

Honeywell

40-7982

June 4, 1981



CERTIFIED MAIL
RETURN RECEIPT REQUESTED

EA-81-36
Recd 6/8/81

Mr. Victor Stello, Jr.
Director
Office of Inspection & Enforcement
US Nuclear Regulatory Commission
Washington, DC 20555

Re: License No. SUB-971, EA81-36

Dear Sir:

This is written in response to the NRC May 20, 1981 Notice of Violation due to a January 2, 1981 incident in which a drum of Honeywell's low-specific radioactive material blew its lid during off-loading at the Richland, Washington burial site.

Pursuant to the provisions of 10 CFR 2.201 and Appendix A of the above referenced NRC communications:

- (1) Honeywell has admitted to the alleged violation.
- (2) The reasons for the violation are described in the January 15, 1981 letter to NRC from F. Ordemann, in the section entitled "Cause of Incident". The reasons for this inadvertent violation are described in detail:

An investigation of the exploded drum by Armand Peterson, Honeywell Production Engineer, on January 6 revealed that the cause of the explosion was excessive hydrogen gas pressure in the drum which was caused by improper mixing of the DU chips and concrete. The improper mixing was traced to an experiment to simultaneously mix DU turnings, compacted absolute filters, and concrete. The experiment was terminated after only several trials.

Normal Honeywell waste disposal procedures include the packing of dry contaminated materials such as paper products, packaging materials, gloves, etc. to be placed on the top of cured DU/concrete mixtures. Absolute filters, two foot square by one foot thick wood frame units, are normally sawed into several pieces and placed on the top of the cured concrete mixtures.

In the experiment in question, absolute filter units were placed in plastic bags, dropped into a 55 gallon drum, and crushed with a trash compactor. DU chips were then placed on top of the crushed filtering units and a concrete mix poured over the top. The experiment was contrary to formal waste disposal procedures which were in existence, but it was conducted by personnel who were interested in developing a better method of disposing of the absolute filter units. This new technique was proposed to the Engineering Department in the form of an Employee suggestion which would be eligible for a cash award if a cost savings would result.

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DEFENSE SYSTEMS DIVISION

HONEYWELL INC., 600 SECOND STREET NE, HOPKINS, MINNESOTA 55343, TELEPHONE 612/931-6511

IE-14

After review of the proposed technique it was dismissed because it was felt that it was not possible to thoroughly mix the chips and concrete in the presence of other contaminated waste such as a compacted filter unit.

There were only five or six drums which were processed in this manner. The drums were set aside for observation, and, after a two week period, no heat reaction was detected. They were placed in the normal barrel disposal area, decontaminated, capped, marked and labeled for shipment to the disposal site.

The exploded drum examined at Hanford also had an excessive amount of moisture inside the drum. A large quantity of floor-drying compound which was very wet had been placed on top of the cured concrete mixture. The inside of the drum above the concrete layer was severely rusted. It is felt that the excessive moisture inside the capped drum, combined with the presence of DU chips not thoroughly mixed in concrete, produced the reaction with DU evolving hydrogen gas. The reaction of uranium in water produces a Uranium oxide and hydrogen. The drum in question was capped and decontaminated on or before November 21. The production of hydrogen gas probably started as soon as the drum was capped and would have continued until the drum finally exploded.

The boltring on the exploded drum was found to be broken. It is not known if the boltring broke, allowing the gas pressure inside the drum to be released, or if an explosion inside the drum broke the ring itself. Although no evidence of fire was found inside or outside the drum, the violence of the explosion suggests that it was caused by an explosion of the hydrogen gas.

Since it was not possible to determine if any of the rest of the drums in the ADCO trailer might have potentially explosive conditions, a method was devised to unload the truck and place the drums in the disposal trench which would not require the U.S. Ecology yard men to lean over the tops of the drums. This unloading was accomplished on January 7 and January 8. No further explosions took place.

(3) Corrective actions which have been taken are described herein:

As stated above the experimental procedure was terminated after several trials and, in fact, was contrary to existing Honeywell waste disposal procedures. Copies of the Honeywell procedures for packaging DU waste materials are attached. They all indicate that DU chips or sludge are not to be mixed with contaminated waste materials.

One significant change has been made to these procedures since the incident on January 2, however. The cement mixing and waste packaging operations are conducted by Honeywell Stores personnel. They also decontaminate the drums prior to shipment and place all markings on the drums.

