

RADIOLOGICAL CHARACTERIZATION, LIMITED REMEDIATION,
AND VERIFICATION SURVEY STRATEGY FOR RELEASE OF
THE FORMER BROOKS AND PERKINS FACILITY AT
1950 WEST FORT STREET
DETROIT, MICHIGAN

June 8, 1994

Prepared By:

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Prepared For:

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Table of Contents

- I. SITE HISTORY
 - A. Document Review
 - B. Facility Inspections
 - C. Facility Status
- II. REFERENCES
- III. CRITERIA FOR RESIDUAL THORIUM CONTAMINATION
- IV. AFFECTED AREAS
 - A. Garage
 - B. Parking Area
- V. VERIFICATION SURVEY PLAN FOR GARAGE INTERIOR
 - A. Prerequisites
 - B. Instrumentation
 - C. Systematic Survey
 - 1. Instrument Source Check
 - 2. Swipe Samples
 - 3. Floor
 - 4. Walls
 - 5. Ceiling / Overhead Surfaces
 - 6. Drain Lines / Subsurface Utilities
 - 7. Reporting
- VI. LIMITED REMEDIATION AND CHARACTERIZATION OF PARKING AREA
 - A. Prerequisites
 - B. Instrumentation
 - C. Surface Scan
 - D. Limited Remediation (Intrusive Investigation)
 - E. Verification Sampling
 - F. Derivation of Site Background Radioactivity
- VII. DOCUMENTATION

VIII. MATERIAL STORAGE AND DISPOSAL

IX. SCHEDULE RATIONALIZATION

Attachments

- US NRC Inspection Report No. 999-90003/94007 (DRSS), February 17, 1994.
- US NRC, Annex A, Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, July 1982.
- Federal Register, Vol. 46, No. 205, Friday, October 23, 1981, US NRC "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past operations".

I. SITE HISTORY

Document Review

The facility at 1950 West Fort Street, Detroit, MI, was originally licensed (No. D-547) by the AEC for source material, issued to the owner, Brooks and Perkins, on 1/17/57. License No. STB-0362, issued 8/10/61, superseded the initial license, and authorized 15,000 pounds of thorium as contained in 40% master alloy and thorium magnesium alloy containing not more than 3% thorium.

Authorized activities included rolling, melting, casting, forming, cutting, sanding and welding manufactured products containing licensed source material. The licensee requested termination of the license in a letter dated 2/5/71, and provided a radiation survey of the facility by their consultant.

A later review of this survey by Oak Ridge National Laboratories (ORNL), an NRC contractor, revealed that the survey results did not include all areas where licensed materials were used. On the basis of the information in the retired license file, such as type and quantity of authorized materials and lack of adequate decontamination documentation, ORNL concluded that this facility has a potential for residual radioactive contamination.

Facility Inspection

A special NRC inspection of the facility was performed on 2/1/94 to review the former licensee's activities and to determine if the facilities were adequately decontaminated prior to terminating the license. The inspector conducted independent radiation surveys in the former licensee's manufacturing, processing, and storage areas. The areas surveyed included restrooms, hallways, offices, former manufacturing areas, parking lots, building down spouts and loading docks. No radiation levels above background were identified in the approximately 33,000 ft² building formerly used by Brooks and Perkins, and the subsequent assay of swipe samples taken of interior areas revealed no significant removable contamination (i.e., < 5 dpm/100 cm² alpha or beta). The 2,000 ft² garage area was locked and found inaccessible during the NRC inspection, and thus not surveyed.

An open area located behind the garage facing West Fort Street showed elevated levels of (gamma) radiation approximately eight times over background (i.e., 120 uR/hr gross vs. 15 uR/hr bkg). Further investigation indicated that this area appeared to be a former radioactive waste disposal area. The breach in the asphalt parking area at which elevated radiation was found was additionally surveyed with a GM pancake probe, corroborating the activity presence (i.e., 1700 cpm gross beta-gamma vs. ~45 cpm bkg). A sample of the contaminated material was collected for off-site analysis which identified the radioactivity as thorium with an elevated concentration of 500 pCi/gm, thus exceeding the NRC release criteria of 10 pCi/gm (Ref.#3).

Facility Status

Frome Investment Company purchased the building some time in the late 1960 to early 1970 time period from Brooks and Perkins Corporation. Currently the building is leased to Eaton Company and is used as a warehouse for air filters. Eaton has four employees that work at the site.

A documented NRC inspection report, dated 2/17/94, and addressed to the present building owner, Frome Investment Company, cites the activity in excess of acceptable criteria. The communication further explains that the levels measured do not constitute an immediate health and safety problem for the lessee or visitors, but does mandate remediation of the contaminated area. A period of sixty days was given for the building owner to respond with a schedule and a plan to characterize the extent of the contamination and decontaminate the area to current NRC release criteria.

