



RETURN TO 396-SS PDR

40-3392

Allied Corporation  
P.O. Box 430  
Metropolis, Illinois 62960 USA  
(618) 524-2111  
Telex 204,67

November 13, 1985  
Certified P-671-100-091



Mr. W. T. Crow, Acting Chief  
Uranium Fuel Licensing Branch  
Division of Fuel Cycle and  
Material Safety, NMSS  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Crow:

Subject: License No. SUB-526  
Docket No. 40-3392  
Amendment No. 1

We have enclosed the additional information requested in your letter of October 1, 1985 concerning the subject amendment. The Metropolis Facility is a multi-product manufacturing facility where many plant employees work in non-uranium processing areas. Consequently, we have formalized our whole body counting procedures to include annual counting for all employees where significant internal exposure potential exists. Workers in non-uranium areas will continue to be monitored using urinary uranium bioassay in accordance with existing license conditions.

Amended page Nos. C-14(a), 5-10(a), 5-19, and 5-20 are enclosed for insertion in the appropriate conditions and demonstration sections of our existing license. Please use these to replace the corresponding pages in our August 29, 1985 submittal.

Sincerely,

*A. J. Cipolla*

A. J. Cipolla  
Plant Manager  
bjs



FEE EXEMPT

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The plant whole body counting program consists of annual counts for employees who routinely work in the Feeds Material Building or Sampling Plant where unencapsulated uranium is processed. All employees routinely working the following job categories will receive annual whole body counts:

Production Department: Ore Prep. Operators and Assistants,  $UF_4$  Operators and Assistants, Fluorination Operators and Assistants, Distillation Operators and Assistants, Decontamination employees, shift breakers and relief operators working in the Feeds Material process area, all hourly employees working in the Sampling Plant.

Maintenance Department: All day shift or shift mechanics routinely assigned to maintenance work in the Feeds Material building or Sampling Plant, all day shift or shift electricians, and all day shift or shift instrument personnel regardless of normal assignment.

Salaried Personnel: Production Day Foremen, Shift Foremen and Shift Supervisors assigned to Feeds Material building; Maintenance Day Foremen and Shift Foremen assigned to Feeds Material Building; all basement laboratory technicians; and Health Physics technicians routinely collecting samples in the Feeds Material or Sampling Plant.

All other plant employees work in areas with insignificant internal exposure potential, and whole body counts are not requested; however, routine urinary uranium samples are collected from these employees in accordance with the program described on pages C-14 to document their minimal exposure.

Additional whole body counts will be performed for any employee when (a) the employee has been restricted based upon excessive urinary uranium values (see page C-14); or (B) the estimated exposure exceeded 40 MPC-Hrs based upon air sampling data, or was calculated from urinary uranium results. The minimum sensitivity of the presently owned whole-body counter is 63 micrograms  $U^{235}$ , or about 32% of the maximum permissible lung burden (MPLB) for natural uranium. The action point for a confirming recount is 50% MPLB. An investigation is conducted when confirmed results exceed 50% of MPLB. Employees with a confirmed lung burden are placed on work restriction. If the maximum permissible lung burden is exceeded by a factor of 2 or more, the employee is referred to a physician.

An investigative study was completed in 1985 which confirmed that type A/E fiberglass air sampling filters were effective as an alternative filter paper for measuring airborne radioactivity in work areas. The study consisted of simultaneous daily collection of air activity data for seventy-six (76) days to compare the activity collected on a membrane filter vs. a fiberglass filter. Statistical analysis of the data indicates the fiberglass filter is slightly more efficient in collecting airborne uranium particles present in the work environment. Air activity collected on fiberglass filters averaged 2% higher than membrane filters for samples at less than 70% of MPC. The difference became greater at higher air concentrations, but in all cases the fiberglass filter produced the higher result. When all 76 data points are considered the fiberglass filter produces results which average about 13% higher than the membrane filter. Results from the regression analyses are shown in Figures 5.2.2(c) page 5-13(a), Figure 5.2.2(d) page 5-13(b), and Figure 5.2.2(e) page 5-13(c).

