

S. F. Appliances Limited
613 W. Washington Street
Morris, Illinois 60450

December 15, 1986

DECOMMISSIONING PLAN

1. GENERAL INFORMATION

Following is the plan to be followed at such time as it becomes necessary for S.F. Appliances, Ltd to release its facilities and property at 613 W. Washington Street, Morris, IL 60450 from licensed activities (NRC License #STB-258) for unrestricted use.

S.F. Appliances, Ltd. is a subsidiary of Valor International of London, England and decommissioning responsibilities for this facility are under the authority of the Radiation Safety Officer, Bonnie J. Joneson. Additionally, certain responsibilities may also be delegated to Janice Chapell who is listed as an authorized user on this license.

Historical Information:

Currently, thoriated mantles are stored, packaged and shipped from the S.F. Appliances, Ltd. facilities. The only processing now being conducted is preburning and shaping of one type of mantle. S.F. Appliances and Valor International have no intention of discontinuing these operations in the near future. Therefore this decommissioning plan may not need to be put into effect for as long as 20 or 30 years from now or longer.

Mantle manufacturing has not been performed at these facilities for approximately seven years. Previously, thorium compounds were used in granular and liquid form to manufacture gas mantles. As a result, the NRC has identified, with the aid of Oak Ridge Associated Universities, several areas of the S.F. Appliances facilities which will need substantial decontamination before release for unrestricted use. The contamination is described in the ORAU report "Radiological Survey of Sunflame Appliances, Limited, Morris, Illinois" dated February 1986. This is a summary of the survey performed by that group on October 29 - 31, 1985.

Training

Training of authorized users on the S.F. Appliances license was submitted in previous applications and is on file with the NRC. Additional contractor personnel which would aid in decommissioning activities would need to present credentials and training records to the management of S.F. Appliances for

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approval before beginning any such activities. Additionally, it will be the responsibility of S.F. Appliances management to assure that any contractor or other personnel who enter restricted areas during decommissioning activities have been instructed in the applicable portions of the "Personnel Training Program", Attachment I to the 7/29/86 renewal application. Records of this training will be maintained.

Procedures

All decommissioning activities shall follow the stated procedures of this plan and any approved contractor plan for safe decommissioning. Any such plans will first be reviewed and approved by authorized S.F. Appliances, Ltd. personnel before implementation. Changes to this plan will also first be submitted to the NRC for approval before implementation.

Contractor Assistance

Because not all decommissioning activities can be performed by S.F. Appliances personnel, contractor assistance will be needed for certain portions of the project. In this case, the responsibility for safety will remain with S.F. Appliances management and the contractor personnel will be required to follow all applicable S.F. Appliances license conditions.

Activities and Tasks

Following is a listing of the major activities and tasks related to the decommissioning of the S.F. Appliances facilities:

- Removal of all products and waste containing radioactive material which would affect sensitive measurement of remaining contamination.
- Cleaning of contaminated equipment. Equipment which cannot be decontaminated to below NRC decommissioning guidelines will need to be treated as radioactive waste and disposed.
- Cleaning and/or removal of wall and ceiling surfaces throughout the S.F. Appliances building.
- Cleaning and/or removing all floor surfaces throughout the S.F. Appliances building.
- Removal and cleaning or disposal of sanitary sewer piping both inside and outside the building.
- Separation of non-contaminated and contaminated soil for removal of latter to an NRC-approved disposal site.

- Packaging and disposal of remaining waste from decommissioning project to an authorized disposal site.
- Confirmatory survey verifying the complete removal of all contamination.

Methods and Schedules:

Equipment:

Cleaning of contaminated equipment will be attempted by scrubbing, brushing, scraping, etc. with use of scrub brushes, sponges, steel wool, cleaning solutions, solvents, and detergents as appropriate for the type of surface to be cleaned. Cleaning will generally be from the top down, saving all cleaning supplies as radioactive waste for disposal.

Equipment and components of equipment which cannot be efficiently cleaned will be packaged for disposal as radioactive waste. The estimated time for decontamination and disposal of equipment is 30 man-days.

Wall, Ceiling and Floor Surfaces:

Wall, ceiling and floor surfaces will be cleaned by first removing the most loosely held contamination by sweeping, vacuuming and mopping (with light scrubbing if needed), with more vigorous scrubbing, scraping and use of detergents to follow until the contaminated surfaces may be removed. Use of paint scrapers, wet and dry vacuums, floor scrubbers and possibly electric chisels (to remove contaminated concrete surfaces) may be used. Removal of some of the tongue and groove floorboards may be necessary in higher contamination areas as discussed in the ORAU report.

We estimate a total of approximately 11,500 ft² of floor surface and 30,000 ft² of ceiling and wall surface will need to be cleaned and/or removed. The ORAU report indicates that in some of the rooms, "only spot cleaning of wall and surfaces will be required", therefore the 30,000 ft² estimate may be high.

NUREG/CR 1754 estimates time and costs for decommissioning rooms contaminated with various radionuclides and the "worst case" estimates from that report have been used in this plan. NUREG/CR 1754 estimates decontamination of a 10 m X 6 m X 3 m high room would require 33.8 man-days for the walls and 10.1 man-days for the floor. Proportionally, we have used this estimate to calculate the following times for decontamination of S.F. Appliances wall, ceiling and floor surfaces:

Walls and ceilings: 985 man-days

Floors: 180 man-days

Again, because of the fact not all ceiling and wall surfaces may require total cleaning, the above estimates are likely high.

