Submit’ button to save the data into the SafeOCS database. Data entered into the form will not be saved if the reporter leaves the webpage without pressing the ‘Submit’ button.

8.1 Notification Identification, Operator Data, and SPPE Detail

Notification Record Identification Information

Operator/Company Assigned Reference No:

BTS Reference No (select if assigned):

Operator Data

Date of Failure:

Operator Company Name:

Complex ID:

Structure Number:

API Well Number (If Applicable):

Company Name Submitting Form, if different than the Operator:

Type of Company Submitting Form

Production Contractor

Other, Specify:

SPPE Details

Equipment Manufacturer:

Model:

Serial Number

Working Pressure:

Nominal Size:

Provide a narrative describing any redress history for the SPPE that failed:

SafeOCS database will automatically assign each submission with a unique identifier (BTS reference number). The system will also provide an optional data field for the operator/company-assigned reference number, if applicable.

Date of Failure- This should indicate the date the SPPE component failed or did not perform per specification. This date will be used to access the submission in order to add or update the report.

Operator Company Name- Select the company name from the supplied dropdown list. If the name of the operator for which you are submitting a failure notification is not in the dropdown list of the field, please select "Other" at the bottom of dropdown list and then type in the operator's name in the pop-up text field.

Complex ID- That is a series of numbers that corresponds to a particular production platform or group of platforms. The complex I.D. is a 1 to 5-digit number.

Structure Number- This is a series of numbers that corresponds to the area or block number. Area and block have multiple structures. The structure I.D. is usually a 1 to 2-digit number.

API Well Number, if applicable- API number provided by the operator. The API is usually a 12-digit number

Company Name Submitting Form, if different than the Operator- Name of the company submitting the notification.

Type of Company Submitting Form (select one)- If the production contractor is not the submitting agent, select other and type in the company involved with the failure in the text field. (Service, OEM, Certification, etc....).

Equipment manufacturer- Free text field to input the principal agent in the design, fabrication and furnishing of original safety and pollution prevention equipment.

Model- A free text field to enter the equipment model number of the defective component.

Serial Number- Free text field to enter the unique identifying serial number of the component.

Working pressure- A free text field to enter the standardized working pressure rating. Working pressure should be in pounds per square inch gauge (psig) units. (Ex. 5,000 psig)

Nominal size- A free text field to enter the whole and fractional size for the equipment. Nominal size should be in inches. (Ex. 2-9/16").

Provide a narrative describing any redress history for the SPPE that failed- A free text field to include any activity involving the replacement of qualified parts. Note: should include the new installation dates and scope of repair work, if any.

8.2 SPPE Details Cont.

Please Provide the date and a narrative description of the last SPPE Test.

Date:

Narrative:

What was the Certification Status of the Failed SPPE (select one)

- Newly Installed; certified SPPE pursuant to ANSI/API Spec Q1
- Newly Installed; certified SPPE pursuant to Another Quality Assurance Program
- Previously certified under ANSI/ASME SPPE-1
- Non-Certified SPPE

Was the SPPE previously repaired, remanufactured, or subject to hot work offsite?

- Yes
- No

What type of tree was associated with the SPPE that failed? (select one)

- Dry Tree
- Subsea Tree

Which SPPE component failed? (Select all that apply)

- Valve Body
- Actuator
- Flow coupling (required for surface- or subsurface-controlled SSSV)
- Safety Lock
- Landing Nipple
- Direct hydraulic control system
- Electro-hydraulic control umbilical
- Flange
- Ring joints
- Ball
- Flapper
- Temperature Safety Element (TSE)
- Emergency Shutdown (ESD) System
- Valve Gate/Seat

What was the type of SPPE that failed? (Select One)

- Surface Safety Valve (SSV)
- Boarding Shutdown Valve (BSDV)
- Underwater Safety Valve (USV)
- Surface controlled SCSSV
- Subsurface controlled SSCSV

Please provide the date and a narrative description of the last SPPE test- A free text field to provide a description of the last test that was performed on the failed equipment including the date, criteria, outcome of test, and functional parameters prior to this failure.

What was the certification status of the failed SPPE (select one)- Newly installed equipment should be certified pursuant to ANSI/API Spec Q1 or other Quality Assurance Program. This certification is intended for companies that manufacture equipment or components used in oil and natural gas production. Certified equipment installed prior to the inception of ANSI/API Spec Q1 2013 should choose ANSI/ASME SPPE-1, if not certified, then select “Non-Certified SPPE.”