An inspection operation has been added to the layouts making it mandatory for a Quality Department Inspector to check all drums prior to being capped. The Inspector will make a notation in the logbook kept by Stores personnel that the insides of the drums are dry. Drums that have any moisture present will not be capped.

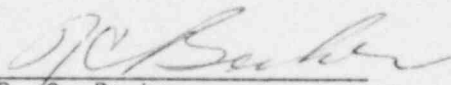
Adherence to these procedures is mandatory and will insure that no drums packaged will have an excessive buildup of hydrogen gas pressure.

As an added precaution all previously capped drums remaining at Honeywell were opened, checked for the presence of moisture, and also checked to determine if they could have been mixed by the experimental procedure. Over 100 barrels were re-opened, inspected and re-capped. None were found to have conditions similar to those in the drum that blew open at Richland.

- (4) The steps which are being taken to avoid further non-compliance include:
 - o Strict observance of written cement mixing and waste packaging operations.
 - o Inspection prior to sealing the drums.
- (5) Full compliance was achieved on January 8, 1981. At this time, disposal, packaging and inspection procedures were reviewed and updated to preclude future recurrence. Further, all appropriate employees were briefed on the incident, its causes and subsequent corrective actions. Finally, Honeywell management and legal department were assessed of the incident.

If there is any further information or clarification required, please contact us at your convenience.

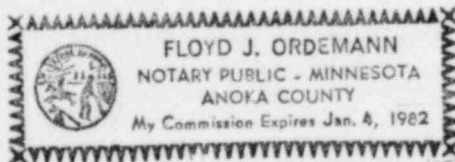
Very truly yours,


 R. C. Becker
 Chief Contracts Counsel

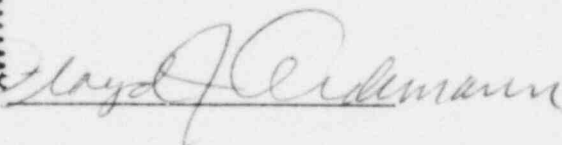
Attachments 4

STATE OF MINNESOTA)
) SS
 County of Anoka)

The foregoing instrument was acknowledged before me this 4th day of June, 1981,



by Robert C. Becker



PRODUCTION PROCESS
DETAIL

OPERATOR MUST WEAR SAFETY GLASSES WITH SIDE SHIELDS

ISSUE	DEPT. NO.	GRP	OPERATION TITLE	PART NUMBER	OPERATION NO.
000	4310	01	DISPOSAL OF DU CHIPS, TURNINGS	28111058	910V
REASON FOR ISSUE				PART NAME	
				PENETRATOR	
OPERATOR STANDARD HOURS			HRS/M	P.L.	DATE
				LHR/AGP	1/3/81
PIECES PER HOUR				LIST BURDEN SUPPLIES, TOOLS, AND EQUIPMENT	
				SHEET 1 OF 2	

SAFETY:

- OBSERVE ALL HANDLING, INVENTORY CONTROL, AND SAFETY PROCEDURES POSTED FOR DU. ROOM

EQUIPMENT:

- DOT-APPROVED 55-GALLON DRUM - 17H.
- SCRAP BUILDING CEMENT MIXING HOOD.
- SAKRETE MORTAR MIX.
- H28111058-T65 DRUM VIBRATOR.
- DRUM-COOLING FIXTURE.
- CEMENT MIXER.

OPERATING INSTRUCTIONS:

- AT THE END OF EACH SHIFT, OR WHEN SUFFICIENT CHIPS ARE AVAILABLE, COLLECT THE D.U. CHIPS AND TURNINGS REMOVED FROM THE BROOKS AUTO CUTOFF, HORIZONTAL MILLS, HEALD BOREMATICS AND LATHES. MOVE TO CEMENT MIXING HOOD.
- PACK CHIPS INTO 55-GALLON DRUM FREE OF NICKS, DENTS AND HOLES. APPROXIMATELY 220 LBS. OF CHIPS.
- MIX 240 LBS. OF SAKRETE MORTAR MIX (4 BAGS) TO APPROXIMATELY 1-2 GALLONS OF WATER TO PRODUCE A THICK TROWELING CONSISTENCY.
- POUR MIX OVER PACKED CHIPS. DRUM IS APPROXIMATELY 3/4 FULL AND WEIGHS 540 LBS. THIS MIX REPRESENTS A RATIO OF ABOUT 1 TO 1. (52% CONCRETE - 48% DU)
- AFTER POURING MIX INTO DRUM, IMMEDIATELY CLEAN OFF ANY CONCRETE ON EXTERNAL SURFACE OF DRUM. (THIS WILL MAKE IT EASIER TO DECONTAMINATE DRUMS LATER.)

