

UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

TELEPHONE
(312) 858-2660

February 29 and March 1, 1972

James M. Allan, Senior Radiation Specialist

HEALTH PHYSICS ANALYSIS - AMERICAN POTASH & CHEMICAL COMPANY
WEST CHICAGO, ILLINOIS - LICENSE NO. STA-583 (DOCKET NO. 40-2061)

Approximately two years ago the licensee's name was changed to Kerr-McGee Chemical Corp. to more closely reflect the fact that this plant is now a wholly owned subsidiary of the ~~the~~ Kerr-McGee Corporation, Oklahoma City, Oklahoma. It was further learned during this inspection that the continued use of this particular facility in the overall plans of Kerr-McGee are currently unsettled.

At the present time, the licensee has a total of 118 employees at the West Chicago plant. Of this total, approximately 30 to 35 persons are on a weekly film badge cycle and about 75 persons are on a monthly film badge cycle. The remaining persons of the 118 are office personnel. In a letter dated September 16, 1970, the licensee reported a film badge reading of 1400 millirem for one employee during the third calendar quarter 1970. The licensee advised in this September 16, 1970 letter that the investigation into this film badge reading lead to the fact that this exposure

was due to improper storage of the film badge during nonworking hours and as a result this was not a personnel exposure. It is the opinion of the inspector that this was in fact a film badge exposure and not a personnel exposure.

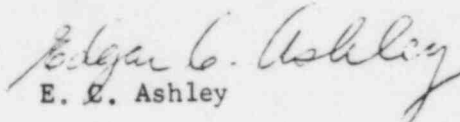
On September 1, 1970, W. L. Silvernail, Ph.D., Manager, Technical Services Department, replaced Mr. William ^{Faulkes} [REDACTED] as Radiation Safety Officer under this license. Dr. Silvernail advised that although he did not have a specific health physics background, health physics services are available upon call at any time from the Kerr-McGee Corporate health physics office in Oklahoma City and from Health Physics Associates, Consultants.

The day-to-day health physics coverage for the employees handling thorium or thorium-^{bearing} [REDACTED] materials appears to be adequate. [REDACTED] Breathing zones and work areas, air samples are taken routinely and time ^{weighted} [REDACTED] studies are performed on any employee who is present in an air concentration showing greater than 40 MPC hours of airborne radioactivity. In addition, the licensee performs numerous implant

and environmental ^{surveys} including radiation levels and contamination wipes and water sampling.

Two items of noncompliance noted during this inspection appear not to create a significant health and safety hazard. One of the items concerned the fact that the licensee changed his production process from an acid process to a caustic process without first having this procedural change approved by the Division of Materials Licensing. The former acid process was incorporated into the procedures as specified in License Condition No. 8. The second item concerns the failure of the licensee to submit an annual inventory report as of June 30, 1971, as required by 10 CFR 40.64(b).

It does not appear that a significant health and safety hazard exists from the use of source material under this license.


E. C. Ashley
Radiation Specialist

U. S. ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE

REGION III
EXPANDED FIELD NOTES

CO Report No.: 7201

Subject : AMERICAN POTASH & Docket No.(s) 40-2061
CHEMICAL COMPANY License No.(s) STA-583

Location: 258 ANN STREET Priority 2
WEST CHICAGO, ILLINOIS 60185 Category I

Date(s) of Inspection: FEBRUARY 29 & MARCH 1, 1972

Date(s) of Previous Inspection: MARCH 23 & 24, 1970

Type of Licensee : ORE PROCESSOR & DISTRIBUTOR

Type of Inspection: UNANNOUNCED

Principal Inspector : E. C. ASHLEY

Accompanying Inspector(s): NONE

Other Accompanying Personnel: -

Report Prepared By: E. C. ASHLEY 3/21/72
(Date)

Report Reviewed By: Jm Allen 3/21/72
(Date)

Proprietary Information: NONE

List of Documents Attached:

~~EXHIBIT~~ EXHIBIT A: CURRENT ORGANIZATION CHART

EXHIBIT B: DESCRIPTION OF INDEPENDENT MEASUREMENT AREAS,

American Potash & Chemical Corp.
West Chicago, Illinois
License No. STA-583 (40-2061)
February 29 & March 1, 1972

GENERAL INFORMATION

9. This was an unannounced reinspection of this source material licensed program conducted on February 29 and March 1, 1972.
10. Mr. Phil Brunner, State of Illinois Department of Health, was notified of this forthcoming inspection on February 28, 1972. *The inspector was unaccompanied.*
11. The following licensee representatives were interviewed and supplied the information contained in these notes. All information contained in these notes is presented in substance unless otherwise indicated.

