RFP-4969

SUMMARY REPORT
OF
INCINERATION PLENUM FIRE
BUILDING 771

July 2, 1980

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See attachment

SYSTEM DESCRIPTION

The incinerator system was in use until April 1989. The system was used to reduce Low Level Waste (clothing, PVC containers, Rags). The system consisted of an incinerator unit in a glovebox. The exhaust from the glovebox was ducted to heat exchangers, to a scrubber, to a cyclone, to a (4) four stage HEPA filter plenum, to a (2) two stage HEPA filter plenum, then to atmosphere.

SCOPE

Investigating Committee was appointed by A. Benjamin, Operations Plant Director, on July 2, 1980. The letter of appointment directed the committee to investigate this occurrence to determine the causes(s) or probable cause(s).

SUMMARY

At approximately 1100 on July 2, 1980, a temperature rise above normal was recorded on charts monitoring operation of the incinerator in Room 149, Building 771. This temperature rise continued until the plenum overheat alarm sounded in the immediate incinerator operation area at approximately 1215. The incinerator operators, not knowing what the alarm indicated, attempted to determine what the problem was and what corrective action to take. At 1234 the dispatcher was informed over Emergency Extension 2911 from a Stationary Operating Engineer (SOE) in Building 771 that there was a fire in the incinerator plenum. Other alarms (overheat, plenum deluge flow, additional 2911 calls) were received subsequent to the initial call. The Building Fire Brigade, the Area Utilities Manager, Operations Management, the Fire Department, the Shift Superintendent, and Radiation Monitoring responded to the alarms. Incinerator operators were informed by their foreman of a fire in the incinerator plenum. Incinerator shut down operations were finalized at this time. The Emergency Operations Center (EOC) was activated. The incinerator plenum deluge spray was activated and essentially controlled the fire. The Fire Department and Fire Brigade members entered the plenum and extinguished the fire completely using fire hoses. The fire was quickly extinguished and mop-up operations began at approximately 1300.

Subsequent to the occurrence, an Investigating Committee was appointed to determine the cause(s) and to evaluate the management system for oversights and omissions. The committee interviewed all pertinent personnel and obtained written statements from some. Pre-incident operating conditions were determined, as far as possible, and numerous samples were collected for materials compatibility analysis. Change-analysis and Management Oversight Risk Tree (MORT) techniques were used to evaluate all the data collected.

The incident will be referred to as a fire, but in actuality no flames were observed. This incident is defined as a rapid oxidation reaction. Conclusions reached from the investigation indicate that the management system responded properly with only one exception. That exception was with the ring-down system to activate the EOC. Not all messages were responded to by the intended recipients or their designated alternates.

The causes of the fire in the plenum were as follows:

1. A heat rise in the system, cause uncertain.
2. A deteriorated bypass valve on the No. 3 Heat Exchanger (KOH scrubber).
3. The urethane sealing the HEPA filter media to the filter frame was subject to nitric acid attack.
4. Accumulation of metallic fines on the filter media.

It appears that the polyurethane foam became nitrated from the environment produced by burning wastes contaminated with nitric acid. The nitrated urethane exhibits an exothermic reaction at 160°C with a resultant temperature rise in excess of 240°C. This rise was sufficient to rapidly oxidize the very fine metallic particles collected on the HEPA filters.

The metal powders collected on the filter media are a result of corrosive gases evolved from the combustion of waste materials. The corrosion problem was enhanced by a damaged bypass butterfly valve which allowed hot corrosive gases to bypass the caustic scrubbing system. This valve in connection with a possible plugged caustic system may have resulted in the elevated temperatures necessary to start the above reactions.

FACTS

A. Historical Operating Conditions

Past operating conditions were investigated and the following were found to be typical average temperatures during normal operations:

1. Firebox Outlet Air	800-1000°C
2. Dilution Air	400°C
3. #3 Heat Exchanger Inlet Air	350°C
4. Venturi Outlet	50°C
5. Plenum Inlet	70°-85°C @ 600 cfm

No fires have occurred in the incinerator plenum during routine operations since the wet off-gas system was installed in the first quarter of CY69. See Figures 1, 2, and 3 for schematics of the total system. The following significant changes have been made since the installation of that system.