II. REFERENCES

1. US NRC Inspection Report No. 999-90003/94007 (DRSS), February 17, 1994.
2. US NRC, Annex A, Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, July 1982.
3. Federal Register, Vol. 46, No. 205, Friday, October 23, 1981, US NRC "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past operations".
4. NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination, ORAU, June 1992.

III. CRITERIA FOR RESIDUAL THORIUM CONTAMINATION

The limits for residual surface contamination for thorium (Th-nat) are (Ref.#2):

Average	Maximum	Removable
1000 dpm/100 cm ²	3000 dpm/100 cm ²	200 dpm/100 cm ²

As Th-nat is both an alpha- and a beta-gamma emitter, the above limits apply independently.

The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 mg/cm² of total absorber.

The volumetric concentration limit of Th-nat (Th-232 plus Th-228) if all daughters are present in equilibrium is 10 pCi/gm (Ref.#3).

IV. AFFECTED AREAS

The areas of the facility at 1950 West Fort Street considered to be affected and thus provided for in this plan are the garage, which was inaccessible and thus not cleared during the 2/1/94 NRC inspection, and the limited parking area in which elevated radioactivity levels were found, and historical on-site burial disposal was suggested.

Garage

The garage area is a cinderblock building of approximately 45' x 45' x 20' high. The roof joists are steel frame on ~8' centers. The subroof is lumber and the roof is composite. The floor is a single pour concrete slab. A sewer manhole is in the center of the floor, and an adjacent square head endcap present may suggest subsurface accessory utilities, i.e., underground holding tank. The building has a single electric box that supplies 100 amps of 110VAC, single phase. An auxiliary control panel for an ADT alarm system is also in the building.

The wall of the building facing West Fort Street has a 10' wide x 12' high roll-up door leading to the street. The distance from the sewer manhole to the street is ~40'. One wall faces the adjoining building, and may be a common wall. The next wall faces the facility warehouse building and the subject parking lot. There are two sewer line vents and one water line penetrating this wall. The final wall faces a parking lot area and has a standard personnel door.

The building does not have adequate lighting, although there are ample electrical outlets for portable lighting. There is no ventilation or insulation, and water seepage is apparent through the wall facing the warehouse. The building is used to store air filters, which should be removed by the lessee prior to the verification survey. Both doors on this building are normally locked.

Parking Area

The subject parking area is approximately 45' x 45', and the asphalt (~3" d.) covering shows its age. The area of known elevated radioactivity is near the corner of the parking lot. The slope of the lot tends to drain away from the affected area. One side of the subject parking lot is bounded by the outside wall of the garage, and the other is the adjacent building. Significant historical vegetation growing over the affected area is obvious by the presence of three tree stumps (~3" - 5" dia.).

V. VERIFICATION SURVEY PLAN FOR GARAGE INTERIOR

A. Prerequisites

1. Personnel involved with the on-site survey shall be trained in the basics of radiation principles, radiation worker, general industrial safety, have current 40 hour HazWOPER training per 29 CFR 1910.120, work under a written site specific Health and safety Plan (HASP), and have practical experience in the operation of the instrumentation and the application of NUREG/CR-5849 protocol.
2. Provide personal protective equipment (PPE), as appropriate, and use plastic laydown areas as necessary.
3. Provide adequate temporary lighting to ensure illumination of the area for worker safety.
4. Perform a documented radiation screening survey with a calibrated Micro R meter in each affected area prior to prolonged occupancy. Record periodic readings and report all significant (i.e., > 0.25 mR/hr greater than area background) findings to provide for a documented investigation and a footnote in the survey summary report.
5. Establish a reproducible grid system in the area to be surveyed, using 3' centers, and provide sketches displaying the grid layout for each elevation, i.e., N,S,E,W walls, floor, and ceiling. Tie the temporary grid system to prominent landmarks, i.e., NE corner of floor, etc.

B. Instrumentation

Survey instrumentation shall primarily be 100 cm² hand-held gas proportional detectors, each mated with a scaler/ratemeter for both scanning and direct timed measurements for lower minimum detectable activities (MDAs). Each instrument shall have a current electronic (pulse) calibration, followed by a voltage response plateau to Th-230, and then efficiency calibrated to Th-230 and Tc-99. Note: The final operating voltage shall be sufficiently high enough for the effective simultaneous detection of alpha and beta radiations (and limited detection capability for gamma radiation). The calibrated efficiency to an NIST traceable standard of Th-230 shall be used for the correction of field observations to reported units of net dpm/100 cm².

Typical instrumentation includes Ludlum Model 43-68 detectors and Ludlum Model 2221 scaler/ratemeters. A wide coverage floor monitor (~450 cm² +) also utilizing a gas proportional detector will be used to enhance the survey coverage and the rate.