Type A/E, or equivalent fiberglass filters are rated at 99.95% retention efficiency for DOP particles of 0.3 microns or larger. Particle size measurements performed in uranium processing areas indicate an average AMAD of 5.7 microns. The minimum AMAD found from 46 analyses was 3.4 microns, and the maximum was > 10 microns AMAD.

### 5.5.3 Internal Exposure Control (continued)

clothing is removed and placed in plastic bags at the job site. The employee then proceeds to a shower provided in the UF<sub>6</sub> facility for decontamination and changes into clean coveralls. The employee then proceeds to the regular shower and locker room to change in the normal manner at the end of his shift. The contaminated clothing removed in the UF<sub>6</sub> facility is stored and washed separately from the routine clothing. In this way, the spread of and possible resuspension of contamination is minimized.

### 5.5.4 Bioassay Program

The current plant bioassay program consists of urinary uranium sampling for evaluation of exposure to the more soluble uranium component of plant materials, and whole body counting to determine the lung deposition of insoluble natural uranium. The program utilizes guidance provided in Regulatory Guide 8.22, and WASH-1251.

Hourly employees are required to leave a urine sample twice monthly following a 24-96 hour absence from work. The sampling schedule is appropriately adjusted to allow for vacations, illnesses, etc. Potentially exposed salaried employees submit one sample monthly. Employees are encouraged to leave urine samples at the end of a shift following a known or suspected exposure to airborne uranium to determine if an exposure has actually occurred. This is in addition to the routine specimens collected.

The fluorometric method currently used for urinary uranium has a minimum sensitivity of approximately 2 ug "U"/liter. The action level used is 30 ug/L. Employees whose urinary excretion rate exceeds 30 ug/L are required to submit a confirmatory sample. In the event the confirmatory sample is found to be above the action level, and it is known that the exposure was to plant materials other than "highly transportable" UF<sub>6</sub>, the employee is restricted, and scheduled for a whole body count. For UF<sub>6</sub> exposures, appropriate samples and calculations are performed to determine if the recommended daily intake limit of 2.5 mg of soluble uranium was exceeded.

Whole body counting is performed annually for workers with a significant potential for internal exposure to unencapsulated uranium. Many plant employees work in non-uranium processing areas eg. Fluorine and Fluorine Products production areas, Service and Stores, Administrative areas. Many other personnel only occasionally enter uranium processing areas eg. laboratory personnel, engineering, and Maintenance Planning and reliability personnel. The counting program commitment provided on page C-14(a) will assure that all employees having a significant potential for internal uranium exposure are counted annually.

The minimum sensitivity of the presently owned whole body counter is 63 micrograms U235, or about 32% of the maximum permissible

lung burden (MPLB) for natural uranium. The action point for a confirming re-count is 50% of MPLB. An investigation is conducted when confirmed results exceed 50% of MPLB. Employees with a confirmed lung burden are placed on work restriction. If the maximum permissible lung burden is exceeded by a factor of 2 or more, the employee is referred to a physician.

Bioassay results from the most recent 3 years of plant operations indicate a decreasing trend in the number of urinary uranium values exceeding the 30 ug/l action level. Refer to Table 5.5.4(A), Page 5-21. During 1981, approximately 0.4% of all urinary uranium values were above the plant action level. A significant number of these incidents were due to the immediate high values obtained following employee exposure to highly soluble  $UF_6$ . No cases have been confirmed where the chemical toxicity limit for the kidney was exceeded.

The whole body counting data shown in Table 5.5.4(B), page 5-22 indicates there were no cases of counts exceeding the action level during the most recent 3 year period. There were 10 cases where chest contamination produced an initial count above the action level; however, an additional shower reduced the counts to less than the action level, but the activity remained greater than MDL. These job categories are included in the annual counting program described on page C-14(a). The ongoing urinary uranium program will quickly detect a significant uranium intake and dictate the need for additional whole body counting of other workers.