1. Fire box temperature thermocouple installed.
2. Bypass line ~~with~~ butterfly air operated valve installed to bypass #3 heat exchanger spray nozzle, venturi, wet cyclone, and sludge filter system in the event of a plug in the system
3. Installed baffle plate over air inlet to plenum and removed Fenwall Fire Detection System from the plenum interior.
4. Replaced automatic fire sprinklers in the plenum with manually operated fire sprinklers.

5. Modified filter plenum including upgraded airlocks and new floor pan.

6. Number 1 Heat Exchanger replaced. New smaller orifice installed in the dilution air line per engineering drawings.

7. Replaced 1000°F continuous operation rated HEPA filters with 250°F continuous operation rated HEPA filters, in 1977.

B. Pre-Event Conditions

In late January 1980, the incinerator was shut down for renovation. The renovation included Item 6 previously mentioned. The incinerator was restarted on June 9, 1980, for routine operations. Items being processed were plastics, in-line filters, size-reduction sludges, and other miscellaneous combustibles.

At approximately 1130 on July 2, 1980, the production foreman for dayshift incinerator operations performed a walk-through inspection of the incinerator, the off-gas system, and the filter plenum. Everything appeared to be normal. Readings observed were as follows:

1. Plenum Inlet	70°C
2. Differential Pressure across Filters	0.7 in. water column
3. Plenum Vacuum	7 in. water column

C. The Event

1. Sequence of Events

(All times are according to the Dispatch Office Tapes -
Times in parenthesis are estimates)

<u>TIME</u>	<u>EVENT</u>
1234.35	2911 call from 771 SOE informing of a fire in the incinerator plenum on the second floor of Building 771.
1234.45	Overheat alarm received for the inlet to the main plenum in Building 771.
1234.48	Flow alarm for deluge system - plenums on second floor of 771.
(1235)	Ring-down notification of two fire alarms in 771.
1236.10	Fire Department reported "in service" by G. V. Hornbeck, officer in charge.
(1237)	Emergency Command Station (ECS) established on the south side of Building 771.
1238.46	Plant Protection Shift Captain reported on the scene at the south side of Building 771. He later testified that the Fire Department was already in the building when he arrived.
(1245)	EOC activated.
(1250)	Ring-down notification of EOC activation.
(1311)	Decision made to go Category I for State reporting.
(1329)	State notification began.
(1342)	State notification completed.
(1545)	EOC secured.

2. Response by Operating Personnel

The first warning of an overheat condition in the incinerator plenum occurred when a loud horn sounded in Room 149. The horn is mounted on a local control board near the incinerator fire box. The exact time the horn alarmed cannot be fixed accurately. The best estimate of the Investigating Committee is approximately 1215. The incinerator relief operators could not silence the horn, since they did not know what the alarm indicated.

A public announcement from the dispatcher alerted the incinerator foreman and the Fire Brigade to respond to the fire alarm in the incinerator plenum.

The incinerator foreman left the Process Material Control (PMC) Office, picked up a full-face mask, and went to the east end of the second floor. After talking to the Fire Brigade Captain, he returned to the first floor to check on the incinerator operation. The oxygen was shut off and no material was being fed to the fire box. Combustibles were moved from in front of the fire box charge door into the sorting box. The caustic sludge filter continued to run in an effort to provide additional cooling to the incinerator plenum. The overheat horn at the incinerator firebox was eventually silenced by adjusting the set point of the temperature recording chart.

3. Response by the 771 Area Utilities Department

The Stationary Operating Engineer (SOE) responded to an overheat alarm from Zone Y, Main Filter Plenum. After inspecting the Incinerator Plenum an alarm was called in on Extension 2911. Upon hearing the building announcement the Utilities Manager obtained his bolt cutters and went to the area. After

observing the red glow within the plenum, the chain locking the manual deluge valve was cut and the system was activated.

Following these actions, the Building Fire Brigade and the Fire Department arrived. Because of the high negative pressure on the filter plenum, entry to further combat the fire could not be made. The exhaust fans were turned down, the doors were opened, and the fire was extinguished.