GM pancake probes mated to ratemeters (Typ. Ludlum Models 44-9/3) will be available for use in tight configurations which prohibit access for the gas proportional detectors. The meter shall have a current electronic (pulse) calibration, set at the probe manufacturer's recommended operating voltage of 900V, and be efficiency calibrated to the NIST traceable Th-230 standard.

Expected MDAs are in the range of ~450 dpm/100 cm² for a direct measurement (gas prop) integrated over one minute, and ~4000 dpm/100 cm² for surface scanning with hand-held detectors. The larger effective area of the floor monitor would yield lower MDAs. The GM pancake probe scan should yield MDAs in the range of ~6000 dpm/100 cm².

A tissue equivalent detector (non-energy dependent), typ. Bicron Micro Rem Meter, calibrated to Cs-137, shall be used to determine the external radiation exposure rate.

C. Systematic Survey

1. Instrument Source Check

Perform documented and standardized instrument source checks before each use and at least at the end of each work day. If the gas proportional detectors are used in the static mode (no gas flow), they are to be limited to two hours of continuous operation, and a source check must be performed both before and after each use. A fluctuation of greater than 20% from the previous reading for either the background count or gross source count shall be reported for determination of the validity of earlier measurements.

2. Swipe Samples

Swipe samples shall be obtained at intervals described herein. Surface swipes will consist of a 47 mm cloth-backed dry swatch (typ. Mohawk smear) pressed against a surface with moderate pressure, and passed over a relatively standardized area of 100 cm² (~ 4" x 4"). A conscious effort to limit the potential for cross contamination will be made, including the immediate closure of the exterior envelope and placement into plastic baggies. Each swipe sample shall be uniquely identified.

At least 5% (1 blank for every 20 samples) blank samples (unused swipe media) shall be incorporated into all sampling campaigns, for verification of sampling material's used, sampling technique, and analytical method. Samples shall be analyzed off-site by use of a low background gas proportional auto sample counter for both gross alpha and gross beta, with nominal Lower Limits of Detection (LLD) of ~15 dpm.

Signed, dated, and timed survey/sampling records shall demonstrate sample origination and identity, and positive control of the samples by the survey crew from collection through interim staging will preserve custody. When samples are to be transferred to another party, a Chain-of-Custody form must be completed, tracking the relinquishing and receiving parties. While in commercial transit, the transporters waybill shall serve as the custodial record.

3. Floor

Provide 100% survey scan coverage of the accessible floor using the gas proportional floor monitor. Record the average and any elevated (area max.) reading in each grid area. (For the duration of this survey, the 3' x 3' grid square will be titled the same as the single grid node at the lower left corner). Augment the floor scan by using hand-held instrumentation in areas inaccessible for the floor monitor. Record average and any elevated (max.) gross cpm/probe, and the grid location in which the additional scan was performed.

Any fixtures (tables, counter tops, cabinets) which are distant from the perimeter walls, shall be considered as part of the floor grid, and thus scanned with continuous coverage and the readings documented at least every 3' x 3'.

The center of every fifth (20%) grid area associated with the floor survey shall have a direct measurement recorded and a respective swipe sample collected. Additional measurements and sampling are required at any/all areas in which significant activity (i.e. bkg + 2 std. dev. of bkg) was found during the scan survey.

The floor survey is completed with the recording of radiation exposure measurements using a Micro R meter, held at near contact (~ 1 cm) and at a height of 1 meter above the floor, over the centers of the systematic random grid squares being sampled. Additional exposure rate measurements are made at any area found to be elevated during the direct measurements, and for which swipe samples were collected. Background radiation levels shall be determined at various locations on and off-site, remaining in the immediate locale for terrestrial similarities, and striving to record some of the measurements near common structure type.

4. Walls

The first two grids (up to 6') of the walls will be surveyed, as accessible. All counter tops, underlying cabinets/drawers, and elevated cabinets/shelves, and fixtures located on or immediately against the vertical plane of each wall, are to be considered as part of the wall survey. Average gross cpm/probe readings are to be recorded for each scanned grid area. Additionally, any elevated (max.) readings are to be recorded.

A direct measurement and a swipe sample are to be obtained from 25% of the first two elevations of grid squares (at least 30 total), and additionally at any bias areas found during the scan survey.

5. Ceiling / Overhead Surfaces

The overhead surface survey shall use the same (mirrored) grid layout as the floor survey. In the absence of finding significant and widespread contamination on the floor, walls, and/or fixtures, the overhead survey will be limited to a partial investigation of approximately 25% of the number of grid squares sampled during the underlying floor survey. That is, if the 100% survey of the floor generated 225 grid squares and thus 45 (@ 20%) complete data points, then 11 grid square areas of the overhead would be investigated.

