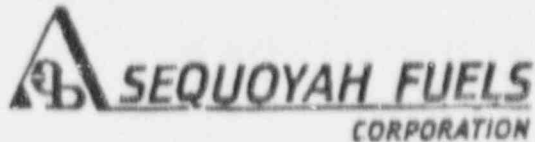


RECEIVED
2/19/91

FAX NO: (918) 489-2291

TEL NO: (918) 489-3327

DATE: 2 / 19 / 91TO: Richard Leonardi, Jr.FAX NO: (817) 860-8810FROM: Tim McIntyre (SOT)TOTAL NUMBER OF PAGES INCLUDING COVER SHEET: 8

MESSAGE:

Attached is a copy of the SOT (Harry Young) report on U.F. Cylinder filling and weighing that you requested.

PRIORITY ROUTING		
FIRST	SECOND	
RA	RSI	RMS&TS
RFA	PSA	NMTS
DESAF	PSB	RATD
DESAI	SP&TS	PS
DRMA	RP&TS	AMS
DE	PS-4	IMS
DE	PS-8	
DE	DL	
DE	CP&RPS	
DE	CP&S	
DE	CP&S	FILE

III-1

SOT Investigation of UF₆ Cylinder Filling and Weighing Process

Page

Event

On Wednesday, February 13, 1991, at approximately 1610, J.C. Brewer informed SOT member GARRY YOUNG that a sample lab report on UF₆ cylinder KM-157 indicated a possible overfill situation. The cylinder had been filled on February 10, 1991, but the lab report on sample analysis results had just been received (which is normal for the routine processing of UF₆ sample results).

J.C. Brewer immediately contacted Richard Parker, Operations Manager, to inform him and to obtain approval to move the suspect cylinder into the accountability weigh station to independently verify the actual weight of the cylinder. Shortly after discussions with Richard Parker, Leroy Reed contacted the shipping operator who obtained the UF₆ Loading Ticket for KM-157 from the shipping area file. The operator checked the printed weight numbers on the platform scale loading ticket and identified a 450 lb. error in the data recorded on the sample data sheet from the trap no. "5 CUR" UF₆ drain weights. This error accounted for the lab results being higher than the actual cylinder weight.

By 1715, word was sent to SOT member GARRY YOUNG that KM-157 had been re-weighed and was at 20,784 lbs. which is below the limit of 21,030 lbs. The re-weighing results were consistent with the previous accountability weighing results, the platform weighing results, and the cart weighing results recorded on February 10, 1991.

Investigation

As a result of this event, an SOT investigation was initiated to review the procedure (N-280-1) and the process

for collecting, recording, evaluating, and transferring data associated with UF_6 cylinder filling and sample analysis. The investigation concluded the following:

1. The existing precautions to prevent overfilling a UF_6 cylinder are appropriate. They include an interlock system that will automatically close the cold trap drain valve if the cart or platform scale indicates approach to an overload condition; two (2) separate scales monitored by the shipping operator as UF_6 is drained into a cylinder (i.e., a cart scale and a platform scale that display at the drain station, the control room, and is printed on the UF_6 Loading Ticket prior to and following each cold trap drain evolution); and a final independent and more accurate accountability scale measurement performed prior to moving the filled UF_6 cylinder outside for cooling down.
2. The data sheet prepared by the shipping operator to send to the sample analysis lab involves calculating the total weight of UF_6 drained from each cold trap based on the platform scale weight printout at the start and finish of each drain. This step can result in human error when subtracting the two numbers and recording the result on the lab data sheet. Such an error occurred in the case of UF_6 cylinder KM-157.
3. The process lab database where sample sheet data and sample analysis data are entered and manipulated has certain error checking features. One of these is the

electronic summation of cold trap drain weights to determine the calculated total cylinder weight (independent of the actually weighed total cylinder weight). This calculated total is reviewed by lab personnel. If it is over or under the expected value by a significant amount, the analysis's weighted average calculations for molybdenum, chromium, and vapor pressure are suspect. An overweight condition was calculated for KM-157 which initiated the concern on February 13, 1991.

4. The operator response to the sample lab results was timely, conservative, and appropriate based on the significance of any indication that a UF_6 cylinder may be overfilled. However, when the lab sample results indicate a calculated overweight condition, the most likely cause is incorrect data since three separate UF_6 cylinder weighing scales would have already been used to check acceptable total cylinder weight prior to the lab data results being compiled. This data error cause was found in the case of KM-157.

Recommendations

1. The existing process for handling UF_6 cylinder weighing and data recording by operations appears appropriate. No specific changes to this process are recommended. However, the shipping operators should be reminded to double check their math when preparing the sample lab data sheets. Although human error cannot be eliminated, periodic reminders can help reduce the likelihood of repeat mistakes.