Was the SPPE previously repaired, remanufactured, or subject to hot work offsite? – Select YES/NO to indicate if Hot work was performed offsite in a shop and not on the platform. Please provide details in the **redress history** box.

What type of tree was associated with the SPPE that failed? – Dry Tree; Subsea Tree.

Which SPPE component failed? – Select the components involved in the reported failure. Note: the valve gate/seal is not the same as the valve body.

What was the type of SPPE that failed? – Select the type of equipment that was involved in the reported failure.

8.3 SSC Details, BDSVs, SSVs and USVs, and SPPE Design Criteria

SSSV Details

What was the type of SSSV that failed? (Select One)

- Tubing retrievable
- Wireline retrievable
- Through flowline (TFL)
- SSCSV retrievable
- SSSV retrievable

Was the SSV formerly a pump through type tubing plug?

- Yes
- No

If the SSSV that failed was Subsurface Controlled (SSCSV), what type was it? (Select One)

- Velocity-type SSCSV
- Tubing-pressure-type SSCSV
- Not Applicable

What was the service class of the SSSV that failed? (Select One)

- Class 1 only standard service
- Class 2 sandy service
- Class 1 and 2
- Class 3 stress cracking
- Class 3s (sulfide stress and chlorides in a sour environment)
- Class 3c (sulfide stress and chlorides in a non-sour environment)
- Class 4 mass loss corrosion service

BDSVs, SSVs, and USVs

What was the service class of the BDSV/SSV/USV? (Select One)

- Class I: Performance level requirement intended for use on wells that do not exhibit the detrimental effects of sand erosion
- Class II: Performance requirement level intended of use if a substance such as sand could be expected to cause an SSV/USV valve failure

If the SPPE that failed was a BSDV, which type was it? (Select One)

- Automatic
- Manual BSDV
- Not Applicable

SPPE Design Criteria

Was the SPPE designed for High Pressure High Temperature (HPHT) conditions?

- Yes
- No

Was the SPPE designed for Arctic Conditions?

- Yes
- No

What was the type of SSSV that failed? – Select the type of SSSV that was involved in the reported component failure.

Was the SSV formerly a pump through type tubing plug? – Select YES/NO to record whether a pump through type tubing plug used as a SSV.

If the SSSV that failed was Subsurface Controlled (SSCSV), what type was it? (Select One) – Velocity; Tubing-pressure; Not Applicable.

What was the service class of the SSSV that failed? (Select One)- Select the service class of the control system involved in the failure.

What was the service class of the BSDV/SSV/USV? (Select One)- Select the service class of the wellhead valve assembly involved in the failure.

If the SPPE that failed was a BSDV, which type was it? (Select One)- Automatic; Manual BSDV; Not Applicable. If it was not a Boarding shutdown valve, then choose N/A.

Was the SPPE designed for High Pressure High Temperature (HPHT) conditions? – Select YES/NO to record the pressure and temperature conditions. Note: HPHT environment means when one or more of the following well conditions exist: (1) The completion of the well requires completion equipment or well control equipment assigned a pressure rating greater than 15,000 psia or a temperature rating greater than 350 degrees Fahrenheit; (2) The maximum anticipated surface pressure or shut-in tubing pressure is greater than 15,000 psia on the seafloor for a well with a subsea wellhead or at the surface for a well with a surface wellhead; or (3) The flowing temperature is equal to or greater than 350 degrees Fahrenheit on the seafloor for a well with a subsea wellhead or at the surface for a well with a surface wellhead.

Was the SPPE designed for Artic Conditions? – Select YES/NO to record whether the equipment was designed for extreme cold weather conditions. (Not applicable in the GOM).

8.4 SPPE Design Criteria Cont. and Well data

Please specify the most extreme exposure conditions for which the SPPE was designed to function

Design Pressure (PSI):

Design Temperature (Degrees F):

Design Flow Rate (number):

Flow rate units: Per

Other Design Environmental Conditions:

Well Data

Provide the information below, as applicable

What was the type of well associated with the SPPE failure? (Select One)

- Production
- Injection Well

Was the well shut in at the time of failure?

- Yes
- No

What was the last Well Test Rate? BOE/day

What was the date of the last Well Test?

