Radiation Work Procedure

RWP No. 12, Rev. 5
Air Sampling

Areas: Air ejector, pipe tunnel, pipe gallery and condenser

Valid from 1/1/68 to revoked.

Description of Work

Operate and inspect equipment including the taking of samples, radiation surveys, etc.

Special Hazards:

1. High energy beta radiation.
2. Neutron exposure in pipe gallery (near reactor) during operation.

Monitoring Requirements

1. Continuous by R. P.
2. By individual doing work.
3. Others

Representative Rad. Conditions for Work

Pipe tunnel at head level	550 mrem/hr
Air ejector south shield wall	1000 mrem/hr
Air ejector inside shield wall	avg. 11,000
Air ejector inside shield wall	avg. 40,000 to 80,000 variable
Pipe gallery	

General Instructions

Permission to enter
Hand and foot count

Special Instructions

Notify console operator before entering.
Note airborne concentration.

EXHIBIT F-3

Cask Release, Wednesday, 8/7/69

At 0800 Wednesday morning, Mr. Rowen was asked to take some smears on the cask that had been washed during the night. The smears that he took were wet and required drying. The activity on the smears varied from 3,000 to 30,000 cpm/100 cm^2 so I decided to wash the cask with alcohol. Mechanical Maintenance furnished three men and Rad Protection furnished one (Rowen). At the men's request, the refueling building RR doors were opened to give additional ventilation. Before lunch, additional smears were taken. These were dry and when counted showed some reduction in activity (I cannot be sure they were taken in the same spots as the morning, however).

A second alcohol scrub was ordered for right after lunch. The refueling building doors were opened for ventilation again. The smears this time indicated no improvement, and possibly an increase in activity, so I decided to wash the cask with a strong solution of DC13 (half H_2O, half DC13). Rowen asked about the doors at this time. I told him that we couldn't open them and that the DC13 wasn't toxic and the additional ventilation wasn't necessary. He stated that he had read somewhere on Tuesday that it was, but he also said that it was not stated as toxic on the can. We generally discussed the ventilation system and I told him that it was being worked on.

The cask was washed with the DC13 and dried with rags. I took a series of smears at top and mid-cask as they were drying the cask. Several were 3,000 - 4,000 cpm, while one was below 1,000 cpm. I told Rowen to go down and get smears top and bottom on the four sides for final release. He did so with no complaint. In the meantime I checked the IPC in the counting room which read lower than the one in the control room. I had the new samples counted in the counting room IPC. I told Rowen that I would buy an average number. He averaged out the numbers and came up with 2600 cpm/100 cm^2 (corrected for counter efficiency).

I had brought up the shipping papers for the cask. They had previously been typed out for < 2200 cpm/100 cm^2. I asked Rowen to sign them. He ignored my request at first, but did not say anything. When I asked again, he said it was 2600 not 2200 so I said "Well, change it to 2600 and then sign it." He did so. He did not refuse. I did not lose my temper, but there could have been impatience in my voice and tone. In my judgement, this average number was okay even though 400 cpm above the DOT regulation.

I also asked Rowen if he wanted to stay over past 1630 hours to finally check the cask and he said no because he wanted to go to the Union meeting. The only person willing to stay over was Bill Evans.

The final survey of the cask showed less than 50 cpm on any smear pads by GM. The area smeared was greater than 100 cm^2. One place any activity was picked up was in the crack of the lid, 20,000 cpm. This area has never been checked before to my knowledge. Next time I'll tape this crack.

G. E. Allen
8/7/69

EXHIBIT G.