#### 5.5.5 Contamination Survey Program

Uranium processing areas, eg. Feed Material Building, Sodium Removal, and Uranium Recovery, are surveyed monthly for removable alpha contamination using smear tests. The administrative action level used for these areas is 2500 DPM/100  $CM^2$ . Eating areas such as the lunchroom, or offices and control rooms used for eating purposes, and plant locker rooms are surveyed weekly. All other non-uranium processing areas in the plant are surveyed quarterly. The administrative limit for these "clean" areas is 250 DPM/100  $CM^2$ . These contamination limits are equal to, or more restrictive than those considered as low as reasonably achievable for "yellowcake" in Regulatory Guide OH 710-4. An area which is found to exceed the plant administrative limit is scheduled for immediate decontamination by the full-time decontamination personnel utilized in the plant. Daily visual surveys are also made in uranium processing areas to detect contamination caused by leaks of highly visible LSA uranium compounds. Contamination detected in this manner is also scheduled for clean up.

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The plant whole body counting program consists of annual counts for employees who routinely work in the Feeds Material Building or Sampling Plant where unencapsulated uranium is processed. All employees routinely working the following job categories will receive annual whole body counts:

Production Department: Ore Prep. Operators and Assistants,  $UF_4$  Operators and Assistants, Fluorination Operators and Assistants, Distillation Operators and Assistants, Decontamination employees, shift breakers and relief operators working in the Feeds Material process area, all hourly employees working in the Sampling Plant.

Maintenance Department: All day shift or shift mechanics routinely assigned to maintenance work in the Feeds Material building or Sampling Plant, all day shift or shift electricians, and all day shift or shift instrument personnel regardless of normal assignment.

Salaried Personnel: Production Day Foremen, Shift Foremen and Shift Supervisors assigned to Feeds Material building; Maintenance Day Foremen and Shift Foremen assigned to Feeds Material Building; all basement laboratory technicians; and Health Physics technicians routinely collecting samples in the Feeds Material or Sampling Plant.

All other plant employees work in areas with insignificant internal exposure potential, and whole body counts are not requested; however, routine urinary uranium samples are collected from these employees in accordance with the program described on pages C-14 to document their minimal exposure.

Additional whole body counts will be performed for any employee when (a) the employee has been restricted based upon excessive urinary uranium values (see page C-14); or (B) the estimated exposure exceeded 40 MPC-Hrs based upon air sampling data, or was calculated from urinary uranium results. The minimum sensitivity of the presently owned whole-body counter is 63 micrograms  $U^{235}$ , or about 32% of the maximum permissible lung burden (MPLB) for natural uranium. The action point for a confirming recount is 50% MPLB. An investigation is conducted when confirmed results exceed 50% of MPLB. Employees with a confirmed lung burden are placed on work restriction. If the maximum permissible lung burden is exceeded by a factor of 2 or more, the employee is referred to a physician.



An investigative study was completed in 1985 which confirmed that type A/E fiberglass air sampling filters were effective as an alternative filter paper for measuring airborne radioactivity in work areas. The study consisted of simultaneous daily collection of air activity data for seventy-six (76) days to compare the activity collected on a membrane filter vs. a fiberglass filter. Statistical analysis of the data indicates the fiberglass filter is slightly more efficient in collecting airborne uranium particles present in the work environment. Air activity collected on fiberglass filters averaged 2% higher than membrane filters for samples at less than 70% of MPC. The difference became greater at higher air concentrations, but in all cases the fiberglass filter produced the higher result. When all 76 data points are considered the fiberglass filter produces results which average about 13% higher than the membrane filter. Results from the regression analyses are shown in Figures 5.2.2(c) page 5-13(a), Figure 5.2.2(d) page 5-13(b), and Figure 5.2.2(e) page 5-13(c).

Type A/E, or equivalent fiberglass filters are rated at 99.95% retention efficiency for DOP particles of 0.3 microns or larger. Particle size measurements performed in uranium processing areas indicate an average AMAD of 5.7 microns. The minimum AMAD found from 46 analyses was 3.4 microns, and the maximum was > 10 microns AMAD.

### 5.5.3 Internal Exposure Control (continued)

clothing is removed and placed in plastic bags at the job site. The employee then proceeds to a shower provided in the UF<sub>6</sub> facility for decontamination and changes into clean coveralls. The employee then proceeds to the regular shower and locker room to change in the normal manner at the end of his shift. The contaminated clothing removed in the UF<sub>6</sub> facility is stored and washed separately from the routine clothing. In this way, the spread of and possible resuspension of contamination is minimized.

