

STATUS of the NP-Facility in J-PARC

K.H. Tanaka for the NP Facility Construction Team

December 2003

NP-HALL

Neutrino to SK

- **NP-Hall**: Experimental Hall for **50GeV-15 μ A** Slow Beam
 - The First (Only One?) **KAON FACTORY** in the World
- **Neutrino Beam Facility (JHF- ν)** : Long Baseline Experiment

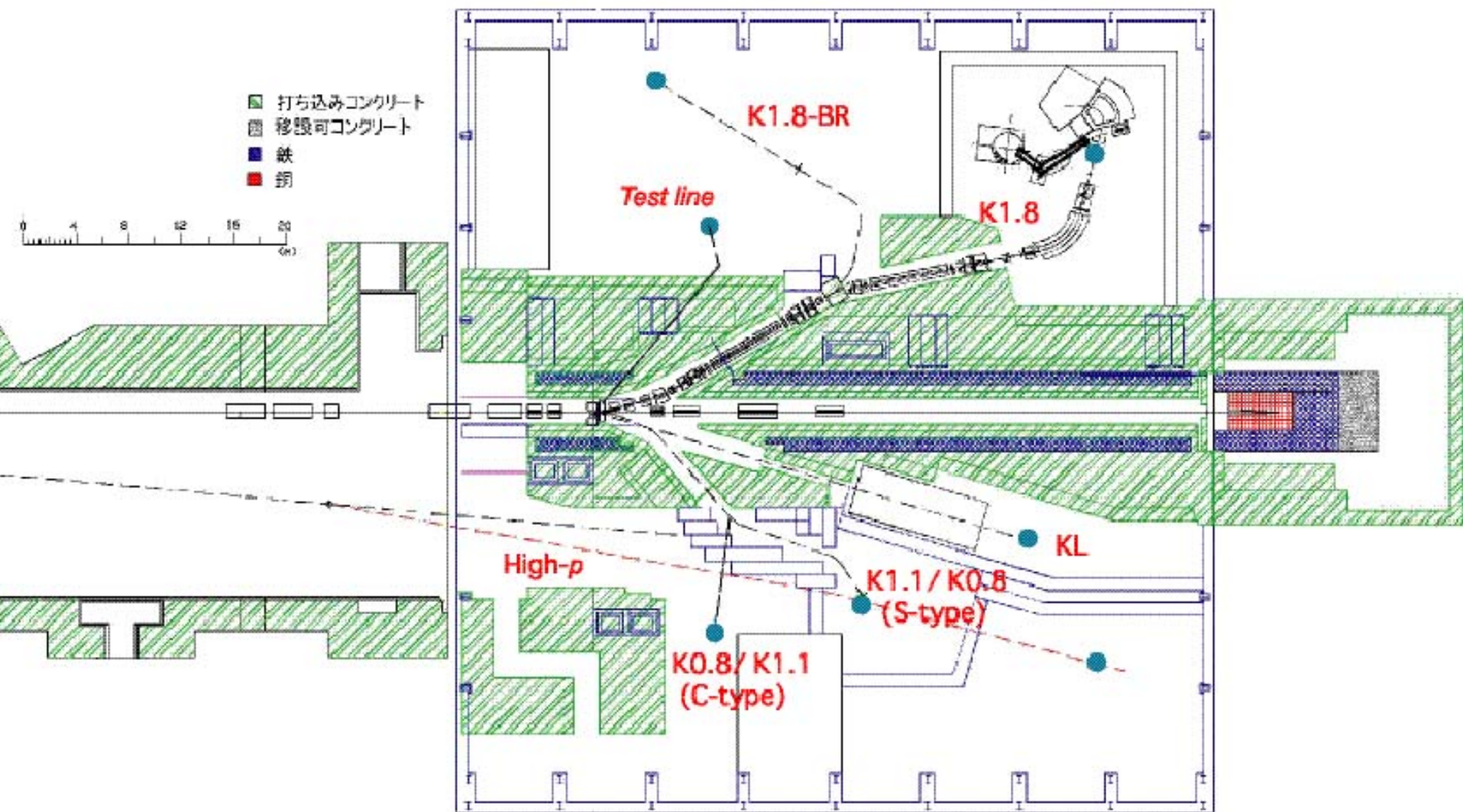
Beam Profile of JHF-50GeV PS (Phase 1-)

- Beam Energy: 50 GeV
(30GeV for **Slow Beam**)
(40GeV for Fast Beam)
- Beam Repetition: 3.4s
- External Beam Width: 0.7s (1.0s) Slow Beam
- Beam Intensity: 3.3×10^{14} ppp, 15 μ A
(2×10^{14} ppp, 9 μ A)
- Beam Power: $E_{\text{Linac}} = 400\text{MeV}$ (180MeV)
750kW (270kW)