O. L. Daigle, Plant Manager

W. L. Silvernail, Ph.D., Manager, Technical Services

J. L. Barber, Manager, Industrial Relations

E. W. Maryniw, Radiation Hygienist, Health Physics
Technician

INSPECTION HISTORY

12. Reinspection No. 7 of this licensed program was conducted on March 23 and 24, 1970. As a result of that inspection, the licensee was cited for four items of noncompliance. The first item concerned the failure

of the licensee to label containers of finished products in accordance with 10 CFR 20.203(f)(2). It was determined following this inspection that the licensee is apparently exempt from the labelling requirements of 10 CFR 20.203(f)(2) ^{as} insofar/any container within his facility. The second and third items of noncompliance concern the whole body exposure of 1.27 rem during the first calendar quarter of 1969 to one individual which was not reported to the Commission nor to the individual person. Following the last previous reinspection, reports have been issued as required. The fourth item of noncompliance concerned the incineration by the licensee of ^{empty} ~~monazite~~ _A bags contrary to 10 CFR 20.305. This item of noncompliance was corrected prior to the inspection by License Amendment No. 2 dated March 27, 1968.

13. Reinspection No. 8 of this source material license program was conducted on February 29 and March 1, 1972, and is the subject of these notes.

PROGRAM

14. The licensee, at the West Chicago facility, uses monazite sand as the raw material in the production of thorium and rare earth oxides. The monazite sand being received at the present time is from the State of Georgia and contains between 3 and 3½% of thorium by weight.

15. Approximately two years ago the licensee began using a caustic process versus an older acid process. The use of a caustic process constitutes noncompliance with License Condition No. 8 which references procedures described in the licensee's application dated May 19, 1969, in that page 11 of the attachments attached to the May 19, 1969 application, the licensee states "Our process is essentially a sulfuric acid method for extracting thorium from monazite ore."
16. At the present time the licensee is utilizing approximately 10 tons per day of Monazite sand in the production of rare earth and thorium oxide. This operational volume is much less than the original design of the facility. [REDACTED]
17. This license authorizes the licensee to possess unlimited amounts of thorium.

ORGANIZATION AND ADMINISTRATIVE CONTROL

18. Accur^rent organizational chart which outlines the chain of command insofar as this licensed program is concerned was given to the inspector during the inspection and is attached to these notes as Exhibit A.

19. The American Potash and Chemical Company became a subsidiary of Kerr-McGee Corporation approximately 5 years ago. Approximately 2 years ago, according to the licensee, the American Potash and Chemical Company name was changed to Kerr-McGee Chemical Corp.
20. Mr. Bruce Bennett, former Plant Manager of the West Chicago facility, left the licensee's employ in May 1971. Mr. Bennett was replaced as Plant Manager by Mr. O. L. Daigle. Mr. William C. Foulkes, Radiation Safety Officer at the time of the last previous inspection, was replaced in that position on September 1, 1970 by Dr. Silvernail. While Dr. Silvernail is not a health physicist, he stated that the consultant firm of Health Physics ~~Assoc.~~ ^{Assoc.} and the Kerr-McGee Oklahoma City Health Physics Department is on call as needed.
21. Mr. Edward Maryniw remains as Radiation Hygienist (Health Physics Technician). Mr. Maryniw gathers all health physics data for this licensed program.

RADIATION SAFETY PROCEDURES

22. Written general instructions for the handling of radioactive materials in the West Chicago plant are issued to all employees ~~and are required~~ ^{and are required} to ~~sign~~ ^{sign} this instruction after they have read it. The title of this instruction is "Radioactivity Statement." A copy of this radioactivity statement is included in the application submitted by the licensee on May 19, 1969.

