University Premises

19 August 1979

— to —

12 January 1980

Stage 1.

18/1/80

'Tour' of building

s 47F - privacy

Considered

- ✓ all ducting, fans, from B/R area — OUT
- ✓ contaminated
  - benches
  - floor tiles
  - floor board (less to repair now)

  — OUT

(from here on THS/IM 'took over')

End of Tape 1

20/12/79

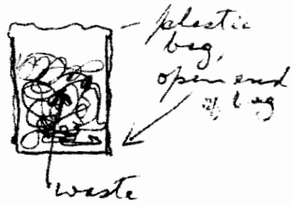
s 47F - privacy

Re Lab-VI

Object of visit was to proceed with removal of waste & 'clean up' as much as poss.

Relevant work, noted here (UK, THS):

- Collected all remaining mercury. To go to Yallambie.
- Dismantled mercury ('sucker') remover: placed vacuum pump + motor on small trolley.
- Emptied vacuum cleaner into bag & to ducting waste drum. Left clean (new) bag in it.
- Monitored items (Victoreen 470A)
  - vac. cleaner: max 8 mR/h (near intake)
  - ducting from Ra repair room: max 7 mR/h (near flange, as before)
  - waste bin: max 10 mR/h (spot marked 'X' on drum)
- Covered waste bin with 'waste' plastic bag — a firm fit →



Left- vac cleaner
ducting
waste bin
all in strong room & locked the door.

- Victoreen 470A:
  - level in Ra repair room, 0.7 to 0.9 mR/h (along median line)
  - in geom. centre strong room: 1.0 mR/h

20/12

Certain items, found to be contam! were broken up & removed with waste. Total items.... filled one truck.

[redacted] left ≈ 11.35 after turning off all fans, in main building & Rm area — believed best to leave off over holidays. Can also check Rn build up / there may be some more items left in Strongroom, contam" or floor Rn repair room....

Personal monitor: I did not use a p.m.; but on past experience my dose would not exceed 2mR. So, take 2mR

Total: [redacted] 46mR.

22mR)

Note added 21/12/79.

TNS called at Unit 6 & 7 & closed all doors between main building & Rn area — object. to assess build-up of Rn (over a few weeks?)

18/12/79

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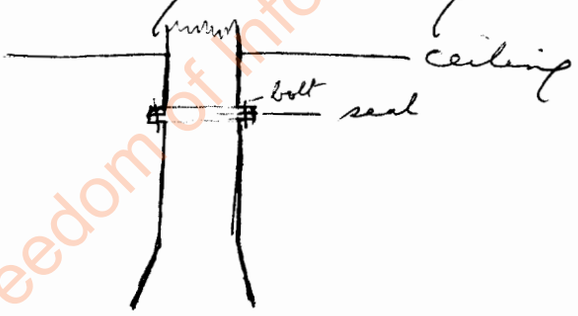
Ra Lab. V
Ra Repair Room VII

Overalls.
Respirator, where indicated.

Work done:

- Removed ducting in Ra. repair room by undoing bolts holding ducting at flange.



- Sealed both ends of ducting removed — covered with heavy duty plastic & used tape to hold.

- ~~Cleaned~~ Cleaned any dust from inside remaining ducting using vacuum cleaner extension — cleaned to just above ceiling. (Wore respirator for this).

- Sealed end of remaining ducting by covering with heavy duty plastic & used tape to seal 3 accessible sides.

- Used vacuum cleaner to remove all dust on wall behind ducting removed. (Also removed dust on floor of room.)

- Turned & lead large 'bricks' over + cleaned (scraped) 'deposit' off surfaces. Bricks now clean on all sides. Lead scrapings collected in vac. cleaner. T-floor cleaned.

- Removed remaining bottle of mercury — covered in oil. (Took to Yallambie & stored with the rest.) Re only Hg at Uni HRL is the small amount in the bottle used as the reservoir when collecting Hg & vacuum pump.