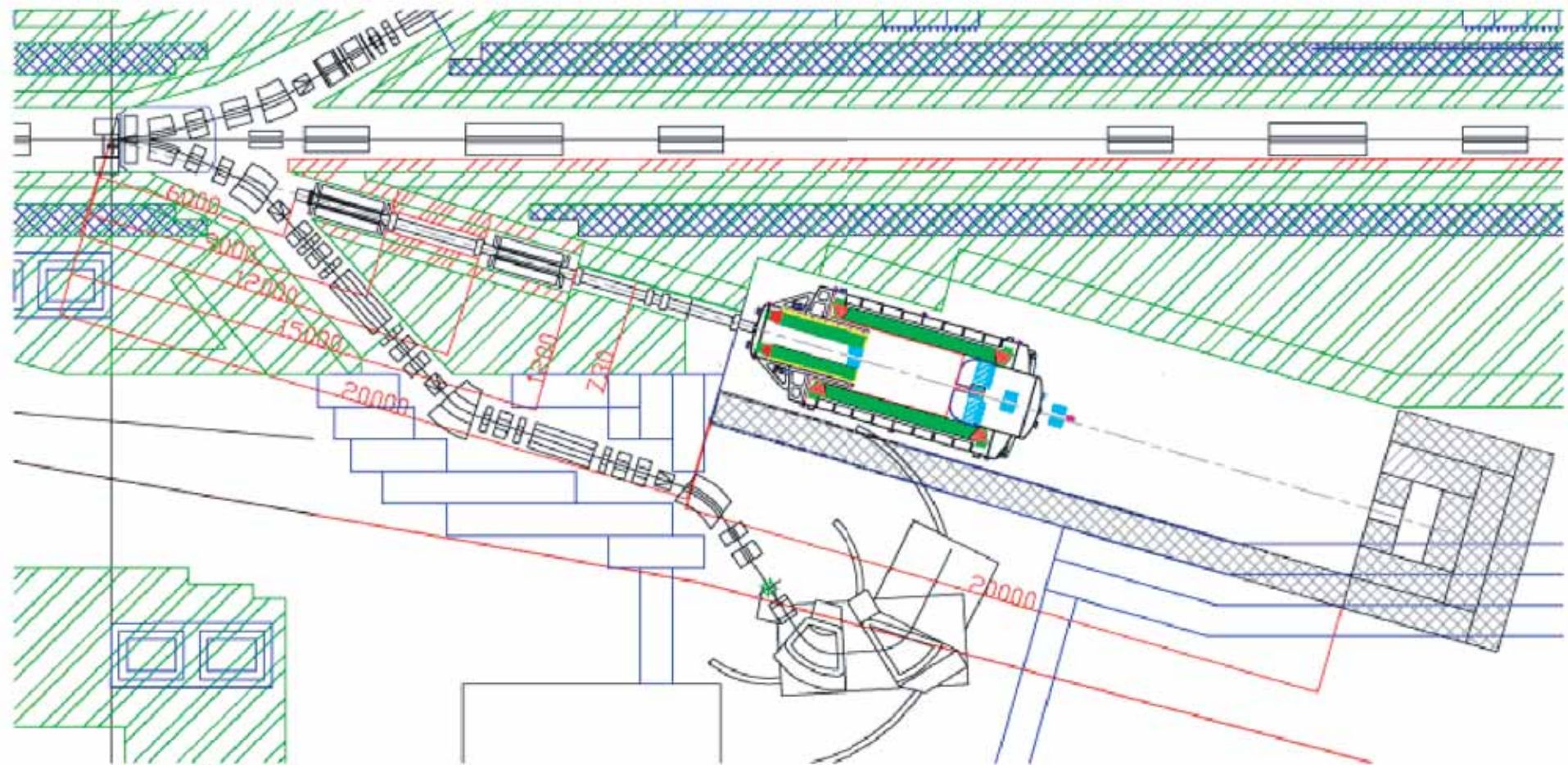
Progress in JFY 2003 for NP-Hall Design

- **NP-Hall Design & Beamlines**
at Phase 1
- **Radiation/Heat Resistant Beam Line System** for SY/ ν -line & NP-Hall