23. A booklet entitled "General Safety Rules and Safe Procedures" has been issued and a copy given to each employee. All types of safety problems including industrial, chemical and radioactivity information is included in this booklet.
24. For each job in the process, a subsequent procedure has been written. All persons who work on a specific job must be acquainted with the individual procedures concerning that job. These procedures include safety instructions.
25. According to the licensee representatives during this inspection, the representatives of the Kerr-McGee Corporate Health Physics Office have made visits to the West Chicago plant since the last previous inspection on three or four occasions. The purpose of these visits was to become acquainted with the West Chicago operation and to determine operation if any changes are required in the radiation safety program from a corporate standpoint. It was learned that the latest visit by the corporate Health Physics Office was made in November 1971 and was a detailed study of the health physics aspects of this program. Mr. Daigle advised that a report of that visit had not been submitted to the West Chicago plant as yet.

FACILITIES AND EQUIPMENT

26. The licensee has two separated facilities in West Chicago. One of these facilities is located in downtown West Chicago and is known as Building W-1. In W-1 the licensee has a small research and development section which involves small quantities of source material on occasion. Building W-1 also houses the company's Sales Department. In the Sales Department is where [REDACTED] source material transfer records are maintained.
27. The main production facility and other offices are located ^{at} the address noted on the license. This main facility is essentially unchanged from the last previous reinspection. During a tour of the production facilities, it was noted that most of the equipment is quite old and shutdown. It was noted during this inspection that when the licensee switched from an acid to a caustic process, existing equipment was modified instead of bringing in new equipment for the process change.
28. Immediately south of the main production facilities is the licensee's fenced in area known as Twelve Acres which is actually an area measuring 12 acres. The waste mud pile is still located in the area and the

licensee has a retention pond for the collection of liquid process waste ~~from~~ the plant along with miscellaneous pieces of scrap being stored there and buildings in which miscellaneous materials are stored. Immediately south of Twelve Acres is another area known as Fifteen Acres which is used exclusively for overflow holding ponds.

29. The licensee's radiation detection and monitoring equipment was noted to be comparable to that which was on hand at the last previous reinspection. One of the most used pieces of equipment on hand is a Nuclear Chicago automatic sample ~~changing~~ *changing* system which is used for the counting of smears, water samples, and air samples. Portable health physics instruments include the Victoreen Model 440 and an Eberline Model ~~MAC~~ *MAC* survey meter.

PERSONNEL MONITORING

30. The licensee uses the film badge service of R. S. Landauer and Company. All thorium plant production workers are on a weekly schedule and the remainder of personnel ~~who~~ *who* have an occasion to enter the areas in which thorium is used or stored, are on a ~~monthly~~ *monthly* schedule. During recent months, the number of persons assigned to weekly film badges range from 30 to 35 while the number of persons on a monthly cycle have remained relatively steady at about 75. The film badge reports submitted

by R. S. Landauer to the licensee for the years 1970 and 1971 were reviewed during this inspection. Except for one film badge, all other badges have shown less than 1 rem per calendar year. The one exception was Badge No. 874 issued to ~~██████████~~ who showed 1400 millirem for the first four weeks of the third calendar quarter of 1970. This film badge result was reported to the Commission in a letter dated September 16, 1970. In this letter, the licensee advised that investigation lead to the fact that Mr. ~~██████████~~ left his badge in areas where source materials are stored instead of leaving it in the normal badge rack. This was confirmed during this inspection. At the same time, other personnel who had been employed in the same duties as Mr. ~~██████████~~, namely ^{tow-motor} ~~██████████~~ operators, have shown on the order of 500 millirem in any one calendar quarter. It was noted that Mr. ~~██████████~~'s third calendar quarter 1970 total was 1510 millirem. ~~██████████~~

31. The licensee maintains State of Illinois Form RMA-1 for all badged persons. This form is equivalent to Form AEC-5. In addition, it was noted during this inspection that the licensee completes a radiation exposure history on all new employees. However, this history information is not transferred to Forms AEC-4 and therefore the licensee is limited to 1.25 rem per calendar quarter for each of its employees.

32. The licensee does not perform bioassay sampling, nor do they use dosimeters in their personnel monitoring program.
33. All film badges are enclosed within a plastic carrying case to reduce the possibility of contamination.

