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To: W. M. Harty

From: R. W. McCullugh by J. R. Cartmell

Subject: CHRONOLOGICAL RECORD OF SIGNIFICANT EVENTS IN CHEMICAL SEPARATIONS OPERATIONS

The history of Chemical Separations Operation is one of effective performance over a period of 25 years. However, due to the nature of the radioactive materials processed and to the relative absence of proven technology, much of which has been developed concurrent with the production effort, performance has not been without problems. In a review of Chemical Separations Monthly Reports dating from June, 1946 through July, 1968, the following abstract has been prepared of the events that have had some impact on processing plant functions.

Relatively few events were of immediate consequence. None was catastrophic. The effects of most events were cumulative, produced from continuing operations that enabled resolution by the gradual provision of suitable safeguards for control and containment.

The abstract is organized as a chronology of events in categories classified as follows:

A. CORROSION AND EROSION

1. Waste Line Failures
2. Vessel Jackets and Coils
3. Piping in Concrete
4. Cell Leaks
5. Material and Equipment

B. STRUCTURE AND AUXILIARIES

1. Crane
2. Shielding
3. Stack
4. Wells

All reports identified are either (Plant Monthlies or CPD Monthlies), PNL Technical Information Section does not have any of these reports in their collection.
2/16/86

5. Cask Cars

6. Burials

7. Underground Storage

8. Cribs, Swamps

C. SYSTEMS AND PROCESS VENTILATION

1. Particulate and Gaseous Emissions

2. Blowbacks

3. Metal Dissolution

4. Losses to Ground

5. Wastes

6. Off-Gas Treatment

D. NATURAL - FIRE - CHEMICAL REACTIONS

1. Explosions - Violent Reactions

2. Fire

3. Natural Events

E. NUCLEAR SAFETY

1. Batch Size

2. Body Depositions

Essentially all of the materials abstracted are unedited statements reported in the historical monthly summaries. Where information in terms of energy release is available those data are also included. Many of the more serious occurrences were investigated and reported.

These reports are readily available and may be obtained by reference to the monthly summary, if more detail is wanted on particular incidents.

RWM:JRC:cs

A. CORROSION AND EROSION

1. Waste Line Failures

HAPO Plant Monthly June 46

Document 7-4343, 7-10-46. A metal waste line failure was detected at the rear of 221-B Building on 6-17-46. Radiation intensity at ground level was 400 r/hr. The leak was confirmed by hydrostatic test under 125 P.S.I.G. Operations were halted for six days for change in the waste routing and to cover the general area with several feet of gravel. Surface reading was reduced to 100 mrad/hr.

HAPO Plant Monthly Sept 46

Document 7-5194, 10-14-66. A suspected waste line failure occurred at 221-B Building. Approximately 80 feet from the 6-17-46 failure, the leak was not confirmed by test and assumed to be migration from the first failure.

The following actions were taken:

a) Test holes were driven to determine extent of the spread, and the area was fenced and posted.

b) The area was covered to a depth sufficient to reduce readings to 2 mr/hr.

c) The area will be surveyed once/week.

d) The surface above the waste lines has been bladed free of vegetation, posted and will be patrolled once/week.

e) Test shafts will be drilled adjacent to waste lines where they pass under roadways.

HAPO Plant Monthly June 47

Document HW-7096, 7-15-47. A waste line failure occurred at T Plant. Gross soil contamination has been measured to a depth of 10-11 feet below the surface. This was the third buried waste pipe failure. Cause was stated as unknown. A spare waste line has been placed in service.

During the same period the B Plant waste line leak, unconfirmed earlier, became a reality. Rerouting of metal waste to the last remaining spare line left B Plant without backup until completion of the BX Tank Farm Project, C-112.

HAPO Plant Monthly Sept 47

Document HW-7795, 10-15-47. Hydrostatic tests revealed leaks in each of the five transfer lines installed for Project C-112. Re-excavation of piping showed three major areas of electrolytic corrosion with lesser damage elsewhere. Piping has been removed for reinstallation in a V-shaped concrete trough, covered

with concrete blocks and the encasement sealed for water tightness. Additional provisions were made for pipe expansion and leak detection.

Piping is to be cathodically protected by application of direct current to the pipe in order to neutralize any flow of current from pipe to soil.

Plans are being made to test all buried and accessible process piping in 200 Areas.

HAPO Plant Monthly Oct 1947

Document HW-7997, 11-18-47. The Electrical Department completed a study of electrolytic corrosion attack on buried stainless steel piping. Temporary measures are being taken pending design and receipt of direct current rectifying equipment.

There is further evidence of severe galvanic action to the underground piping at U Plant. All seven lines from the plant reveal leaks.

Twenty percent of the total pipe involved in Project C-112 (BX) is affected, thus delaying the project for an estimated three months.

HAPO Plant Monthly Nov 1950

Document HW-19622, 12-20-52. 221-B Plant reported the initial failure of an encased metal waste line.

Document HW-22610, 11-21-51. A first-cycle waste line from 221-B to 154-BX failed. Effort to excavate and inspect for cause of failure was abandoned when readings of 120 r/hr. were met with 18 inches of earth remaining over the pipe.

HAPO Plant Monthly Oct 1951

HAPO Plant Monthly May 1953

Document HW-28267, 6-19-53. The underground header connecting first-cycle bottoms to the East Area Waste Evaporator failed. Ground seepage was observed during pumping. Point of rupture has been confirmed and the pipe covered with concrete.

HAPO Plant Monthly Nov 1954

Document HW-33962, 12-20-54. Failure of an unencased first-cycle waste line from T Plant resulted in a cave-in, run-off of solution, and high ground - surface dose rates.

HAPO Plant Monthly Dec 1955

Document HW-40692, 1-30-56. Rupture of an underground process line near the 154-TX Diversion Box caused a 15 ft. x 30 ft. pool of metal waste on the ground surface, and a radiation field of 1.2 r/hr. at 80 feet.

Document RL-SEP-332, 3-22-65. On 2-18 the 244-CR Vault was flooded to the level of the tank tops. Source of the flood was found to be a failed coating waste line in a diversion box which drains to the vault sump.

Document ISO-476, 9-21-66. Following the discovery in July of a leaking waste line in the concrete encasement between Purex and the 241-A waste tank farm the encasement was uncovered and the pipes were inspected at nine separate bends. Although no additional leaks were found, four "wrinkles" were observed in the piping at two locations. These distorted sections of pipe were replaced. Engineering analysis indicates that temperature in excess of 180°F may have been encountered which would cause expansion interference with adjoining hardware. Intensive study was begun on the probability of appropriate temperature control.