PART NUMBER	OPERATION NO.
28111058	910V

POOR ORIGINAL

PRODUCTION PROCESS
DETAIL

ISSUE	DEPT. NO.	GRP	OPERATION TITLE																						PART NUMBER	OPERATION NO.		
002	4310	01	DISPOSAL OF D.U. CHIPS, TURNINGS																						28111058	910V		
REASON FOR ISSUE																									PART NAME			
																									PENETRATOR			
SHEET																								P.E.	DATE	I.E.	SHEET 2 OF 2	
ISSUE																								LHR/AGP	11/8/81			

LIST BURDEN SUPPLIES, TOOLS, AND EQUIPMENT

6. AFTER POURING MIX OVER CHIPS, USE A STEEL ROD TO DISTRIBUTE CONCRETE THROUGH CHIPS.
7. AFFIX LABEL (OR TAPE) TO DRUM INCLUDING THE FOLLOWING INFORMATION: A) Type of Waste - Chips B) Date
c) Lot Number of Parts being Machined on Borematic #2.
8. DO NOT MIX D.U. CHIPS WITH SLUDGE BECAUSE OF A POTENTIAL FIRE HAZARD.
9. DO NOT MIX D.U. CHIP OR SLUDGE WITH CONTAMINATED WASTE BECAUSE OF A POTENTIAL FIRE HAZARD.

SAFETY INSTRUCTIONS:

1. THE PURPOSE OF ENCAPSULATING DU CHIPS IN CONCRETE IS TO ELIMINATE THE POSSIBILITY OF A FIRE CAUSED BY THE HEAT GENERATED BY THE REACTION OF SMALL DU PARTICLES AND AIR OR MOISTURE. ENCAPSULATION PREVENTS THE ACCUMULATION OF LARGE AMOUNTS OF DU AND REDUCES THE POSSIBILITY OF EXCESSIVE HEAT BUILD UP.
2. IF A DRUM APPEARS TO BE HEATING UP EXCESSIVELY, PLACE IT IN THE DRUM-COOLING FIXTURE. HOLD THERE UNTIL TEMPERATURE FALLS TO ROOM TEMPERATURE. NOTIFY DEPARTMENT SUPERVISOR IMMEDIATELY IF A DRUM HEATS UP.

J. Patrek
10-8-80

PART NUMBER	OPERATION NO.
28111058	910V

PRODUCTION PROCESS
DETAIL

OPERATOR MUST WEAR SAFETY GLASSES WITH SIDE SHIELDS

ISSUE	DEPT. NO.	GRP	OPERATION TITLE	PART NUMBER	OPERATION NO.
D22	4310	01	DISPOSAL OF D.U. GRINDING FINES, SLUDGE	28111058	915V
REASON FOR ISSUE				PART NAME	
				PENETRATOR	
OPERATOR STANDARD HOURS			PIECES PER HOUR	P.L.	DATE
HRS/M				LIR/AGP	11/5/81
				IL.	SHEET 1 OF 2
				LIST BURDEN SUPPLIES, TOOLS, AND EQUIPMENT	

SAFETY:

1. OBSERVE ALL HANDLING, INVENTORY CONTROL AND SAFETY PROCEDURES POSTED FOR D.U. ROOM.

SPECIAL NOTES: DU FINES ARE MUCH MORE HAZARDOUS THAN CHIPS OR TURNINGS. TAKE PARTICULAR CARE TO GET MIXTURES CORRECT WHEN PERFORMING THIS OPERATION.

OPERATING INSTRUCTIONS:

1. AT THE END OF EACH SHIFT, OR WHEN SUFFICIENT SLUDGE IS AVAILABLE, COLLECT SLUDGE FROM STONE CUTOFF SAW AND CENTERLESS GRINDERS. ALSO COLLECT ANY SLUDGE REMOVED DURING MACHINE CLEANING OPERATIONS. MOVE TO CEMENT MIXING HOOD
2. TRANSFER 50 LBS. OF SLUDGE (APPROXIMATELY 1/2 FULL - 5 GALLON PAIL) TO CEMENT MIXER.
3. ADD 240 LBS. OF SAKRETE MORTAR MIX (4 BAGS) AND APPROXIMATELY 1-2 GALLONS OF WATER TO PRODUCE A THICK TROWELING CONSISTENCY. THIS MIX REPRESENTS A CONCRETE/DU RATIO OF ABOUT 7 TO 1 (83% CONCRETE-12% DU-5% GRINDING WHEEL ABRASIVES).
4. POUR MIX INTO 55-GALLON DRUM FREE OF NICKS, DENTS AND HOLES.
5. AFTER POURING MIX INTO DRUM, IMMEDIATELY CLEAN OFF ANY CONCRETE ON EXTERNAL SURFACE OF DRUM. (THIS WILL MAKE IT EASIER TO DECONTAMINATE DRUMS LATER.)