What were the Environmental Conditions? (Check all that apply)

- Sand, Specify percentage %
- H₂S
- CO₂
- Other, specify:

Pressures and Temperatures

Surface: psi / degrees F

Bottom Hole: psi / degrees F

Under what conditions was the SPPE activated at the time of the failure? (Check all that apply)

- Activated during normal well operations
- Activated in response to an ESD
- Activated during emergency weather or other emergency conditions
Specify the nature of the emergency:
- Activated during a process upset
- Activated in response to the detection of a high or a low pressure condition by a PSHL sensor located upstream of the BSDV
- Activated when the gas lift system introduced gas into the system
- Activated during a leakage test

Description of the failure

Provide a narrative description of the failure to include, **but not limited to**:

- as much information as possible on the operating conditions that existed at the time of the malfunction or failure
- an accurate description of the malfunction or failure
- any operating history of the SPPE leading up to the malfunction or failure (e.g. field repair, modifications made to the SPPE, etc.)

Please specify the most extreme exposure conditions for which the SPPE was designed to function. - Five fields to record the pressure, temperature, rate, units, and other operating conditions of the equipment. Note: Gas rate= Thousand Cubic Feet (MCF) or liquid rate. Liquid rate= barrels per day or velocity. Velocity= ft./sec (feet per second). Please also include water depth and other environmental conditions.

What was the type of well associated with the SPPE failure? – Select Production or Injection to specify the well type.

Was the well shut in at the time of failure? – Select YES/NO to record the well operating status prior to the failure. If the well was operating prior to the failure, select no. Note: Yes, if the well was rendered inoperative prior to actual test. E.g.- Shut in for weather related incident or for production reasons. Note: Do not select yes if the well was rendered inoperative due to the failure or performing a test.

What was the last Well Test Rate? – Free text field to enter the last test rate. Note: The gas must be converted to Barrel of Oil Equivalency (BOE)/day and added to the oil rate for total BOE/day rate.

What was the date of the last Well Test? – Free text field to enter the last well-rate test date.

What were the Environmental Conditions? – Sand; H₂S; CO₂; or Other. Select the external environmental operating condition. If the environmental conditions for which you are submitting a failure notification is not listed, please select “Other” and then type in the condition in the text field.

Pressure and Temperature – Two drop down boxes; the first to select the surface pressure and temperature and the second to select the bottom hole pressure and temperature. Note: If the bottom hole lacks a gauge, then refer to the most recent pressure transient analysis (PTA) or bottom hole pressure survey available.

Under what conditions was the SPPE activated at the time of the failure? – Select the conditions involved in the failure being reported.

Description of the failure – Free text field to provide adequate information to the conditions and nature of the failure. Note: Please provide a description of the damage parts and include the leakage rate or pressure of build up if it was over the limit.

8.5 Well data Cont.

Specify how many cycles or hours were completed since the last preventative maintenance.

(If the SPPE was newly installed, specify how many cycles or hours were completed since the SPPE was installed).

number of cycles or number of hours

Provide a narrative describing the general configuration of the SPPE and hydrocarbon flow path.

What factors contributed to the failure? (Select all that apply)

- Improper Design
- SPPE erroneously thought to be certified but was not
- Inadequate requalification/verification testing
- Installation was incompatible with specific design elements like subsea trees and related equipment, tubing hangers, etc.
- Improper Use
- Operating conditions out of range of device
- Mechanical failure – leak
- Mechanical failure – sand cut erosion
- Mechanical failure – Corrosion (chemical - H₂S or CO₂)
- Mechanical failure – Corrosion (atmosphere)
- Valve seat degradation
- Failed to open
- Failed to close
- Failed to contain hydrocarbons
- Failure to meet required closure timing (consider both isolation and bleed time when deciding)
- Electrical power failure
- Hydraulic power failure
- Incorrect assembly
- Valve damaged during assembly/disassembly
- Improper maintenance
- Improper repair
- Shipping damage
- Damage related to lifting or material handling
- Storm damage
- Collision damage
- Damage related to a seismic event
- Applied hydraulic pressure through wellhead seal assembly required to maintain surface-controlled SSSV in the open position exceeds MRWP of the wellhead by more than a minimum required amount
- Other, Specify:

Preliminary Root Cause (Select all that apply)

- Human Error, Personnel Skills or Knowledge
- Human Error, Quality of Task Planning and Preparation
- Human Error, individual or group decision-making
- Human Error, quality of task execution
- Human Error, quality of hazard mitigation
- Human Error, communication
- Maintenance plan and procedure
- Manufacturing defect
- Design issue
- Wear and tear
- Other, Specify:

Is a formal Root Cause and Failure Analysis recommended?