Sanitary Sewer and Drain Piping:

The ORAU report indicates the sanitary sewer piping within the building and an unknown length of piping outside the building will need to be removed and probably disposed as low-level waste. Because of the unknown quantity of pipe, it will be impossible to perform an exact estimate. For time and cost estimates, we will use the NUREG/CR-1754 estimate of costs to remove and dispose a 63 foot underground drain line and hold-up tank, 72 man-days and \$37,000.

Removal of Contaminated Soil:

The ORAU report estimates about 50 cubic meters of soil will need to be removed and disposed. NUREG/CR-1754 estimates soil decontamination where approximately 1000 cubic meters of contaminated soil was involved. We are therefore estimating approximately 5% of the time and costs, or 10 man-days and \$27,500.

Confirmatory Surveys:

We estimate the confirmatory survey of the complete facilities to ensure all contamination has been removed will require approximately another 60 man-days.

Schedule:

Total manpower requirements for decommissioning is therefore estimated to be about 1337 man-days. The amount of time required will depend on the numbers of contractor personnel on hand at any one time. For example, if the contractor proposes to use six persons, it is reasonable to estimate the entire project may be completed in 222 days, or slightly less than one year.

Quality Assurance

All radiation detection and measuring equipment used for these activities shall have been calibrated within the past year according to methods approved by the NRC. S.F. Appliances management will be responsible for confirming that all company owned or contractor owned instruments are properly calibrated.

11. Radiation Protection:

ALARA Policy

The management of S.F. Appliances is committed to maintaining radiation exposure to personnel and release of radioactivity in effluent as low as is reasonably achievable (ALARA) and a written policy on this has been established.

Contractor Personnel:

Contractor personnel shall only be allowed to enter restricted areas when management has ensured the person has received the required instructions, is wearing the proper protective clothing and is monitored by the radiation detection device appropriate for that activity.

Radiation Protection Equipment:

Typical equipment which will be used for measuring radioactivity will include the following:

- g.m. detectors for measuring and detecting alpha, beta and gamma radiation may be used.
- portable NaI detectors for sensitive location of areas of radioactivity by detection of the gamma emissions.
- NaI well counter for efficient analysis of samples for contamination.
- portable ZnS detectors for measurement of surface alpha contamination.
- stationary ZnS detectors for measurement of alpha contamination on wipe samples and air samples.
- air sampling equipment to obtain samples of air in worker breathing zone for comparison to applicable concentration limits.

Protective clothing shall be worn by personnel entering restricted areas where the possibility of transferable contamination exists. The type of clothing to be worn for specific tasks and activities shall be determined by the health physics personnel in charge of that activity and may consist of shoe covers, gloves, coveralls and head covers.

It is anticipated that decommissioning activities can be accomplished without the necessity of respirators to meet the NRC air concentration limits, although face masks may be worn for ALARA purposes. During some steps, a fine spray of water may be used to minimize the chances of the materials becoming airborne.

Frequent surveys will be made during decontamination to minimize the spread of radioactivity. Restricted areas shall be conspicuously posted to avoid inadvertent entry by unauthorized persons or those without appropriate protective clothing.

Frequent air sampling shall be performed at breathing zone level to ensure radioactive concentrations in air are within allowable and ALARA limits.

Radioactive Waste Management:

Radioactive waste generated during the decommissioning shall be removed for disposal as soon as practical after packaging is completed.

III. Final Radiation Survey:

Upon completion of decommissioning, a final confirmatory survey will be performed of all surfaces of the S.F. Appliances facilities. This will be performed in a comprehensive manner, measuring all surfaces to confirm activity is below the limits specified in the NRC Guidelines for Decontamination, dated July 1982. Surveys and wipes for removable contamination will be performed in a gridlike pattern using the equipment described earlier in this plan. Instruments with sensitivities sufficient to detect the levels specified in the July 1982 guide will be used.

IV. Funding:

Estimated costs:

The following costs are based on estimates of similar activities given in NUREG/CR-1754. The costs are in 1978 dollars as detailed in that publication and the estimated costs at the time the plan is put into effect would need to be determined by multiplication by a factor such as the Handy-Whitman Index to account for escalation in prices.

These costs generally include management, equipment, planning, contingency and other ancillary costs. The costs, however, are to be used for estimation purposes only. Actual costs at time of decommissioning may vary greatly depending on the availability of suitable contractors and on those contractors proposals as well as on the availability and costs of waste disposal sites, insurance and other items which may not escalate at the same rate as other applicable indicators.

-	Equipment decontamination:	
	30 man-days	\$3,840
	28 cubic meters of waste	12,400
-	Wall, ceiling, and floor decontamination:	
	<u>walls, ceilings</u>	
	30,000 ft ² of surface	315,000
	147 cubic meters of waste	35,000
	<u>floors</u>	
	11,500 ft ² of surface	73,000
	45 cubic meters of waste	20,000
-	removal of drain piping	
	cost including disposal	37,000

-	removal of contaminated soil	
	cost including disposal	27,500
-	final confirmatory survey	
	60 man-days	<u>2,480</u>
	TOTAL:	6561,420

Funding:

At such time as the decommissioning is to take place, S.F. Appliances, through its parent company Valor International, will make available the necessary funds to complete the decommissioning of the facilities and property. This will be accomplished by supplementing available funds by liquidation of other assets or holdings of Valor International. See attached certification letter dated 11/10/86.