The survey of overhead (at least 6' above the floor) areas shall consist of a scan of horizontal and vertical surfaces, with a recording of average gross cpm/probe, and the location documented by grid number. Any elevated (max.) readings would be additionally recorded. A direct measurement (gas prop.) and a swipe sample shall be obtained from each area in which the limited scan was performed, and at any areas in which elevated detection was observed.

Any affected area found to have significant and widespread contamination during the survey of lower surfaces, or having undergone extensive remediation because of widespread radioactive contamination, shall have the survey strategy for elevated surfaces evaluated on a case by case basis.

6. Drain Lines / Subsurface Utilities

The sewer manhole in the center of the floor shall be accessed and surveyed remotely, as practicable. Confined space requirements are applicable, and all necessary monitoring and safety practices shall be adhered to when considering investigations personally into the manhole. Swipe samples and any residue (sediment, water) samples obtainable shall be analyzed off-site. The squared endplug shall be surveyed and sampled accordingly, if readily removable. Associated data shall be tracked with the floor survey, and likewise the investigation of any penetrations of the wall will be tracked with the wall surveys.

In the absence of detecting significant activity in the accesses to any penetration during the field survey, the investigation shall be terminated (barring any abnormal sample result in the pending analysis). However, should significantly elevated radioactivity greater than background levels be detected, the investigation should continue to include determination of the routing of the affected utility to provide subsequent sample points.

7. Reporting

All survey data shall be standardized in units of dpm/100 cm² or uR/hr, as appropriate, and provided in a summary report along with the location in which the measurement was made and/or the sample was collected. Survey and laboratory instrumentation QC and calibration data shall be provided with the survey summary report, and the raw field generated records will be included.

VI. LIMITED REMEDIATION AND CHARACTERIZATION OF PARKING AREA

A. Prerequisites

1. Personnel involved with the on-site survey shall be trained in the basics of radiation principles, radiation worker, general industrial safety, have current 40 hour HazWOPER training per 29 CFR 1910.120, and shall work under a written site specific Health and Safety Plan (HASP).
2. Provide personal protective equipment (PPE), as appropriate, and use plastic laydown areas as necessary.
3. Ensure that all subsurface utilities are professionally traced and prominently marked above ground to clearly display their routing through the affected paved parking area.
4. Perform a documented radiation screening survey with a calibrated Micro R meter in each affected area prior to prolonged occupancy. Record periodic readings and report all significant (i.e., > 0.25 mR/hr greater than area background) findings to provide for a documented investigation and a footnote in the survey summary report.
5. Establish a reproducible 10m x 10m grid system in the subject area to be surveyed, using subgrids of ~5' centers, and provide sketches displaying the grid layout. Tie the temporary grid system to prominent landmarks, i.e., existing survey benchmarks, utility poles with stamped identification, or exterior walls of adjacent structures.
6. Sampling equipment shall be appropriately decontaminated to prohibit cross-contamination of subsequent samples.
7. Samples sent for off-site analysis shall be analyzed for gross alpha/gross beta and gamma spectroscopy.

B. Instrumentation

Survey instrumentation shall primarily be 2" x 2" NaI detectors mated to scaler/ratemeters, typ. Ludlum Models 44-10 & 2221. The meters are electronically (pulse) calibrated, and the integral units (meter + detector) are voltage plateaued and efficiency response calibrated to Cs-137. The NaI instrumentation shall be cross-calibrated on-site during background determination to a tissue equivalent detector (non-energy dependent), typ. Bicron Micro Rem Meter.

The sensitivity of the NaI detectors, when used in typical background radiation fields of ~5K - 10K cpm, have been observed to significantly respond (increase of ~2 x bkg) to Th-nat concentrations in soil in the range of ~15 - 20 pCi/gm. Thus, proper use of the instruments to screen unshielded substrate can identify contaminated fill with a fair level of confidence, given density and particle size similarities to soil, but is incapable of confirming materials 'clean' (or < 10 pCi/gm).

C. Surface Scan

The entirety of the surface area of the subject parking lot shall be scan surveyed by a walkover technique using NaI instrumentation. Cracks and openings in the pavement, and joints where building wall surfaces meet the asphalt, shall be scrutinized for trends of shine from affected subsurface material. Average instrument readings, and the reading and specific location of any elevated (> 2 x bkg) responses shall be recorded for each 5' x 5' subgrid area.

D. Limited Remediation

The known contaminated area, and any additional significantly affected area found during the surface scan, shall be intrusively investigated by the controlled (manual) removal of the substrate. The affected area shall be liberated from its pavement covering for access periodically as necessary. (Note: The broken away asphalt pieces may be temporarily staged, pending a documented survey for release, or sacrificed as contaminated). The exposed surface of the underlying substrate shall be scan surveyed before and after each shovel/bucket is removed, as will the portion of media in transit, thereby limiting the waste volume being generated as practical. Periodic samples of the removed material being drummed shall be collected for compositing for later laboratory analysis for characterizing/manifesting.