RADIATION SURVEYS AND/OR EVALUATIONS

34. There have been no changes in the licensee's liquid active waste sampling program since the last previous reinspection. Liquid effluent samples are obtained on a daily basis. One quart grab samples are obtained from the overflow hose which drains into the settling pot. The daily samples are put together and are considered a single composite weekly sample. The composite samples are allowed to stand ~~and~~ solids settle to the bottom of the glass jar. An aliquot of the clear liquid is taken and then evaporated and alpha counted and is considered as ^{the} soluble sample. After the soluble sample is taken, the composite sample is ~~thoroughly shaken~~ ^{thoroughly shaken}. Another sample is ^{then} taken which is called total soluble and insoluble. Each of the soluble results are subtracted from the soluble and insoluble combination results to ^{give} ~~the~~ the final data for the water samples. A review of the licensee's water sample records show that, except for one week in December of 1970, all

results for soluble and insoluble have been less than the water concentrations allowed by Appendix B, Table II, 10 CFR 20. During the week of December 14-20, 1970, one composite soluble sample showed 4×10^{-6} microcuries/ml.

35. The licensee takes five monthly water samples from the DuPage River in the West Chicago area. These samples are taken at the following locations:

1. North of West Chicago sewer treatment plant.
2. Gary Mill Road at the DuPage River.
3. Mack Road Bridge at the DuPage River.
4. Beecher and Summit Bridge at the DuPage River near Winfield.
5. The mouth of the storm sewer, 12th Street and the plant.

A review of the results of these water samples show essentially all nothing detectable with one showing 1.1×10^{-6} uc/ml.

36. Four specific types of inplant air samples are taken. The first is the breathing zone of the operator while at the point of operation where dust radioactive material is handled. The second is the specific work area the operator occupies when not at the point of operation. The third is the general plant area which the operator or

others may occasionally or frequently occupy. The fourth type of air sample is taken during maintenance of thorium processing equipment containing dust material. Air samples are also collected outside of the inplant area and are located at the periphery of the fence, in unrestricted areas outside of the fence, and on the production roof areas.

37. All inplant air samples are taken every other week; production area roof samples are taken monthly; periphery of the fenced areas are taken quarterly; and air sample is taken outside and unrestricted areas are taken on a weekly basis. Essentially all of the air samples are taken for five minutes at a flow rate of 35 liters per minute, using a $1\frac{1}{2}$ inch diameter ~~Wat~~⁺man 41 filter paper.
38. A review of the air sample records shows that the roof and outside air samples show less than 1×10^{-12} microcuries per ml with most showing less than 5% of 10^{-12} uc/ml. For inplant air sampling, it was noted that most of the samples show less than 1×10^{-11} uc/ml. When any air sample does exceed this value (some ^{are on the} order ^{of} 2 to 3×10^{-11} uc/ml) an occupational study is done with these persons to show that they have not been exposed to 40 MPC hours.

39. Since the last previous reinspection, the licensee has incinerated monazite bag as authorized by this license on 23 separate different occasions during the period April 1, 1970 to February 11, 1972. The highest air sample taken in the stack during incineration has shown 0.367×10^{-11} microcuries/ml with most showing in the range of 0.03 to 0.1×10^{-11} microcuries/ml.
40. All surplus equipment which is considered as scrap is surveyed prior to be released for sale. The licensee uses the deminimus levels which have been supplied to them by the Commission as the guide for releasing scrap material for sale. If the material is of such configuration such as pipes ^{which} ~~cannot~~ cannot be surveyed internally and had ^a ~~known~~ known thorium use ^{and} ~~all~~ all scrap which exceeds the limits described in ~~deminimus letter~~ ^{deminimus letter} are taken to the Twelve Acres site and stored. The licensee maintains a logbook record of these surveys. According to the logbook, the last time the scrap was taken to Twelve Acres was March 16, 1970 (none since the last previous inspection). The only scrap which had been sold since the last previous reinspection were some stainless steel plates sold in July 1971. No contamination was detected on the plates.

41. Radiation level surveys are conducted while air samples are being taken in each of the various areas. The results of these radiation level surveys are recorded on maps of the areas. A review of these records shows that radiation levels up to 25 to 30 mr/hr are noted around the various process tanks. Most radiation levels noted as a review of these records for the areas throughout the plant are on the order of 5 mr/hr or less.
42. Mr. Maryniw performs routine beta-gamma surveys along the fenceline at the southwest boundary of the licensee's plant to assure that radiation levels do not exceed 2.5 mr/hr at any one time. This radiation level at this plant boundary area is authorized by Condition No. 9.
43. Each railroad car which brings in monazite sand to the plant is vacuumed and scrubbed down after emptying and then surveyed for alpha and beta-gamma contamination. Along with each car which is turned back to the railroad, a certificate is issued to the railroad certifying that the beta-gamma radiation is less than 10 mr/24 hours and that the average alpha contamination is less than 500 dpm/100 square centimeters.