- Left dusting, tie R/S waste, vac. cleaner, all in strongroom. This will be a 'hot spot' — should be removed before next general survey begins.

- Left fans on in main building but turned fans off in Rn area. (Re latter fans were off during the removal of the dusting — considered safer, & less likely to spread dust.

Re Reports Room: Stage 1 completed 18/12/79

Personal monitors:

HPI 3746	[redacted]	1 mR	10:00 to 11-30
HPI 3748		1 mR	"

Total to date: [redacted] 45 mR

29/11/79

Rm Lab. IV
Ra. Repair Room VI

[redacted]

Overalls, boots -- as for 15/11/79
Monitor. Victoreen 470A
'Panoramic'

Work done (much concurrently):

- Removed the metal supports from the rollers on the overhead rails in the fan lab.
- Removed remains of supports from the lead screens (previously rolled in front of the fan plant) — cut off flush with screens.
- Cleaned cupboard in room lab — removed wax, bottles ... & used vacuum cleaner over the inside.
- Lifted linio tiles on floor until could find no more mercury & removed all mercury found — checked rest of floor.
- Cleaned all 'available' surfaces of the two large lead bricks removed from glove box. Used rasp & chisel. Both effective. Collected all bits with vacuum cleaner. Left only 'underneath' faces still to be done — one brick (marked) is still ≈ 3 mR/h on underface. Rest of bricks ≈ 0.5 mR/h (could be due to activity underneath ... scatter ...?)
- Checked duct in Ra repair room. There is a 'hot spot' (only one?) on front face just at or below the flange: max 7.8 mR/h. Approx 6 mR/h in vicinity, decreasing to 1.5 mR/h at base. Tried to undo bolts but too much paint on them. Will have to remove using hacksaw.
- Inspected old vac. pump — decided no mercury in it.

29/11/79

- Decanted all mercury (except a small amount of very 'oily' mercury held in bottle) into 4 winchesters. These were removed to Yallambie.
- Under roof, above Rn lab.. General level 200μR/h + approaching Ra store room went to 500μR/h +. Will increase as ducting from that room approached.
- Sorted items on floor according to whether 'contam' or not — used 30 c/s on PCM 5 as 'limit'

Personal Monitors : s 47F - privacy

21/11/79

[redacted]

Radon Lab-III

Overalls, boots, as of 14/11/79
Monitor Victoreen 470 A 'Panoramic'

Work done: (some concurrently).

- Cleared sink of sludge & mercury in U bend. — could not undo ⊗ -- so removed whole sink to gain access to U bend & replaced after cleaning. Bend clear except for the Hg which has amalgamated with the brass.

- Removed waste wood from the repair room — to 265 Spring St later today.

- Emptied the vacuum cleaner bag and base of v.c. Replaced. Monitored v.c. — max dose to surface 15 mR/h & dose bag base varies from 1.5 to 3 mR/h as main body of v.c. approached.

- Removed old mercury sump, framework & supporting bench to workshop area.

- Removed 'lower' vac. pump assembly, which was known to contain mercury after serious accident in which Hg was pumped through it. (Pump useless. Motor should be ✓)
  Drained pump — collected (prob.) 100 mL Hg.
  [Opened pump up & drained as well as poss'l.]
  Pump & bits into plastic bag for disposal.

- Removed mercury from floor -- etc.
  [redacted] went under floor to area under

21/11/79

Ran pump & recovered 'vapour trap' (a glass flask △) – about ¼ full Hg. Found stopper at top had been forced out & Hg on ground. Using 'sucker' and compressed air bulb [s 47F - privacy] was able to recover most of the Hg. (It was poss' to pass these lines through existing holes in the floor). [s 47F - privacy] spent ≈ 1¼ h doing this. (Re 'vapour trap' vac. pump assembly was used to activate 'sucker' at all times)

- Removed lead screens from overhead roller supports – left leaning against wall.
- Removed some floor tiles -- collected 'stray' mercury. Some Hg is well inside deep floor joists – cannot reach with sucker.

