

Daily

- rod positions at startup and during operation
- effects of sample insertion/removals
- xenon, temperature
- fluxes in irradiation sites and other locations (magnitude, spectrum)
- heating effects in irradiation sites
- gamma dose rates

"Monthly"

- fuel burnup
- result of core loading change (fuel, irradiation sites, control rods, reflector changes)
- effect of moving core (or removing beam ports, lead block)

Long-term

- new fuel types (physics and thermal-hydraulics effects due to changes in alloy, loading, enrichment, geometry)
- new control materials
- fission product inventory
- detector response
- radiation damage to structural and other materials

Accident analysis

- sudden large positive reactivity insertions: accidental fuel addition; removal of high cross-section materials; beam port flooding; fissile materials in samples.
- loss of coolant flow

Tools Available:

Codes: WIMS (2 versions?)

LEOPARD (2 versions, 1 undocumented)

BOLD VENTURE

CITATION

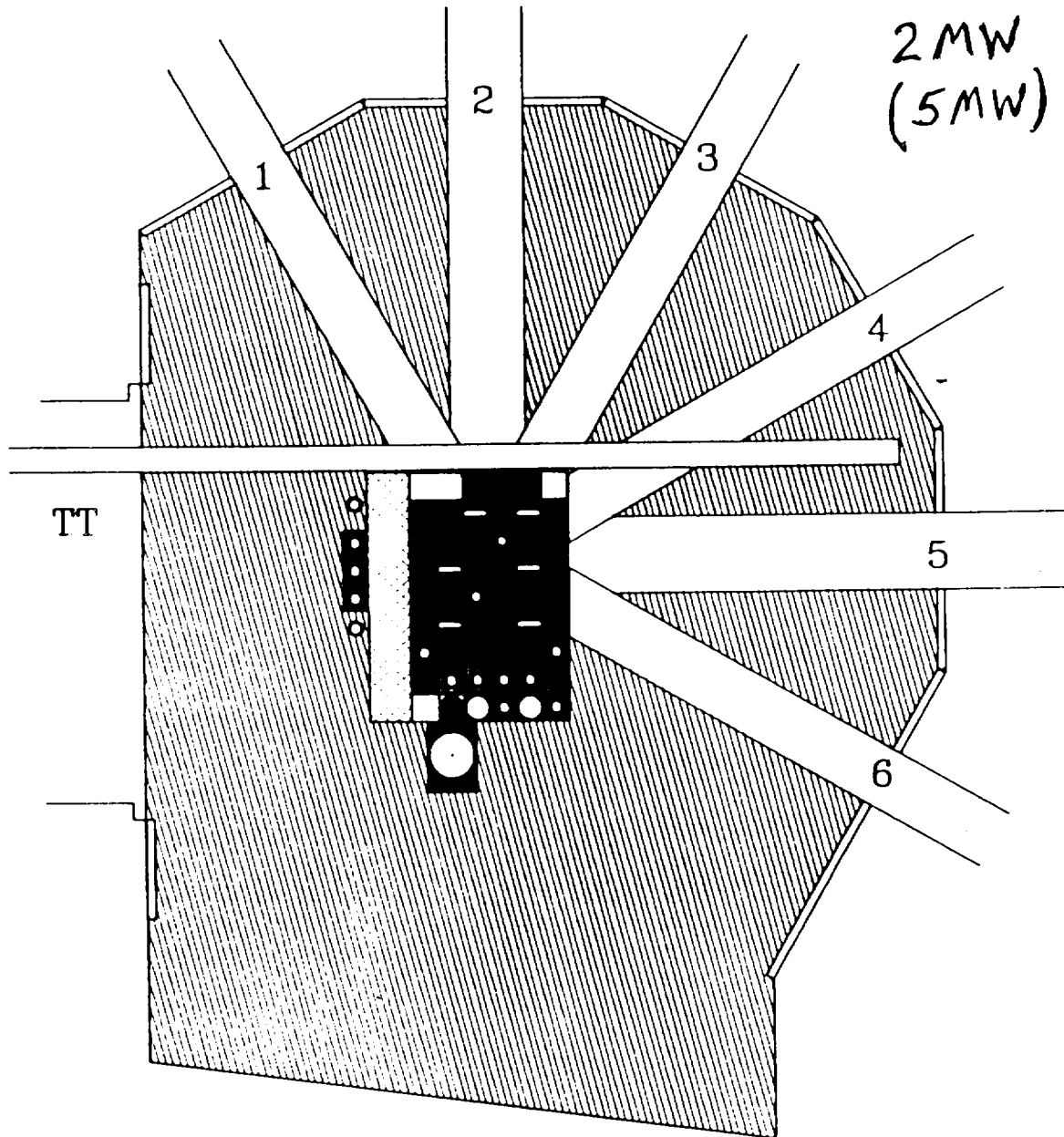
SAIPS (spectrum unfolding)