Document ISO-512, 10-21-66. Thermocouples were installed on the four encased waste lines from the Purex Plant and connected with a multipoint temperature recorder and alarm system. The data indicate that the design temperature of 150°F is exceeded with most steam jettings of waste solutions through these lines.

Document ISO-563, 11-21-66. The Redox encased lines and line support systems were inspected and found to be in good condition. This information suggests corrections that can be made to the Purex encased waste lines to prevent damage from thermal expansion.

2. Process Tank Coil and Jacket Failures

HAPO Plant Monthly March 1947

Document 7-6048, 4-14-47. There are nine vessels in both B-T Canyon Buildings with jacket leaks in varying degrees of magnitude. With the exception of 6-1 tank at B Plant the leaks remain fairly constant. However 6-1 is copious. The large water volume interferes with conductivity probe function designed to detect process solution leaks. Resolution - to replace vessel or reroute metal solution to preclude use of 6-1 for cooling.

HAPO Plant Monthly Oct 1947

Document HW-7997, 11-18-47. Jacket leaks continue to be a canyon vessel problem. Spare vessels have been installed and others are scheduled. Orifices have been placed in pipe flanges to tank jackets to reduce pressure to below 20 psig.

HAPO Plant Monthly Feb 1951

Document HW-20438, 3-20-51. A coil failure occurred in the T Plant sodium hydroxide storage tank. Nearly all corrosion lay near steam inlet. Since apparent cause of failure is steam erosion the decision has been made to reverse inlet and outlet on all other vessels having steam coils.

HAPO Plant Monthly Oct 1952

Document HW-26047, 11-20-52. A steam coil failure in the Redox D-12 Waste Concentrator caused gross contamination of process cooling water, 207-S retention pond and swamp area outside 200 West Area. Swamp area dose rates are up to 2 rem/hr. including 35 mr/hr. at 1 inch from the ground. The swamp has been diked to maintain a constant water level.

HAPO Plant Monthly Nov 1952

Document HW-26376, 12-23-52. The H-4 oxidizer coil failure at Redox caused further gross contamination of swamp and 207-S Retention Basin. In a three day period the dose rate at the swamp inlet increased from 6 mrep/hr. to 700 mrep/hr.

HAPO Plant Monthly May 1953

Document HW-28267, 6-19-53. Redox experienced the third D-12 Waste Concentrator failure since startup.

HAPO Plant Monthly Aug 1953

Document HW-29229, 9-18-53. High radiation readings at the 207-S Retention Basin were traced to a leaking H-4 Oxidizer pot coil at Redox. Normal operation was continued by keeping the coil pressurized. Complete failure necessitated blanking the coil and adopting a cold oxidation step.

CPD Monthly Jan 1959

Document HW-59079, 2-20-59. An F-11 tube bundle failure at Purex resulted in contamination of steam condensate piping to a maximum of 500 r/hr.

CPD Monthly Nov 1961

Document HW-71895, 12-21-61. A general spread of low level contamination to the eastern half of the Purex exclusion area occurred as fission products escaped from a trap pit on failure of a process vessel steam coil and trap pit piping.

CPD Monthly Nov 1963

Document HW-79768, 12-20-63. B Plant retention basin was contaminated due to failure of the 6-1 rare earth storage tank coil. General dose rates to 500 mrad/hr. and tumbleweeds reading up to 50 rads/hr. at surface were encountered.

CPD Monthly June 1964

Document HW-83102, 7-22-64. A coil leak in the Purex first cycle acid waste storage tank (F-15) caused release of an estimated 10,000 curies of mixed fission products to the cooling water swamp. Action has been taken to kill the algae, precipitate the fission products, and to cover the inlet ditches.

3. Piping in Concrete

HAPO Plant Monthly Oct 1947

Document HW-7997, 11-18-47. The first evidence of the movement of piping in concrete was found at both canyon buildings. Movement of as much as three inches has been evidenced in the pipe galleries, but not in the cell nozzles. At this point the condition is not considered serious except for diminution of working space and strain placed on steam piping from control panels and header.

HAPO Plant Monthly Oct 1949

Document HW-14916, 11-18-49. Use of a hydraulic jack has been made to correct the problem of steam pipe creeping in concrete.

4. Cell Leaks

HAPO Plant Monthly Sept 1948

Document HW-11226, 10-25,48. The major portion of process cell leaks in the T and B Canyons is caused by gasket failures. Work is being done for development of remote gasket replacement on a preventive maintenance basis, and the development of improved gasket types.

5. Material and Equipment

HAPO Plant Monthly April 1951

Document HW-20991, 5-21-51. Audigauge readings of the sodium hydroxide transfer line from 211-T to the canyon and concentration buildings indicates that after five years of constant service the pipe maintains approximately 2/3 of the original wall thickness.

HAPO Plant Monthly Nov 1949

Document HW-15267, 12-16-49. The Redox expansion group recommends the use of stainless steel flooring in cells handling solvent as a protection for concrete. Use of Amercoat is prescribed in the remaining sections.

HAPO Plant Monthly Feb 1951

Document HW-20438, 3-20-51. For Redox vessel fabrication there have been repeated failures of stainless steel heats to meet corrosion tests. It is normally possible to utilize off-standard material for vessel fabrication with reasonable certainty of acceptable performance because of relatively mild corrosion conditions in specific locations. Where acute conditions are expected 347 is substituted for 309. However, 309 is required for operational spares.

HAPO Plant Monthly April 1951

Document HW-20991, 5-21-51. A potential schedule delay is forecast from a shortage of sheet metal welders available for work on the D-cell stainless steel floor liner. Engineering recommends substituting a relatively new hexone resistant coating. The substitute was accepted.

HAPO Plant Monthly Oct 1951

Document HW-22610, 11-21-51. After fracture of three, one-inch connector operating screws it was discovered that type 440-A hi-chrome steel possessed unsatisfactory metallurgical properties. Replacement of 400 screws with type 4140 carbon steel, more resistant to shock, is scheduled.

HAPO Plant Monthly Nov 1951

Document HW-22875, 12-21-51. There was a loss of 103,800 lbs. of ANN from the 211-S storage tank to the sewer when failure of stainless steel bolts holding the cleanout (bling) flange occurred.

Hold-down stud failures occurred on the centrifuge and off-gas filter footpads at Redox. These, among 80 other studs fabricated by Construction forces at White Bluffs led to the locating and testing of the remaining studs of this type. One additional failure was located.

