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FROM: J. E. Maider

OPERATIONS INCIDENTS

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A. REACTOR INCIDENTS

Can Ruptures

A ruptured slug (described previously in report HW-10079) which required a shutdown of F pile on May 30, 1948 was discharged on June 4. All pile effluent water contaminated by this slug was pumped to a specially constructed disposal trench near 107-F retention basin. Following this, all algae and sludge in the east half of the basin were removed to the same trench to insure that no fission products would pass to the Columbia River. The pile was started up on June 16, 1948. Subsequent examination of the slug revealed that the cap had been displaced, evidently by the force exerted on the cap by the metal.

The D pile was shut down on June 22, 1950 due to a high inlet water pressure on Tube No. 1572-D. Investigation revealed the presence of a ruptured slug as the cause of the high pressure. Following the removal of the slugs on both sides of the ruptured piece, the tube was removed from the pile in sections and the section containing the slug was segregated for further inspection. Pile operation was resumed on June 29, 1950. Subsequent examination of the ruptured slug showed a poor weld and a pin hole in the weld as a cause of the rupture. There was no evidence of contaminated water resulting from this incident.

Graphite Expansion

The problem of graphite expansion in the piles was discussed in the previous report of June 1948. Since then, the use of CO₂ instead of helium has appreciably retarded the expansion such that the problem has been minimized to a considerable degree.

Tube Water Leakage

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B pile was shut down on September 22, 1948, because of a water leak in Tube No. 1569-B. The leak was located at a point 19 feet 2 inches from the rear Van Stone flange. The tube was replaced on September 23, 1948. A considerable amount of free water accumulated in the lower part of the graphite

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Tube Water Leakage (Continued)

packing. Following start-up, the pile was operated at reduced levels in order to dry out the graphite but graphite temperatures on the fringe of the "wet zone" were maintained at temperatures no higher than 100°C to prevent steam formation. The normal level was resumed on October 6, 1948.

On October 20, 1948, the F pile began to experience a series of conditions similar to those which occurred at B pile. A sudden loss of reactivity was noted and the pile shut down. Investigation revealed a water leak in Tube No. 3169-F at about its center point. The apparent cause was the corrosive action resulting from the rupture of one piece of Special Request No. 15 (LiF) with which the tube was charged. A considerable amount of water leaked into the central and lower sections of the graphite packing. The tube was replaced and operation resumed at low levels to allow the free moisture in the graphite packing to evaporate at a safe rate. Nominal operating level was reached on November 14, 1948.

Rod Failure

On September 3, 1949, a partial failure of the horizontal rod hydraulic shim pump drive system occurred at B pile. Investigation showed that excessive leakage of oil at No. 9 drive motor had resulted in the transfer of considerable oil from the shim pump sumps to the accumulator pump sumps via the drain line. The shim pump sumps were refilled and the motor was overhauled to prevent recurrence of the condition. The emergency accumulator system was not affected by the trouble.

Power Outage

On June 6, 1950, a power outage occurred which caused the shutdown of two piles for about twenty minutes. The other two piles were down at the time on scheduled outages. The trouble was caused by failure of an insulator string on the No. 3 Columbia 230 KV line which was being energized for the first time.

Lighting Power Circuit Failure

On November 27, 1949, high winds caused a failure of the normal lighting power circuit at F pile. Although it was not necessary to shut down the pile, considerable difficulty was experienced because the emergency lighting circuit did not function properly. Corrective measures were taken to prevent recurrence of this condition.

Panellit System

Considerable difficulty was experienced with the panellit system at B pile in January, 1950. Unexpected film accumulation in fringe tubes resulted in back pressure increases on those tubes. An immediate program of gauge replacement and recalibration was instituted. More frequent purges of the pile and gauge replacement subsequently minimized this difficulty.

Gamma Intensities - Top Edge - B-D-F Piles

A review of the readings of the gamma dosage rates from the beams at the

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Gamma Intensities - Top Edge - B-D-F Piles (Continued)

top edges of B-D-F piles indicates the following general pattern for the period June 1948 through August 1950:

B Pile

The gamma intensity of the beam increased steadily from July 1949 to December 1949, at which time the intensity apparently leveled off.

D Pile

The gamma intensity of the beam increased steadily from November 1948 to August 1949, at which time it leveled off for a two month period and since that time has slowly decreased.

F Pile

The gamma intensity of the beam increased steadily from January 1949 to September 1949; from October 1949 to August 1950, the intensity leveled off and decreased significantly.

B. SEPARATIONS INCIDENTSContaminated Particles Emitted From Stacks

The problem of contaminated particles released from the ventilation stacks in the Separations areas was discussed in the previous report of June 1948. The subsequent installation (October 1948) of sand filters in the ventilation effluent systems which have maintained an efficiency of better than 99 percent alleviated the conditions and previous restrictions such as the wearing of respirators were discontinued.

Contamination Spread

Following several incidents of shoe contamination of personnel who had been working in the railroad cut outside one of the Canyon buildings, a complete survey was made from the building to the "heavy equipment burial ground," which revealed the spread of contaminated dust particles, with the maximum levels being detected in the immediate vicinity northeast of the burial ground. A Lima motor crane which was outside the burial ground was found to be moderately contaminated. Investigation indicated that this contamination was caused by active dust being blown from a box in the burial ground which had previously been used to haul discarded heavy process equipment to the burial ground. The box was buried and the bulldozer which was used to cover the trench was found to be contaminated with dust. A recurrence of such a situation has been prevented by properly sealing the boxes used for such a purpose.

Water In Sand Filter

During December 1949, the efficiency of one of the sand filters dropped to well below 99 percent. Investigation during January and February 1950 of pressure drops across various critical points and examination of gas sampling

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Water In Sand Filter (Continued)

lines revealed no cause of the trouble. During March, it was discovered that water was accumulating in the seals which was due to a faulty steam trap discharging into the system. In April, the sand filter had dried out and efficiency increased to the previous greater than 99 percent levels. Subsequent tests indicated that the efficiency of the filter did not actually decrease, but was indicated to be less because of monitoring difficulties experienced as a result of the moisture in the air streams.

Minor ExplosionsHood 10

A violent release of gases occurred in Hood 10, 235 Building on September 6, 1950 during the routine operation of firing the reduction bomb. Contributory factors were a poor copper gasket seal between the bomb and its lid, and probable incomplete argon purging of the bomb before firing.

The explosion was of sufficient magnitude to loosen the gaskets of the lucite panels on the front and back of the hood, and also to inflate the hood rubber gloves and displace their inner rings. Both these conditions permitted direct transfer of plutonium contamination to the operating area, reaching as far as Hood 19. There was, however, no physical injury nor personal contamination involved.

Mechanical and method improvements are being effected to insure proper sealing between the bomb and lid, and positive argon purging of the bomb.

Hood 25

An explosion occurred in Hood 25, 235 Building on November 9, 1949 during the attempted purging of a coating unit bell jar. Incorrect sequence of operations was responsible for developing an explosive mixture of air and Nickel Carbonyl.

As a result of the explosion the bell jar was completely disintegrated, and the hood rubber gloves were inflated and ruptured by particles of broken glass. The operator, in a crouched position in front of the hood, received a superficial scalp laceration, probably from a piece of glass. The wound was not contaminated, and there was no widespread contamination in the operating area.

The application of specific procedures and the introduction of an inert gas for purging have minimized the possibility of a recurrence.

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