4. Response by the 771 Fire Brigade

After hearing the building announcement, brigade members acquired breathing air packs and responded to the scene. After observing the red glow within the plenum along with the utilities people, two members were instructed to set up an air bottle change station at Chemical Makeup. There was some confusion at the change station because of empty air bottles arriving and the lack of assistance to change the bottles. After getting a full bottle of air, the Fire Brigade Captain returned to the plenum and assisted the Fire Department in putting out the fire.

5. Response by 771 Radiation Monitoring

The Radiation Monitoring Foreman arrived on the scene and was informed of the situation by the Fire Brigade Captain. Approximately six monitors were directed to the second floor to assist with contamination control and bottle changes. Respiratory protection requirements were announced as follows: half-masks in the hallways of the first floor; full-face masks required in the production areas and on the second floor. Subsequent to this announcement some personnel were observed on the second floor in half-masks, others were seen removing their

masks to communicate. The subsequent positive body count of one employee is suspected to be a result of the above violations.

6. Response by the Fire Department

The 2911 Emergency Call was received in the fire station alarm office. The officer in charge responded to the scene with three firemen in Pumper No. 2. The response crew entered Building 771 through the SOE Control Room. The plenum overheat alarm and the water flow alarm were received in the fire station and transmitted to the response crew while they were enroute to 771.

After entering 771, the firemen proceeded to the annunciator panel on the second floor to determine the location of the alarms. They observed that the main plenum inlet overheat and the Zone V deluge water flow alarms were activated. They were informed by an unidentified bystander that the fire was in the incinerator plenum. They proceeded to the incinerator plenum. Upon arrival, they observed a red glow in the plenum. Upon checking the manual deluge valve, it was determined that the manual system had already been activated. They then activated the hose reel on the wall next to the plenum and attempted an entry into the north door of the plenum airlock. They experienced difficulty in opening the inner airlock door. The SOE requested the fans to be turned down and entry was then possible through the inner door. The fourth bank of filters were sprayed down. Entry was then made into the south side of the plenum and the first three stages were sprayed and cooled.

After checking the condition in the main plenum, it was determined that the main plenum deluge system should be shut off.

A bottle change station was established on the second floor outside of the Chemical Makeup Room. The first supply of extra air bottles was delivered to 771 by a member of the alarm crew. There were several empty bottles delivered. The empty bottles had been removed in the Fire Station from the shelves where full bottles are normally stored. Several of these bottles were actually empties awaiting shipment for hydrostatic testing.

D. Post Event

1. Organization

Immediately following the event, a bulletin ~~was~~ was distributed and a letter appointing an investigating committee was issued ~~was~~. The committee met the following morning and work assignments were made ~~was~~. Further direction ~~was~~ was received from the Department of Energy (DOE).

The committee began interviewing all principal participants ~~and~~ and made arrangements to have the plenum interior photographed (Figs. 5 through 8). A sequence of events and change analysis were developed for the incinerator system. Significant recent changes are described previously in this chapter (Section A, Historical Operating Conditions). Decisions were made to visually inspect the caustic system #3 Heat Exchanger bypass valve. This valve was removed and found to be significantly deteriorated (Fig. 12). J. F. Towell of Facilities Engineering and Construction was requested to evaluate the valve and the conditions under which it must operate and to make recommendations for its replacement ~~and~~.

Numerous samples were taken of various components of the incinerator system under the direction of G. W. Brassell, Components Development. A study was undertaken to determine the compatibility between materials of construction and waste by-products (both organic and inorganic) found in the incinerator plenum system to identify the cause or causes of this particular fire. Samples were categorized according to Table I.