2. The existing process for handling UF_6 sample data by process lab personnel appears appropriate. However, Don Knoke indicated during this investigation that a simplified data form is being developed for operator use and that electronic checking of drain weight summations that exceed procedural limits is possible. Both of these should be implemented to enhance the handling and review of lab data on UF_6 cylinders.

ggg

2/16/91

Attachments

1. 2/13/91 Lab Analysis Report for KM-157
2. Data Sheet sent to the lab for drain of "5 CUR" to KM-157
3. UF_6 Cylinder Loading Ticket from platform scales for KM-157

ATTACHMENT 1

URANIUM HEXAFLUORIDE

02-13-1991

WEIGHTED COMPOSITE ANALYSES

 PRODUCTION CYLINDER KM-157

Mo PPM U-BASIS .1
 Cr PPM U-BASIS 2.3
 VAPOR PRESSURE 54

DATE SAMPLED *****	TIME SAMPLED *****	COLD TRAP *****	LBS DRAINED *****	Mo PPM *****	Cr PPM *****
2.9.91	1930	4P	5710 ✓	.1	2.8
2.9.91	2330	5CA	3573-3970 ✓	0	0
2.10.91	0100	2P	11520 ✓	.1	2.8

TOTAL WT. = 21218
 20784

2-13-91 weighed
 on accountability scales

2S CYL *****	PERCENT IN PRODUCTION CYLINDER *****
1918	26.9
1919	18.7
1920	54.3

21030 lbs

Bill,

Leroy Reed gave this
 to me & said the weights
 were calculated wrong +
 it to its rightful place
 2-13-91

CYLINDER STATUS/DATA (USE FOR CYLINDERS NOT SAMPLED)

ATTACHMENT 2

OPERATIONS

NS 1919

YL CONTENTS

— Hot. — Dep

Type Drain Station
 48Y 30B
 48Y 30B

S Cyl. GROSS WT. _____ GRAMS
 MAXIMUM ALLOWABLE 2200 GRAMS

ATE/TIME 2330 29-90

Cold Trap SCOR PRESSURE 36 TEMP 2-9-90
 Date of Drain 2-9-90

Lbs. Drained Shipping Cyl. # 157

3925 9475 1631

NET WT. _____ GRAMS FILL STATION _____
 — OK — Not OK

OPERATOR'S INITIALS CEW

Should have been 3525

LABORATORY RECEIPT

DATE/TIME 2-9-91 2345 GROSS WT. _____ NET WT. _____ ANALYSIS
 MAXIMUM ALLOWABLE 2200 GRAMS OK

LABORATORY SUB-SAMPLING

DATE/TIME _____ GROSS WT. _____ NET WT. _____ ANALYSIS

No of 15 mL _____ No AA _____ Cr AA _____

No FPin U-basis _____ Cr FPin U-basis _____

ATTACHMENT 3

VF4 CYLINDER
LOADING TICKET WPC-1000

15M 157

WEIGHT	ACTIVITY
HEIGHT 0 LB	
SEC. # 963	
STATION 3	
14:56 OFFER#1	
HEIGHT 4535 LB	
SEC. # 964	
STATION 3	
15:04 OFFER#1	
HEIGHT 35 LB	
SEC. # 965	
STATION 3	
15:25 OFFER#1	
HEIGHT 35 LB	
SEC. # 966	
STATION 3	Start 4P
18:06 OFFER#1	
HEIGHT 5745 LB	
SEC. # 967	
STATION 3	Turn 4P
19:37 OFFER#1	
HEIGHT 5745 LB	
SEC. # 968	
STATION 3	Start 5000
22:47 OFFER#1	
HEIGHT 9270 LB	
SEC. # 969	
STATION 3	Turn 5000
23:22 OFFER#1	
HEIGHT 9280 LB	
SEC. # 970	
STATION 3	Start 2P
00:47 OFFER#1	
HEIGHT 20800 LB	
SEC. # 971	
STATION 3	End 2P
01:16 OFFER#1	
HEIGHT 20805 LB	
SEC. # 972	
STATION 3	Not
02:54 OFFER#1	
HEIGHT 23205 LB	
SEC. # 973	
STATION 3	Cross
02:55 OFFER#1	

Subtract
these numbers
to obtain
total drain
weight.

DATE	NO.	IN, TRANSIT		GROSS	WEIGHT (pounds)		NET	OBC. TARE	PRESURE TARE	TEST WEIGHT	DATE & TIME SAMPLED	OBSERVATION
		ORDERED FROM	RECEIVED NO.		TARE	WT						
2-2-91	2200							4516	4520	4508		0.42
2-9-91	1930	4P	600E				5745					0.42
2-9-91		SCUR					9270					0.42
2/16/91	6100	2P					30800					DS
2/16/91				25300	4516		20784					DS

km 157