- **T1 Target** & its Related Parts
- **Beam Dump**

Phase-1 layout

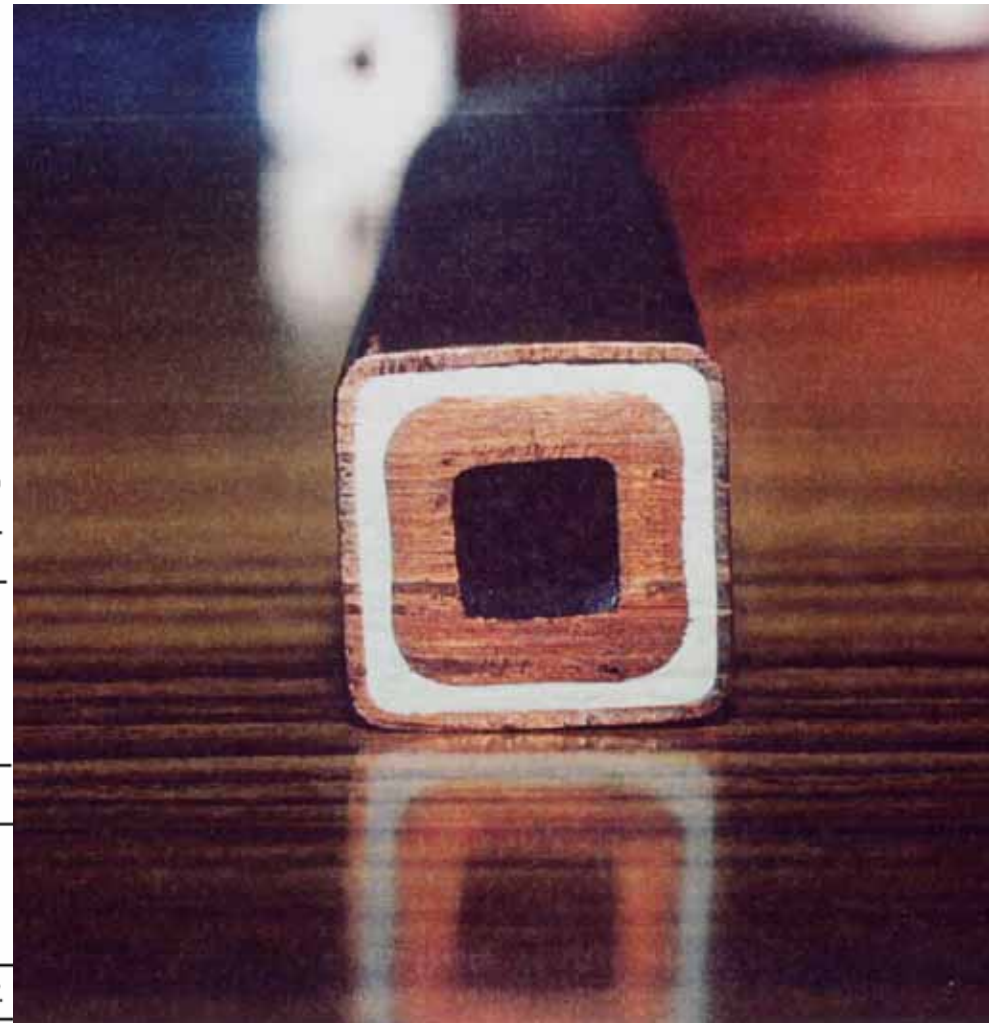
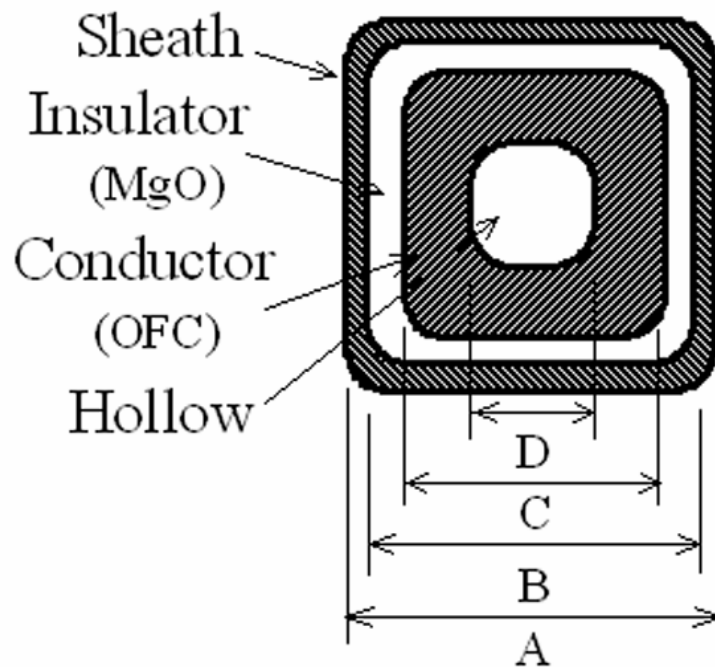


