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SUMMARY OF GENERAL INFORMATION MEETING
OAK RIDGE, TENN., OCTOBER 24-26, 1949

By: M. H. Curtis
J. L. Schwennesen

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SUMMARY OF GENERAL INFORMATION MEETING
OAK RIDGE, TENN., OCTOBER 24 26, 1949

I. INTRODUCTION

The General Information Meeting, held at Oak Ridge this year, was A.E.C. sponsored and included representatives from practically all of the sites connected in any way with the atomic energy program. Approximately 300 delegates from locations other than Oak Ridge were in attendance. Over 100 papers on all aspects of the atomic energy program were presented which meant that brevity was essential. For example, the entire field of solvent extraction with its many new processes now being studied was covered in one and one-half hours.

This document attempts to summarize the general content of some of the papers which may be of interest to the Separations Technology Division.

II. SUMMARY OF MEETING

A. Session 4 - Shielding

Paper 14 - A Rational Approach to the Shielding Problem -
H. A. Bethe, Cornell

At the present time theory can predict the characteristics of gamma ray absorption quite well and absorption coefficients are known with reasonable certainty (±5%) for a number of materials. With neutron absorption on the other hand, theory is of very little value because of numerous, not fully-understood complications. Greatly needed then are many bulk shielding experiments to establish reasonable values for neutron absorption in shielding materials.

Most efficient reactor shields should be composed of dense gamma absorbing materials (Pb, W, U probably being the best) in combination with lighter, more efficient neutron absorbing materials (Boron, hydrogenous substances). Thus it may be seen that it is uneconomical to use more dense material than necessary for the desired degree of gamma absorption.

Based on available data it appears possible that a shield weight of 100 metric tons or less may be designed for a reactor of 60 in. radius. In other words, the threshold of design for suitably shielded atomic powered aircraft may be approached.

Paper 15 - Theory of the Gamma and Neutron Attenuation Problem -
H. J. Hurwitz, KAPL

This paper presents a theoretical approach to the shielding problem. Points of importance brought out were the fact that theory must be concerned with the exceptional particle, i.e., the one penetrating shielding

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media the farthest as distinguished from a "statistical average particle".

Paper 16 - Summary of the Oak Ridge Shielding Session -
Gale Young, NDA

The activities of an Oak Ridge group in the summer of 1949 were discussed. A complete report is found in Document ORNL-437.

Paper 17 - Fundamental Information on Shielding
H. Feshbach, MIT

Work was described relative to experimental determination of various nuclear cross sections. Brought out was the fact that more work needs to be done especially in certain energy ranges where no data at all is available.

Paper 18 - Bulk Shielding Tests - E. P. Blizard, ORNL

Various shields available for evaluation were described together with a theoretical basis for evaluating results.

Paper 19 - Shielding Materials - T. Rockwell, ORNL

Various special purpose materials having value as potential shields were discussed. These materials can be divided into four groups. In Group 1 are those materials a relatively thin layer of which will absorb thermal neutrons without the production of hard gamma rays. Boral, a boron carbide - aluminum mixture are two of the materials that have been developed. In Group 2 are cheap shields which may take the form of cast concrete where densities of 3-1/2 - 4 are desired or a metallic cast aggregate where higher densities are needed. Group 3 includes familiar pre-cast concrete block construction. At the present time experimentation with the handling of large, multi-ton cast concrete blocks is proceeding. Here the advantage is, of course, that the shield may be moved or rearranged when desired. Group 4 includes mobile shields which offer a minimum volume and usually are composed of a dense, more efficient gamma absorber in combination with a lighter, more efficient neutron absorber. A material developed at ORNL is Plumbor, 70% Pb-30% B.

B. Session 5 - Chemistry and Chemical Technology

Paper 20 - Preparation and Physical Properties of Columbium Pentafluoride - J. H. Junkins, K-25

This paper presents part of a program to determine appropriate steps in volatile separations processes such as occurs in parts of the UAP process. Columbium metal is reacted directly with fluorine at 280-300°C in a special platinum reactor. The white pentafluoride crystals formed have a melting point of 78.85°C. H = 8600 cal/mole, and ΔS is 24 cal/mole/degree C.

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Paper 22 - <u>Oxidation of Uranium Tetrafluoride at High Temperatures,</u>
T. S. McMillan, K-25

A special reaction was found to occur under exceptional conditions and was investigated as a possible means of UF_6 production. The usual reaction is $3\ UF_4 + O_2 + 6\ H_2O \rightarrow U_3O_8 + 12\ HF$; the other $UF_4 + O_2 \xrightarrow{\Delta} UO_2F_2 + UF_6$. The reaction occurs stepwise, the first step at 800°C, the second at 300°C.