MCNP 4

Other: several foil kits for different neutron energies;


NAA Lab and other counting equipment


SWIMMING POOL McMASTER NUCLEAR REACTOR





 light water H_2O

 lead

 fuel assembly

 core irradiation site

 peripheral irradiation site

 rabbit irradiation site

1-6 beam ports ALL RADIAL

TT tangential beam port

NORTH

	A	B	C	D	E	F
1	H ₂ O	H ₂ O	PTR (10) 47 kW	CI (18) 57 kW	CI (18) 32 kW	MNR (18) 17 kW
2	Refl.	MNR (18) 27 kW	SHIM (9) 30 kW	PTR (10) 72 kW	SHIM (9) 33 kW	PTR (10) 51 kW
3	PTR (10) 56 kW	MNR (18) 58 kW	CI (18) 101 kW	CI (18) 102 kW	MNR (18) 70 kW	CI (18) 68 kW
4	CI (18) 58 kW	SHIM (9) 39 kW	CI (18) 123 kW	PTR (10) 113 kW	SHIM (9) 43 kW	LEU (18) 62 kW
5	MNR (18) 35 kW	MNR (18) 62 kW	Refl.	MNR (18) 73 kW	MNR (18) 63 kW	MNR (18) 48 kW
6	LEU (18) 72 kW	SHIM (9) 18 kW	MNR (18) 65 kW	CI (18) 62 kW	REG (9) 36 kW	PTR (10) 49 kW
7	H ₂ O	CI (18) 41 kW	PTR (10) 57 kW	PTR (10) 57 kW	MNR (18) 32 kW	Refl.
8	Refl.	Refl.	Refl.	Refl.	Refl.	Refl.
9	H ₂ O	H ₂ O	H ₂ O	Refl.	H ₂ O	H ₂ O

Legend:

- PTR (10) = 10 plate HEU fuel (8 in all)
- MNR (18) = 18 plate HEU fuel (11 in all)
- CI (18) = 18 plate HEU fuel (9 in all)
- LEU (18) = 18 plate LEU fuel (2 in all)
- SHIM (9) = 9 plate HEU fuel with a control absorber (5 in all)
- REG (9) = 9 plate HEU Regulator Rod (fast-acting shim) (1 in all)
- H₂O = Water site for irradiation of samples (8 in all)
- Refl. = Reflector / irradiation (10 in all)

- # of 18 plate assemblies = 22
- # of 10 plate assemblies = 8
- # of control assemblies = 6
- subtotal = 36
- # of non-flow sites = 8
- # of reflector sites (minor flow) = 10
- Total # of sites = 54