The remediation of specific affected locations is expected to be typically limited to the monitored removal of up to the capacity volume of one DOT 17H 55-gallon drum per discrete location, but not to exceed ten drums total during site characterization.

E. Verification Sampling

Discrete Surface Sampling

Areas in which the remediation afforded during the investigative characterization may have successfully eliminated observed field instrument response (~bkg readings only), shall be sampled for verification for release. Composite samples shall be made of discrete grab samples of exposed surface material from the vertical sides/walls, and of the horizontal bottom/floor of the excavation.

Cluster Sampling

Areas in which the committed volume of material (up to one 55-gal drum) had been removed during the investigative characterization and observed significant field instrument readings remain, shall be sampled for further determination of the extent of areal and vertical contamination. A series of sample locations shall be selected subjectively in a cluster pattern around the existing investigative excavation. Vertical core samples shall be pulled from each to a depth of at least 3', after removal of the asphalt layer. A (typical) motorized post-hole digger shall be used for vertical sample extraction. Discrete grab samples shall be obtained from the auger for composite samples from depths 0-1', 1-2', and 2-3'. Upon removal of the auger/tool from the bore hole, documented hole-logging shall be performed using an NaI detector vertically down the walls of the hole to identify the presence and distribution of subsurface activity. The center of the subject excavation from which affected material had been removed originally, and thus the reason for this cluster sampling, shall be sampled using the same method, in effort to verify the extent of possible directly vertical migration.

Systematic Sampling

After the remediation of obvious areas of elevated ground contamination has been completed, pending analysis of the verification samples collected, systematic soil sampling of each affected grid block (10m x 10m) shall be performed at locations equidistant between the center and each of the four grid block corners. As the scan survey over the attenuating layer of asphalt pavement is not capable of detecting underlying surface areas with activity levels within 75% of the guideline value for thorium, additional sampling is required to provide an acceptable level of confidence that locations of elevated activity have been identified. The EPA (Ref.#4; EPA, 1989) recommended triangular grid shall be followed for a 95% assurance that elevated areas in excess 10m² surface area are identified. The four-point standard systematic pattern shall be supplemented with additional sample points located along the 10m grid lines, at block corners and centers, and midway between grid block corners to provide a triangular sample pattern with spacing of 5m or less (enclosed area of ~6.3m²).

A single 10m x 10m complete grid block would contain a total of thirteen sample points, as described. Each selected location shall have the pavement overburden destructively removed. A documented survey shall be performed of the surface of the uncovered substrate using NaI detectors within 1 cm, a surface sample shall be collected for analysis, and the direct survey repeated in the sampled hole. The exposure rate shall be measured at 1 m above the surface of each sample location.

Subsurface Sampling

Minimally, subsurface sampling to a depth of 3' shall be performed at the four standard systematic sample points equidistant from between the center and each of the grid block corners, per the method described in cluster sampling. Additionally, any area found with significant ($> 2 \times \text{bkg}$) activity during the systematic random survey above shall be provided with subsurface sampling as necessary.

F. Derivation of Site Background Radioactivity

The inner city location of the subject facility discounts the probability of existing open soil areas, and moreover undisturbed open soil areas for local (representative) but off-site sampling for background determination, as described in NUREG/CR-5849. The practical alternative approach to be taken shall initially provide for on-site surface sampling in areas without obvious effect (not downstream) from facility contaminants or other uncharacterized outfalls. Note: On-site background sampling shall be performed after completion of the characterization survey for reasonable rule-out of obtaining an inadvertent spike of contaminated material, which may otherwise be misinterpreted as a background anomaly. Selected/available sample points shall be screened (NaI detector), although biasly tainting sample randomness, to ensure the absence of significant elevated radioactivity levels. The contingency to be followed in the absence of unaffected open soil areas for obtaining the initial seven background samples required shall provide for on-site core sampling, distant from any affected grounds. Composite samples will be collected to represent the 0-1', 1-2', and 2-3' depth increments. The adequacy of background data points shall be determined upon receipt of analytical results, per NUREG/CR-5849, p. 8.15.

VII. DOCUMENTATION

The required documentation to be maintained and incorporated in the final report shall include:

1. Map of the facility surveyed and its relationship to the surrounding area and respective (interior/exterior) grid patterns;
2. Field survey records indicating observed instrument response, ambient background levels, locations of measurements and samples, sample identity, signature of surveyor, date and time of the recorded survey;
3. Calibration records of radiological detection and measurement instrumentation;
4. Calibration certificates of NIST traceable radioactive standards in instrument calibration;
5. Routine instrument source response checks and laboratory instrument QCs;
6. Corrected/standardized field survey readings to reported respective net activity units (i.e., dpm/100cm², uR/hr) for direct comparison to the criteria;
7. Measured activity of swipe samples in units of net dpm/100cm², with a sample detection limit of no greater than 10% of criteria (20 dpm);
8. Measured concentration of gross alpha, gross beta, and specific nuclides in units of pCi/gm for soil;
9. Soil sample data analytical error at 95% confidence level;
10. Name of person reviewing results.