TABLE I. Materials Sampling and Analysis

A. HEPA Filters

1. New Filter
2. Contaminated Filter from Previous Run
3. Burned Filter

B. Filter Plenum

1. Smear - Walls and Floor
2. Contaminated Water

C. Incinerator System

1. Fire Brick and Mortar
2. Smear - Duct
3. Smear - Butterfly Valve
4. Caustic Solution

D. Incinerated Waste Materials

1. Paper, Plastic, Sludge, etc.

2. Investigative Observations and Results

A. HEPA Filters

The HEPA filters involved in this incident are manufactured by Flanders Filters, Inc., and consist of a waterproof glass-Nomex media in contact with corrugated aluminum separators. The media is bonded to a stainless steel frame with a rigid FR (fire retardant) polyurethane foam at the top and bottom and with an RTV silicone on the sides. The downstream side of the filter is equipped with a 1/4-in. thick by ~1-in. wide neoprene gasket. This particular filter is rated for a maximum continuous operating temperature of 250°F (121°C).

The materials used in construction of this HEPA filter were characterized, tested after exposure to acid vapors, and analyzed after inservice use for type of contaminants being collected. The analysis and testing of HEPA filters consisting of a new filter, a contaminated filter from previous run, and the burned filter are reported in Table II. In summary, the HEPA filters are inert and will not support combustion at temperatures up to 450°C under normal operating environments. However, when the urethane foam is exposed to HNO₃ fumes, the material exhibits an exothermic reaction at 160°C producing temperatures in excess of 240°C, with the final temperature rise being a function of material availability.

The inservice HEPA filter media analyzed exhibited large amounts of metal oxide powders and some organic contamination consisting largely of chlorates, nitrates, and other unidentified compounds. The metal oxide powders identified consisted mostly of Cr, Fe, and Ni, all present in stainless steel. This is an indication that the stainless steel duct work is being corroded by the acidic environment. All of these very fine metal particles collected on the filter media are capable of supporting combustion.

TABLE II. Analysis of HEPA Filters

HEPA Filter	Material Sampled	Analysis	Results
New	Media	DTA	Stable at Temps up to 450°C
"	"	Ignition Temp.	<900°C
"	"	Flame Test	Does not burn
"	Urethane Foam	DTA	Exotherm >300°C
"	Urethane Exposed to HCl	"	" "
"	Urethane Exposed HNO ₃	"	Exotherm at 160°C - >240°C
"	RTV Silicone	"	Stable up to 400°C
"	Aluminum Separator	E-Spec	No coatings Aluminum
Contaminated from Previous Run	Media	E-Spec	Ba, Fe, Zn, Pb, Cr, Ni
"	"	IR	Metal oxides
"	"	IR	Hydrocarbons ~0.08 mg/g chlorates
Burned Filter	"	E-Spec	Ba, Fe, Zn, Pb, Sn, Sb, Al, Cr, Ni - oxides

B. Filter Plenum

The filter plenum walls and floor were washed with copious amounts of water in the process of extinguishing the fire. The water collected in Tank V-2 was sampled and analyzed. The water sample had a pH of 5.5 and contained ammonium ions and chlorates. Smears of the plenum walls and floor exhibited large amounts of iron and iron oxide and minor amounts of chromium, nickel, and chlorides.

C. Incinerator System

Analysis of the materials found in the incinerator plenum system consisted of determining the composition of the fire brick and mortar used in rebricking the incinerator, removing the butterfly bypass valve for smearing and inspection, and determining the type of contaminants removed by the caustic (KOH) scrubber. The results of the different analyses performed on these materials are reported in Table III.

TABLE III. Analysis of Incinerator System Materials

<u>Material</u>	<u>Analysis</u>	<u>Results</u>
Fire Brick	E-Spec and AA	~0.6% Fe_2O_3
Mortar	" "	~1.0% Fe_2O_3
Duct-Smear	X-ray Fluorescence & X-ray diffraction	Major species - Fe Minor species - Ni, Cr, and KCl Inorganic carbonates, oxides and metal chlorides
Butterfly Valve Smear	X-ray Fluorescence	Inorganic nitrates and metal oxides
Caustic Solution	EDS	Major species-K, KCl Moderate species- K_2CO_3 KOH Minor species-Fe, Ni, Cr, Pb, Cl
	pH	6
	IR	(Fe, Cr, Zn, Ni) oxides Chlorates

D. Incinerated Waste Materials

Waste materials being incinerated at the time of incident were sampled. Typical materials consisted of PVC bottles, surgical gloves, rags, and paper. Combustion of PVC results in large amounts of HCl gas. Analysis of the paper and rag products revealed they contained concentrated amounts of nitric acid. The presence of these two corrosive acids in the incinerator effluent explains the type of contaminants found in the duct work, caustic solution, filter plenum, and filters.

