NOTICE

**CERTAIN DATA
CONTAINED IN THIS
DOCUMENT MAY BE
DIFFICULT TO READ
IN MICROFICHE
PRODUCTS.**

CLASSIFICATION <div style="font-size: 2em; font-weight: bold; margin-top: 10px;">UNCLASSIFIED</div>			DOCU <div style="margin-top: 10px;">HW--89067</div>		IN NO.
<div style="font-size: 1.5em; font-weight: bold; margin-top: 5px;">Battelle</div> <div style="font-size: 0.8em;">Pacific Northwest Laboratories Richland, Washington 99352</div>			COPY <div style="margin-top: 5px;">1</div>		DE93 001738	
TITLE AND AUTHOR <div style="margin-top: 10px;">UNUSUAL INCIDENT - RADIOIODINE RELEASE TO ATMOSPHERE PUREX PLANT - SEPTEMBER 2, 1963.</div> <div style="margin-top: 10px;">JH WARREN, CHAIRMAN</div>			DATE <div style="margin-top: 10px;">SEPTEMBER 19, 1963</div>		CONTRACT <div style="margin-top: 5px;"> ☐ - 1830 ☐ - 1831 </div>	
			PROJECT NO. 		RESERVED FOR TECH. INFO. USE <div style="text-align: center; margin-top: 20px;"> </div>	
D I S T R I B U T I O N						
NAME	COMPANY	LOCATION	NAME	COMPANY	LOCATION	TECH. INFO.
<div style="font-weight: bold; font-size: 1.2em; margin-bottom: 20px;">DISCLAIMER</div> <div style="font-size: 0.8em;"> <p>This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.</p> </div> <div style="margin-top: 50px; text-align: right; font-size: 0.9em;"> Due to film deterioration, portions of this document may be illegible. </div>						
ROUTE TO	PAYROLL NO.	COMPANY	LOCATION	FILES ROUTE DATE	SIGNATURE AND DATE	

UNCLASSIFIED

MASTER

AEC-RL RICHLAND, WASH

CLASSIFICATION

DISTRIBUTION RESTRICTED TO U.S. ONLY

UNCLAS

HW-89067
/ --

CHEMICAL PROCESSING DEPARTMENT

UNUSUAL INCIDENT

RADIOIODINE RELEASE TO ATMOSPHERE

PUREX PLANT - SEPT. 2, 1963

Distribution:

WS Frank	(4)
WJ Gartin	(4)
AB Groninger	
KG Grimm	
MK Harmon	(5)
RW Harvey	
WE Johnson	(2)
TG LaFollette	(3)
PR McMurray	(5)
CE Newton	
HM Parker	
PH Reinker	
OC Schroeder	(5)
HP Shaw	(3)
JH Warren	(2)
Extra	(12)

(Issue Date 9-19-63)

Further stabilization action in Purex consisted of moving the liquid contents of the C Dissolver to a metal solution holding tank where mercuric nitrate was added to a 0.001 molar concentration to hold the iodine. The undissolved metal in the C dissolver was covered with water and later adjusted to a five per cent caustic concentration. Temperatures and air flows on the C dissolver were held to a practical minimum and special monitoring of associated process vessel air exhaust systems was initiated.

An aerial survey of the environs of Purex on the afternoon of September 2 did not indicate any problem external to the plant. Surveys of the deposition filters around the 291-A stack and at the equipment disposal tunnel construction site were negative. The rate of release of radioiodine to the atmosphere peaked at 2.6 curies/hour on September 2, then reduced steadily to 0.03 curies/hour by September 5. Total amounts released were approximately 24 curies on September 2; 34 on September 3; and five on September 4 (incl. period to 9:10 A.M. September 5).

OBSERVATIONS

1. Cask car #40, loaded in the 100-C Area, was loaded inadvertently with 18-day cooled metal when it was thought to have been loaded with 153-day metal.
2. The majority of the cask car loading is done in this area on day shift. Shipment on the 4-12 and 12-8 shifts is not unusual. This particular loading was accomplished on the 4-12 shift.
3. A utility operator assisted in the loading of the cask car, receiving verbal instructions from the pile operator concerning the position numbers of the buckets to be loaded. It was intended that positions 2284, 2285, and 2286 be utilized. Thru an error in instruction, understanding or execution, the utility operator loaded the buckets from positions 2084, 2085, and 2086 instead, giving the pile operator the corresponding bucket cards.
4. The pile operator made out the transfer papers entering the position numbers which should have been loaded, and attached the bucket cards which he had been given by the utility operator to the transfer papers. The transfer papers were then signed by the supervisor. The bucket cards were not checked against the shipping papers nor were they initialed by the supervisor.