### 5.5.4 Bioassay Program

The current plant bioassay program consists of urinary uranium sampling for evaluation of exposure to the more soluble uranium component of plant materials, and whole body counting to determine the lung deposition of insoluble natural uranium. The program utilizes guidance provided in Regulatory Guide 8.22, and WASH-1251.

Hourly employees are required to leave a urine sample twice monthly following a 24-96 hour absence from work. The sampling schedule is appropriately adjusted to allow for vacations, illnesses, etc. Potentially exposed salaried employees submit one sample monthly. Employees are encouraged to leave urine samples at the end of a shift following a known or suspected exposure to airborne uranium to determine if an exposure has actually occurred. This is in addition to the routine specimens collected.

The fluorometric method currently used for urinary uranium has a minimum sensitivity of approximately 2 ug "U"/liter. The action level used is 30 ug/L. Employees whose urinary excretion rate exceeds 30 ug/L are required to submit a confirmatory sample. In the event the confirmatory sample is found to be above the action level, and it is known that the exposure was to plant materials other than "highly transportable" UF<sub>6</sub>, the employee is restricted, and scheduled for a whole body count. For UF<sub>6</sub> exposures, appropriate samples and calculations are performed to determine if the recommended daily intake limit of 2.5 mg of soluble uranium was exceeded.

Whole body counting is performed annually for workers with a significant potential for internal exposure to unencapsulated uranium. Many plant employees work in non-uranium processing areas eg. Fluorine and Fluorine Products production areas, Service and Stores, Administrative areas. Many other personnel only occasionally enter uranium processing areas eg. laboratory personnel, engineering, and Maintenance Planning and reliability personnel. The counting program commitment provided on page C-14(a) will assure that all employees having a significant potential for internal uranium exposure are counted annually.

The minimum sensitivity of the presently owned whole body counter is 63 micrograms U235, or about 32% of the maximum permissible

lung burden (MPLB) for natural uranium. The action point for a confirming re-count is 50% of MPLB. An investigation is conducted when confirmed results exceed 50% of MPLB. Employees with a confirmed lung burden are placed on work restriction. If the maximum permissible lung burden is exceeded by a factor of 2 or more, the employee is referred to a physician.

Bioassay results from the most recent 3 years of plant operations indicate a decreasing trend in the number of urinary uranium values exceeding the 30 ug/l action level. Refer to Table 5.5.4(A), Page 5-21. During 1981, approximately 0.4% of all urinary uranium values were above the plant action level. A significant number of these incidents were due to the immediate high values obtained following employee exposure to highly soluble UF<sub>6</sub>. No cases have been confirmed where the chemical toxicity limit for the kidney was exceeded.

The whole body counting data shown in Table 5.5.4(B), page 5-22 indicates there were no cases of counts exceeding the action level during the most recent 3 year period. There were 10 cases where chest contamination produced an initial count above the action level; however, an additional shower reduced the counts to less than the action level, but the activity remained greater than MDL. These job categories are included in the annual counting program described on page C-14(a). The ongoing urinary uranium program will quickly detect a significant uranium intake and dictate the need for additional whole body counting of other workers.

#### 5.5.5 Contamination Survey Program

Uranium processing areas, eg. Feed Material Building, Sodium Removal, and Uranium Recovery, are surveyed monthly for removable alpha contamination using smear tests. The administrative action level used for these areas is 2500 DPM/100 CM<sup>2</sup>. Eating areas such as the lunchroom, or offices and control rooms used for eating purposes, and plant locker rooms are surveyed weekly. All other non-uranium processing areas in the plant are surveyed quarterly. The administrative limit for these "clean" areas is 250 DPM/100 CM<sup>2</sup>. These contamination limits are equal to, or more restrictive than those considered as low as reasonably achievable for "yellowcake" in Regulatory Guide OH 710-4. An area which is found to exceed the plant administrative limit is scheduled for immediate decontamination by the full-time decontamination personnel utilized in the plant. Daily visual surveys are also made in uranium processing areas to detect contamination caused by leaks of highly visible LSA uranium compounds. Contamination detected in this manner is also scheduled for clean up.

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