K1.1 and KL



Radiation Resistant Beamline System

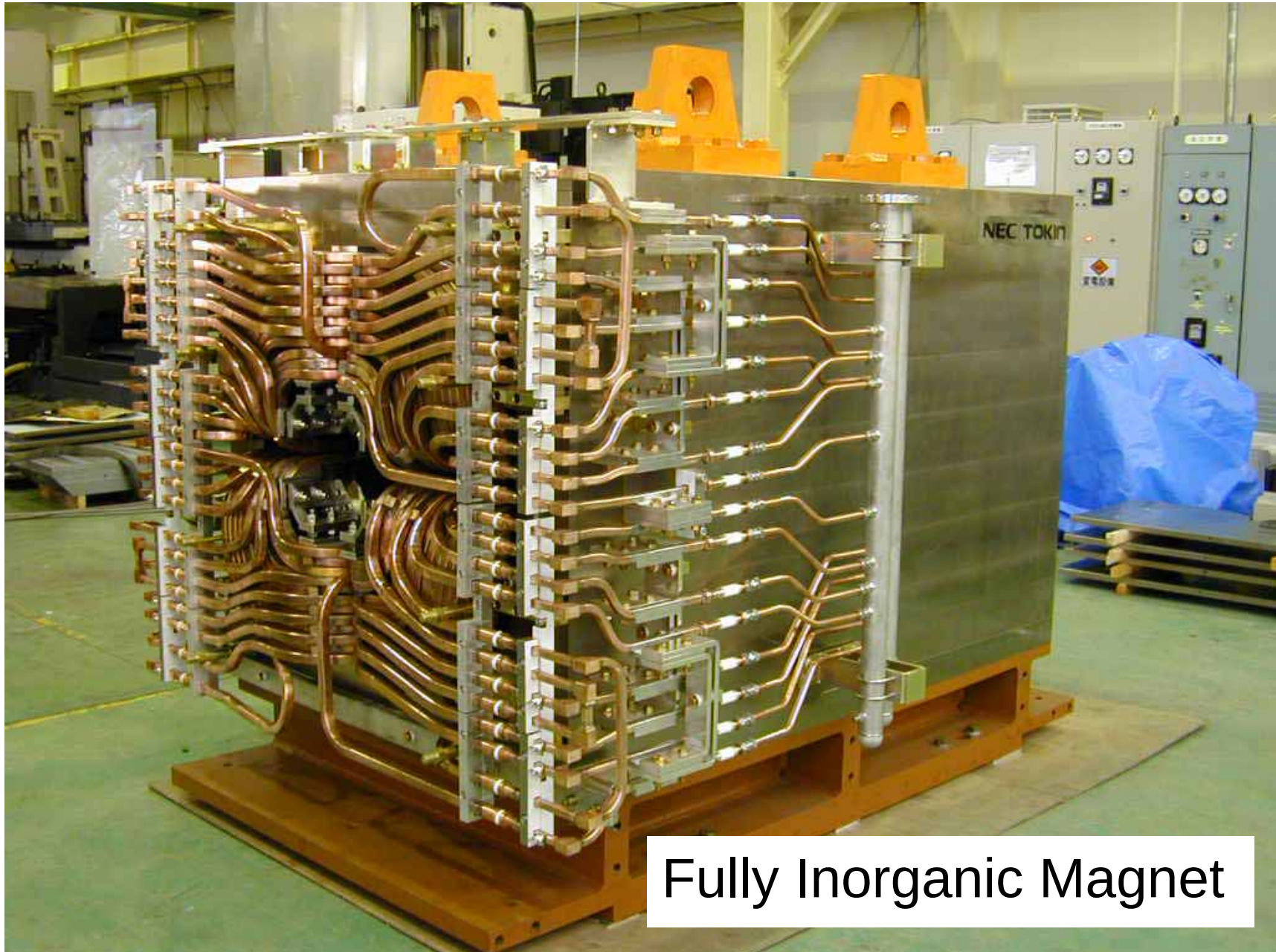
Mineral Insulation Cable



Nominal Current (A)	2000	2500	3000	1000*	2000*
Dimensions (mm)					
A: Outward Size	20.0	23.8	28.0	18.0	14.0
B: Insulator Size	18.0	21.6	25.0	16.6	12.6
C: Conductor Size	14.6	18.0	20.0	13.2	9.2
D: Hollow Size	7.4	10.0	10.0	--	--
Cross Section (mm ²)					
Conductor	150.9	211.7	293.1	168.4	78.8
Insulator	117.7	153.2	227.4	106.6	79.4
Seath	73.4	95.3	150.6	47.8	36.6

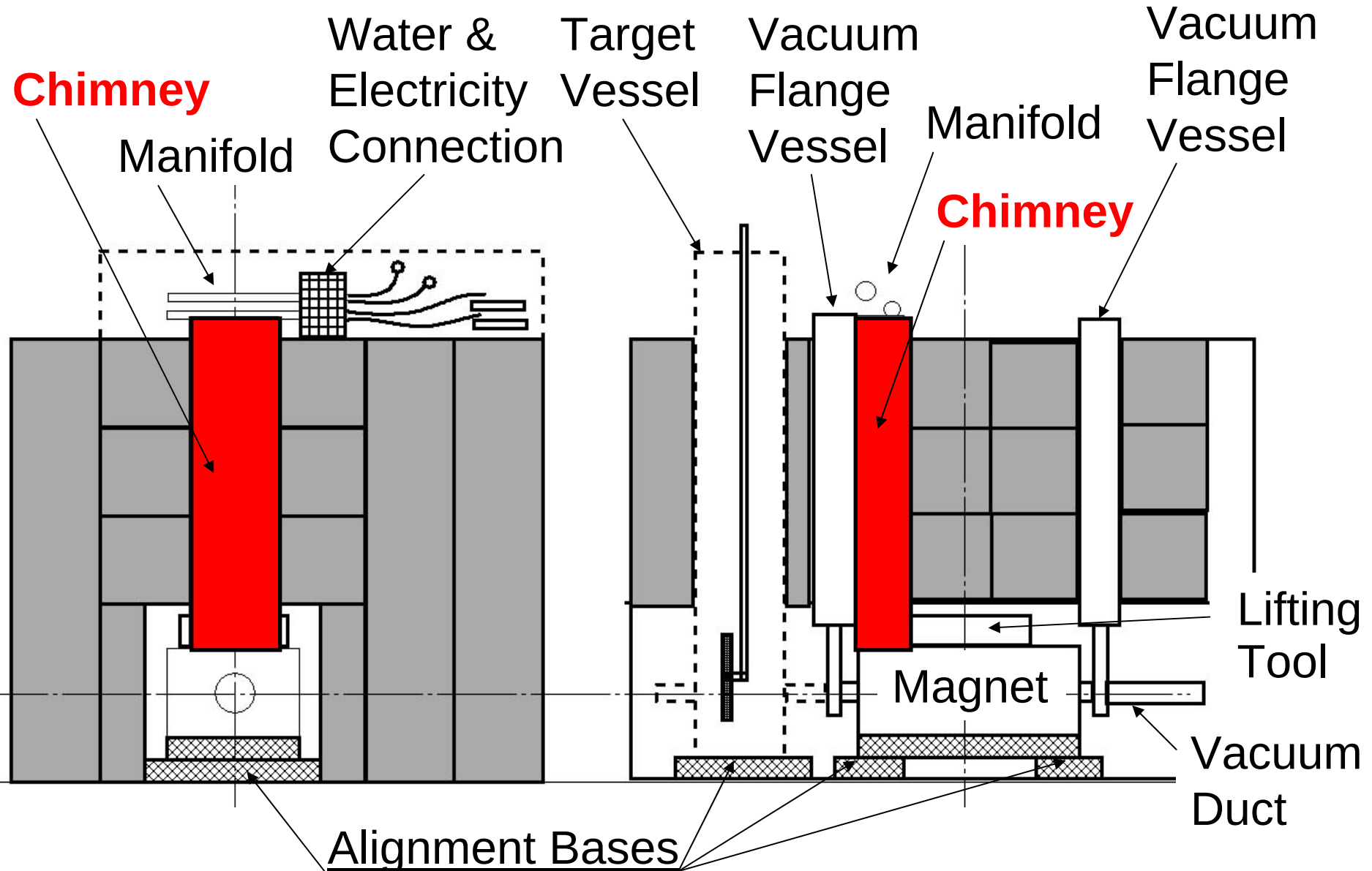
* indicates Solid Conductor MICs. No hollow is in Cu conductor.