EQUIPMENT:

1. DOT-APPROVED 55-GALLON DRUM
2. SCRAP BUILDING CEMENT MIXING HOOD
3. SAKRETE MORTOR MIX
4. H28111058-T65 DRUM VIBRATOR
5. DRUM COOLING TANK
6. CEMENT MIXER

PART NUMBER	OPERATION NO.
28111058	915V

PRODUCTION PROCESS
DETAIL

ISSUE	DEPT. NO.	GRP	OPERATION TITLE																	PART NUMBER	OPERATION NO.								
002	4310	01	DISPOSAL OF D.U. GRINDING FINES, SLUDGE																	28111058	915V								
REASON FOR ISSUE																				PART NAME									
																				PENETRATOR									
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	P.E.	DATE	IE.	SHEET	
ISSUE																										LHR/AGP	11/8/81		2 OF 2

LIST BURDEN SUPPLIES, TOOLS, AND EQUIPMENT

6. REPEAT STEPS 2 AND 3 ABOVE.
7. CONTINUE REUSING DRUM, POUR ENOUGH OF A SECOND MIX INTO DRUM TO OBTAIN A TARGET WEIGHT OF 560 LBS. (DRUM IS APPROXIMATELY 1/2 FULL AT THIS WEIGHT.)
8. REPEAT STEP 5 ABOVE.
9. AFFIX LABEL (OR TAPE) TO DRUM INDICATING THE FOLLOWING INFORMATION: A)TYPE OF WASTE, B)DATE: & C)LOT NO. OF PARTS BEING MACHINED ON BOREMATIC #2.
10. DO NOT MIX D.U. CHIPS WITH SLUDGE BECAUSE OF A POTENTIAL FIRE HAZARD.
11. DO NOT MIX D.U. CHIPS OR SLUDGE WITH CONTAMINATED WASTE BECAUSE OF A POTENTIAL FIRE HAZARD.

SAFETY INSTRUCTIONS:

1. THE PURPOSE OF ENCAPSULATING D.U. SLUDGE IN CONCRETE IS TO ELIMINATE THE POSSIBILITY OF A FIRE CAUSED BY THE HEAT GENERATED BY THE REACTION OF SMALL D.U. PARTICLES AND AIR OR MOISTURE. ENCAPSULATION PREVENTS THE ACCUMULATION OF LARGE AMOUNTS OF D.U. AND REDUCES THE POSSIBILITY OF EXCESSIVE HEAT BUILD UP.
2. IF A DRUM APPEARS TO BE HEATING UP EXCESSIVELY, PLACE IT IN THE DRUM-COOLING FIXTURE. HOLD THERE UNTIL TEMPERATURE FALLS TO ROOM TEMPERATURE, NOTIFY DEPARTMENT SUPERVISOR IMMEDIATELY IF A DRUM HEATS UP.

J. Patrek
10-8-80

PART NUMBER	OPERATION NO.
28111058	915V

PRODUCTION PROCESS
DETAIL

OPERATOR MUST WEAR SAFETY GLASSES WITH SIDE SHIELDS

ISSUE NO. 002	DEPT. NO. 4310	GRP 01	OPERATION TITLE DISPOSAL OF CONTAMINATED WASTE	PART NUMBER 28111058	OPERATION NO. 925V
REASON FOR ISSUE				PART NAME PENETRATOR	
OPERATOR STANDARD HOURS			P.P.H. LHR/AGP	DATE 1/8/81	SHEET 1 OF 2
PIECES PER HOUR HRS/M			LIST BURDEN SUPPLIES, TOOLS, AND EQUIPMENT		

SAFETY:

- OBSERVE ALL HANDLING, INVENTORY CONTROL AND SAFETY PROCEDURES POSTED FOR THE DU ROOM PER GENERAL SAFETY OPERATING NOTES.

EQUIPMENT:

- DOT-APPROVED 55-GALLON DRUM (DOT-17H)
- COMPACTOR 28111058-T

OPERATION INSTRUCTIONS:

A. COMBUSTIBLE CONTAMINATED WASTE:

ANY ITEM THAT CAN BE EASILY BURNED UP; FLAMMABLE (SAKRETE BAGS, PAPER TOWELS, FILTERS, GLOVES, WOOD, ETC.)