ANALYSIS

A. Management System

The management system for notification and coordination of the emergency worked very well. The only exception was with the ring-down notification of the EOC management group.

B. Emergency Response Personnel

All groups responded in a timely fashion to the emergency. Communication between the involved parties, either directly or by radio, was very difficult because the incident occurred in a high noise area. The firemen wearing contained breathing air apparatus had difficulty communicating with the officer in charge. Some personnel broke their respirator seal to improve communication. Others arrived in less than minimum respiratory protection. Breaking the respirator seal resulted in one positive inhalation. Also, because this action was performed by some members of management, a bad example is set for subordinate employees. The arrival of empty breathing air bottles could have resulted in additional personnel exposures if full ones had not been readily available.

C. Operating Personnel

A certified incinerator operator was present during the time of the incident, yet he did not know what the alarm meant. Knowledge of the alarm significance would not have prevented the fire, but may have minimized it. Also, the operators written log (Fig. 13) is in conflict with the recording chart of the plenum inlet air temperature (Fig. 14)

D. Contributing Factors

The primary contributing factors were the deteriorated bypass valve of the caustic scrubber system, the presence of nitric and hydrochloric acids in the system, and the change from 1000°F to 250°F rated HEPA filters.

CONCLUSIONS

It appears that the FR polyurethane foam became nitrated from the environment produced by burning nitric acid containing waste. The nitrated urethane exhibits an exothermic reaction at 160°C with a resultant temperature rise in excess of 240°C. This temperature rise was sufficiently great enough to rapidly oxidize the very fine metal and metal oxide products collected on the HEPA filter.

The metal fines collected on the filter are a result of the stainless steel duct work corrosion by hot acidic gases evolved from combustion of waste materials. The stainless steel corrosion problem was enhanced by a damaged bypass butterfly valve which allowed hot corrosive gases to bypass the caustic scrubber system. This damaged valve, in connection with a flow restriction in the caustic system, may have also resulted in the 180°C temperature rise experienced by the system.

INCINERATOR PLENUM FIRE
BUILDING 771

July 2, 1980

ATTACHMENT - EXHIBITS

ROCKY FLATS INCINERATOR

Figure 1

DIFFERENTIAL PRESSURE GAUGES

BUILDING 771 - INCINERATOR - OFFGAS SYSTEM

Figure 2

INCINERATOR PLENUM SYSTEM

LEGEND

- TI = Temperature Indicator
- TI = Temperature Indicating
RA = Recording Alarm
- ΔP = Pressure Differential

Figure 3

EOC LOG OF EVENTS AS THEY WERE RECEIVED AT THAT TIME (DATA MAY HAVE BEEN PART
JULY 2, 1980 SPECULATION DURING TIME OF RECEIPT)TIME

1234.35 FIRE DEPARTMENT RESPONDED TO HEAT ALARM ON MAIN FILTER PLENUM
(CHECKED WITH DISPATCH AND CALL WAS RECEIVED ON 2911 AT THIS TIME
ALSO)