HAPO Plant Monthly Apr 1952

Document HW-23437, 2-21-52. ANN storage tank SS-113 at Redox failed on 1-28. Apparent cause was inability to fuse the tygon liner to the steel sheet leaving a void for the corrosive ANN solution to attack the metal. The two remaining storage tanks are under surveillance. (NOTE - they subsequently failed.)

Document RL-SEP-654, 8-23-65. When equipment was removed from Purex A cell, the dissolver footpads were observed to have been damaged extensively by corrosion. It will be necessary to install a steel plate and grout underneath before the new dissolver can be positioned securely.

B. STRUCTURE AND AUXILIARIES

1. Crane

Hapo Plant Monthly Dec 1960

Document 7-5630, 1-17-47. The mechanical brake shaft of the 75-ton hoist at B Plant failed while a cover block was being lowered. The block feel six feet, was badly cracked, and required replacement. There was no other equipment damage.

2. Shielding

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Document 7-5630, 1-17-47. In an effort to remove an apparent spot of contamination at grade level in a B Plant, rear-of-canyon stairwell, a hole chipped through the floor disclosed a cavity directly over the first-cycle waste line. Dose rate was 3.5 r/hr. at the small opening.

CPD Monthly Jan 59

Document HW-59079, 2-20-59. A routine survey of the Purex Storage Gallery revealed a radiation level of

4.5 r/hr. at 2 inches from the floor adjacent to the canyon wall. The radiation is probably due to a void in the concrete although it had not been detected in previous surveys.

3. Stack

Plant Monthly Jan 1947

Document 7-5802, 2-20-47. A leak in the 291-T stack drain was measured at 500 mrep/hr. Further investigation revealed a pin-hole leak had developed in the stainless steel pan to permit nitric acid attack on the concrete base. When acid was also found in the annular space of the 291-B stack periodic alignment checks of both stacks were scheduled.

4. Wells

Plant Monthly April 1947

Document 7-6184, 5-12-47. This was the first reference to drilling of wells to determine underground spread of contamination. Eight wells have been completed to date.

5. Cask Cars

Plant Monthly Nov 1946

Document 7-5505, 12-18-46. On arrival of cask car No. 38 at B Plant it was found that the drain valve had failed and the water had drained from the cask. Revisions were prescribed for use of plugs in the valve drains from all casks.

6. Burials

Plant Monthly Apr 1949

Document HW-13190, 5-18-49. A contamination spread from T Plant to the heavy equipment burial ground occurred during discard of a burial box. General contamination avergaed 7 mrep/hr.

Probably 29513 Plant Monthly Sept 1953

Document HW-29153, 10-21-53. Burial of a failed H-4 oxidizer at Redox was the highest dose rate radiation work performed in the Separations Section to date. After two days of in-cell decontamination the dose rate during burial was 250 mr/hr. at 500 feet.

CPD Monthly Sept 1957

Document HW-52864, 10-23-57. A general contamination spread that occurred during burial of several Purex tube bundles requires extensive decontamination of the RR right-of-way.

CPD Monthly Oct 1957

Document HW-53449, 11-23-57. A burial box loaded with contaminated process jumpers was exposed to heavy rain. The ground below was contaminated to the level of 2 rads/hr.

On 10-24-57, a box used to transport failed equipment from Redox to T Plant was pulled from the rail car enroute when one of the box swing cables caught on a RR tie or switch frog. The ground was contaminated to 2 R/hr.

CPD Monthly Nov 1957

Document HW-53967, 12-23-57. A burial box from Purex measuring 450 mrads/hr. at 150 feet dropped liquid while in transit resulting in 40-1700 mrads/hr. contamination to the RR bed and right-of-way.

CPD Monthly Dec 1957

Document HW-54319, 1-21-58. During an H-2 centrifuge burial from Redox fumes were observed coming from the centrifuge shortly after it was placed in the box. After four hours of this condition and unsuccessful attempts to control it, fumes escaped the tunnel and began circulating throughout the building via the vent system. Within eight hours all personnel were on masks. Considerable contamination was deposited on all horizontal surfaces including construction work areas outside the building. Controlled work conditions had to be set for the lump sum contractor. When the centrifuge was removed for burial contamination was spread to 234-5 and 224-U areas.

CPD Monthly Jan 1959

Document HW-59079, 2-20-59. On January 8, a Fission Product contamination spread occurred over 250 acres of 200-West Area when a burial box containing Redox cell jumpers collapsed during backfill operations.

CPD Monthly Oct 1959

Document HW-62593, 11-20-59. During burial of two tube bundles from Purex the right-of-way became contaminated, with readings up to 3 rads/hr. at 18 inches.

CPD Monthly Nov 1960

Document HW-67459, 12-21-60. A Redox burial box collapsed during backfill, but no spread resulted since the collapse did not occur until work was almost complete. Box design and backfill techniques again are being studied in an effort to preclude further problems of this nature.

CPD Monthly Apr 1961

Document HW-69443, 5-22-61. During a Purex burial a wooden "non-collapsible" burial box containing 83 highly contaminated process jumpers collapsed as it was being covered in a trench. Contamination up to 500 rads/hr. was spread over an area of 400,000 square feet generally within the burial garden.

CPD Monthly Feb 1964

Document HW-81078, 3-20-64. Contamination spread along the RR right-of-way from Purex to the 200 East burial ground occurred when a tube bundle burial box leaked during transport.

7. Underground Waste Storage

CPD Monthly June 1958

Document HW-56602, 7-22-58. The bottom of the steel liner in storage tank 113-SX was found to be bulged about four feet upwards of its normal position. Liquid between the concrete support structure and the steel liner appears to be the most plausible explanation for the observed condition. During the month the liner returned to its normal position.

CPD Monthly Aug 1959

Document HW-61736, 9-21-59. Tank 106-TY is suspected to be leaking. Dry wells are being checked but no confirming results have been obtained.

CPD Monthly Apr 1964

Document HW-82089, 5-22-64. There is a suspected leak from 107-SX tank. Radiation readings detected in underground laterals are increasing at an average daily rate of 2000 counts/minute.

CPD Monthly July 1964

Document HW-83508, 8-21-64. Observation of 107-SX tank continues. One lateral probe reading has increased to 1,150,000 counts/minute. The other two laterals are static and no leak confirmation has been indicated from any of the seven dry wells.

Document RL-SEP-112, 12-21-64. Tank 108-SX indicates some leakage as noted from increase in readings from two laterals from 150,000 to 720,000 counts/minute. One of the vertical test wells also has increased from 5,000 to 6,000 counts/minute.

Document RL-SEP-282, 2-23-65. A rapid steam emission commonly called a "bump" occurred in underground storage tank 105-A which contains the most recent high level waste from Purex. This was the first "bump" ever detected in any Hanford waste storage tank while the recirculators were believed to be in operation. No abnormal processing conditions were noted prior to or following the incident.