Figure 4 Core Configuration (# 48C) as of January 8, 1997

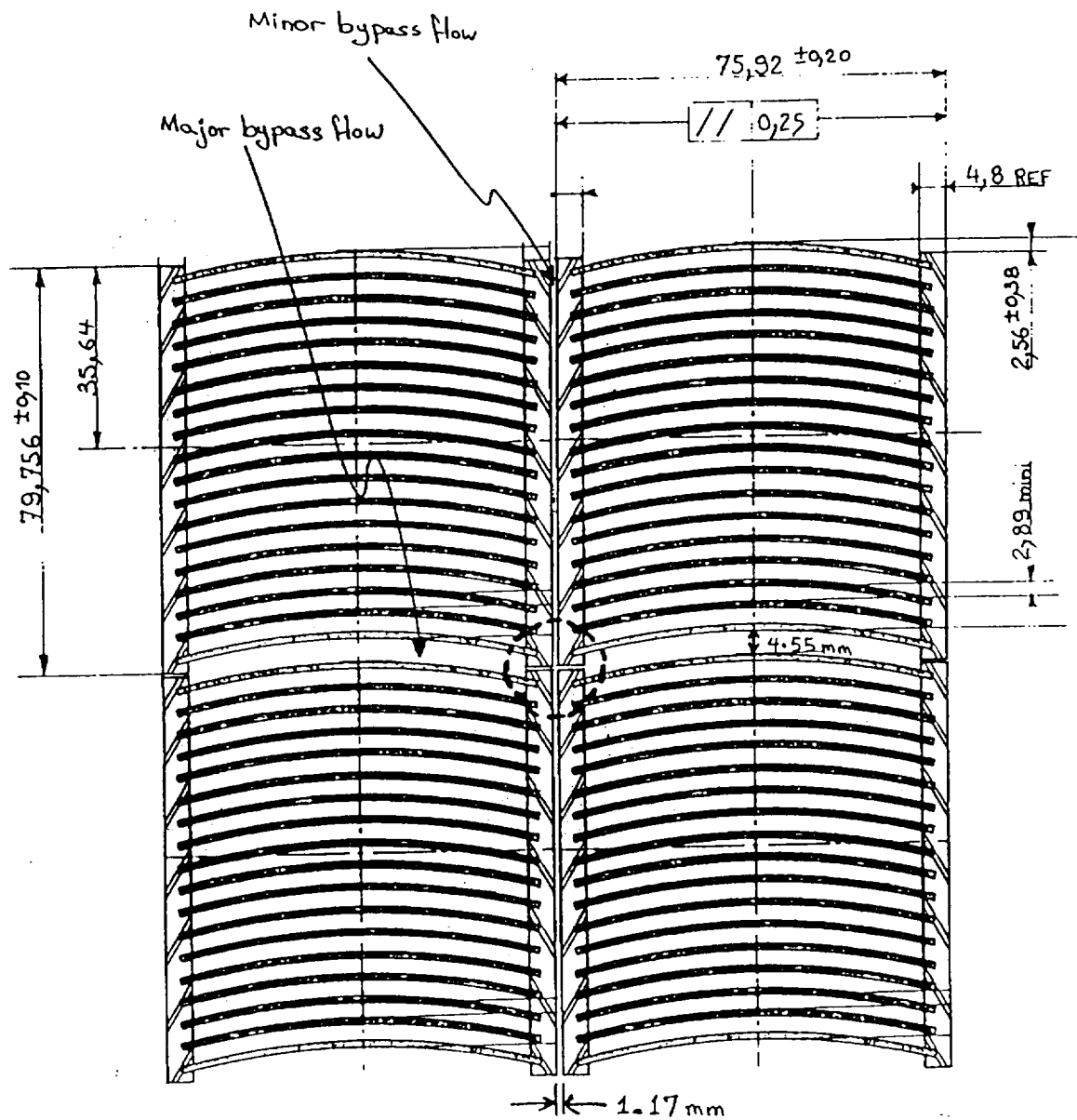
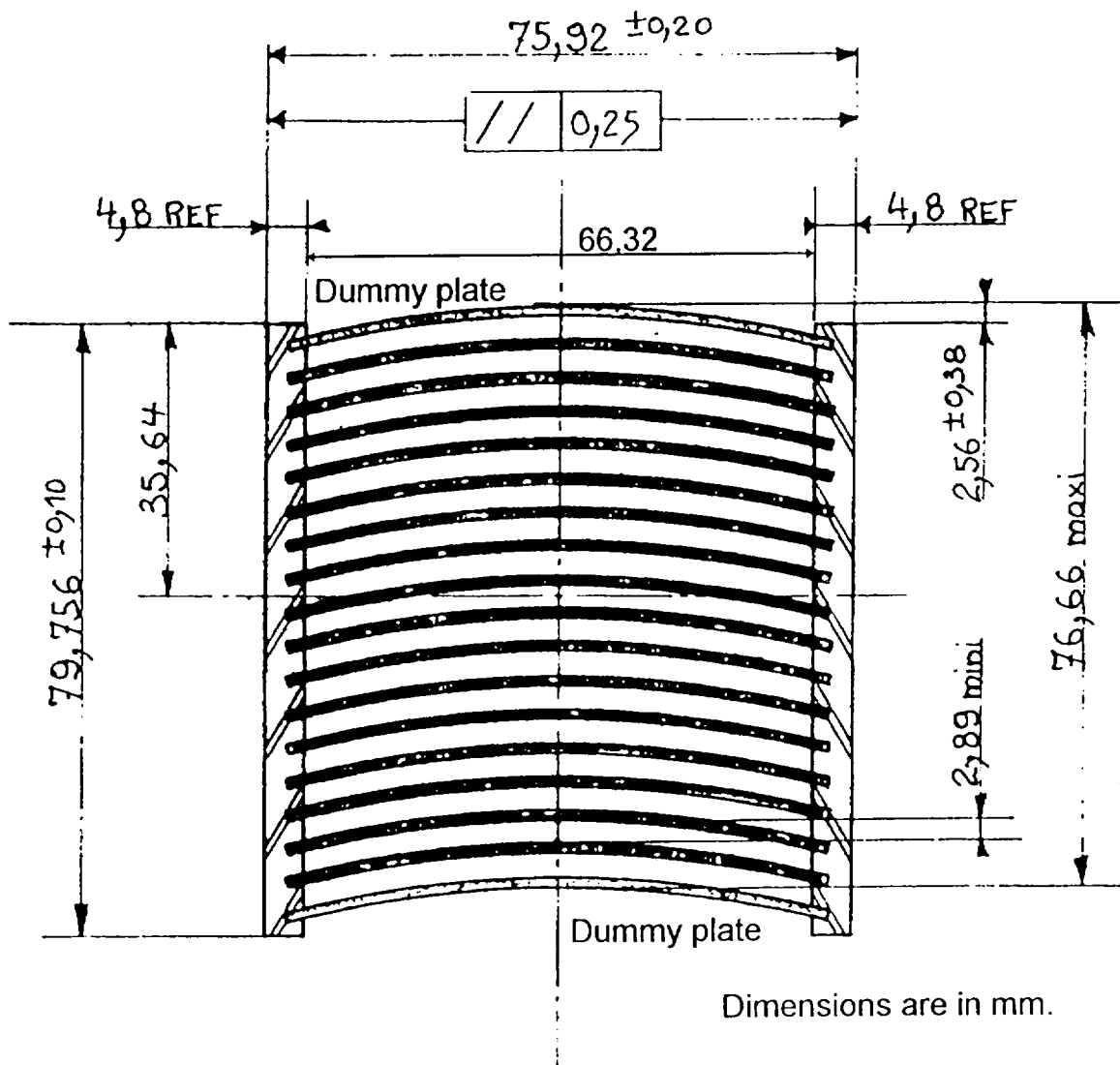