44. The licensee's housekeeping program includes wet scrubbing of the floors on a daily basis in areas where thorium containing materials is handled. In the case of a spill, the level at which the contamination is necessary is considered that amount which is visible to the eye. The operator is instructed to clean up all spills as soon as possible. In addition, all staircases in the production buildings are damp ~~mapped~~ on a daily basis. Forms AEC-3, "Notice to Employees," were noted to be posted in various locations throughout the plant.
45. At the entrance to or in each area which was visited during this inspection, a 24 inch by 24 inch magenta on yellow sign showing the conventional radiation symbol and the words, "Caution - Radiation Area - Airborne Radioactivity Area - Radioactive Material; Containers, Tanks, Etc. In This Area May Contain Radioactive Materials," was noted. Please see paragraph 12 above for further information regarding container labelling.

RECORDS

46. The licensee is authorized to receive and possess unlimited amounts of thorium. All shipping records are maintained on the second floor of the downtown West Chicago facility of the licensee. Information noted on the shipping records during this inspection showed that persons who are being shipped thorium by the licensee have their AEC

source material license [REDACTED] number, agreement state license number, or export license number noted on the form. The licensee advised that the Oklahoma City offices of Kerr-McGee are used for the maintaining of actual copies of export licenses. The original export license accompanies each shipment exported.

47. It was noted during this inspection that the licensee did not submit an annual inventory report for the period ending June 30, 1971, which constitutes noncompliance with 10 CFR 40.64(b). The licensee representatives advised that this was an oversight due to the change in organization and personnel during May and June 1961. At the same time Mr. Daigel advised that a retroactive report for the period ending June 30, 1971 would be submitted to the Commission [REDACTED] and that a timely inventory report would be submitted for the period ending June 30, 1972.

INDEPENDENT MEASUREMENTS

48. The AEC representative conducted independent radiation level measurements using an Eberline Model E-500B survey meter with a 30 milligram per square centimeter probe. The radiation level at the surface of

the D7 tanks located on the third floor of building No. 9 showed radiation levels of between 20 and 30 mr/hr. The radiation level at the barrel of thorium sulfate located on the second floor of building No. 9 showed between 35 and 40 mr/hr at the surface. The radiation levels at bags of Georgia monazite on the dock in building No. 9 showed 12 mr/hr at the surface and ^{1.5-8.0} [REDACTED] mr/hr at 18 inches. The radiation level at the fenceline in Twelve Acres near the mud pile was approximately 2 mr/hr.

49. Using HV70 filter paper, the AEC representative made one square foot wipes in eight separate areas in the production facilities during this inspection. Also, a water sample was obtained ^{at} [REDACTED] the Twelve Acre holding pond near the outlet of the waste pipes coming from the production facilities. In addition, a "mud" sample was taken at the same location as the water sample. Each of the eight contamination wipe samples and the water and mud samples have been sent to Argonne National Laboratory for gross alpha and beta-gamma analysis. A listing of these wipes and water and mud samples is given as Exhibit B attached to these notes.

LICENSE CONDITIONS

50. Each of the license conditions of this license were reviewed with the licensee representatives during this inspection. Please see paragraph *15* above for the one specific discrepancy regarding these conditions.

MANAGEMENT DISCUSSION

51. The results of this inspection were discussed on March 1, 1972, with Dr. W. L. Silvernail and J. L. Barber. The results of the inspection were also discussed ^{by telecon} with Mr. O. L. Daigel, Plant Manager, upon his return from out of town on March 2, 1972. The licensee representatives advised that a revised production procedure reflecting a caustic process versus the former acid process would be submitted to the Division of Materials Licensing. In addition, the licensee action regarding the annual inventory was reiterated at this time as discussed in paragraph *47* of these notes.
52. Although not a specific item of noncompliance, the change of the company's name was discussed at this time period. The licensee representatives advised that a letter would be submitted to the Division of Materials Licensing to change the name of the licensee as shown on Item 1 of their license to Kerr-McGee Chemical Corp. in place of American Potash and Chemical Company as it now stands.