Document RL-SEP-332, 3-22-65. Continued study of the severe "bump" which occurred in 105-A indicates that two of the air circulator dip tubes are physically raised about 6 feet. Probing of a four-inch riser located between the circulators reveals an obstruction 10 feet above the bottom. It is possible that the bottom liner of the tank is severely bowed. A thorough study is underway.

Document RL-SEP-405, 4-22-65. A significant increase in radiation level in the No. 3 caisson lateral under tank 105-A was found during routine checks. Radiation measurements showing a "hot" spot of 10-20 r/hr. over a distance of two feet.

Water lance probing of 105-A tank indicates the tank bottom may be distorted upward as much as eight feet. Installation of a new pump pit is in progress to provide capability for lowering liquid level in the tank.

Document RL-SEP-509, 6-21-65. Extensive investigation has been started to determine the cause of the bulged liner in tank 105-A. Part of the testing will be done on a scale model of the steel liner which is now being designed.

Document RL-SEP-618, 7-21-65. Redox waste storage tank 108-SX has shown some seepage as indicated by radiation readings on laterals under the tank and dry wells located around the tank's perimeter. Two test holes were drilled near the tank through the seepage zones to determine the extent of seepage. Radioactivity has been found to terminate at depths seven and eleven feet below the tank bottom. Maximum dose rates from the soil samples were about 2.5 r/hr.

Document RL-SEP-706, 9-21-65. Test wells are being drilled to depths of up to 70 feet around the 115-SX waste storage tank which leaked approximately 16 inches of dissolved sodium nitrate solution to ground during March 1965. Two wells drilled to date show deepest penetration of activity to be nine feet below the tank bottom. Maximum beta-gamma activity in soil samples brought to the surface is 6,000 c/m.

Document RL-SEP-913, 1-21-66. Ten test wells were drilled around the 115-SX waste storage tank to determine the distribution of waste solution that leaked from the tank several months ago. The radioactivity, primarily radiocesium, appeared to have penetrated no more than 15 feet below the tank bottom.

Document ISO-709, 4-20-67. Persistent migration of radioactivity beneath waste storage tank 108-SX which contains self-boiling Redox wastes, led to a decision to remove the cesium-bearing supernatant solution. Calculations indicate that if the sludges were allowed to dry without supplementary cooling, peak temperatures of about 1600°F would be reached in about 18 months. Since an air sweep could limit the peak temperature to acceptable values, an air cooling unit is being designed for installation and use if needed.

Document ISO-714, 9-21-67. For the past several months boiling waste in tank 105-A has exhibited peculiar manifestations in its liquid level. For no apparent reason, every few days, the liquid level in this tank would decrease in a matter of minutes, followed by a relatively stable period lasting about 20 hours. The liquid level would return to its original level in about a day to complete the cycle. After a lapse of 33 days the cycle has been resumed. As a precautionary measure a pump has been installed in the tank so that the supernatant can be pumped to another tank at a moment's notice.

Document ARH-59, 10-25-67. Recent probing of waste storage tank 108-SX indicated that the bottom liner had bulged upwards about 2-1/2 feet in the northwest quadrant. Location of this deformation corresponds approximately with the site where contamination seepage was detected earlier.

Document ARH-60, 11-22-67. Color photographs obtained of the inside of waste storage tank 108-SX confirm the bulge in the bottom liner and the distortion of the recirculators and dip tubes.

Document ARH-305, 7-22-68. Efforts are continuing to safely remove the contents from waste storage tank 105-A, which has an unstable (bulged) steel liner. About 94% of the cesium-137 and 30-40% of the strontium-90 has been removed from the supernatant heel. Sludge removal operations are scheduled for August.

8. Cribs and Swamps

CPD Monthly July 1958

Document HW-56972, 8-22-58. A preliminary study was made on the substitution of sodium hydroxide for limestone for neutralization of process condensate discharges to the Purex A-5 crib. Experimental work indicates calcium used for neutralization promotes leaching of radiostrontium from the soil column under the crib.

CPD Monthly Dec '58

Document HW-58711, 1-21-59. Plugging of the A-4 crib occurred during jetting of the 216-A-2 catch tank contents and resulted in backflow of this material into the 291-A turbine house through the floor drains. The floor was contaminated to 20 rads/hr. at contaminated to 8 rads/hr.

CPD Monthly Feb 1959

Document HW-59434, 3-20-59. Flooding and overflow of the Purex A-6 crib contaminated the adjacent area to 500 mrads/hr.

CPD Monthly Dec 1959

Document HW-63313, 1-21-60. Due to a low percolation rate and weakening of the existing dike walls the Redox cooling water swamp is rapidly losing its ability to handle the cooling water.

CPD Monthly Dec 1960

Document HW-67985, 1-20-61. Surveys in the Purex 216-A6 crib area revealed dose rates up to 30 rads/hr. at four feet due to crib overflow.

C. SYSTEMS AND PROCESS VENTILATION

1. Particulate and Gaseous Emissions

HAPO Plant Monthly Oct 1947

Document HW-7997, 11-18-47. First official mention was made of radioactive particulate around (1000-ft. radius) the B-T Plant stacks. Origin is stated as unknown. Project Engineering has been requested to undertake design work incorporating filter systems and new stacks.

HAPO Plant Monthly Nov 1947

Document HW-8267, 12-17-47. Study of ground contamination is concluded to have originated from B and T Plant Stacks. Specks ranging up to 1/32" in diameter have magnetic properties. In addition to provision for filtration systems, sections of the stack ductwork are to be removed and inspected. If particles are determined to be similar immediate steps are to be taken to replace all existing ductwork.

HAPO Plant Monthly Dec 1947

Document HW-8438, 1-21-48. Great concern has been expressed about spot contamination found in the 200 Areas. Source is stated to have been located and a change of equipment made at one stack. Intention expressed to eliminate conditions within the next 60 days.

Inlet and outlet ducts of the exhaust fans found to be the source of contamination. Confirmed by samples of air streams and inspections of ductwork coupons. Proposed filter work has been suspended in favor of emphasis on replacement of electrical fans equipped with stainless steel inlet and outlet ducts.

HAPO Plant Monthly Jan 1948

Document HW-8931, 2-20-48. Indication of marked decrease in particulate discharge observed.

Recent samples of off-gas upstream of the fans indicate presence of extremely minute active particles. Additional study of the problem is required.

HAPO Plant Monthly March 1948

Document HW-9595, 4-26-48. Large particle discharge has been eliminated, but problem of smaller, mist-like particles still exists. Problem is to be pursued by installing special filters and scrubbers in the exhaust systems.