Figure 5 Bypass flow geometry in the assembly region



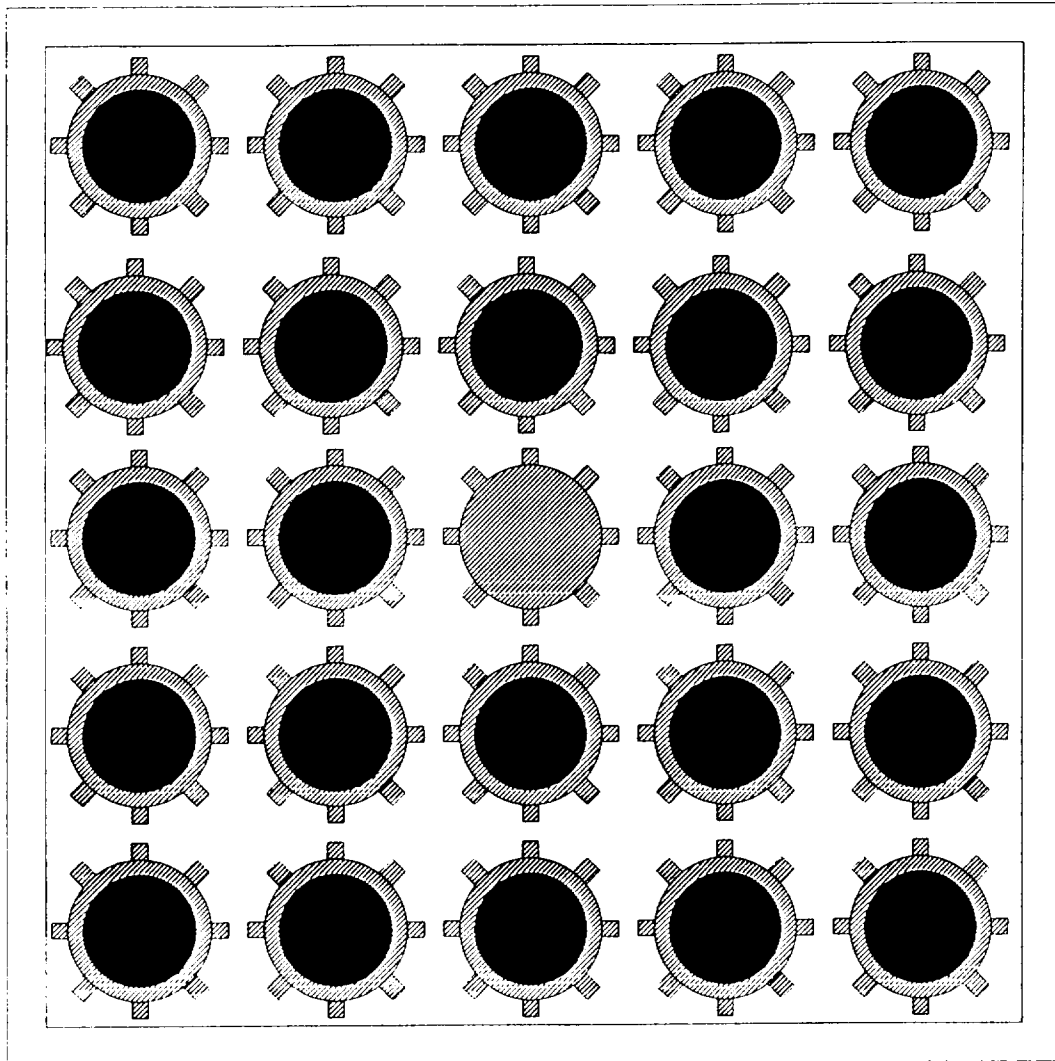
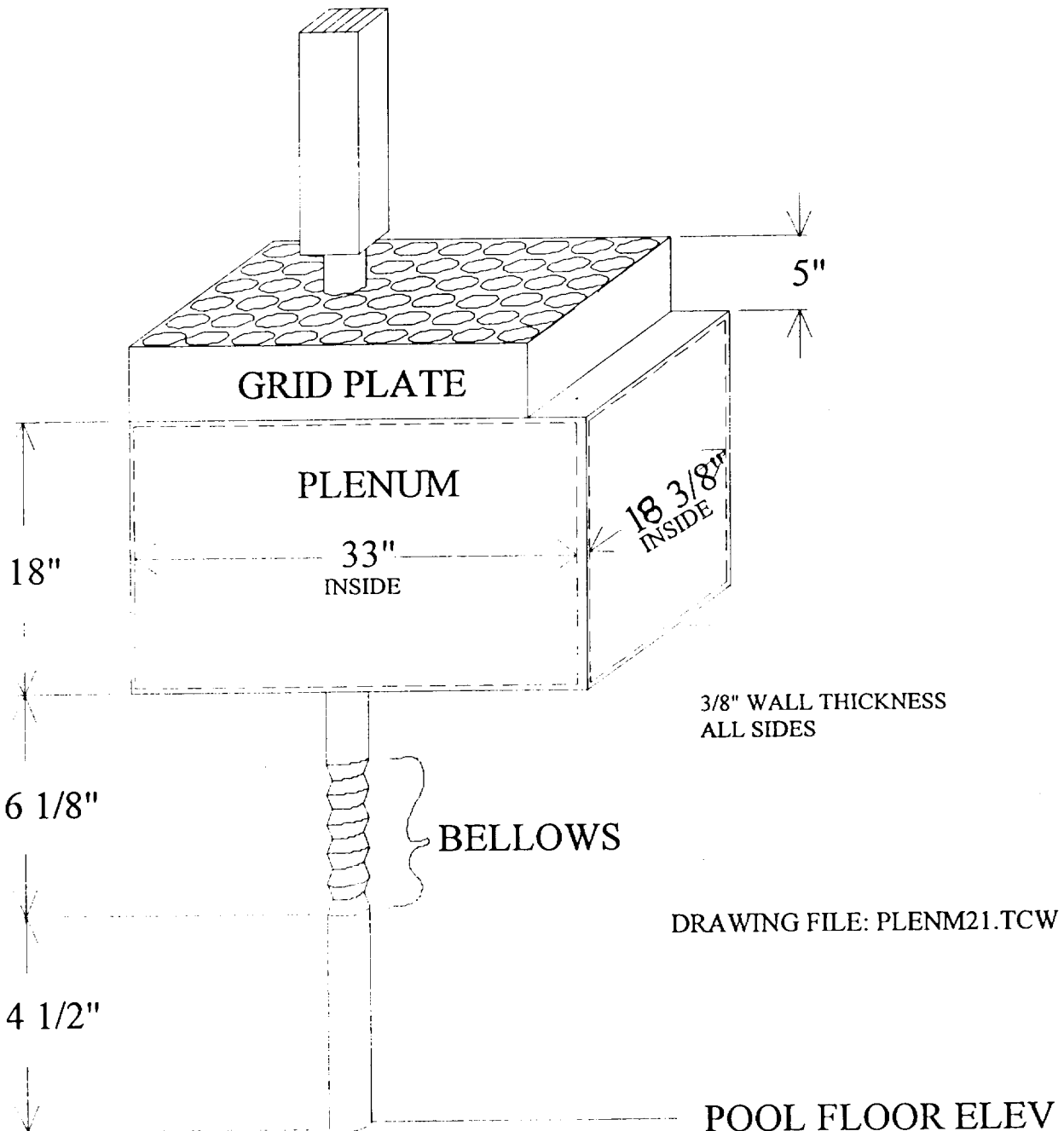