Construction of actual magnet Q440MIC



Fully Inorganic Magnet

Chimney for NP-Hall Magnets



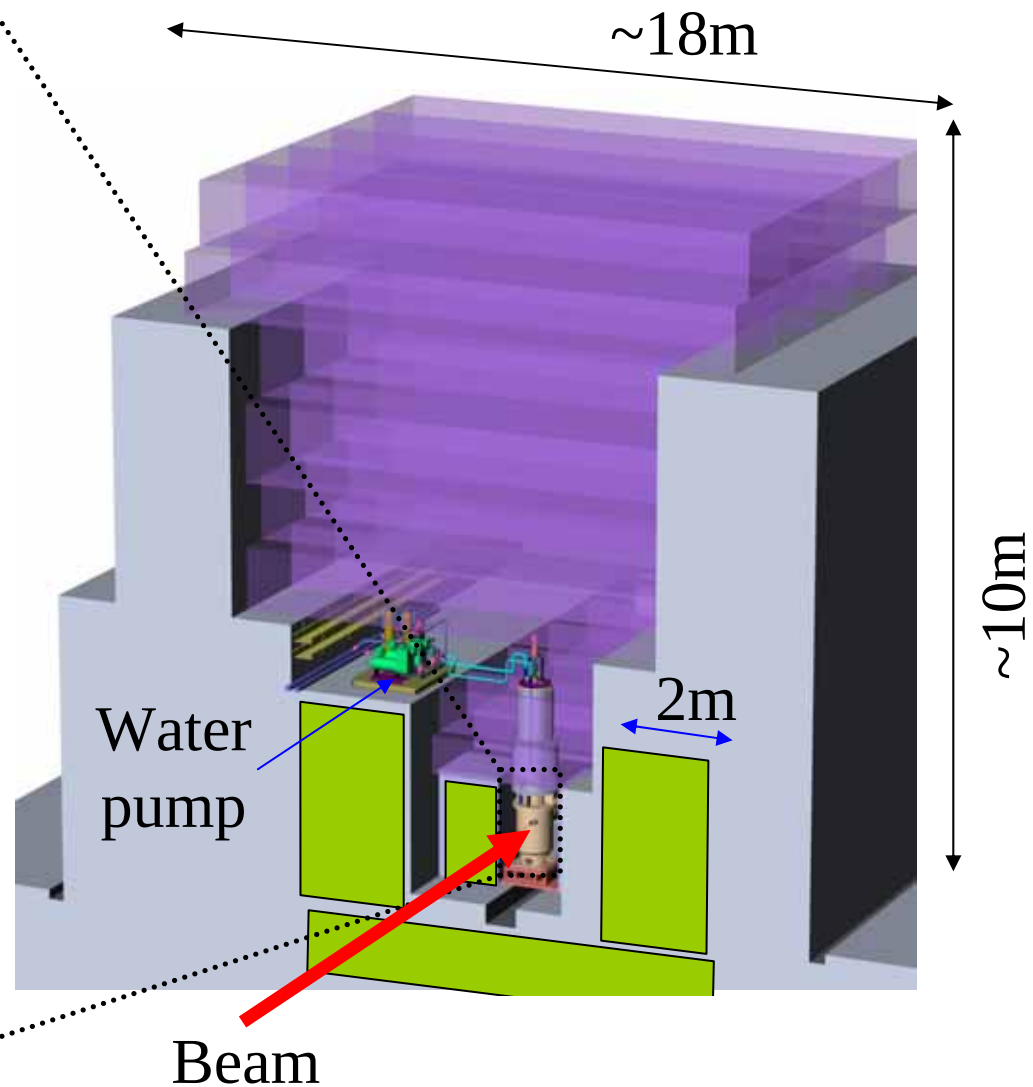
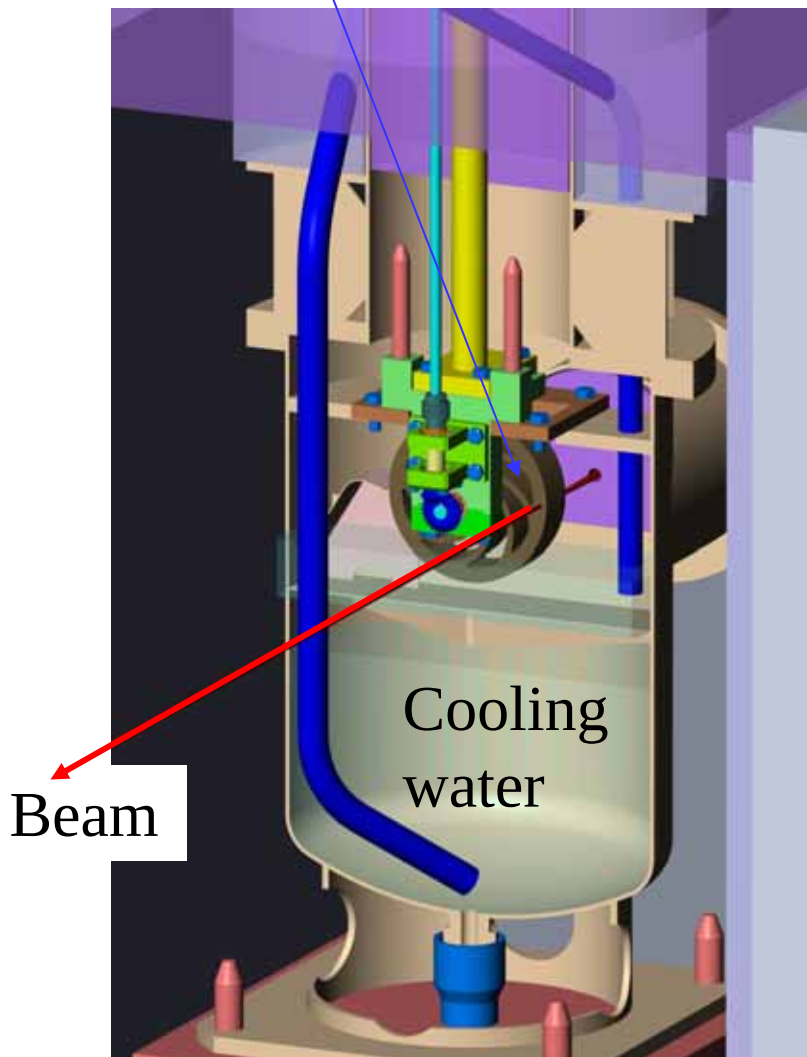
Chimney for NP-Hall Magnets