Paper 21 - <u>Thermal Decomposition of Uranyl Fluoride</u> -
S. S. Kirslig - K-25

An extension of the work outlined the 2nd reaction, Paper 22 above also produces UF_6 according to the following reaction:

$$3UO_2F_2 \rightarrow 2/3\ U_3O_8 + UF_6 + 1/3\ O_2$$

Paper 23 - <u>Electrolytic Production of Uranium Tetrafluoride</u> -
A. L. Allen, K-25

UF_4 may be produced more cheaply than by chemical means by the electrolysis of uranyl salts in an HF and UO_2F_6 bath. Temperature ranges of 20-40°C and 80-100°C with fast stirring are the optimum.

Paper 24 - <u>Fluorination with Chlorine Trifluoride</u> -
R. L. Jarry, K-25

A reaction of UO_2 with $Cl\ F_3$ to form UF_6 was described.

Paper 25 - <u>The Precision of the Fluoremetric Uranium Method and Some Optical Properties of the Phosphors</u> -
C. J. Barton, Y-12

Different methods of preparing samples and the effect of other salts in masking fluorescence was discussed.

Paper 26 - <u>Concentration of U^{235} by Chemical Exchange with Countercurrent Electromigration.</u>
A. Clark, Jr., Y-12

This paper attempts to prove a substitute for gaseous diffusion. A possible use is for enriching Hanford depleted Uranium. Results indicate the process is very costly however. The process briefly consists of an electrolysis of a counter-current-moving chloride solution of ph 1-1.5 according to the following reaction:

$$^{238}U^{IV} + {}^{235}UO_2^{++} \rightleftarrows {}^{235}U^{IV} + {}^{238}UO_2^{++}$$

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Paper 27 - Extraction of Th^{IV} into TTA-Benzene from Aqueous Solutions of ph 0.3 to 4.1 - W. C. Waggener, ORNL

A theoretical derivation of formulae to handle the data was presented.

Paper 28 - Extraction of $Th(NO_3)_4$ into Tributyl Phosphate - Hexane Solutions - O. E. Meyers, ORNL

An interpretation of data was made to determine the state of solvation of thorium. No temperature effect was noted. 3TBP to 1 Thorium were found, but H_2O solvation was not 4 as had been previously suspected.

Paper 29 - Recent Results on the Hydrolytic Behavior of Metal Ions - K. A. Kraus, ORNL

U^{IV} and Zr hydrolysis occurs in chloride media. Mathematical treatment is handled by the classical theories. A Zr plateau of hydroxyl numbers of 2.33 is reached after one hour. This corresponds to previous findings in other cases.

Paper 30 - Anion Exchange Studies - G. E. Moore, ORNL

Data for Dowex #1 from HF-HCl media were presented. Radio chemical following of Nb, Zr, and Ta occurs. The effect of acid concentrations, etc., shows separations to be practical.

Paper 31 - An Auto-Titrator - W. N. Carson, Jr., HW

The development of an automatic titrator for acid-base or oxidation-reduction reactions utilizing electrolysis to produce the titrating ion was described. The indicator may be photometric or potentiometric.

Paper 32 - Quality Control Program in Y-12 - F. E. Clark, Y-12

The history of quality control in the Y-12 area was discussed. It was found that about 2% of the total effort required for analytical work was needed for control and accountability purposes.

C. Session 8 - Waste Disposal and Processing

Paper 52 - Tolerances and Permissible Levels of Radioactivity in Wastes - K. Z. Morgan, ORNL

Some of the generally accepted radiation tolerances were reviewed. Limits now in effect for personnel are summarized by the following table:

[redacted]

TYPE OF RADIATION	MAXIMUM PERSONNEL EXPOSURE VALUES MR/WEEK	MREP/WEEK	MREM/WEEK
X or γ	300	- - -	300
β	- - -	300	300
Thermal Neutrons	- - -	60	300
Fast Neutrons	- - -	30	300
α	- - -	15	300

Paper 54 - Process Development for Handling Liquid Wastes - W. A. Rodger, ANL

It was stated that the goal of successful liquid waste processing is to form a solid waste. Small laboratory waste evaporators were mentioned along with ion exchange methods with the ultimate goal of reducing waste volumes. Most of the discussion was more applicable to disposal methods in the relatively populous regions around the national laboratories.

