

# **NOTICE:**

**“BEST AVAILABLE COPY”**

**PORTIONS OF THE FOLLOWING  
DOCUMENT ARE ILLEGIBLE**

The Administrative Record Staff

OUTGOING LTR NO

Re RF-1205

DIST	LTR	ENCL
WILLIAMS RO		
DORR JE		
BINJAMIN A		
CROSSLAND WD		
DUNBAR DH		
HABIRER WV		
KUNZ EG		
OWEN IG		
RIBRO WL		
SHANNON WM		
SMITH RE		
SWEENEY PF		
VLJVODA E		
WIDERICHT D		
YODIR RE	X	X
YOUNG FR		
SHIFT SUPTS		
ARMSTEAD WE		
BARNES WL		
BARTLETT JB		
BILLAGAMBA E		
BOYD CW		
BYRNE JP		
CALINS K		
CRUICKER SW		
DENNIS PW		
DOBBI FC		
DONDIUNG LR M		
DUNN DA		
ELLIS HR		
FARRILL IC		
FASULO LJ		
FLOYD DR		
FRIBERG K		
GER JA		
HEALY TJ		
HIBIC RA		
HOFFMAN RB		
HOPPE R		
JANNETTI E		
JOHNSON RT		
KARLSSON RH		
KERN JM		
KICHINER B		
KRUC DM		
LOUDEFNBURG CF		
MARTIN RT		
MARTINEZ JL		
MASON DG		
MCCARTHY JD		
MCMAMARA EF		
O'BRIEN M		
PALJANI MA		
PUTZIER EA		
RHOADES RE		
ROOKER WI		
ROSE C		
STILWARD LM		
STUMP WD		
THOMAS SC		
TROFELTSCHE R		
VILLASQUIZ RN		
WACNER JD		
WEIDNER C		
WERNER MR		
WILLIAMS RA		
Kerrick, C	X	X

CLASSIFICATION	LTR	ENCL
UNCLASSIFIED	X	X
CONFIDENTIAL		
SECRET		
AUTH CLASSIFIED		

DATE 6-15-80

LTR APPROVALS

*[Signature]*

ORIG & TYPIST INITIALS

TRC/mmk

IN REPLY TO LTR NO

ROCKY FLATS PLANT  
ENERGY SYSTEMS GROUP  
P O Box 464  
Golden Colorado 80401  
(303) 497 7000  
Contractor to  
U S Department of Energy



Rockwell  
International

*Copy Done*  
*6-18-80*  
*B*  
*CTI*

000034265

June 13, 1980

80-RF-1205

Mr D Ofte  
DOE, RFAO

EXECUTIVE SUMMARY OF THE 1957 FIRE

Enclosed is the subject summary which you requested we prepare. As you are aware, a great deal more work was done than is reported here. If this summary is insufficient for your needs, additional details can be developed.

*Tom Crites*  
T R Crites, Manager  
Environmental Sciences

TRC mmk  
Orig and 1 cc - Mr Ofte  
Enc

*MHS 16-5*

ADMIN RECCRD

IA-B771-A-000075

1/5

A REVIEW OF THE  
SEPTEMBER 11, 1957 FIRE AT THE  
ROCKY FLATS PLANT IN PLANT BUILDING NUMBER 771

by

C W Barrick  
Environmental Sciences Department

## INTRODUCTION AND SUMMARY

Smoke from a burning glove, detected in a building hallway, led two watchmen to discover flames extending 18 inches out of a Plexiglas window on a glovebox. The time was approximately 10 10 p m , Wednesday, September 11, 1957. The fire had started in a 3 inch high by 5 inch diameter can of plutonium turnings in the "fabrication development line" in Room 180, (first floor) of the plutonium processing and fabrication building (Building 771) of the Rocky Flats Plant near Golden, Colorado. Fires in the box exhaust booster filters and main filter plenum on the second floor may have also been started around this time but were not discovered until 10 28 p m. An explosion of collected flammable vapors in the main exhaust duct at 10 39 p m resulted in spreading plutonium through most of the building and probably contributing to the release of plutonium from the 152 foot tall stack.

The fire in Room 180 was controlled at 10 38 p m but rekindled several times. The main filter fire was controlled at 2 00 a m , September 12 and the fire was officially declared out at 11 30 a m , Thursday, September 12, 1957.