Magnet **Chimney** Prototype No. 0

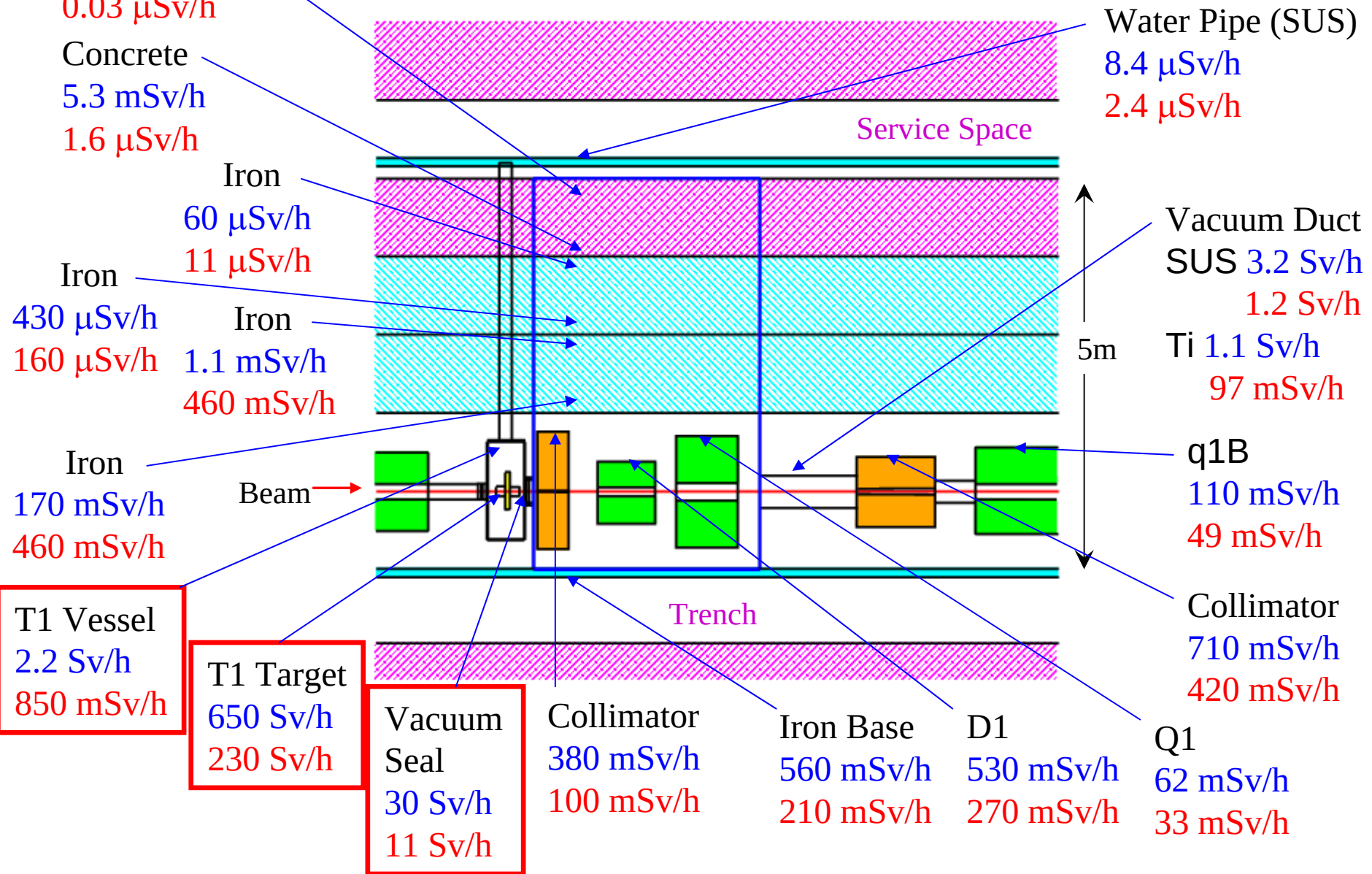
Ttarget disk
5.4cm Thick
50cm Diam.

T1 Target R&D (by Yamanoi)