1234.38 DELUGE DUMP ALARM RECEIVED - D. GUFFY OF UTILITIES SAW THERE WAS A
FIRE IN INCINERATOR

1235 VIA RINGDOWN - 2 FIRE ALARMS BEING RECEIVED IN BUILDING 771; NO FURTHER
DETAILS

1240.53 DISPATCH RAN THEIR TAPES OF 2911 AND THIS IS THE POINT THAT THE SECOND
CALL WAS RECEIVED ON 2911

1241 - INCINERATOR FIRE CALLED IN ON 2911 - FIRE IN PLENUM OF INCINERATOR

1244 DELUGE SYSTEM IN MAIN FILTER MAY HAVE DUMPED

1245 EOC ACTIVATED VIA THE RINGDOWN SYSTEM

1245 TURNED OFF WATER INTO PLENUM 572:

1249 SHIFT SUPERINTENDENT COMMAND POST SET UP SOUTHWEST CORNER BUILDING 771,
GATE 20

1250 DISPATCH OFFICE NOTIFICATION RECEIVED VIA RINGDOWN THAT THE EOC WAS BEING
ACTIVATED

1252 DELUGE VALVE STILL OPEN IN MAIN PLENUM

1255 SHIFT SUPERINTENDENT (604): THE BELL HAS STOPPED - THIS MIGHT BE AN
INDICATION THAT THE WATER FLOW STOPPED

1255 - EOC CALLED JOHN GEER, UTILITIES, TO REPORT TO EOC - ALL FIREMEN, PLUS FOUR
PLANT PROTECTION EMPLOYEES REPORTED TO BUILDING 771

1255 1600 DISCHARGE ON DELUGE,

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Figure #4-B

EOC LOG

7-2-80

EOC LOG OF EVENTS: BUILDING 771 FIRE

TIME

1258 1000 SQUARE FEET CONTAMINATION AROUND INCINERATOR PLENUM

1259 217/FIRE DEPARTMENT: COMING TO FIRE STATION FOR FRESH AIR BOTTLES

1302 1300 DISCHARGE MAIN FILTER PLENUM DELUGE SYSTEM

1303 204/604: CHEM NEEDS HELP WITH CHANGE-OUT; HE NOTIFIED BY ED PUTZIER

1305 SECOND FLOOR ALARM RECEIVED; SPRINKLER FLOW

1306 GORDON WEBER GOING TO ENVIRONMENT TO SET UP FOR EXTRUSION SAMPLES

1311 DECISION MADE TO GO CATEGORY I

1312 MORRIS - ZERO DROP IN FIRST STAGE OF THE FILTER PLENUM OF INCINERATOR;
SECOND STAGE INDICATE THEY ARE INTACT

1316 FIRE CHIEF ARMSTEAD: EVERYTHING UNDER CONTROL; DON'T THINK IT GOT INTO
SECOND STAGE

1316 CAT. I - FIRE IN INCINERATOR IN 1ST 2 STAGES OF 4 STAGE FILTER PLENUM

1321 604: REQUEST FOR PLASTIC BAGS AND TAPE BE BROUGHT TO BUILDING 771 FROM
WAREHOUSE - EOC RELAYED MESSAGE TO J. WASCHAK

1322 THIRTY MINUTES BEFORE SAMPLES CAN BE PULLED

1322 1000 TO 2000 SQUARE FEET FLOOR SPACE CONTAMINATED - SOME PERSONNEL
SLIGHTLY CONTAMINATED - EXTERNAL

1322 604 ADVISES: SLIGHT CONTAMINATION IN BUILDING - NO RELEASE OF CONTAMINATION
TO OUTSIDE

1328 604: RECONFIRMED THAT CONTAMINATION WAS SLIGHT EXTERNAL

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Figure #4-C

EOC LOG OF EVENTS: BUILDING 771 FIRE

EOC LOG

7-2-80

TIME

1329 STATE NOTIFICATION BEGAN

1331 STILL APPEARS THAT FOUR EMPLOYEES ARE BEING SENT TO BODY COUNT

1331 604: PACKAGING MATERIAL RECEIVED FROM WAREHOUSE

1331 604: ADVISES FOUR PEOPLE TO BODY COUNT - PUTZIER INFORMED BY EOC CADRE

1329 (CALLED E. WOLF ON STATE EMERGENCY NUMBER - SHE SAID SHE WAS ONLY TEMPORARY RELIEF AND DID NOT KNOW WHAT THE PROCEDURE WAS - ED BOONE TOLD HER TO TAKE DOWN THE INFORMATION AND TRY TO GET IN TOUCH WITH SOMEBODY TO FIND PROCEDURES)

1332 (CALLED AL HAZLE'S OFFICE - REACHED EDITH ROOT AND SHE SAID THERE WAS NO ONE ELSE IN THE OFFICE - GAVE HER THE MESSAGE - SHE DIDN'T KNOW THE PROCEDURE EITHER)

1333 ED BOON NOTIFIED JEFFCO - THEY TOOK THE MESSAGE AND SAID THEY KNEW WHAT TO DO - (JEFFCO WAS CALLED IN ERROR; THEY'RE NOT SUPPOSE TO BE NOTIFIED IN A CATEGORY I INCIDENT/MM).