Paper 55 - Processing of Combustible Solid Wastes - P. J. Schauer - ML

Work done by Mound Laboratory, KAPL, and the Air Reduction Corporation in the disposal by burning of combustible solid wastes was described. For the most part the wastes were contaminated CWS filters, wood, rubber gloves, etc. The material was burned in a special incinerator with 60-70% of total activity dropping to the ash and most of the remainder going into the flue gas. Mound Laboratory has developed a special method for recovering the particles in the flue gas. Briefly, it consists of using the particles as a nucleous for water droplet formation in a special jet and steam expansion chamber. The Air Reduction Corporation is working on a special incinerator design that will produce a flue gas containing essentially only CO_2 and water. Thus it may be possible to condense out all of the flue gases in a caustic scrubbing tower.

Paper 56 - Process Development for Gaseous Wastes - A. G. Blasewitz-HW

The development and installation of sand gas filters at Hanford as a result of the discharge of gaseous, active wastes from the stacks was reviewed. Data were presented for tests using glass wool of two types (0.0055 in. fiber diameter and 0.00005 in. fiber diameter) as a filtering media for stack gases from dissolver operations. It was shown that the glass wool combinations tested were considerably more efficient per unit of thickness than the sand filters, and that to accomplish a given decontamination, considerably less pressure drop would be experienced using glass wool filtering capsules. Mentioned briefly was a successful test for I^{131} removal from the stack gas by reacting the I^{131} with $AgNO_3$-saturated ceramic beryl saddlesin the off-gas line.

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Paper 57 - Some Effects of Radioactivity on Living Organisms - E. McCrady, A.E.C.

Biological work on a control basis is getting started at ORNL. Lake and stream plant and animal life are to be studied with a view as to what concentration of radioactivity occurs within plants or animals and as to what the ultimate effect will be. ORNL has control data on lakes and streams to be studied and the rate of discharge of radioactivity into these waters is known. TVA cooperation makes available previous data on plant and animal life in the waters to be studied before the discharge of radioactivity into the water which began about four years ago. The interdependence of living forms and nature's system of checks and balances will be studied as to the relationships in the presence of active wastes. An interesting point is that in one of the lakes under study no fish of one particular type younger than about four years has been found.

Paper 58 - Development of an Evaporation System - G. E. McCullough, KAPL

A brief discussion outlined a liquid waste evaporative system at KAPL. A special evaporator with a feature to eliminate foaming and scaling of the boiling solution was employed to reduce volumes to those containing about 10 weight % dissolved solids. The solution was then transferred to heated drying rolls where the volume was reduced about six-fold and a product formed containing about 5-10% moisture to reduce the dusting problem.

D. Session 10 - Chemical Separations Processes

Paper 65 - Introduction - Dr. English, A.E.C.

The most important features of any chemical separations process are economy, handling of fission activity, and disposal of wastes. No process can be considered complete until the waste problem is under control. A major shortcoming in some present solvent extraction processes is the fact that large quantities of non-volatile salting agents are employed which means that the waste handling problem is aggravated. The possible use of volatile salting agents may be an alternative. It is hoped that plans for present separations processes will be very flexible so that new developments may be incorporated into them.

Paper 66 - Solvent Extraction Processes

a. Zebrowski - KAPL

Work has been done in determining Pu and Ru data in acid deficient systems. There has been follow up on Ru decontamination improvement caused by filtrol contacting. A study of the causes of Pu losses in ORNL runs indicated slow Pu^{+4} polymerization in acid deficient systems. Some mixer settler runs were made and some emulsification noted. SPRU should start cold runs in December.

[redacted]

b. Levenson - ANL

ANL hopes to be out of the Redox business by the end of the year. At 30% Hanford Pu and F.P. levels 2 cycle (1st cycle ORNL - 2nd ANL) decontamination was 2-6 x 10^6 for α and 1.5-4 x 10^6 for β. An ANL Semi-works study of Ru removal by ozonization indicated 99% removal on the 1st runs but less on subsequent runs due to Ru plating out on lines, etc., and refluxing. Recycling of ozone has been used with satisfactory results.

The precipitate formed in IIDU lines during Redox system operation has been identified as mostly $Fe(NO_3)_3$ and is explained by the fact that there seems to be an appreciable distribution coefficient of Fe^{++} into the organic phase where oxidation occurs.