Humboldt Bay Power Plant

Memorandum

Subject: RADIOACTIVE CONTAMINATION ON THE SECTION OF 14 INCH DIAMETER PIPE IN THE COLD MACHINE SHOP

During the course of making a routine "C" survey on February 18, 1970, CT R. Rowen discovered that a section of 14 inch pipe indicated 300 cpm above a background of 300 cpm using a portable G-M instrument. This section of pipe was to be used in fabricating a shield for use in Unit No. 3. This pipe was one of two pieces remaining on site, the other 18 pieces having been sold to G and R Metal as scrap. This piping had originally been in service in the suppression chamber, and had been cut out during modification work. It had subsequently been cut up into approximately 3-1/2 foot lengths and was surveyed and moved outside the Unit No. 3 controlled area fence. One criteria for releasing material unconditionally from Unit No. 3 is that the direct survey indicates less than 100 cpm beta gamma, and less than 500 dpm alpha. This particular piece of pipe indicated 300 cpm beta-gamma when Rowen inspected it on February 18, 1970. The activity was on the inside wall of the pipe and was not smearable. The contamination appeared to be spread over an area of approximately 50 to 100 square inches. Some metal was filed off and counted on the multichannel analyzer; the results indicated that all of the activity was due to Co-60. No count-rate above background on the outside of the pipe was detectable.

For the purpose of the following calculations, the following assumptions were made:

1. The counting efficiency for the portable G-M was about 1%.
2. The G-M is sensitive to approximately 16 in^2 area.
3. The count rate of 300 cpm was uniform throughout the interior of the pipe. (In reality, the contaminated area was approximately 50 - 100 square inches.)

The dimensions of the pipe are 14" ID x 1/4" wall x 38" length.

1. Inside area, $A = \pi DL = (3.14)(14)(38) = 1630\ in^2 = 1.05 \times 10^4\ cm^2$
2. Weight $= (SG)(V) = \frac{(7.7)(62.4)(3.14)(3.17)(1.21^2 - 1.17^2)}{4} = 107$ lbs. $= 4.86 \times 10^4$ grams
3. Total activity $= \frac{(1630)}{16}(300\ cpm)(100\ \frac{dpm}{cpm}) \cong 3 \times 10^6$ dpm
4. Specific activity $= \frac{(3)(10^6)}{(4.86)(10^4)(2.22)(10^6)} = 2.8 \times 10^{-5}$ uCi/gm
5. Area spec. activity $= \frac{(3)(10^6)}{(2.22)(10^6)(1.05)(10^4)} = 1.3 \times 10^{-4}$ uCi/cm^2

The total activity of $\frac{(3)(10^6)}{(2.22)(10^6)} = 1.35$ uCi

(continued)

EXHIBIT H.

Humboldt Bay Power Plant

Memorandum

Subject: RADIOACTIVE CONTAMINATION ON THE SECTION OF 14 INCH DIAMETER PIPE IN THE COLD MACHINE SHOP

During the course of making a routine "C" survey on February 18, 1970, CT R. Rowen discovered that a section of 14 inch pipe indicated 300 cpm above a background of 300 cpm using a portable G-M instrument. This section of pipe was to be used in fabricating a shield for use in Unit No. 3. This pipe was one of two pieces remaining on site, the other 18 pieces having been sold to G and R Metal as scrap. This piping had originally been in service in the suppression chamber, and had been cut out during modification work. It had subsequently been cut up into approximately 3-1/2 foot lengths and was surveyed and moved outside the Unit No. 3 controlled area fence. One criteria for releasing material unconditionally from Unit No. 3 is that the direct survey indicates less than 100 cpm beta gamma, and less than 500 dpm alpha. This particular piece of pipe indicated 300 cpm beta-gamma when Rowen inspected it on February 18, 1970. The activity was on the inside wall of the pipe and was not smearable. The contamination appeared to be spread over an area of approximately 50 to 100 square inches. Some metal was filed off and counted on the multichannel analyzer; the results indicated that all of the activity was due to Co-60. No count-rate above backgrounnd on the outside of the pipe was detectable.

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The total activity of $\frac{(3)(10^6)}{(2.22)(10^6)} = 1.35$ uCi

(continued)

EXHIBIT H.

POWER PLANT
UNIT NO. 3

MEMORANDUM
8/29/66

SUBJECT: Control Technician Log Book

Effective January 3, 1966 the C.T. Log Book will be kept as a record of all important events* that occur during the day in Rad. Protection and Chemistry. It will be the duty of the R_2 man to maintain this log and sign the completed sheet each day.