Intensive study of the stack gas problem continues. Smaller particles are being found over a wider area. Studies indicate a twofold problem: formation of scale and deposition on black iron ducts; small

particles and mists from process vessels and cells. Prescribed action: Fan and duct replacements being expedited; cell ventilation ducts to be equipped with CWS filters, and scrubbers are being fabricated for installation in the dissolver off-gas lines.

HAPO Plant Monthly April 1948

Document HW-9922, 5-28-48. Completed installation of stainless steel fans and ductwork, and the off-gas scrubber at B Plant. The scrubber is 40-50% effective for nitrogen oxide and nearly all of the radioiodine. Effort is continuing to reduce the amount of active mist entrained in cell air.

Consultation has been held with biochemical and medical experts in regard to the stack gas problem. All agree that harmful particles and mist must be removed before reaching stack discharge even though cost be considerable. Reasonable haste in solving problem advised, but belief expressed that harmful effects to plant personnel as a result of continuing operation as at present, for a period of three to six months, is extremely remote.

The CWS filters installed in B-T process cells were effective for only three days. Sample activity decreased by a factor of 50-100 but returned to original values.

Dr. Langmuir's advice on mist control is to limit air flow through the cells. Temporary sealing of cell and trench cover blocks reduced stack gas activity by a factor of three and virtually eliminated visible specks.

Development of permanent equipment for stack gas contamination control includes testing of an electrostatic precipitator and a Rotoclone scrubber.

Agreement reached that best means of coping with ground contamination is by fixation with a cover crop.

HAPO Plant Monthly May 1948

Document HW-10166, 6-21-48. Construction of facilities for removing contaminated particles from stack gases has started. The conclusion has been reached that there is no easy way to solve the problems so efforts are being concentrated on a "brute-force" approach for treatment of the entire gas stream before stack entry. The new scrubbers are judged to be successful. Dissolver contribution is estimated at less than 2% of the total filterable activity discharged from the stacks.

Excavation for the 293-B and T gas filtration buildings has been started.

Design is providing for two banks of six cells each. Type of filter medium is not firm at this point, and the structure will be built for any of various alternates.

HAPO Plant Monthly June 1948

Document HW-10378, 7-26-48. Plans are to install at T Plant a four-unit water scrubber system upstream of the exhaust fans. The units will consist of 8' diameter columns in parallel and packed with Raschig rings. Water is to be supplied from canyon vessels jacket effluent.

HAPO Plant Monthly July 1948

Document HW-10714, 8-20-48. Studies now indicate the desirability of using sand-bed filters as a means of corresting the stack gas contamination problem. Efforts are being concentrated on this concept as a solution. Plans for the four-unit water scrubber are being scrapped in favor of sand-bed filters, 110 x 48 feet.

HAPO Plant Monthly Nov 1948

Document HW-11835, 12-23-48. Indicated efficiency of B and T Plant sand filters: 99.3% to 99.9% for activity removal. Recontamination of sand filter exhaust air still continuing however. Pilot studies for I^{131} or due to particulate matter. Particulate collection on most types of samplers shows little improvement in deposition rate.

HAPO Plant Monthly Jan 1949

Document HW-12391, 2-25-49. Experimental results with No. 55 fiberglass indicates a marked advantage over sand. Design for use in off-gas lines is proceeding.

Provisions are also being made for future installation of silver nitrate radioiodine removal facilities.

HAPO Plant Monthly Oct 1949

Document HW-14916, 11-18-49. In biological monitoring, animals collected within a 30 mile radius of 200 Area stacks showed slight but definite thyroid activity.

HAPO Plant Monthly Nov 1949

Document HW-15267, 12-16-49. A project proposal has been prepared for installation of fiberglass filters in B and T Plants. Ammonium nitrate formation found on experimental filters presents both a plugging and explosion problem.

HAPO Plant Monthly Feb 1950

Document HW-17056, 3-20-50. T Plant sand filter efficiency averaged better than 99% for 15 months. Recently it has fallen well below that efficiency and continues there without change in differential pressure. The decrease was thought at first to have been associated with the dissolution of 16-day cooled metal, but no improvement has been observed since return to 90-day cooled metal.

HAPO Plant Monthly Mar 1950

Document HW-17410, 4-20-50. Constant accumulation of water in T Plant sand filter is attributed to discharge from a faulty steam trap and to a cell flushing program.

It is postulated that I^{131} released from "green" metal has been absorbed by the water and is now being released to account, in part, for the lower filter efficiency.

HAPO Plant Monthly June 1950

Document HW-18221, 7-20-50. Studies by Separations Technology indicate that dust carried into the canyon by the air conditioning system contributes very little to the particulate matter which finds its way to the sand filter. There is every evidence that this material has origin in cells as corrosion products.

Plant Monthly Sep 1950

Document HW-19021, 10-20-50. Exceptionally high fission product counts were found in air samples taken adjacent to the B Plant canyon. It was established as largely iodine discharged during neutralization and sparging.

Plant Monthly Oct 1950

Document HW-19325, 11-20-50. Installation of the first off-gas filter - silver reactor unit was made on 10-24-50 at B Plant.

Plant Monthly Jan 1951

Document HW-20161, 2-16-51. Completed installation of the fourth filter - reactor unit. All have proved effective to 99.9% for both I^{131} and particles. It is estimated that 50% of I^{131} is discharged from the dissolvers and the remainder downstream via vessel vent. Sparging during dissolution has been adopted in an effort to drive off more at this point.

Plant Monthly Mar 1951

Document HW-20671, 4-20-51. Separations Technology investigating the concentration of ammonia and oxides of nitrogen present during transition from coating removal to metal dissolution indicates that formation of ammonium nitrate in the silver reactor and fiber glass filter is extremely unlikely.

HAPO Plant Monthly May 1951

Document HW-21260, 6-21-51. T Plant I^{131} activity discharges are 20-fold higher than from B Plant under ostensibly similar conditions. There is some evidence that the T Plant reactor may have been overheated. To preclude overheating reactors the prescribed inlet temperature has been reduced from 475° to 375°F.

HAPO Plant Monthly Sep 1951

Document HW-22304, 10-19-51. Regeneration of silver reactors with silver nitrate has proven to be feasible and satisfactory.

Routine use of mercuric nitrate is being made to suppress evolution of I^{131} via vessel vent.

Plant Monthly Feb 1952

Document HW-23698, 3-21-52. Tests to determine whether evolved ammonia would react to form ammonium nitrate and foul the off-gas filters were completed. No marked dp change has been observed and it is planned to discontinue filter by-pass.