It has been found that in an acid deficient Redox system neither Np^{+4} or Np^{+6} will extract into the 1AS.

c. D. G. Reid - ORNL

Nothing new to report. It is felt definitely that only two Redox uranium extraction cycles are needed and that direct maintenance may be used after the first cycle in the Redox process.

d. A. M. Rom - ORNL

The "25" process was described briefly. An extraction and strip column are used in a process similar to Redox. Uranium feed comes from a high flux pile using enriched U.

e. Crandall - HL

A solvent extraction system utilizing a TTA contact to remove Pu^{+4} from the U and F.P. then using solvent X to remove the uranium without a salting agent was described. (Solvent X may be pentaether, cyclohexanone, etc.). Considerable reflux is required for proper operation of the system. A report is soon to be published.

f. D. E. Ferguson - ORNL

A TBP (tributyl phosphate) solvent extraction process for stored metal recovery was described. Uranium feed enters the middle of a "1A type" column, is extracted into the organic phase containing about 15% TBP in a hydrocarbon diluent and is scrubbed with a stream containing about 3 M HNO_3 as a salting agent. The organic phase is stripped of uranium by water extractant in a "1C type" column. The final uranium product is an aqueous uranium solution about 0.2 M in HNO_3 and containing only on the order of 10 ppm phosphate. Results so far have indicated a uranium decontamination to less than the background β and γ of natural uranium in one cycle.

g. W. B. Lanham - ORNL

The "Purex" process, a Pu-U reduction-extraction using TBP extractant and HNO_3 salting agent was described. Pu is reduced to the +3 state then oxidized and stabilized in the +4 state with HNO_3. Pu extraction is from the +4 state. It is expected that the process, a substitute for Redox, will give reduced waste volumes and offer an excellent source of fission products for possible recovery. The process is considered feasible but is definitely in the preliminary stages.

Paper 67 - Precipitation Processes - Hurd, Barton - K-25, Ruch - ORNL

The UAP process for metal recovery was described in some detail. The process consists of blending and dissolving in nitric acid the supernate and sludge in the metal waste tanks and precipitating the ammonium phosphate salt of uranium. Two cycles are employed.

It was found that the most desirable precipitate from the standpoint of ease of filtering and decontamination was formed by the addition of NH_4NO_3 to the dissolved metal solution, although other ammonium salts might be used. The hot (95°C) solution in the precipitator is cooled slowly at the rate of about 1°C per minute to give crystals of maximum size and decontamination factor. Filtration has given no problem.

The process has been demonstrated in 40 gal. batch lots to achieve information on F.P. decontamination, uranium losses, and general operability. It has been found that the total overall two cycles U loss was on the order of 0.5% for the semi-works scale operations with product activities being on the order of 300-700% of natural uranium. It should be noted that stored metal at least three years of age is needed for the process in order that a reasonably decontaminated product may be obtained.

Paper 68 - Volatility Processes

a. H. A. Bernhardt - K-25

Fluorination of UAP was described and proceeds according to the following sequence: $UO_2NH_4PO_4 \xrightarrow{\Delta} UO_2HPO_4 \xrightarrow{\Delta} (UO_2)_2F_2O_7 \xrightarrow{HF} UF_4 \xrightarrow{F_2} UF_6$

A UF_6 distillation after the process gives little Pu decontamination. Pu is best removed by keeping the F_2 reaction vessel as cool as possible to prevent the formation of PuF_6. Ru removal is good apparently due to absorption on the walls of the reactor. An interview with Bornhardt indicates that he is doubtful if the required decontamination factors can be obtained in the fluorination steps.

b. E. Florin - LA

Work was outlined in the formation and identification of PuF_6. A deposit of PuF_4 on a filament was reacted with fluorine at a temperature of

400-600°C in a fluorothene reaction tube. The disappearance of $Pu\,F_4$ is followed by the appearance of $Pu\,F_6$ in cooler portions of the reaction vessel. Data was presented to show that the vapor pressures of $Pu\,F_6$ and UF_6 are almost identical.

c. J. Katz - ANL

Work is aimed at potential separations processes by volatility means. Low temperature fluorination of metal by $Cl\,F_3$, $Br\,F_3$, $Br\,F_5$ and IF_5 have been studied. At 45°C the $U + Cl\,F_3 \rightarrow UF_6$ reaction goes to completion in six hours while $U + BrF_3 \rightarrow UF_6$ goes to completion in twelve hours at 25°C. In one run in a quartz reaction vessel 230 mg of irradiated U metal dissolved in BrF_3 in two hours. BrF_2 formed was frozen out at room temperature with other products being volatilized and condensed at liquid air temperature. UF_6, Br and fission products were warmed with a helium stream and caught in fractions in different temperature level condensers. About the only activity found associated with UF_6 was due to I and Te.

d. J. Malm - ANL

A potential means of separating Pu from Np and various fission products elements using volatilization methods was discussed.

e. R. E. Leuze - ORNL

Fluorination of irradiated metal was described. Insufficient Pu was present to determine its distribution. Various decontamination factors were given for dissolvings and distillations.