- Yes
- No

Specify how many cycles or hours were completed since the last preventative maintenance – Number field to input the amount of cycles or hours completed.

Provide a narrative describing the general configuration of the SPPE and hydrocarbon flow path. – Free text field that should clearly describe the pipe arrangement, the total number of SPPE valves, the sequence, and the flow path from the completion well to the production manifold. Note: If it is a Boarding shutdown valve, describe the number of wells and the isolation valve arrangement for each of those wells.

What factors contributed to the failure? – Select the equipment behavior, omission, event, or deficiency that sets the stage for the failure. If the contributing factor for which you are submitting a failure notification is not in the field list, please select “Other” at the bottom and then type in the cause in the supplied text field.

Preliminary Root Cause. -Select the process or events that lead to the failure. If the preliminary root cause for which you are submitting a failure notification is not in the list, please select “Other” at the bottom and then type in the root cause in the supplied text field. Note: If the choice is ‘wear and tear’ please refer to the **SPPE Details** section and include the installation date and shelf life of the failed component in the **redress history** narrative box.

Is a formal Root Cause and Failure Analysis recommended? – A formal Root Cause Failure Analysis (RCFA) includes the operator, OEM, and an inspection of the failed parts. Select yes, if the component required a RCFA.

8.6 Corrective Action

Corrective Action

What corrective action was taken related to the SPPE failure? (select all that apply)

- Adjust
- Check
- Inspection
- Modify
- Overhaul
- Refit
- Remanufacturer
- Repair
- Replace
- Service
- Test
- Other, Specify:

Where was the corrective action accomplished (select one)

- Contractor's facility
- Manufacturer's facility
- On location
- Operator's facility
- Other, specify:

If the corrective action was accomplished on location, who conducted the corrective action? (select one)

- Operator
- Contractor
- Manufacturer
- Not Applicable
- Other, specify:

Was the failure associated with an HSE incident?

- Yes
- No

If yes, what was the type of incident? (select all that apply)

- One or More Fatalities
- Injury to 5 or more persons in a single incident
- Tier 1 Process Safety Event (API 754/IOGP 456)
- Loss of Well Control
- \$1 million direct cost from damage or loss of facility/vessel/equipment
- Oil in the water >= 10,000 gallons (238 bbls)
- Tier 2 Process safety event (API 754/IOGP 456)
- Collisions that result in property or equipment damage > \$25,000
- Incident involving crane or personnel/material handling operations
- Loss of Station-keeping
- Gas release (H₂S and Other) that result in process or equipment shutdown
- Muster for evacuation
- Structural Damage
- Spill < 10,000 gallons (238 bbls)
- Other, specify

What corrective action was taken related to the SPPE failure? - Select the corrective action taken on the platform to place the equipment back into operation. If the corrective action for which you are submitting a failure notification is not part of the list, please select "Other" at the bottom and then type in the action taken in the supplied text field.

Where was the corrective action accomplished- Select the facility that performed the corrective action on the equipment. "Other" maybe selected to input the corrective action completed in the supplied free text box that is not included in the provided list.

If the corrective action was accomplished on location, who conducted the corrective action? – Select the entity that performed the corrective action.

Was the failure associated with an HSE incident? – Select YES/NO to record if this was a Health Safety Equipment (HSE) incident. If Yes, select the type of incidents. "Other" maybe be selected to specify the type of incident in the supplied text box that is not included in the provided list.

9.0 Investigation and Failure Analysis

In the event of a component failure it is important to conduct an effective investigation and failure analysis in order to identify the causes (i.e., physical, human, and systemic) and root cause(s) of a failure. This will establish a knowledge base that the industry can use to instill safety and improve equipment/component reliability.

There are several major approaches to investigation and failure analysis that are used within the industry. Any one of these approaches should be selected in order to verify the root cause and identify the causes (physical, human, or systemic) of the failure.

The scope of any investigation and analysis related to the equipment/component failure must be based on factual information (e.g. hose failure, valve leaking in closed position).

9.1 Failure Causes

As part of the investigation and failure analysis process, three types of causes are identified. These are: physical, human factor, and systemic causes.

9.1.1 Physical Causes

The consequence, manifestation, or results determined through evidence that have influenced or triggered a component failure. Examples include corrosion, fatigue, excessive stress, erosion, rupture, etc.