Residual Dose

30Days Operation/1Day Cooling
1Year Operation/Half Year Cooling

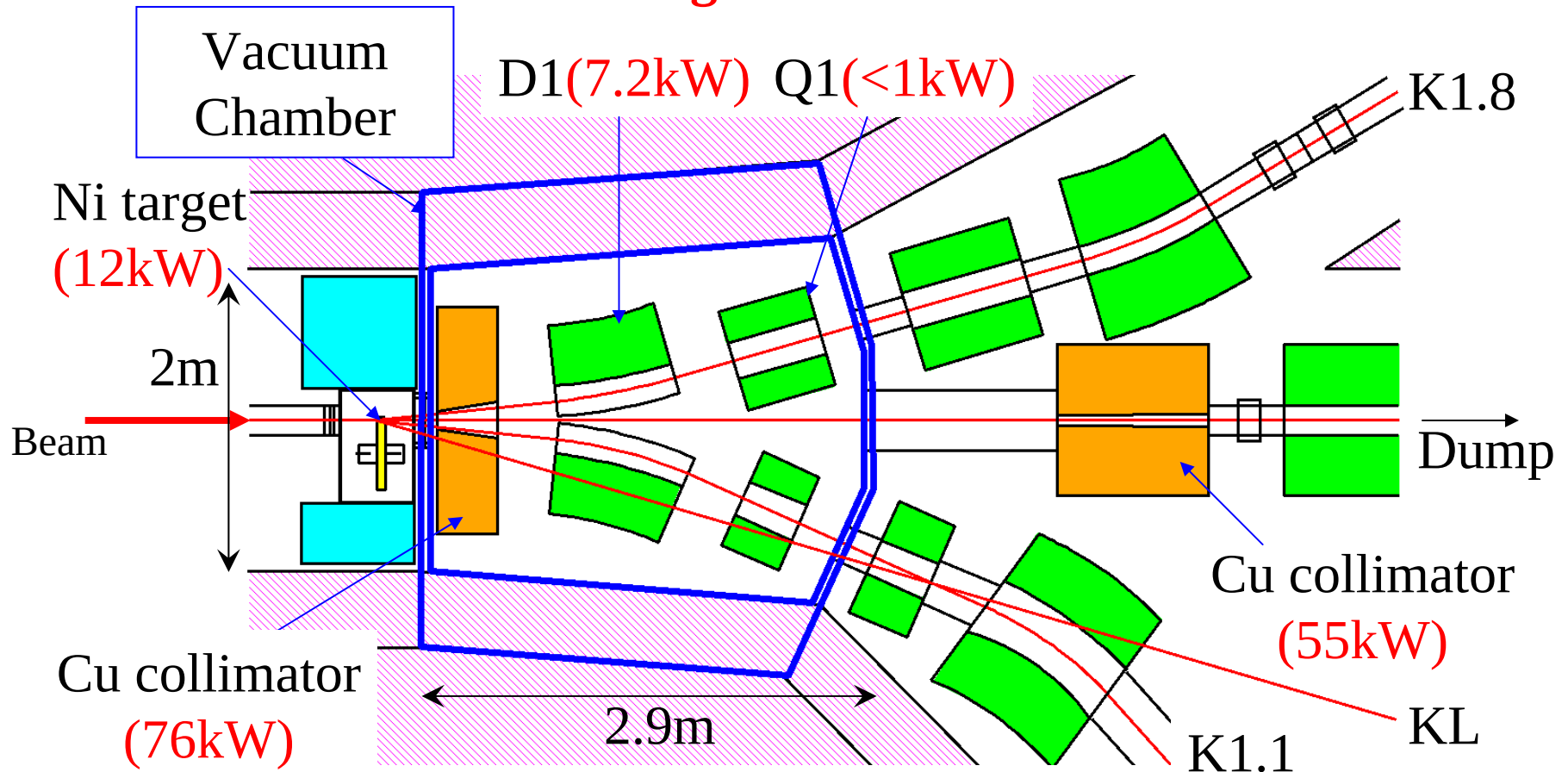


Downstream of T1 Target

How to solve 200kW Heat Problem?