Personal Monitors:

(Through overnight-, did not wear them during morning. From past experience & having regard to nature of work done can assume dose to [s 47F - privacy] and myself would have been ≈ 1 mR)

During afternoon, used monitors:

#PI 3746 [s 47F - privacy] 2 mR Total: [(2+1) + 39] = 42 mR

#PI 3747 (1) 5 mR [(5+1) + 15] = 21 mR

(had been dealing with active waste)

[Rn plant]

1

15/11/79

s 47F - privacy [redacted]

Radon Lab. II
& Ra Repair Room V

Morning + afternoon
(10.05 to ≈16.00)

Overalls, boots, as for 14/11/79

Monitor: Victoreen 470A 'Panoramic'

Used monitor: above mercury tank under Rn 'pump'
0.15 mR/h

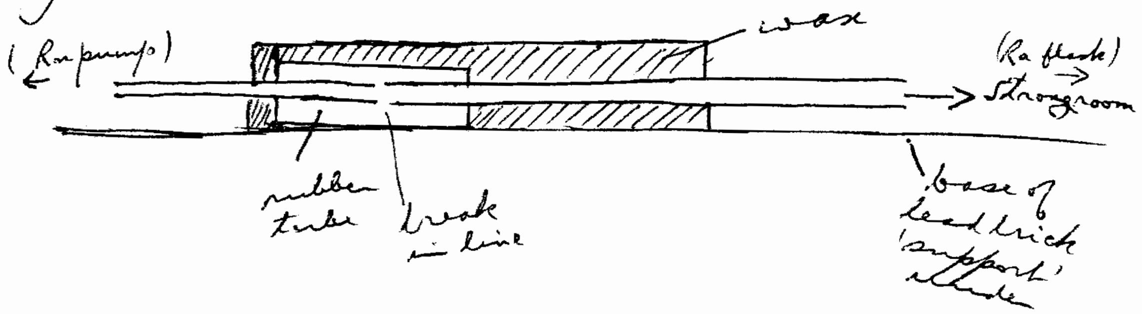
liquid air trap on last stage of Rn 'pump (most active part) 0.25 mR/h

glass tube leading to strongroom, above Rn pump 0.5 mR/h.

A/ Dismantled Rn pump, from top downwards.
Glass parts put in drum & broken up.
All framework above Hg sump removed
Glass tube leading to strongroom removed.
(This contained some mercury)
The line included a glass 'trap'

This was 'active': 3 mR/h.

Also line appeared to have been joined at some time:



Found easiest to break glass tubes using file—cut 'nick' & break same way. Few failures.

When all remains of Rn pump were in the drum the exp. rate on outside surface was (max) ≈ 1.3 mR/h
With the glass 'trap' removed ≈ 1.2 mR/h

B/ Mercury tank under pump.
Removed top plate – no difficulties.
Top of mercury very dirty – 'scum'; flakes of metal (rust) from under-surface of top plate; 2 pieces glass tube + some glass bits; some (little) grease; bits of cork.
Cleared mess away from 1 corner + placed cardboard 4 times times, on top of remaining surface to 'hold' scum from floating about. Removed beaker + dip Hg from 'clean' corner + pour Hg into wide plastic funnel set in top of 'winchester' bottle. Filled 5 'winchesters', each about '1/3 full'. Final collection of mercury from tank + from 'safety tray', floor ... by 'suction' into existing bottle, using top vacuum pump of Rn plant.
No effective means of collection.
During work found remarkable quantity of mercury lying under tank – origin?
Lifted some bits near pump to see

whether we can gain access to 'vapour' trap under floor — prob. contains Hg. Answer — no. Will either have to go under floor or raise floor boards locally — latter seems pref.