VIII. MATERIAL STORAGE AND DISPOSAL

All contaminated materials generated during facility characterization and/or remediation shall be properly packaged in steel drums (typ.) or other standard strong tight container appropriate for transportation of its contents under DOT regulations. An external survey of the packages shall be performed, including contact and one meter dose rates and swipe samples. Prominent identity markings shall be affixed to provide ease in correlation of sample results to its container of origin. Applicable labeling shall be provided as necessary, relative to the contents, exterior survey results, and probable extended on-site storage. Available disposal alternatives should be investigated for determination of ultimate removal from site or additional required licensing activities for extended storage.

IX. SCHEDULE RATIONALIZATION

The characterization and limited remediation protocols established for this facility are to provide for the effective assessment and any necessary follow-up action in a timely fashion to prohibit, as practical, unnecessary demobilization and remobilization. The following sequence of events shall support that goal:

1. Develop Site Specific Health and safety Plan (HASP);
2. Exterior Grid Lay-out;
3. Surface Scan of Grounds;
4. Intrusive Investigation (Ltd. Remediation);
5. Characterization / Verification Sampling;
6. Systematic Surface Sampling;
7. Systematic Subsurface Sampling;
8. Bias Subsurface Sampling;
9. Background Sampling;
10. Garage Area Comprehensive Interior Survey While Off-site Analytical Results of Grounds Pending;
11. Address Exterior Grounds, as Necessary, and Count Interior Swipe Samples Off-site;
12. Decon as/if Necessary;
13. Verification Sampling at Any Follow-up Areas;
14. Interim Storage of LLW
15. Complete Waste Characterization
16. Investigate/Exhaust Disposal Options
17. Final Report



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION III
601 WARRENVILLE ROAD
LISLE, ILLINOIS 60532-4351

FEB 17 1994

Frome Investment Company
ATTN: Mr. and Mrs. William Ellmann
28000 Weymouth
Farmington Hills, MI 48334

License No. STB-0362 (terminated)
Docket No. 040-00235 (terminated)

Dear Mr. and Mrs. Ellmann:

SUBJECT: INSPECTION OF FORMER ATOMIC ENERGY COMMISSION (AEC) LICENSED SITE

This refers to the special inspection conducted by Mr. D. G. Wiedeman of this office on February 1, 1994, of your facilities located at 1950 West Fort Street, Detroit, Michigan. These facilities were previously owned by Brooks and Perkins Corporation. Licensed activities were previously authorized by Atomic Energy Commission (AEC) Source Material License No. STB-0362. The results of our preliminary survey findings were discussed with you by phone at the conclusion of the inspection on February 1, 1994. This also refers to the telephone conversation between you and Mr. D. G. Wiedeman on February 14, 1994, regarding the results of our laboratory analyses of samples collected at the time of our inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. The inspection consisted of a selective examination of representative records from the former license file, observations, independent measurements, and interviews with the current owners and occupants of the building.

Based upon this inspection, it appears that thorium may have been improperly disposed of at the site. Specifically, the thorium concentration found in the soil located behind the garage facing W. Fort Street was in excess of NRC unrestricted use criteria. The NRC criteria is described in the October 23, 1981 Federal Register, Branch Technical Position "Disposal or Onsite Storage of Thorium and Uranium Wastes from Past Operations." The radiation levels measured in this area does not constitute an immediate health and safety problem for your lessee or visitors; however, we do expect remediation of the contaminated area. Therefore, within 60 days from the date of this letter, please provide this office with your schedule and plan to characterize the extent of the contamination and decontaminate the area to current NRC release criteria.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter, the enclosure, and your response to this letter will be placed in the NRC Public Document Room.

The response directed by this letter is not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL96-511.

44-02280070 2pp

From Investment Company

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FEB 17 1984

We will gladly discuss any questions you have concerning the inspection.