E. Session 12 - Heat Transfer

Paper 85 - Realization of High Rate Heat Transfer to Water
R. B. Briggs - ORNL

This paper concerns the transfer of heat from a pile to pile cooling water through the aluminum can containing fuel metal. Investigations at Hanford have found the corrosion of aluminum at high rates of water flow considerably less than originally expected. At the present time aluminum surface design temperatures of 100°C are not unreasonable from the long range corrosion viewpoint. Water flow rates should be such that at least a ΔT between water and the aluminum surface of 100°F be available. Experimental data have indicated heat transfer coefficients on the order of 10^4 at water velocities of 45-50 ft/sec. In the Materials Testing Reactor an overall heat transfer coefficient of 7000 at a water velocity of 30 ft/sec. has been used for design.

Three kinds of scales have been noted on aluminum surfaces in connection with the above usage: first, gels; second, Ca^{++} deposits; third, a very thin layer of aluminum oxides. Of course the overall effect of such scales and the ultimate effect on heat transfer coefficients must be taken into account.

Paper 36 - Heat Transfer with Boiling Water - J. N. Addons - MIT

In any instance where high rates of heat transfer to water are required, the possibility of boiling of the water must not be overlooked. The standard curve of heat transfer from a boiling liquid versus temperature differential between liquid and vapor phases was reviewed. The rates of heat transfer in boiling water have been studied using an electrically heated wire suspended in the liquid. It was of interest to note that formation of boiling vapor phase bubbles occurs with almost explosive violence (taking place in less than 1/50,000 second) which may explain some of the high heat transfer coefficients realized. At the present state of knowledge, the prediction of heat transfer coefficients has been reasonably achieved.

F. Session II - Fluorine Chemistry

Paper 95 - High Temperature Hydrogenation of Uranyl Ammonium Phosphate
W. Davis, Jr. - K-25

At 500-700°C hydrogenization produces a reduction to uraneous oxypyrophosphate while at 800-1000°C the reaction is essentially a conversion to UO_2 and elemental phosphorous.

Paper 96 - High Temperature Hydrogenation - Hydrofluorination of Uranyl Ammonium Phosphate to Uranium Tetrafluoride -
W. Davis, Jr. - K-25

The reaction UAP $\xrightarrow{H_2-HF}$ UF_4 may proceed in a single step at 500-700°C in measurable quantities. Activation energy has been measured as 18 ± 5 kilocalories/mole.

Paper 97 - Conversion of UO_2 to UF_4 in Vibrating Tray Reactors -
G. S. Montillon - K-25

The reaction $UO_2 + 4HF \rightarrow UF_4 + 2H_2O$ was made to proceed by passing anhydrous HF countercurrent to a stream of UO_2 powder vibrating in a closed tray reactor at 60 cycles/min. in a vertical direction. The operation was semi-continuous in that UO_2 was fed more or less continually to the reactor and UF_4 discharged at the opposite end. The dusting problem was minimized by having all parts of the reactor totally enclosed and using flexible bellows to allow the tray to be vibrated.

Paper 98 - Conversion of UF_4 to UF_6 in Vibrating Tray Reactors -
[illegible] H. Smiley - K-25

A similar set-up to that described above allowed fluorination of the UF_4 to be 98% complete in 3-4 minutes at a temperature of 775-950°C.

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Paper 99 - Vapor Phase Reduction of UF_6 with Trichlorethylene -
R. A. Schmidt - K-25

Using a 1:1.4 mole ratio UF_6:trichlorethylene a vapor phase reduction to UF_4, HF, HCl and fluorocarbons was made to proceed. The problem of dust removal from the reaction products was of major importance and was best solved using an electrostatic precipitator (90% dust removal efficiency) and filters. Particle size was on the order of 10 microns or less.

Paper 100 - Some Observations on the Chemical Reactions of BrF_3 and
ClF_3 - J. J. Katz - ANL

At 0°C ClF_3 reacts with U to form UF_6 at a rate of about 10%/hr; it reacts with UF_4 readily to form UF_6.