3/1/72 ~~666~~

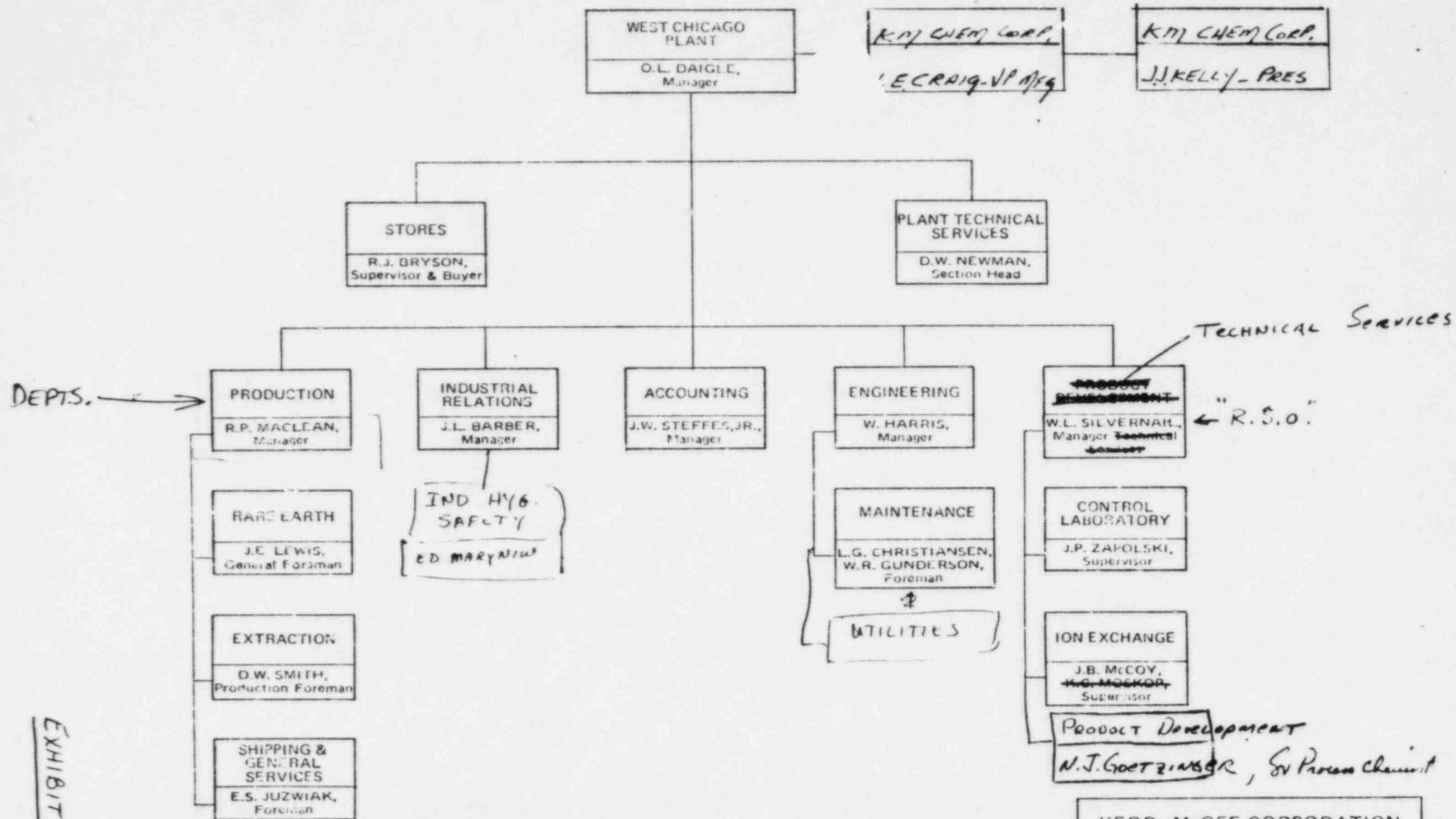


EXHIBIT A

KERR-McGEE CORPORATION
KERR-McGEE CHEMICAL CORP.
WEST CHICAGO PLANT
PREPARED JULY 15, 1971

Samplers Delivered to ANL on 3/9/72

PTS #	I.D. #	Results	DESCRIPTION
982	W-1	α -42 dpm/liter β -103 dpm/liter	WASTE WATER FROM PROCESS TANK AT 12 ACRES HOLDING POND.
983	M-1	α -9.4 μ dpm/g β -4.1 $\times 10^4$ dpm/g	NATURAL WATER SEDIMENT "MUD" TAKEN FROM 12 ACRES HOLDING POND.
984	S-1	α -9814 dpm β -11,513 dpm	FLOOR SWEEP - GALL. 9. 3 RD FLOOR SODA ASH DEP (~1 ft ²) WEST AISLE - MIDWAY
985	S-2	α -6743 dpm β -6053 dpm	" " " NORTH STAIRCASE, 1 ST LANDING, BELOW 3 RD FLOOR
986	S-3	α -6920 β -4497	" " " 2 ND FLOOR, TH. SULFATE RIDGEWAY WEST AISLE - MIDWAY
987	S-4	α -7502 β -4980	" " " S.W. STAIRCASE at exit from 2 ND FLOOR
988	S-5	α -3666 β -5247	" " " 1 ST FLOOR, HOORWAY BETWEEN DOCK & BLENDER AREA
989	S-6	α -5266 β -9253	" " " Bed of Elevator
990	S-7	α -3743 β -4440	" " " Dock at Manag. Bldg.
991	S-8	α -509 β -643	" " " 4 TH FLOOR - South End of West Wing.

(Results of Sample Counting received from ANL on 3/22/72)

⊗ J. SEDLET (ANL) CALLED ON 3/23/72 TO ADVISE THAT "W-1" SHOULD BE
A FACTOR OF 10 X HIGHER.

EXHIBIT B

TYPE 0

SPECIAL SERVICE
ALPHA, BETA, GAMMA MEASUREMENT

No. AE 353

Date 3-7-72

Please perform as a special service gross beta-gamma and alpha counting and recording for the samples listed hereon:

Control No.	Date Counted	Initials	Results d/m/sample	Suspected Contaminate	Identification