Plant Monthly Mar 1952

Document HW-23982, 4-18-52. Operational failure of the Ru scrubber in Redox caused a stack release and recirculation via the ventilation supply system into 202-S and 222-S Buildings.

Plant Monthly Apr 1952

Document HW-24337, 5-20-52. A significant number of radioactive particles were discharged from the Redox stack. Radiological Sciences reported the presence of intensely radioactive particles in the Redox Area under conditions which raised probably insoluble questions of possible overexposure.

HW-24605 ?
HAPO Plant Monthly May 1952

Document HW-24685, 6-20-52. Emission of a large number of radioactive particles from the Redox Stack occurred; the active material was primarily Ru. 1A column during flushing and draining may be the source.

Plant Monthly Jan 1953

Document HW-26946, 2-24-53. Eleven and 17 curies I^{131} were discharged from B and T Plants on silver reactor failures. Nineteen curies were discharged from Redox as a result of reactor failures.

Plant Monthly July 1953

Document HW-28906, 8-20-53. Twenty-seven curies of I^{131} were released in a single 24 hour period as a result of reactor failures.

HW 29229(?)
Plant Monthly Aug 1953

Document HW-29279, 9-18-53. A large number of Ru carrying crystals of ammonium nitrate again were discharged from the Redox stack. Extensiver decontamination of the Redox crane and CMP has been ineffective because of prompt recontamination during process cell work. Until the cell ventilation system can be improved, crane contamination will be a problem.

HAPO Plant Monthly Sep 1953

Document HW-29513, 10-21-53. During cold oxidation of Redox feed 53 and 84 curies of Ru contamination were discharged on successive days. Ru emissions averaged 6.3 curies/day for the month.

Extreme dose rates existing on the canyon deck and crane constitute a significant threat to sustained production in Redox.

HAPO Plant Monthly Jan 1954

Document HW-30724, 2-25-54. There was a severe Ru emission and high level contamination of a considerable expanse of surrounding area. 260 curies were discharged causing surface dose rates up to 7.5 rep/hr. and necessitating road resurfacing, access denial of extensive ground area, and cleanup of many vehicles.

Plant Monthly Feb 1954

Document HW-31006, 3-23-54. The Redox head-end flowsheet has been revised in an effort to minimize Ru emissions. Reflux is being employed in the H-4 oxidizer tower.

Plt Monthly Mar 1954

Document HW-31267, 4-23-54. Total reflux in the Redox H-4 oxidizer tower shows no appreciable improvement in Ru emission over the non-reflux type runs.

Plt Monthly July '54

Document HW-32684, 8-20-54. Off gases from both primary sources of Redox stack emission, H-4 oxidizer and the vessel vent, are now routed through the sand filter after receiving improved scrubbing or prefiltering. Oxidizer off-gas is routed through two caustic scrubbers in series, a fiber glass filter and the sand filter before stack discharge.

Plt Monthly Oct 1954

Document HW-33585, 11-24-54. A modified 200 West Area particle decontamination program resulted in a reduction in estimated expense from $235,000 to $106,000. The badly contaminated 50 acres east of Redox were plowed and seeded with rye grass. This action coupled with backfill around the Redox stack greatly reduced a primary source of ground contamination within 200 West Area.

Plt Monthly Nov 1954

Document HW-33962, 12-20-54. Visible particulate contamination was released on several occasions from the Redox stack. Activity ranged to 20 rads/hr. Analyses of particles indicate Ru of an age related to the January 1954 emissions. More recent discharge shows predominance of Ru-103 indicating "current" material as the source. Verification is being vigorously pursued.

T&PD Plant Monthly Mar 1955	Document HW-35891, 4-20-55. T Plant production was seriously affected by high I^{131} emissions on 3-17-18. Average emissions for T Plant were 11.3 curies/day and for Redox 6.1 curies/day. Maximum in a 24-hour period were: T Plant 90 curies; Redox 19 curies.
Plt Monthly Apr 1956	Document HW-42626, 5-21-56. Production rates and lower cooling periods taxed Purex I^{131} removal capacity of the silver reactors. Forty-seven curies were discharged.
CPD Monthly Nov 1957	Document HW-53967, 12-29-57. A 14-curie I^{131} emission occurred at Redox when the crane was cleaned with a chlorinated solvent. Chloride ion in the solvent presumably displaced radioiodine from the sand filter.
CPD Monthly Nov 1958	Document HW-58305, 12-22-58. A serious iodine emission problem was created by transfer for charging of one or more buckets of 23 50 35-day-cooled metal. Thirty-one curies were discharged.
CPD Monthly Nov 1959	Document HW-62864, 12-21-59. Increase of fission product activity was noted on ground area control plots. Weekly stack flushing has not been effective. A sampling program has been established to define source.
CPD Monthly Jan 1960	Document HW-63706, 2-22-60. A fission product emission occurred when dissolver off-gas jets switched from air to steam. It is assumed that vent jet piping is holding up ammonium nitrate crystals and fission products. All off-gas routing through the scrubber or absorber is being investigated.
CPD Monthly Apr 1962	Document HW-73525, 5-21-62. Short-cooled metal was received and charged at Purex. Operating control limits were exceeded during transfer of metal solution from the dissolver. Further dissolution is being held to permit decay time.
CPD Monthly Sept 1963	Document HW-79097, 10-21-63. Sixty-three curies I^{131} discharged from Purex in a seven-day period as a result of an error in shipment of three buckets of short-cooled metal.
CPD Monthly Aug 1964	Document HW-83876, 9-21-64. A bucket of "green" metal was detected by crane operator observation and confirmed by the tunnel monitor. The bucket was returned to IPD.

Document RL-SEP-755, 10-22-65. During a neptunium run at Redox 66 curies of ruthenium were released to the atmosphere via the sand filter and ventilation stack. The activity was well dispersed in the environment and ground activity was barely distinguishable above background. Cause of the unusual breakthrough was not determined and the investigation is continuing.

Document ISO-210, 4-22-66. A stack emission of short duration occurred on 3-31 which spread contaminated particulate matter to the south and west of the Redox stack. The particles appeared to be the usual ammonium nitrate crystals contaminated with radioruthenium. Contamination was contained within the exclusion area. Reason for the emission is unknown.

Document ISO-512, 10-21-66. A sample of decayed vegetation and earth was taken from a spot of radioactivity reported by Regional Monitoring north of the 200 West Area perimeter fence. Two small pieces of fibrous vegetation were selected for analysis. One determined that the activity was essentially all $Sr\text{-}Y^{90}$.