At 0°C BrF_3 reacts slowly with U_3O_8 to form UF_6 and with Pu $(IO_4)_3$ to form Pu F_4. It reacts more rapidly with UO_2 to form UF_6, PuO_2 to form $PuO_2F_2^{++}$, and a mixture of PuO_2 and U_3O_8 to form PuF_4. The bulk of any activity coming through with the volatile reaction products is short lived.

Paper 101 - Reaction of Fluorine with Water Vapor - F. D. Rosen - K-25

A proposal to remove traces of water vapor by reacting with fluorine has been studied. At the present time water vapor-fluorine nozzle mixing experiments comprise the bulk of the program.

Paper 102 - Spray Decomposition of Uranyl Nitrate Solutions to Uranium
Trioxide - E. W. Powell - K-25

UNH solution is atomized in a concentric, two fluid, spray nozzle with either air, nitrogen, or steam being the atomizing fluid. The nozzle discharges straight down into a radiantly heated 6-in. diameter by 4 ft. long stainless steel cylinder. The wall temperature of the cylinder is maintained at 600°C opposite the nozzle. UO_3 is formed on the hot sides of the cylinder, removed to the bottom of the cylinder by a knocker arrangement and continuously withdrawn by a screw conveyor. About 1/2-1% of the nitrate is left in the removed UO_3 powder. The removal of dust from the off-gas stream is a problem of major importance. A scrubber removes 85% of the dust and glass cloth filter bags reduce the discharge concentration to 3 ppm dust in the exhaust gas.

The UO_3 formed ranges in color from light orange to dark brown depending on cylinder temperature (at higher temperatures considerable U_3O_8 is formed). It was found that practically all nitrate decomposition had occurred in the 18 inches immediately below the nozzle.

The UO_3 thus formed is considerably more reactive than Mallinkrodt UO_3. Its bulk density is 0.9 as compared to Mallinkrodt UO_3 average 4.0 grams/cc. Its surface area is 8.0 square meters/gram as compared to a Mallinkrodt product surface area of 0.5 square meters/grams. The UO_3 produced by the new

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method can be directly converted to UF_4 whereas the present product cannot.

The process is continuous and presents no new handling problems since the feed is a liquid UNH and the product can be a packaged UO_3 powder.

G. Session 14 - Miscellaneous

Paper 104 - Investigation of Redox Systems with Infra-Red Absorption - R. H. Moore - HW

Infra-red measurements indicating a hexone-water complex formation were described.

Paper 105 - Ozonization of Redox Solutions for Ruthenium Decontamination - K. M. Harmon - HW

All work described has been covered in Chemical Research Section Monthly Reports.

Paper 106 - Filtrol Scavenging for Decontamination of Redox Solutions - W. E. Roake - HW

All work described has been covered by Chemical Research Section Monthly Reports.

Paper 107 - Design and Performance of Pulse Column Counter-Current Contactor - W. A. Burns - HW

A general discussion of the topic. This was the best attended paper of Session 14.

Paper 108 - Metallic Complexes in Hydrochloric Acid - J. H. Payne, Jr.-MI

Metallic complexes determined by potential measurements (Nernst Equation) were described.

Paper 109 - Beta Assay of High Salt Content Liquid Waste Solutions - M. McEwen - [illegible]

Development and tests of beta counters for use upon HW [illegible] wastes were described. More work is to be done.

Paper 110 - Thermoluminescence of X-Ray and Pile Irradiated Alkali Halides Between 80 and 500° Kelvin - J. A. Ghormley - ORNL

LiF and NaCl data were taken. First noted on tritium ice. LiF (cold) glowed and the crystal colors also changed after pile exposure. The theory of "frozen" electron levels was proposed. More work is contemplated for the future.

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Paper 111 - The Electrical Resistivity of Polonium - E. R. Manring - ML

The use of an inductive method to determine resistance using a 13.5 curie sample was presented.

Paper 113 - Behavior of Electrodes in a High Intensity Radiation Field - E. M. Kinderman - HW

Periods of stability of various electrodes in 3.5 curie phosphate solut were mentioned. Reference was made to KLX-61.

Paper 114 - Development of a Precision, Steady-State, Resistance-Bridge Calorimeter - J. F. Eichelberger - ML

Development of the calorimeter, designed for hot work, was outlined. The final model is of sound design meeting all requirements for accuracy, equilibrium time, etc.

M H Curtis
M. H. Curtis
Redox Development Section

J L Sch
J. L. Schwennesen
Redox Development Section

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