9.1.2 Human Factor Causes

These are related to human activities that have contributed to the failure of a system or component. Identifying and understanding the contribution of human factors during component failure investigations will improve corrective action identification and component performance. Examples include maintenance error, failure to follow procedures, etc.

9.1.3 Systemic Causes

These are related to any system or process activity rather than other specific isolating factors, including failures in the procedures used to execute the work.

NOTE: If the failure is part of a wider event, then the appropriate investigative procedure may need to be followed IN ADDITION to the creation of the report on component failure.

9.2 Analysis Overview

This section presents the two types of investigation and failure analysis.

- **Failure Cause Known**
- **Root Cause Failure Analysis**

NOTE: If an investigation fails to sufficiently determine the root cause(s) of the failure, then analysis can proceed to a RCFA.

If the root cause is known, then this information is submitted to SafeOCS.

The Failure Notification Form can be updated (as needed) during the investigation and analysis process. The document can be uploaded, along with additional information, using the SafeOCS unique reference number or identifier that was assigned to the original Failure Notification Form.

9.3 Failure Cause Known

The failure cause is known if a failure scenario was conducted and the conditions that lead to the failure were carefully observed and described. A failure scenario is the process in which all the possible sequence and combination of events, conditions, and system states leading to the failure were identified.

9.3.1 Example of Failure Cause Known

A valve damaged during installation normally can be easily categorized as Failure Cause Known. It is important to report such issues, because if this were to escalate to a systemic/reoccurring event, then it may warrant a change to the design or installation/maintenance procedures.

9.3.2 Resources

The Production/Senior Subsea Engineer should discuss what happened with another technical member of crew to determine:

- What happened?
- How it happened?
- Why it happened?

A description of the event and other appropriate information should be provided on or with the Failure Notification Form.

9.3.3 Closure

The investigation is considered closed when the **failure cause is known** and the information is provided. The system will process the resubmittal, thus fulfilling the regulatory requirement. Cases that do not show a **failure cause known** are discussed next under Root Cause Failure Analysis Required (RCFA) (9.4).

If the Failure Notification Form has previously been submitted as “final”, it may still be modified or updated as appropriate. Just attach any supporting documentation using the unique reference number or an equivalent unique identifier that was assigned to the original Failure Notification Form by the SafeOCS system.

9.4 Root Cause Failure Analysis Required (RCFA)

The RCFA (sometimes called a formal root cause failure analysis) is a more detailed investigation requiring more time and resources to complete. The result of the RCFA can be used to correct specific problems and prevent reoccurrence, for instance: OEM product bulletins, equipment owner maintenance system changes, etc.

9.5.1 Physical Evidence

In many instances, component failures are field repairable, but there may be cases when a replacement assembly is readily available. In such an event, the physical evidence of the failed component is provided. Photographs, dimensions, sketches, and written reports can be submitted as further evidence of the investigation.

9.5.2 Resources

Typically, an RCFA includes at least one SME, one or more appropriate representatives from the OEM, a suitably qualified third party, and/or the operator.

The RCFA report should include the causes (physical, human, and systemic) and the contributing factors for the failure occurrence.

9.5.3 Closure

The incident can be considered closed when the component failure report in the database is updated (closing the initial report) and the final report is published. A Failure Notification Form that has either been modified or updated must include the necessary documentation supporting the identified cause(s) and attached using the unique reference number or equivalent unique identifier.

10. Compliance

Pursuant to 30 C.F.R. § 250.803, a failure report shall be generated for SSVs, BSDVs, and USVs contained in section 10.20 of API Spec 6A and section 7.10 of API Spec. 14A and Annex F of API RP 14B for SSSVs. To facilitate the accomplishment of this responsibility, this guidance document established protocols governing the reporting and subsequent investigations of a safety and pollution prevention equipment failure incident.

11. Capture and Share Lessons Learnt

When developing protocols for identifying, investigating, reporting, and maintaining records of incidents and failures, it is important that each of these events serves multiple purposes. For instance, proper investigation and reporting assists OEM's and owners identifying problematic areas and weaknesses that can be improved ensuring equipment safety and reliability.

Pursuant to 30 C.F.R. § 250.803, it is important that lessons learnt from component failures are shared with the appropriate industry stakeholders.

12. Reporting Design and Procedural Changes

Pursuant to 30 C.F.R. § 250.803, changes in design and operating procedures (resulting from a failure) that were not submitted as part of the Failure Notification reporting process must be submitted to SafeOCS within 30 days. This information should include the unique reference number assigned by the SafeOCS system or an equivalent unique identifier established when the Failure Notification Form was originally submitted.