Note Hg appears inactive. Measured between tops of 4 w'chesters (until Victoria) at Yallambie — no response > background (~0.05 mR/h)

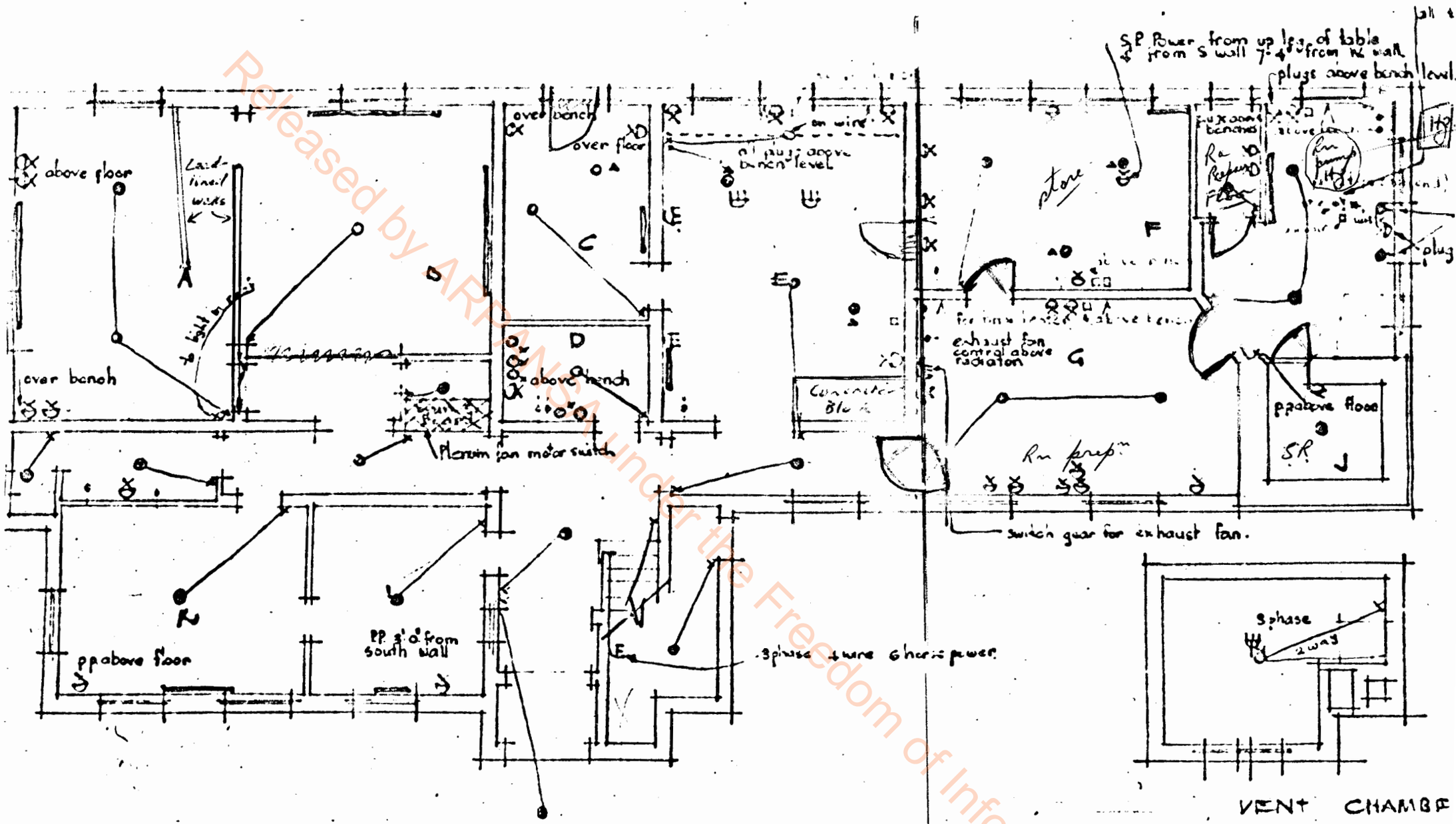
All 'scum' etc — left in tank tipped into tray, & thence into drum with waste. Tank & tray now clean.