Sincerely,

George W. McCarver for
Gary L. Shear, Chief
Fuel Cycle and Decommissioning Branch

Enclosure: Inspection Report
No. 999-90003/94007(DRSS)

cc w/enclosure:
Kenneth Coble, Michigan
Department of Health

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 999-90003/94007(DRSS)

Docket No. 040-00235 (terminated)

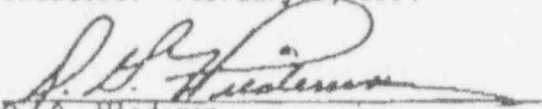
License No. STB-0362 (terminated)

Licensee: Brooks & Perkins Corporation
 1950 West Fort Street
 Detroit, Michigan 48216

Inspection At: Building and property owned by Frome Investment Company
 (a former Brooks & Perkins Corp. facility)
 1950 West Fort Street
 Detroit, Michigan

Inspection Conducted: February 1, 1994

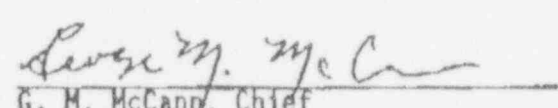
Inspector:


 D. G. Wiedeman
 Senior Health Physicist

Date

2/17/94

Approved by:


 G. M. McCann, Chief
 Fuel Facilities and Decommissioning
 Section

Date

2/17/94

Inspection SummaryInspection on February 1, 1994 (Report No. 999-90003/94007(DRSS))

Areas Inspected: This was a special inspection to review the former licensee's activities and to determine if the facilities were adequately decontaminated prior to terminating the license. The inspector conducted independent radiation surveys in the former licensee's manufacturing, processing and storage areas. This inspection was part of an NRC project which evaluated approximately 17,000 retired licenses. An NRC contractor, Oak Ridge National Laboratories (ORNL) performed the evaluation. On the basis of the information in the retired license file, such as type and quantity of authorized materials and lack of adequate decontamination documentation, ORNL concluded that this facility has a potential for residual radioactive contamination.

Results: The NRC inspector did not identify any radiation levels above background in the building formerly used by Brooks & Perkins; however, an area outside the building, believed to be a former disposal area showed levels of radiation (gamma) approximately eight times above background. A sample analysis indicated the soil contamination exceeds the NRC release criteria.

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2. Background

AEC License No. D-547 was issued on January 17, 1957, then superseded by license No. STB-0362 on August 10, 1961, to Brooks & Perkins Corporation. This license authorized 15,000 pounds of thorium as contained in 40% thorium master alloy and thorium magnesium alloy containing not more than 3% thorium. The license authorized two locations of use: 1950 West Fort Street, Detroit and 12633 Inkster Road, Livonia, Michigan (Attachment A). This inspection report covers activities at the 1950 West Fort Street facility only. For details regarding the Livonia, Michigan facility see NRC Inspection Report No. 999-0003/94012(DRSS).

Authorized activities included rolling, melting, casting, forming, cutting, sanding and welding manufactured products containing licensed source material. The licensee requested termination of the license in a letter dated February 5, 1971, and provided a radiation survey by their consultant of the Livonia and Detroit facilities. The NRC inspectors review of this survey shows that one area at Livonia exceeded the release criteria and the survey results did not include all areas where licensed materials were used (in both facilities).

3. Facility Status

Frome Investment Company purchased the building some time in the late 1960 to early 1970 time period (exact date was unknown), from Brooks & Perkins Corporation. Currently the building is leased to Eaton Company and is used as a warehouse for air filters. Eaton has four employees that work at the site.