Gail E. Allen
J. V. Boots

GEA:cr

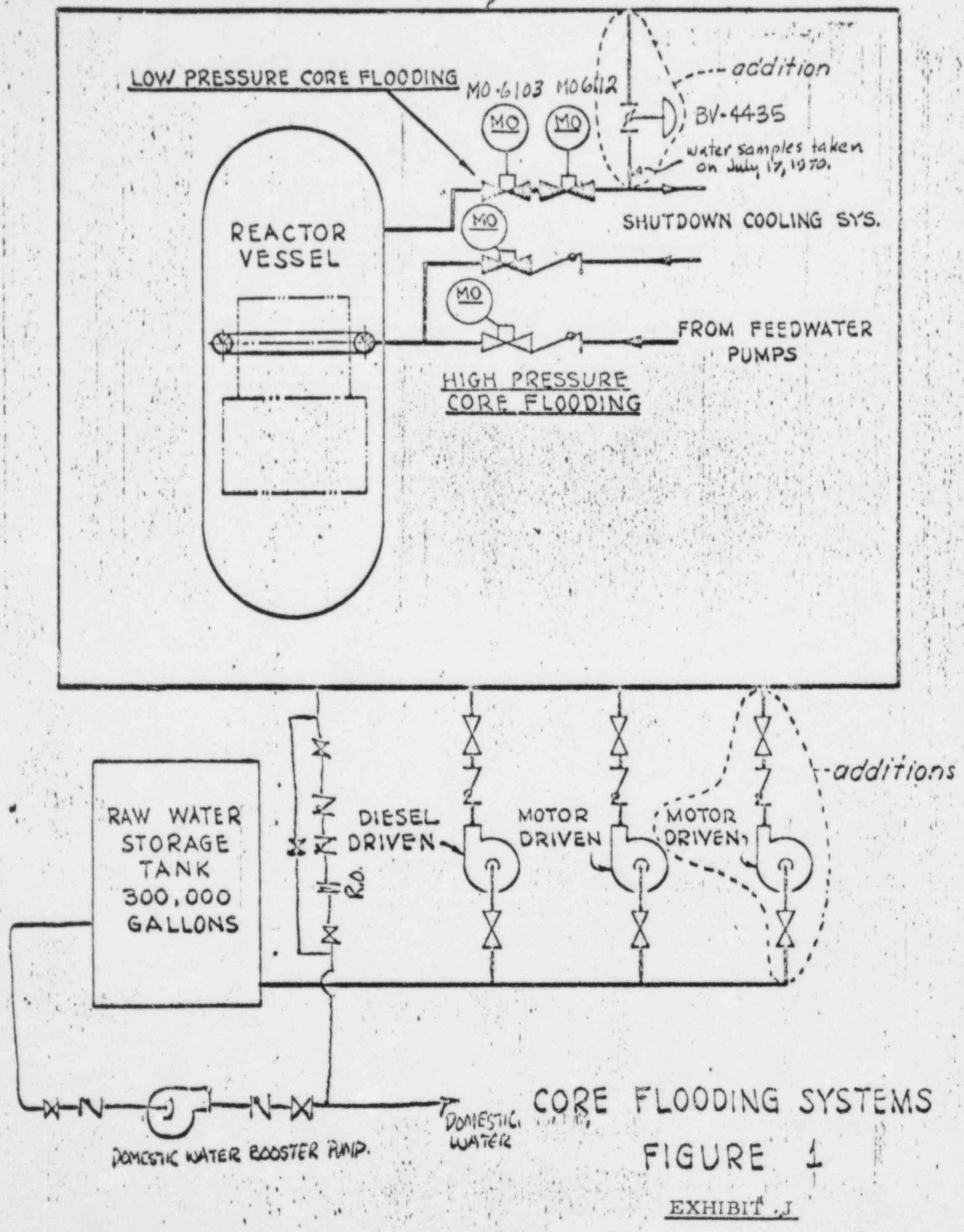
* "All important events" is defined as:

1. Unusual happenings such as Control Room contaminated, large spill, etc.
2. Unusual air sample data or chemistry data.
3. Brief rundown of day's activity.
4. Personnel contaminated.
5. Personnel clothing retained because of contamination.
6. Any violation of established standards.
7. Any other thing felt important by the C.T. in this area.

READ, DATE, AND INITIAL

J. K.
R. S.
H.J.D.
M.S.
D.W. DW 8-30-66

EXHIBIT I



CORE FLOODING SYSTEMS

FIGURE 1

EXHIBIT J