✓ In Ra repair room, cut remains of old bench into shorter lengths & split — easier to dispose of & safer.

				Total (to date)
Digital Monitors:	s 47F - privacy	HPI 3748	1 mR	39 mR
		HPI 3746	1 mR	15 mR

Note ✓ the 'lower pump' in Ra plant does not work. Motor appears v. Belt 'slips'.

✓ the small vac pump in Ra lab does not work, nor does motor (?) Whole seems 'jammed'.



GROUND FLOOR PLAN

14/11/79

s 47F - privacy

(morning 08.35 to 10.05)

Ra/Rn Area : Rn Lab I

Used 'old clothes' and white overall (AWRE), + R. boots, O'shoes.

Took photographs (5) of Rn pump. (Instamatic + flash.)
(note added – these are in 'archives')

Removed one bolt from top of mercury tank under Rn pump. (There are 36 bolts)
Removed 'plug' from top of mercury tank & tested depth of mercury. ~~XXXX XXXX XXX~~
Measured dimensions (OD) of tank ~~XXXX~~ as
55 cm × 34 cm × 9 cm
Depth mercury 4·5 cm – tank : half full.
Vol Hg 8·4 L. Mass of Hg (8·4 × 13·5) = 114 kg (≈ 50 lb)

Inspected Rn pump + tank. Appears to be no obstacle to dismantling whole.
Remove Hg from tank by (i) siphon (ii) 'suction' + (finally) remove top of tank.

Floor covering : tiles.

Pump outlet – seems to go under floor + no upward return!

Wood – monitor for active areas
– split
– saw & break.
– to bags.

Digital Monitor : HPI 3748 1 mR Total 38 mR

30/10/79

s 47F - privacy

(morning)
≈4h

Ra Repair Room IV

Charged, as for III on 24/10/79.

In Ra repair room broke up glove box. Moved remains out to leave room for later work. Cleaned floor with vac. cleaner.

Emptied vac. cleaner. Before, max ≈ 100 mR/h on surface; after, max ≈ 25 mR/h.

Moved trolley into repair room & placed against bench. Trolley ≈ 1cm higher than bench top. Used 2 plastic bags to cover adjacent areas on trolley & manoeuvered lead bricks on to them. Moved trolley out of repair room & left in Ra lab. One lead brick has 'hot' area on one corner ≈ 10 mR/h (γ) at surface.

Checked top bench with monitor. MIN 8 mR/h, MAX 27 mR/h
AV. ≈ 15 mR/h

Scraped 'hottest' areas & removed dust with vac. cleaner.

Removed all dust and debris from inside cupboards. Checked with monitor. Found one 'stain' on top shelf towards window end: 8 mR/h. Scraped to remove surface. Removed dust with vac. cleaner. General level in cupboard was ≈ 2 mR/h.

Broke up bench top — split into several lengths. Removed temp. outside room.

Broke up & removed cupboard. Cleaned dust as possible from walls, etc. Found no active 'remnants' near or under. Cleaned up all wood -- removed outside temp^y.

Checked floor - found some active areas. Removed all dust & debris. Active areas associated with stains, but most of stains on floor are not active.

Marked 'hot spots' with chalk & gave identifying letters:

Area:	A	B	C	D	E	F	
Exp. Rate ($\frac{mR}{h}$)	10	20	15	16	6	6	(= max values ('surface'))

Exposure rate in room:

In doorway ≈ 1 mR/h, + moving monitor at waist height along median (E-W) line of room found rate 1 mR/h to 0.8 mR/h. - seems remarkably constant.