- OBTAIN AND MOVE ONTO COMPACTOR A 55-GALLON DRUM OF CURED CONCRETE WITH CHIPS (DRUM IS 3/4 FULL AND MARKED) THAT HAS BEEN SETTING A MINIMUM OF 14 DAYS AFTER MIXING.. THERE IS TO BE NO EVIDENCE OF WATER ON TOP OF CONCRETE.
- IF THERE ARE NO DRUMS AVAILABLE AS SPECIFIED ABOVE, USE EMPTY 55-GALLON DRUM.
- PACK COMBUSTIBLE CONTAMINATED WASTE INTO DRUM.
- COMPACT WASTE INTO DRUM TO UTILIZE DRUM CAPACITY.
- CONTINUE REUSING DRUM UNTIL MAXIMUM WEIGHT IS OBTAINED (600 LBS) OR DRUM IS COMPLETELY FULL.
- NOTIFY INSPECTION DEPARTMENT WHEN DRUMS ARE READY TO BE CAPPED.
- AFTER INSPECTION DEPT. APPROVAL, CAP DRUM WITH COVER SECURED, LOCKING RING WITH NUT AND BOLT.
- ON TOP COVER OF EACH DRUM, MARK DRUM LOT NUMBER AND GROSS WEIGHT.

PART NUMBER 28111058	OPERATION NO. 925V
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PRODUCTION PROCESS
DETAIL

ISSUE	DEPT. NO.	GRP	OPERATION TITLE																	PART NUMBER		OPERATION NO.							
042	4310	01	DISPOSAL OF CONTAMINATED WASTE																	28111058		925V							
REASON FOR ISSUE																	PART NAME					DATE		IE.					
																	PENETRATOR					11/8/81							
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	P.E.	LIR/AGP		SHEET 2 OF 2	
ISSUE																													

LIST BURDEN SUPPLIES, TOOLS, AND EQUIPMENT

B. NON-COMBUSTIBLE CONTAMINATED WASTE:

ANY ITEM THAT IS NOT FLAMMABLE; (METAL PARTS, , CUTOFF AND GRINDING WHEELS, ETC.)

- OBTAIN AND MOVE ONTO COMPACTOR A 55-GALLON DRUM OF CURED CONCRETE WITH SLUDGE (DRUM IS 1/2 FULL AND MARKED) THAT HAS BEEN SITTING A MINIMUM OF 7-DAY AFTER MAX. THERE IS TO BE NO EVIDENCE OF WATER ON TOP OF CONCRETE.
AN EFFORT SHOULD BE TAKEN TO PUT NON-COMBUSTIBLE CONTAMINATED WASTE ON TOP OF CURED CONCRETE AND SLUDGE; HOWEVER IF THERE ARE NO DRUMS AVAILABLE AS SPECIFIED PUT NON-COMBUSTIBLE CONTAMINATED WASTE ON TOP OF CURED CONCRETE AND CHIPS.
- REPEAT STEPS 2 THRU 7 AS SPECIFIED IN PARAGRAPH A.

Irene Patrick
10-8-80

POOR ORIGINAL

PART NUMBER	OPERATION NO.
28111058	925V

Honeywell

INSPECTION PROCEDURE

INSP. DEPT.	CERTIFICATION REQUIRED	CLASS INSPECTION REQUIRED	OP NUMBER	PART NAME	PART NUMBER	REV/M					
6041	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	09305	D.U. WASTE DISPOSAL DRUM PACKING	N/A	N/A					
ITEM NO.	CHARACTERISTICS				CD	AQL	EQUIP	REF			
	This inspection procedure is for inspection of D.U. Waste Disposal drums prior to capping and sealing of the drum for shipment.										
A1	Contents must be dry. Cement must be set and there must be no visible moisture or standing water.										
2	Fourteen days must have passed since the last cement was poured. Verify from tag on drum.										
B1	Check drums 100%, no defects. If drum is acceptable, sign off log book.										
ISSUE	DATE	APPROVAL	APPROVAL	ISSUE	DATE	APPROVAL	APPROVAL	DEVICE NO.	SPECIFICATION	DATA RECORD NUMBER	SAMPLING PLAN NO.
1	1/9/81	MB						N/A	--	Log Book	See Above
								WRITER	DATE	PART NUMBER	REV/M
								Baxter	1/9/81	N/A	N/A