1335 604: THEY ARE TAKING DOWNSTAIRS PERSONNEL OFF OF RESPIRATORS

1335 SETTING UP PORTABLE MONITOR EAST OF BUILDING 771

1335 SET UP AT "H" DOOR FOR PACKAGING CONTAMINATED MATERIALS

1337 NO SAM ALARMS - STEPHEN REPORTED READ-OUT OKAY

1338 604 TO 501: EVERYTHING GOING SATISFACTORY - 701 UTILITIES SOUTH WALL, BUILDING 771

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Figure #4-D

EOC LOG

7-2-80

EOC LOG OF EVENTS: BUILDING 771 FIRE

TIME

1342 STATE EMERGENCY PLAN NOTIFICATION COMPLETED AT THIS TIME (CONFIRMATIONS RECEIVED)

1346 PA ANNOUNCEMENT IN BUILDING 771 STATING FIRST FLOOR OFF RESPIRATORS - SECOND FLOOR STILL IN FULL FACE - GORDON WEBER SETTING UP PORTABLE SAMPLER ON EAST SIDE OF BUILDING 771

1349 604 (PER REQUEST): TOOK APPROXIMATELY THREE MINUTES TO GET UNDER CONTROL (REST OF TIME WAS COOL-DOWN PERIOD)

1349 MAIN FILTER PLENUM MANUAL DELUGE VALVE SET OFF BY UTILITIES PERSONNEL TO PUT WATER ON FILTERS AS PRECAUTIONARY MEASURE (ED BOONE SAID NOT TRUE)

FOLLOWING IS THE MESSAGE THAT WAS TRANSMITTED TO THE STATE EMERGENCY NOTIFICATION GROUP FOR A CATEGORY I: "THE ROCKY FLATS' SHIFT SUPERINTENDENT ADVISES A CATEGORY I FIRE IN BUILDING 771 IN LOCAL INCINERATOR. NO RELEASE OF CONTAMINATION TO THE OUTSIDE - 1000 TO 2000 SQUARE FEET OF FLOOR CONTAMINATED - SOME EXTERNAL EXPOSURE TO PERSONNEL - CAUSE UNKNOWN AT THIS TIME"

1355 AIR SAMPLES WHICH GO INSIDE TO OUTSIDE OF BUILDING 771 WERE SCREENED AND NO RELEASE WAS DETECTED/ED PUTZIER

1356 REPORTED TO AL HAZLE, STATE EOC, FIRE UNDER CONTROL IN THREE MINUTES; REST OF TIME SPENT ON COOL-DOWN; WATER TURNED ON MAIN FILTER.

1358 604: LEAVING COMMAND POST GOING TO MAIN OFFICE IN BUILDING 771 FOR CRITIQUE C. CREWS WILL BE COMMAND POST CONTACT POINT

1400 201/604: FIRE CHIEF IN DECONTAMINATION ROOM

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Figure #4-E

EOC LOG OF EVENTS: BUILDING 771 FIRE

EOC LOG

7-2-80

TIME

1410 604: CLEANING UP; MAIN PLENUM OKAY AND OPERATING

1413 ALL TRUCKS FROM GARAGE WERE ON STANDBY FOR THIS EMERGENCY FROM 1300 TO 1350/J. WASCHAK

1414 604: UNCONFIRMED REPORT TOTAL ANALYSIS WAS BACKGROUND ON THREE STACK AIR SAMPLES

1419 604: SEVEN PEOPLE TO BODY COUNT AT THIS TIME

1422 C. CREWS ADVISED THAT THEY ARE GOING TO SECURE THE COMMAND POST

1426 TAKING SAMPLES OF AIR BOTTLES FOR REMOVAL

1426 FIRE TRUCK (PUMPER) SECURED

1427 771 SOUTH HATCH WAS SECURED BY R. NEWBY, PLANT PROTECTION

1427 AIR SAMPLES HAVE BEEN CHECKED AND TESTS HAVE CONFIRMED NO MEASURABLE RELEASE - TEST TAKEN BY ENVIRONMENTAL SCIENCES PER 604

1427 W. ARMSTEAD HOT; LOST CLOTHES

1507 STATE EMERGENCY SYSTEM NOTIFIED: " EMERGENCY CATEGORY I OVER AT 1355; NO RELEASE TO OUTSIDE; MAIN FILTER PLENUM IN OPERATION."