Outside, over preparation bench next to windows in East wall rate fell to 0.2 mR/h. [On 10/10/79 before work done in room, exp. rate was ≈ 12 mR/h

Checked vacuum cleaner with monitor: ~~max~~ (surface) MAX 30 mR/h & rest 20 to 25 mR/h

Moved remains of bench & cupboard back into room. Moved trolley with lead bricks back into room. Also, Vac. cleaner and all 'bits' and tools used.

V

3

30/10/79

Digital Monitors.

s 47F - privacy

			Total to date
HPI	3746	6 mR	37 mR
HBI	3747	4 mR	14 mR

—"—

Next visit

Photograph Ra pump ---. (flash, etc)

Empty vac. cleaner, as before. measure ---

monitor as before. → Inspect lead brick. . . clean (?) [Hot spots only? scrape? ~~sandblast~~.] —OR OUT as scrap?

Wood — for disposal.

MONITOR Remove Ra pump. (Glass file) (overhead line)

" Mercury . . monitor tank ---(sludge?)

" " under floor

Residual Hg (benches floors).

May have to remove lino. ---
+ search for Hg and
hot spots & contam.

Remove Hg (bulk) from building

Generally clean up Ra lab., strong room.

Hot spots elsewhere — clean | Ra benches + floors + workshop floor

Ducting — Ra repair room
— Ra Lab | check. PI

Remove non-fixed contam — Hg.

24/10/79

s 47F - privacy

(Morning)

Re Repair Room III

Changed to old clothes + put on white (AWRE) coverall, with rubber boots, gloves (2 pairs & heavier work) and respirator (full face). Used as necessary.

Emptied bag in vac cleaner into sealable plastic bag keeping 'dust' emptied. This dust v. active. Cleared blockage (rubber stopper) in entrance to vac cleaner hose. Cleaned sparking well. Used (i) brush (ii) open aperture ( ) on long extension.

(1) Checked bench with monitor. Found 'hot' area near East end — no discrete source; seemed to be embedded in dried material fixed on bench surface.

(2) Cleared dust off wheels bench & off lead bricks; off walls where necessary & off part of floor where must walk.

(3) removed (plate) glass window from glove box & removed dust from box (v. little there). Decided to leave box sitting as present.

(4) scraped top of bench, esp. where monitor indicated active material. 'Hottest' area 220 mR/h but reduced to ≈ 20 mR/h upon scraping. Some general contamination all over bench. Scraped quickly around lead bricks. Scraped more bench — general clean of surface. All loose dust removed.

Decided to leave until next visit. Check on vac. cleaner gave 180 mR/h — again active.

Check with monitor showed levels considerably decreased.

(11)

Digital monitors

Total dose accum. to date

s 47F - privacy

No HPI 3746 8 mR 31 mR

No HPI 3748 3 mR 10 mR

(~~X~~ Monitor carried in pocket of trousers, L.H side.)

Next visit

(1) empty vac. cleaner as before
(2) move wood out of repair room
(3) sweep, clean lead bricks
(4) remove lead brick - trolley
(5) close air vent overhead and remove dust from ducting, if poss
(6) clean, sweep bench --
(7) " dust off floor
(8) " " from cupboards (most of it)
(9) knock up bench ready to remove.
(10) complete clean. ? cup'ds

Check residual contam. — levels of mR/h.
Review: action still req'd, [esp. cup'ds — should they be removed -- broken up -- ?]

Yes ← because may be RA material behind, even under

(11) remove cupboards
(12) clean behind (esp'y)

s 47F - privacy

17/10/79

s 47F - privacy

Ra Repair Room II

Changed to old clothes and put on white (AWRE) coverall, with rubber boots, gloves + (most of time) respirator (full-face).

Radium-repair room

Checked vacuum cleaner — operating well. Used V.C with brush on end of long extension to (1) clean up dust on bench + part-of outside wooden covering.