PTS-982		FSI	42 dpm/liter (alpha)		Sample W-1
		"	103 dpm/liter (beta)		contains barium + daughter
PTS-983		FSI	9.4 x 10 ⁴ dpm/g (alpha)		Sample M-1
			4.1 x 10 ⁴ dpm/g (beta)		
PTS-984			9844 dpm - L		Sample S-1
			11513 dpm - B		
PTS-985			6743 - L		Sample S-2
			6053 - B		
PTS-986			6920 - L		Sample S-3
			4497 - B		
PTS-987			7502 - L		Sample S-4
			4980 - B		
PTS-988			3666 - L		Sample S-5
			5647 - B		
PTS-989			5266 - L		Sample S-6
			9253 - B		
PTS 990			3743 - L		Sample S-7
			4440 - B		
PTS-991			509 - L		Sample S-8
			643 - B		

PTS 991

PACKING LIST
TYPE 6

1) AE 353
Date 3-7-72

TO : Argonne National Laboratory

FROM: U. S. Atomic Energy Commission
Region III, Division of Compliance
Glen Ellyn, Illinois

Please perform the following described special service:

Control No.	Service	Cost
PTS-982	Water sample.	
PTS-983	Mud sample.	
PTS-984-991	Smear samples.	
	Test all of the above for gross alpha and beta-gamma.	

Cost _____

3-9-72

ALPHA BKGD 4
BY GD 410

YIELD .35

YIELD .30

Based on Pu^{239} Based on $Sr^{90}-Y^{90}$

SAMPLE

ALPHA

BY

S-1

34386/10

38644/10

S-2

23637/10

22259/10

S-3

24260/10

17589/10

S-4

26296/10

19040/10

S-5

12866/10

21038/10

S-6

18472/10

31840/10

S-7

13142/10

17418/10

S-8

1815/10

6026/10

S-1

9814 dpm

11513 dpm

S-2

6743 dpm

6053 dpm

S-3

6920 dpm

4497 dpm

S-4

7502 dpm

4980 dpm

S-5

3666 dpm

5647 dpm

S-6

5266 dpm

9253 dpm

S-7

3743 dpm

4440 dpm

S-8

509 dpm

643 dpm