For questions contact SafeOCS
www.safeocs.gov
1-844-OCS-FRST (1-844-627-3778)

APPENDIX 1. DEFINITIONS

SPPE

The process or control equipment whose primary function is safety or the prevention of pollution in offshore oil and gas operations. SafeOCS captures failure data for the five specific SPPE components.

Operator Company

The operator or operating company named as the designated operator of the well associated with the SPPE.

Complex ID

Unique Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) identifier assigned to a single structure or a group of structures connected by a walkway

Structure Number

Unique Bureau of Ocean Energy Management, Regulation and Enforcement number assigned to a specific structure within a complex.

API Well Number

A well identifier assigned as defined in API (American Petroleum Institute) by the appropriate state or federal regulatory agency.

Production Contractor

A company hired by the Operator to manage and operate their equipment.

Redress History

The equipment history of any activity involving the replacement of qualified parts.

Dry Tree

Surface assembly of valves, spools, pressure gauges and chokes fitted to the wellhead of a completed well to control production, located on the deck of the production platform.

Subsea Tree

An assembly of valves, spools, pressure gauges and chokes fitted to the wellhead of a completed well to control production located on the seafloor.

Surface Safety Valve

The valve which contains the wellstream and shuts off flow when closed. The SSV is usually operated by actuator that is designed to close the SSV upon command or loss of power.

Subsurface Safety Valve

A device whose designed function is to prevent uncontrolled well flow when closed.

Boarding Shutdown Valve

A valve usually within 10 feet of a boarding pipeline riser (from a subsea well, flowline, or pipeline) that shuts off flow when closed. It is usually automatically operated and designed to close upon loss of power.

Underwater Safety Valve

Automatic valve assembly (installed at an underwater wellhead location) which contains the well stream and shuts off flow. The USV is typically operated by an actuator that causes the surface safety valve to open when power is supplied and to close automatically when power is lost or released.

Surface Controlled subsurface safety valve (SCSSV)

A downhole safety valve that is operated from surface facilities through a control line strapped to the external surface of the production tubing.

Subsurface Controlled subsurface safety valve (SSCSV)

A downhole safety valve designed to close automatically in an emergency. There are two basic operating mechanisms: valves operated by an increase in fluid flow and valves operated by a decrease in ambient pressure.

Tubing retrievable

Type of subsurface safety valve that is run and retrieved as part of the production tubing string.

Wireline retrievable

Type of safety valve in which the principal components can be run and retrieved by wireline or slickline.

Through flowline (TFL)

Pertaining to treatments performed on subsea wells where the fluids and associated pump-down equipment, such as plugs or darts, are pumped through the flowline normally used for production fluids.

Velocity-type SSCSV

A type of valve designed to close when high well-effluent velocity causes a pressure differential across a bean (orifice) in the valve in excess of the design differential chosen by the installer.

Tubing-pressure-type SSCSV

A type of valve designed to close when tubing pressure drops below a pre-set level referenced by a pneumatically charged container in the SSCSV.

Production

The phase of oil and gas operations involved with well fluids extraction, separation, treatment, disposal, measurement, and sale.

Injection Well

A well in which fluids are injected into the reservoir rather than produced from it, the primary objective typically being to maintain reservoir pressure.

Well Shut-in

A well which is capable of producing, but is isolated with closed valves and not presently producing.

Failure

A condition that prevents the component from operating as designed. Improper performance of a device or equipment item that prevents completion of its design function.

Root Cause

The cause (condition or action) that begins a cause/effect chain and ends in the equipment component failure. If eliminated, it would prevent the reoccurrence of the event (under investigation) and similar occurrences.

Formal Root Cause Failure Analysis (RCFA)

A comprehensive systematic investigation process undertaken to identify the root cause of a component failure or other effect.

Corrective Action

An action, which is taken to correct a failure and restore equipment functionality.

Preventive Action

An action to address a failure's cause to prevent reoccurrence.

Hot-Work

Work that involves heat at temperatures above the hydrocarbon flash point (ex. welding, grinding).

Rated Working Pressure

The maximum internal pressure that the equipment is designed to contain or a design operating condition.

Maximum Allowable Working Pressure

The highest operating pressure allowable at any point in any component during normal operation or disrupted conditions.

Tree

an assembly of valves, gauges, and chokes mounted on a well casing head, used to control the production fluid and flow of oil, water, or gas.