1540 PER RADIATION MONITORING: 1500 SQUARE FEET CONTAMINATED; 1M AT INCINERATOR PLENUM DOOR AND TAILS OFF TO 10K AWAY FROM DOOR

1545 EOC SECURED

Figure ⁵~~4~~

INCINERATOR FILTER PLENUM 7-2-80

1st STAGE, TOWARD AIR INLET

Figure 6

INCINERATOR FILTER PLENUM 7-2-80
1st STAGE, FRONT SIDE

Figure #12⁷
INCINERATOR FILTER PLENUM 7-2-80
2nd STAGE, BACK SIDE

Figure #12 8

INCINERATOR FILTER PLENUM 7-2-80
3rd STAGE, FRONT SIDE

Figure #4 9

INCINERATOR FILTER PLENUM 7-2-80
3rd STAGE, FRONT SIDE, ONE FILTER

Figure #~~45~~ 10

INCINERATOR FILTER PLENUM 7-2-80
BETWEEN 2nd AND 3rd STAGES

Figure 16

INCINERATOR FILTER PLENUM 7-2-80

4th STAGE, BACK SIDE

Figure #12 12

BY-PASS VALVE TO NO. 3 HEAT EXCHANGER
- KOH SCRUBBER - 7-2-80

DATE 7-2-80

INCINERATOR CAUSTIC SCRUB SHEET

OPERATOR	TIME	LEVEL IN SUMP	CAUSTIC FLOW RATE	TEMPERATURE OF CAUSTIC HEAT EXCHANGER	TEMPERATURE OF #3 OUTLET	TEMPERATURE OF GAS GOING TO PLENUM	VELOCITY IN CFM	IN: OF H ₂ O				PUMP PRESSURE ON SPRAY CHAMBER	PUMP PRESSURE ON VENTURI	FILTER DIFF.	REMARKS
								SYSTEMS DIFFERENTIAL	VENTURI	WET CYCLONE & DEMISTER	SPRAY CHAMBER				
	2400	3/4	60	30	47	55		38	30	1	4.5	23	18	.5	
	0100	1/3	70	31	47	55		38	31	1	4	23	18	.5	
	0200	1/2	70	31	47	55		38	31	1	4.5	22	18	.5	
	0300	2/3	70	31	48	55		36	28	1	4	18	14	.6	Grossed Wheel
	0400	Full	70	32	50	55		36	29	1	4	22	18	.6	
	0500	Full	70	31	48	55		36	28	1	5.5	20	18	.6	
	0600	Full	70	30	48	55		37	28	.5	5	24	22	.6	Washed Venturi
	0700	Full	70	33	50	55		37	28	.5	6	30	23	.6	
	0800	Full	60	30	50	55		37	29	.5	5	29	24	.6	
	0900	Full	60	30	50	55		37	29	.5	5	29	24	.6	
	1000	Full	60	30	50	55		37	29	.5	5	29	24	.6	
	1100	1/2	60	30	48	55		35	28	1	3.5	26	22	.7	
	1200	1/2	60	32	48	55		25	28	1	3.5	26	22	.7	
	1300	1/4	60	29	40	70		14	0	0	1.2	26	24	0	
	1400														
	1500														
	1600														
	1700														
	1800														
	1900														
	2000														
	2100														
	2200														
	2300														

Figure #13

INCINERATOR OPERATORS LOG

7-2-80

Figure #20 14
 CHART INCINERATOR PLENUM
 INLET TEMPERATURE 7-2-80

Figure #27 15
 CHART INCINERATOR OFF-GAS
 SYSTEM TEMPERATURES 7-2-80

Figure #22 | 6
 CHART INCINERATOR FIRE-BOX
 TEMPERATURE 7-2-80