Each of these monitors has an alarm feature which reports in the dispatcher's office. The C-dissolver monitor has its own instrumentation, while the A and B dissolver monitors have a common instrument requiring positioning of a manually operated valve before dissolving begins.

8. The monitor systems on the A-dissolver and in the common off-gas line are operated and maintained by Purex Operation. The monitor on the 291-A stack was installed by HL to measure cumulative emission over extended periods, but serves Purex as a third operating control at the same time. It is maintained by the Purex Operation as a service to HL, with operability checking once a week. It was checked Friday, August 30, and found to be operating satisfactorily.
9. The 291-A stack monitor is set to alarm at 2,000 c/m. It did not alarm on the day of the incident until 12:30 P.M. This monitor is more complex than the other two, involving the passage of the off-gas through a caustic scrubber. Some of the caustic oleeds off continuously, flows past a counting tube, and collects in a bottle. This monitor seemed to be working properly when checked by HL personnel in the afternoon of the incident, September 2.
10. An estimated 100,000 curies of I-131 was present in the three buckets (approx. three tons) of "green" metal charged to C-dissolver. Early recognition of unusual circumstances and stabilization actions taken avoided a much greater emission.
11. Investigative work in the 100 Areas as soon as the incident was reported to them was prompt, thorough and accurate, enabling action to proceed without delay and on an informed basis from a technical point of view.
12. The Purex C-dissolver will be tied up for at least 60 days, potentially limiting plant capacity by approximately one-third.
13. Cost of the incident was \$2,080.00, itemized as follows:

Overtime worked by HL monitors and radio-chemistry laboratorians	\$1,900
Milk purchased by HL for analysis	\$ 100
Stabilization chemicals used by Purex	\$ 80
	<hr/>
	\$2,080

CAUSE

Failure to follow prescribed administrative procedures governing the loading of cask cars.

RECOMMENDATIONS

1. Tighten up design of IV control designed to protect against the inadvertent loading and shipping of short cooled metal from the 100 Areas to the 200 Area. Explore a method of doing this automatically.
2. Regarding the 291-2 stack idene monitor, thoroughly integrate a review of the procedure for its source checking, operation and maintenance between involved CPD and HL personnel.

*HL for Hanford Laboratory

UNUSUAL RADIOIODINE RELEASE TO ATMOSPHERE FROM PUREX PLANT

Time of Occurrence: September 2, 1963 (Starting at 8:30 A.M.)

Time of Formal Investigation: September 16, 1963 (1:30 P.M.)

Investigating Committee: Chairman, JH Warren - Production
 PR McMurray - Purex
 CE Newton - Radiation Protection, HL
 OC Schroeder - Manufacturing, LPD
 Secretary, RW Harvey - Industrial Engineering

INTRODUCTION

During a routine uranium metal dissolving operation in the Purex Plant, alarms from two dissolver system monitors activated, indicating unusually high radiation in the off-gas stream. Although the reaction was shutdown in approximately 15 minutes and the situation stabilized, iodine emission from the stack over the next 72-hour period totalled approximately 63 curies.

DESCRIPTION

On the evening of September 1, five cask cars loaded with irradiated uranium metal were received from 100 Areas C, E, and KW. All slips were checked, showing the metal to be 15 days old on average. The 15 buckets which these cars contained were charged to the C dissolver in Purex on the 12-8 shift, September 2. Coating removal was completed before the start of the 8-4 shift. The dissolving operation was started at 8:10 A.M., with the dissolving temperature reaching a maximum (about 100°C) at 8:25 A.M. The off-gas iodine monitors on both the C dissolver and in the 293-A combined dissolver off-gas line alarmed at 8:30 A.M.

A check of the monitor charts in the P80 gallery by the supervisor indicated the alarm was valid. The iodine monitor on the 291-A stack did not activate, however, and a quick check indicated it to be tracking normally. It was then tested with a source and appeared to give a normal response. (A more comprehensive check later in the afternoon by HL personnel showed this instrument to be operating properly.) At this point, 8:45 A.M., the dissolution operation was suspended and cooling of the dissolver contents was begun. The three 100 Areas which had furnished the irradiated metal were contacted, and immediate checks of the shipping papers and bucket slips were made. It was verified that one of the cars had been loaded with 18-day cooled metal in the 100-C Area.

END

**DATE
FILMED**

2 1261 93