4. Independent Measurements

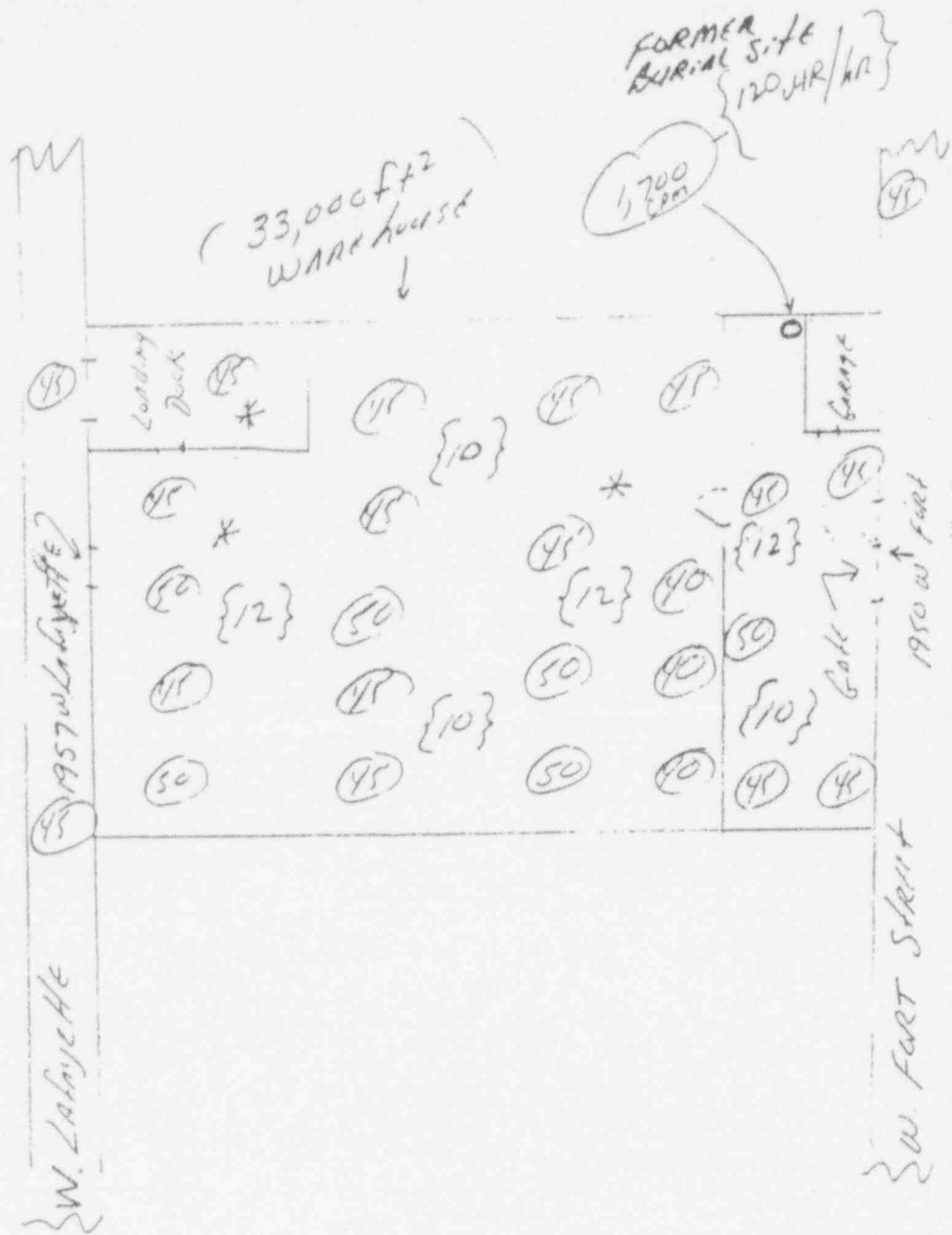
Background radiation measurements were taken in the downtown area of Detroit, Michigan with a Victoreen Model 190 and Ludlum Model 19 portable survey instruments. Background measured 45-55 counts per minute (cpm) with the Victoreen and 7-15 microroentgens per hour ($\mu\text{R/h}$) (1.8-3.8 nanocoulomb per kilogram per hour) (nC/kg/h) with the Ludlum.

Independent radiation surveys were performed with a Victoreen Model 190 portable survey instrument with a Model RP-1 pancake probe, NRC Tag No. 0405020, Ludlum Model 19, NRC Tag No. 015522, both calibrated on July 28, 1993 and an Eberline ESP alpha scintillation counter, NRC Tag No. 033845, calibrated on June 27, 1993. Prior to the surveys all instruments were checked for accuracy and constancy with dedicated and traceable check sources. All instruments responded as expected.

The inspector conducted radiation surveys in and around the former manufacturing, processing and storage areas in the building. The areas surveyed included restrooms, hallways, offices, former manufacturing areas, parking lots, building down spouts and loading docks. The NRC inspector's survey of the above referenced building and adjacent property did not identify any radiation levels above natural background. An open area located behind the garage facing W. Fort Street showed elevated radiation levels. Further investigation indicated that this area appeared to be a former radioactive waste disposal burial area. The inspector measured 120 $\mu\text{R/h}$ (30.8 nC/kg/h) on the ground surface and 15 $\mu\text{R/h}$ at 3 feet above the ground with the Ludlum Model 19 survey instrument. The Victoreen 190 showed 1,700 cpm (beta+gamma). No alpha activity was identified. See Attachment B for survey results.

5. Laboratory Analyses



A sample of the contaminated material was collected for further analyses in the Region III laboratory. Analysis of the sample determined that the radioactive material is thorium with a concentration of 500 picocuries per gram (pCi/g) (18.3 becquerel per gram [Bq/g]) which exceeds the NRC release criteria of 10 pCi/g (0.37 Bq/g). Smear tests for removable activity were taken at random locations within the building and were analyzed for gross alpha and beta activity. The results for gross alpha and beta activity were less than 5 disintegrations per minute (dpm) (0.1 Bq)/100 cm^2 which is below the NRC limit of 200 dpm (3.33 Bq)/100 cm^2 . The NRC release criteria for buildings and equipment can be found in NRC document titled "Guidelines for Decontamination of Facilities and Equipment prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated August 1987.




Date of Survey- 2/1/94

Survey Instruments- Victoreen 190 w/pancake probe
 Ludlum Model 19 microR meter
 Eberline ESP alpha meter

Calibrated- 7/28/93

Survey units- counts/minute (cpm) 
 microrentgens/hour 

Background radiation-45-55 cpm 
 7-15 microrentgens/hour

* = approximate smear test locations

Survey by: D. G. Wiedeman (accompanied by Michigan Department of Health)