HAPO Plant Monthly Sep 1947

Document HW-7795, 10-15-47. Initial evidence of gallery contamination resulting from buildup of back pressure in process transfer lines is attributed to gassing of a jet into a relatively full process vessel. Corrective measure involved orificing of steam to the gang valve.

28576 (?) HAPO Plt Monthly June 1953

Document HW-28756, 7-22-53. A blowback occurred at the H-4 section contaminating both the Redox operating and pipe galleries. This incident added to the already heavy decontamination load which includes crane, craneway and south sample gallery.

Plt Monthly Apr 1954

Document HW-31734, 5-21-54. Five separate blowbacks into the Redox pipe gallery instrument and chemical addition lines constituted a serious potential for personnel exposure.

Plt Monthly July 1955

Document HW-38375, 8-26-55. A process blowback from the H-4 oxidizer in Redox produced radiation levels to 500 r/hr. at six inches and one r/hr. at the radiation zone boundary. Twenty-one employees received some exposure but less than the daily control limit.

Plt Monthly June 1956

Document HW-43938, 7-23-56. A control valve failure in 233-S building caused Pu solution to backup through an instrument line to the control room. Gross air and surface contamination resulted throughout the building and in the ground area outside.

CPD Monthly Nov 1958

Document HW-58305, 12-22-58. On 11-23-58, an H-4 oxidizer blowback occurred in Redox resulting in 500 r/hr. maximum readings from an instrument line at the panel board. A vapor phase reaction when hexone was recycled from F-8 tank to H-4 is suspected.

CPD Monthly Sep 1959

Document HW-62179, 10-21-59. 233-S building at Redox was operated on respiratory protection for two days due to alpha air contamination. Vessel pressurization and blowback through an instrument line and defective gauge at the panel board was the source.

CPD Monthly Aug 1962

Document HW-74804, 9-21-62. Dose rates up to 5 r/hr. were measured in the silo sample gallery at Redox as a result of a partial vacuum created when steam was allowed to condense in a line from the 1A column.

3. Metal Dissolution

HAPO Plt Monthly Aug 1950

Document HW-18740, 9-18-50. A production test was authorized to determine the effect of processing 67-day cooled metal. The results:

A marked increase in the radiation level of samples from 40 to 80 mr/hr.

Gamma pencils were issued to 231-Building personnel when activity of product solution increased substantially.

Accumulations of particles on air sampling devices located in the area were approximately seven times higher than for 90-day metal. The increase was attributed to dust particles carrying eight-day I^{131} rather than particulate matter which caused past difficulties.

4. Losses to Ground

HAPO Plant Monthly Feb 1951

Document HW-20438, 3-20-51. An estimated 22.5 tons of depleted uranium were lost to the soil in the vicinity of 102-BX tank when the cascade outlet plugged permitting the liquid level to rise and flow to ground via one or more of five submerged spare nozzles.

5. Wastes

Plt Monthly May 1951

Document HW-21260, 6-21-51. Current metal waste in the first tanks of the 101-BX BY and TX cascades

are approaching the boiling point of the supernatant due to larger quantities of more active sludge. Suggested resolution:

Install coolers in the abnormally hot tanks.

Reroute feed lines so that cascades will consist of two or three tanks instead of the four or six at present.

Plt Monthly Nov 1951

Document HW-23140, 1-22-52. Contents of some of the underground storage tanks receiving metal waste have reached or are approaching the boiling temperature of these solutions. 105-TX is 238°F in the sludge and 210°F in the supernatant. By-pass lines have been installed to reduce the cascade from four to two tanks in series. The existing temperature definitely exceeds the temperature used as a basis for design of waste removal units. Three specific pumps are being fabricated to withstand high temperature operation.

25533 (?) Aug 52 Plt Monthly

Sep Plt Monthly 1952

Document HW-25523, 9-24-52. Waste in the 110-S tank has started to boil. Air condensers are not adequate. Action to curb emission is required.

Document HW-25781, 10-20-52. Emissions from 107 and 110-S tanks are continuing. Air condensers are being modified to permit water cooling.

Plt Monthly Dec 1952

Document HW-26720, 1-23-53. Failure of two waste tank series to cascade properly and the plugging of two 200 East to 200 West lines have seriously handicapped disposal of TBP waste to the 200 East Area.

Plt Monthly Jan 1954

Document HW-30724, 2-25-54. Self concentration in the 101-S and 104-S tanks is discharging steam vapor and liquid at frequent intervals. Metal shelters and glass wool filters have been installed on an emergency basis to confine contamination.

6. <u>Off-Gas Treatment</u>

Plt Monthly June 1951

Document HW-21506, 7-20-51. Methods for reactivating the silver nitrate in the reactors are being studied. After considering the possible methods of recharging the silver reactors it has been judged most expedient to replace the columns and to permit the replaced units to be set aside for decay of activity prior to regeneration.

CPD Monthly Apr 1964

Document HW-82089, 5-22-64. The Purex process was suspended on 4-10 to investigate the cause of decreased air flow and increased dp across the main canyon ventilation filter. From holes bored in the top inlet, the bed was found to be depressed from 12" to 24" under various flow conditions. The bed was coated with a material - primarily ammonium nitrate. Partial recovery of air flow was accomplished by cycling the exhaust fans on and off to decompress the bed. Flow was reestablished at 90,000 cfm compared with a normal 120,000 cfm.

CPD Monthly May 1964

Document HW-82526, 6-22-64. Laboratory studies on a filter model indicated that the plugging phenomenon experienced in April arose from humidity changes. Changes in humidity of exhaust air cause agglomeration and bridging of ammonium nitrate which has accumulated in the filter.

Document RL-SEP-52, 11-20-64. The Purex filter became severely restrictive. Control of flow was regained after three days of reduced flow at 72,000 cfm. A temporary emergency by-pass designed to provide adequate control in the event of complete failure of the main filter remains in standby.

Document ISO-714, 9-21-67. In April, 1964, the dp across the Purex Plant ventilation filter became excessive. Design and construction of a replacement filter was commenced immediately and the filter was placed in service early in 1965. After that period investigations were conducted which revealed that large quantities of ammonium nitrate were present in the forefilter of the failed unit. A white powder distributed through the bed contained about 11% insolubles (silica and rust) while the surface crust contained about 50% insolubles. By isolating the filter and passing air at 80% relative humidity through the bed, the ammonium nitrate has been dissolved and drained from the bed. From all indications the filter will be restored to normal service.

Document ARH-302, 4-22-68. B Plant operations were suspended for four days when a high dp developed across the main ventilation filter. Relief was obtained by placing the old existing sand filter in parallel operations. The main filter was subsequently returned to full service with no recurrence of the problem.