Figure 6 MNR-MAPLE assembly



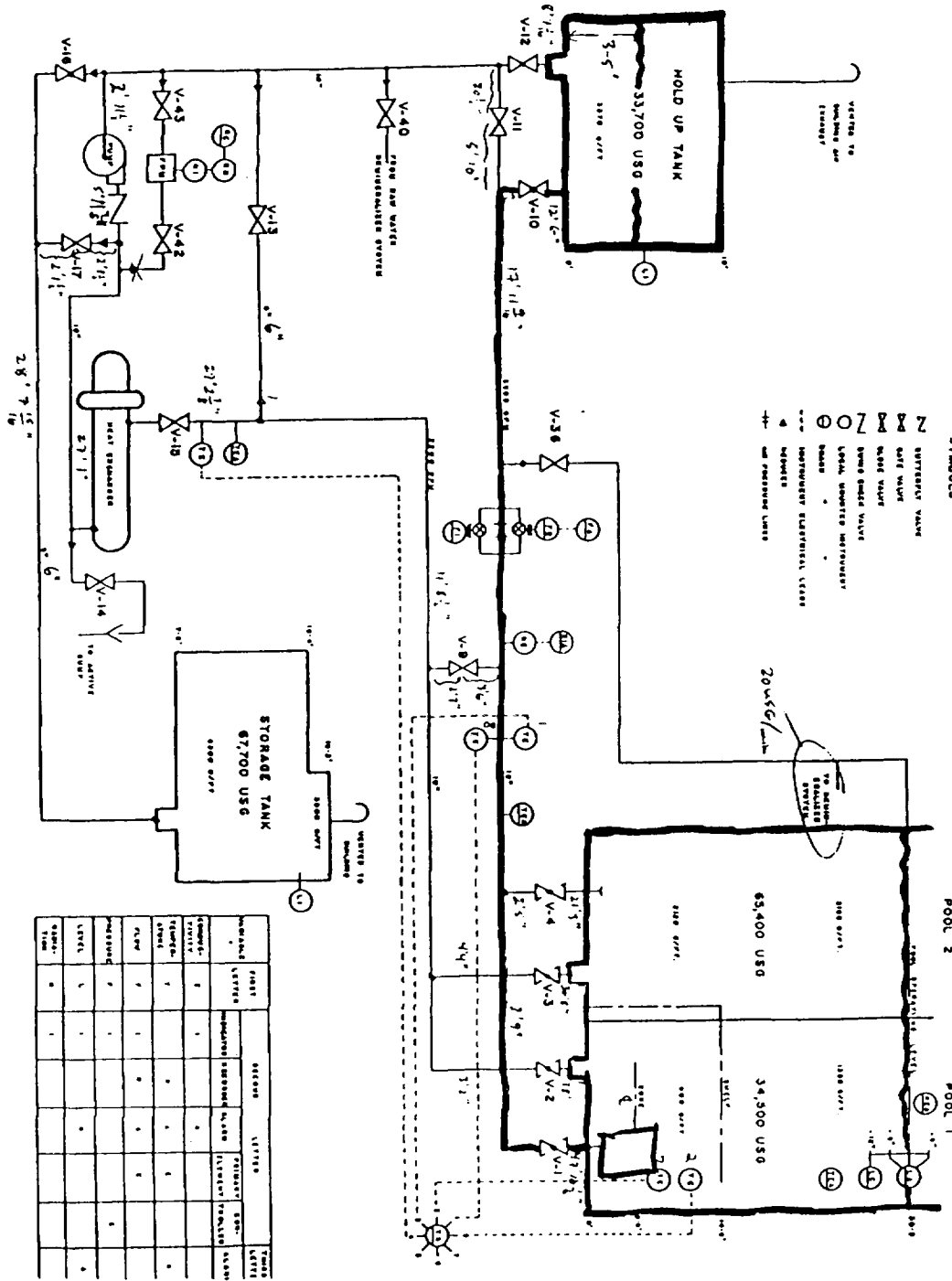


Table 1.1 Flows and temperatures for MNR (base case: core 48c)

ASSEMBLY GROUP	COOLANT VELOCITY (m/s)	FLOW / ASSEMBLY (kg/s)	COOLANT OUTLET TEMP (°C)	MAXIMUM SHEATH SURFACE TEMP (°C)	MAXIMUM FUEL TEMP (°C)
MNR18	0.72	49.20	36	43	44
MNR18HOT	0.73	2.35	43	59	60
APTR	1.00	27.28	34	45	46
APTRBYP	0.72	2.21	36	47	48
HPTR	1.00	3.03	37	59	62
HPTRROUT	1.00	0.87	34	59	62
HPTRBYP	0.72	0.63	34	63	65
SHIM	0.72	7.43	34	45	46
SHIMBYP	0.73	3.80	36	46	47
COREBYP	0.72	4.43			
SAMPLES	0.03	0.03			
SHIMABS	0.06	0.03			
HMAPLE	0.94	3.13	40	84	92

Archive directory: /cathena/development/mnr-grid.