(2) clean up dust inside glove box — V.C. sucking ~~ceased~~ ceased to 'suck' properly — blocked? Some 'pull' left but not enough to be useful.

From glove box removed as waste, piece glass tube; razor blade, one glass flask ≃ 150 mL (!) — this found to be V. active (100 mR/h near surface)

(3) In consultation with J.S. demolished wooden sections of glove box + removed all from bench — left on floor. Inside of box (on walls) seemed remarkably clean of dust — ~~was~~ mostly on bench. Was able to slide large lead blocks on bench, but very heavy. Bench now 'open', but still dusty at East end. This end is V. active — monitor to 1 R/h. (!) Demolition took ≃ 20 min.

Decided to leave as is'. Opened fan overhead duct, which I had kept closed during clean up + demolition. (It is normally left open to assist removal of Rn.)

17/10/79

Check on vacuum cleaner gave reading ≈ 200 mR/h near bottom — v. active.

Check with monitor shows that with V. cleaner removed (to strongroom) levels of exposure rate are about half what they were near open door, in room.

Digital monitors.

[redacted] s 47F - privacy

			At end of operations
No.	HPI	3746	10 mR
No.	HPI	3748	4 mR
No.	HPI	3747	1 mR

Removed 2 more winchesters, ≈ ⅓ full, & Hg, to Yallambie — stored with rest.

Next visit

✓ Take (i) old clothes, (ii) tissues to clean respirator (iii) an axe (+), to break up bench.
~~(iv) brush (?)~~

✓ and (i(a)) fit vac. cleaner (is it blocked?)

✓ (1) clean up remaining dust on bench & floor, if poss. using vacuum cleaner.

X (2) remove bench — note E and v. active

✓ (3) leave all wood in room pending removal

[NOTE lead bricks are too heavy to lift off bench but can slide about, with effort.]

X (4) monitor inside of wooden cowling — active?

X (5) poss. — dust from vent.

[redacted] s 47F - privacy

16/10/79

Next visit 17/10/79 Taki

✓ a) Remove more Hg — [illegible] bottles)

✓ b) Remove dust from ~~floor~~ glove box — in Ra repair room: bag from vac. cleaner OUT as waste. (High level).

c) Inspect glove box — how best dismantle store as waste. Remove lead blocks — store — (?)

per note of 17/10/79

↓ Later dismantle glove box must use full protection for b)/c) above.

Present views:
11/10/79

1/ prot. all. sig. contam. in glove box

2/ : clean up dust — —

+

3/ dismantle glove box — store as waste.

+/ survey ~~—~~ levels after 2/+ 3/ above

[Prob recomm. demolish all S. and building + pass whole S. orig.

NOTE ~~Hg~~ : under lino? in 'old' sump under floor?]

10/10/79

R.a Repair Room I

s 47F - privacy

Afternoon

Preliminary Assessment of Job.

1. Measured exposure rate in room (Monitor: Victoreen 470A 'Janaramic')

outside: S. wall (mean ≈ 12 mR/h – seems to be opposite bench in glove box)

inside: N. wall: increases from door end towards E. wall. max 30 mR/h

in doorway 7 mR/h

in glove box – near (lower) bend brick on bench 300 mR/h (mean)

Digital monitors: personal monitors.

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monitor HPI 3748. At end of operation 13mR

" HPI 3746. " " " " 3mR

Dust samples: collected from bench walls, & inside glove box – in plastic containers, marked. Also removed glass & small items from inside glove box.

s 47F - privacy

In addition to this 'radiological' work, we removed some of the mercury found in the radon lab. This was in bottles. Cause of storing in plastic bags, etc. At Yallambie, they were placed in wire cage in 'waste' area so that loss or damage is unlikely. The mercury will have to be checked for radioactivity. The bottles will have 'activity deposit' on the outside.

There is much more mercury to come — including mercury in reservoir of radon pumps.

s 47F - privacy 11/10/79