D. NATURAL - FIRE - CHEMICAL REACTIONS

1. Explosions - Violent Reactions

HAPO Plt Monthly Mar 1952

Document HW-23982, 4-18-52. Significant personnel and work area contamination resulted from a process vessel explosion at 234-5 Building.

Plt Monthly Feb 1953

Document HW-27288, 3-18-53. On 2-5-53 a violent chemical reaction involving nexone - nitric acid necessitated evacuation of personnel and extensive decontamination work at the Redox Plant. Source of the incompatible mixture was either the salt waste header or a sample pot. Process solutions were blown from 6 ports in the south sample gallery. Surface dose rates up to 200 rep/hr. presented a difficult decontamination problem.

CPD Monthly Feb 1958

Document HW-55215, 3-21-58. A violent chemical reaction occurred in the Purex A cell silver reactor, rupturing the vessel and discharging the coated ceramic packing onto the cell floor. The event occurred during transfer of solution from A-2 dissolver to the blend tank, hence cannot be associated with a gas phase reaction. The exact cause remains unknown. It is hypothesized that metastable compounds such as silver nitrate - ammonium complexes, or silver imide or azide spontaneously decomposed. The reactor was regenerated after it had been unplugged with a solution of ammonium hydroxide.

CPD Monthly Mar 1958

Document HW-55571, 4-21-58. Chemical studies indicate that silver reactors can be safely cleaned with 2M sodium thiosulfate - 0.4M sodium hydroxide. This reagent eliminates any possible formation of unstable silver compounds and has a high solvent power for simple silver halides as well as complex silver compounds.

The recent Purex reactor incident has let to renewed concern over the presence of ammonia in the silver reactors as a potential explosion hazard. The original ammonia scrubber design is being reviewed and issuance of a revised design is imminent.

Document ISO-J63, 11-21-66. Recently the hydrogen concentration in the off-gases from the Redox dissolvers has occasionally exceeded the lower flammable limits (4.0 $\pm$ 0.1%) while sodium nitrate from high level waste storage tanks was being used to suppress

hydrogen. Operating conditions have been adjusted so that recovered sodium nitrate can still be used while studies are being conducted to determine the cause of the off-standard behavior.

Document ISO-708, 3-20-67. Laboratory investigations using synthetic solutions have shown that the presence of Cr^{+6} in the sodium nitrate solution at 5 grams/liter (as found in recovered sodium nitrate) can cause an increase in hydrogen evolution by a factor of 5 when dissolving aluminum under plant process conditions.

2. Fire

HAPO Plant Monthly July 1952

Document HW-25227, 8-15-52. Spontaneous ignition of contaminated waste occurred in the burial garden. Airborne Pu fell out in the vicinity of Z-Plant.

Plt Monthly Sep 1953

Document HW-29513, 10-21-53. Alcohol ignited in hood 13 of Tank III of the RMA line causing sufficient pressure to rupture two hood gloves and spread gross contamination.

Plt Monthly July 1954

Document HW-32624, 8-20-54. The backside of the RMA line was grossly contaminated following ignition of gram quantities of Pu metal turnings during a plastic bag sealing operation.

CPD Monthly July 1959

Document HW-61366, 8-21-59. A fire was discovered in the east end of the Redox storage gallery. Friction developed in the drive belt of the exhaust fan caused overheating and sparks which fell on clothing and rubber goods stored below. Equipment damage was estimated at $2,500.

CPD Monthly Feb 1960

Document HW-64089, 3-21-60. During conversion of the Purex N cell ion exchange prototype to a production unit sparks from a welding torch set fire to extraneous material. No equipment damage resulted and contamination spread was restricted to N cell.

CPD Monthly Apr 1960

Document HW-64991, 5-20-60. On 4-17-60 an uncontrolled chemical reaction occurred during metal dissolution in the newly installed multipurpose dissolver at Redox. The uranium fire involved severely damaged the dissolver and led to gross contamination of the canyon and crane.

CPD Monthly Nov 1963

Document HW-79768, 12-20-63. A fire of unknown origin caused irreparable damage to the Pu anion exchange and concentration system at Redox on 11-6-63. The Plant was down for the balance of the month to undertake very extensive decontamination work.

Document ARH-302, 4-22-68. On 3-7 an electrical fault followed by arcing and fire destroyed the No. 3 breaker at In-Tank Solidification Unit No. 1.

Document ARH-305, 7-22-68. An electrical fault in the submerged calrod unit of In-Tank Solidification Unit No. 1 caused ignition of wire insulation. Loss was estimated at $1800.00.

3. Natural Events

HAPO Plt Monthly Apr 1949

Document HW-13190, 5-18-49. A slight earth tremor was felt in the 200 Areas at 12:00 noon on 4-13-49. No damage was recorded.

HAPO Plt Monthly May 1951

Document HW-21260, 6-21-51. A crane boom left unbraked in an elevated position after completion of the days work swung into a primary supply line during a high wind. A complete power outage occurred in all of 200-West Area causing a 25 minute delay in operations.

HAPO Plt Monthly May 1953

Document HW-28267, 6-19-53. Fallout from Nevada tests caused depositions on all horizontal surfaces throughout the 200 Areas. Contamination measured from 3000 to 5000 c/m.

Document RL-SEP-476, 5-21-65. An earth tremor occurred on April 29. All tank farm leak detection laterals and dry wells were monitored. No significant changes were detected.

E. NUCLEAR SAFETY

1. Batch Size

CPD Monthly Apr 1962

Document HW-73525, 5-21-62. A nuclear excursion occurred in the solvent holding tank, K-9 at Recuplex (234-5) on 4-7-62. Three employees were involved. No permanent restrictions are indicated.

2. Depositions

HAPO Plant Monthly Apr 1949

Document HW-13190, 5-18-49. Bioassay sampling revealed the first case of Pu deposition at HAPO. A former Los Almos employee, the individual is suspected to have been affected at that site.

Plt Monthly Mar 1950

Document HW-17419, 4-20-50. There is borderline evidence of Pu accumulation in several 234-5 building personnel.

HW-43137(?) HAPO Plt Monthly May 1956

Document HW-43147, 6-21-56. The first apparent case of Pu deposition above permissible limits has been recorded. A maintenance fitter at 224-T in February, 1955 is judged to have received 150-170% of the permissible limit.

HAPO Plt Monthly June 1956

Document HW-43938, 7-23-56. As a result of the control valve failure and Pu backup to the 233-S control rooms three of eight employees received significant exposures. One of the three, by bioassay, may be the highest deposition case experienced at HAPO.