This incident resulted in an \$818,600 AEC property loss and an uncertain environmental release of plutonium and associated radioactivity. Estimates of this release are given as follows:

- 1 "detectable but insignificant<sup>a</sup>," J. Epp, 771 Building 1957 Fire Report
- 2 "25,618 Microcuries recorded stack release<sup>b</sup>," M. A. Thompson, 1975 Omnibus and 1977 Draft Rocky Flats Environmental Impact Statement ERDA 1545-D, 1980 Final Rocky Flats Environmental Impact Statement DOE/EIS-0064
- 3 "1 gram of plutonium offsite<sup>c</sup>," S. E. Hammond, 1971 LASL Meeting Report LA-4756
- 4  $1.0 \pm 0.3$  Ci (14 grams) total plutonium release<sup>d</sup>, C. W. Barrick, 1980

The rationale behind these release estimates is explained in the following referenced paragraphs:

- a "Insignificant" compared to the 1957 industry and governmental standards. For instance, the maximum permissible level for workers was 9 dpm total long lived alpha (TLL $\alpha$ ) activity per cubic meter of air. For comparison the only offsite air sampler with detectable TLL $\alpha$  activity was located near Wagner School. From September 10-13, it sampled 4320 m<sup>3</sup> of air and gave an activity of 0.05 dpm/m<sup>3</sup>. The eight onsite air samplers operating from September 11, 8:15 a.m. to September 12, 3:30 p.m. showed no detectable activity. The detection limit was 0.009 dpm/m<sup>3</sup> for three day air samples. No offsite surface readings of direct count were above background. The average offsite removable TLL $\alpha$  activity was 4.2 dpm/100 cm<sup>2</sup>. The highest was 24 dpm/100 cm<sup>2</sup> at Ward Road and the C&S Railroad tracks. The plant accepted offsite removable activity limit was 50 dpm/100 cm<sup>2</sup>. The average onsite removable activity was 6.3 dpm/100 cm<sup>2</sup>. The highest, 51 dpm/100 cm<sup>2</sup>, was from the 991 Building roof.
- b Several assumptions were made concerning the exhaust air flow rates September through October 1957 and concerning the time represented by the recorded average daily releases "before" and "after the incident." Subsequent authors (Hobbs, Hornbacher, Kittinger, Thompson) additionally assumed that the amount recorded at the stack sampler September through December 1957, minus the average (of normal 1957 months) stack sampler readings was the best estimate of the 1957 fire release. This is the basis of the 25,618  $\mu$ Ci release value. There is no way to accurately quantify the release from stack sampler data because the concentration (dpm/m<sup>3</sup>) and the flow rate was unknown and fluctuating between 10 and 12 p.m. September 11, 1957.
- c "Offsite" meant outside the cattle fence which in 1957 was the USAEC property line enclosing the approximately four square mile plant site. There are several drafts of this report with more explicit maps and data back to March 1958. The first mention noted of "one gram offsite" was in a 1970 draft of Report LA 4756. Monthly progress reports and personal data files were searched but no statements of basis, assumptions, method or calculation was found to indicate the actual derivation of Hammond's estimate.

d This estimate was made for this report by the author assuming the southern most branch of the soil activity deposition, best illustrated by Krey (1976 Health Physics 130, pp 209-214), was due to the '57 fire. Wind speed and direction data from atop 123 Building in 15 minute intervals was used to predict the expected path of releases from the 771 stack. The accuracy of these assumptions was checked where possible by vegetation sampled September 12 and 13 (and continued through October 1957) and analyzed for plutonium. This model was used to deconvolute the Krey 1976 estimate of Rocky Flats plutonium in Denver area soils (11.4 Ci) into that small portion due to the 1957 fire and the remaining larger portion from the oil barrel leak (1958-1969). The release track was taken as the axis of symmetry and the portion of the Krey, 1976, contours west of this axis were rotated to provide closed and deconvoluted contours due to the '57 fire. The larger remainder fit a soil deposition model based on vector analysis of the 17 year wind rose. Here it was assumed the deposition pattern axis of symmetry followed the summation of vectors where the wind direction gave the angle and the quantity  $(\bar{v} - 5)^3$  = vector magnitude with  $\bar{v}$  being the average wind speed in mph (Fuchs "The Mechanics of Aerosols," Chap VIII, 1960).

Other available information sources such as air sample results, removable activity on surfaces, soil sample activity measurements and isotopic ratio measurements were cross checked to verify deposition of plutonium to the southeast in 1957 rather than during the period 1958-69 assumed by Seed, et al, in RFP INV 10 (1971) and Krey (1970)(1976). Both authors stated the 1957 fire release was not explicitly included in the basis of their estimates, probably due to the obviously larger (approximately 90%) fraction of deposition due to the barrel leak and also the uncertainties in the 1957 plutonium stack release estimates.