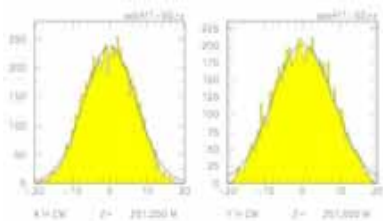
Magnets → **Upstream Collimator**

Beam Ducts → **Big Vacuum Chamber instear of Ducts**

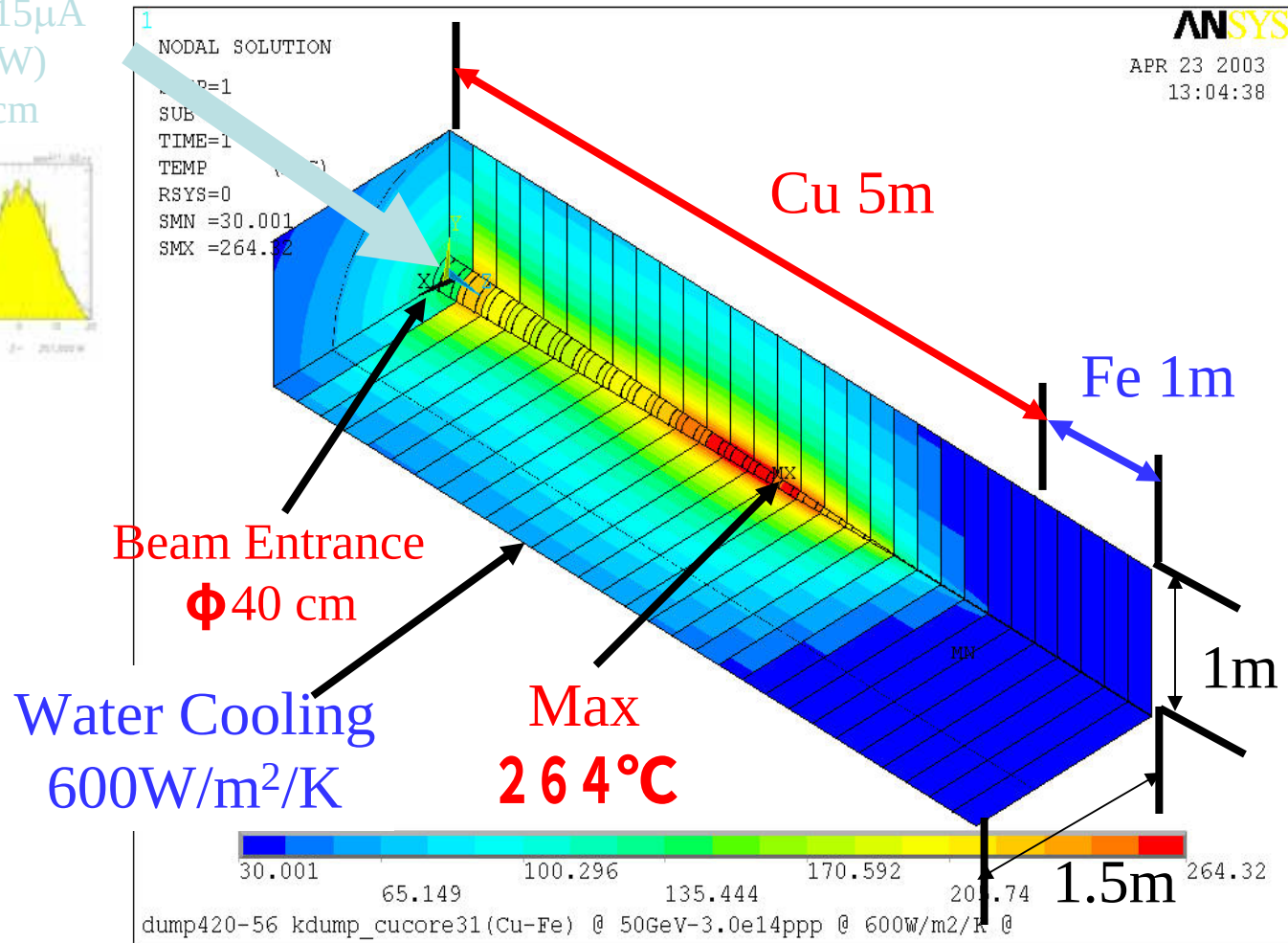


Beam Dump Design

Proton beam
50GeV-15 μ A
(750kW)
 ϕ 40cm



An Example of the Dump Core $\frac{1}{4}$ Model Calculation by MARS & ANSYS



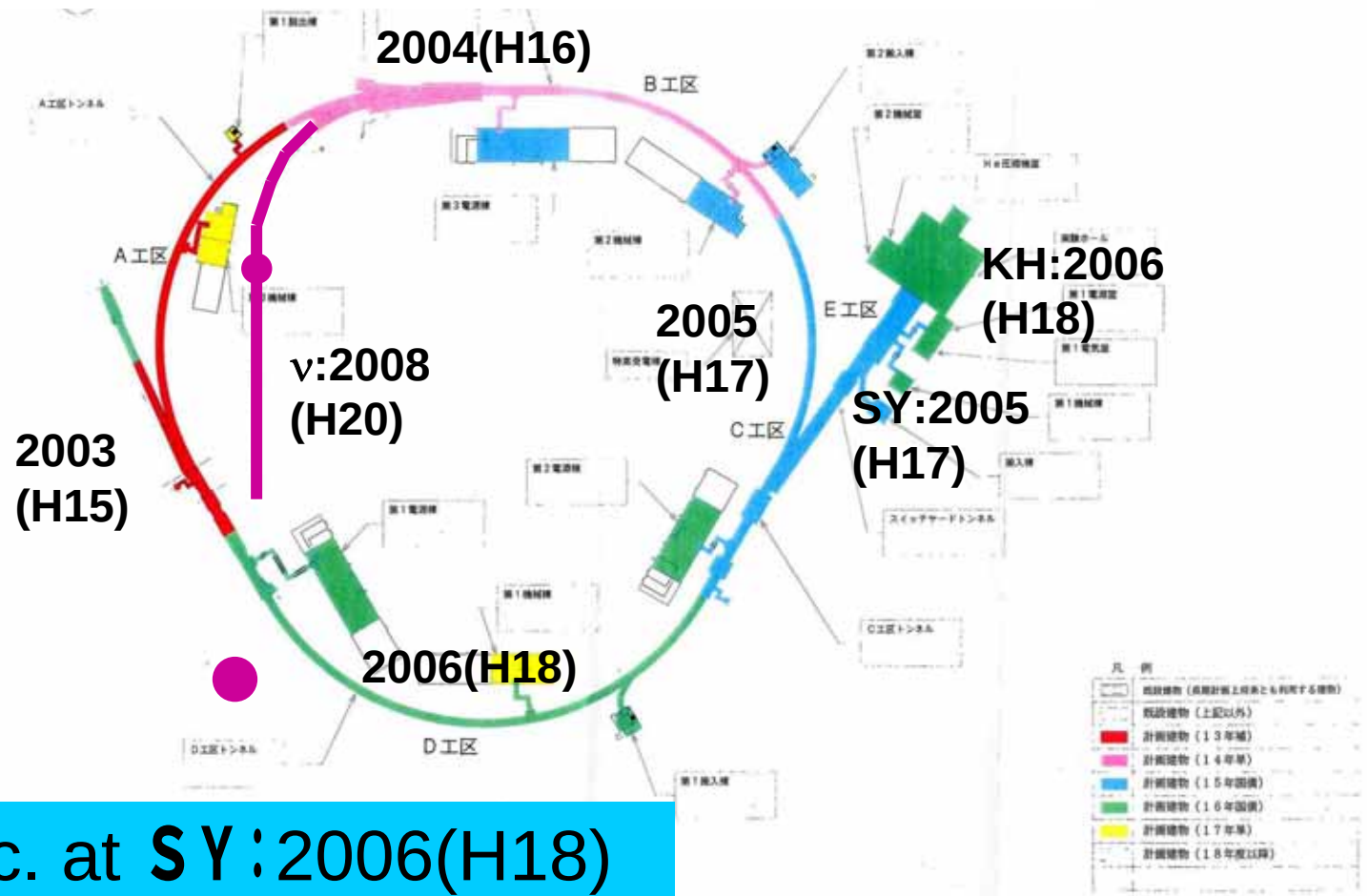
OFC
 ρ = 8.9[g/cm³]
Thermal
Conductivity
390 [W/m/K]

(calculated by Y. SATO & M. MINAKAWA)

Summary & Status

- Facility Design & Beam Line Layout
 - Almost Completed
- High Intensity Beam Handling System
 - Almost Ready.
- Most Serious Parts,
i.e. Target & Beam Dump
 - Final Stage of Design/R&D.

Construction Schedule



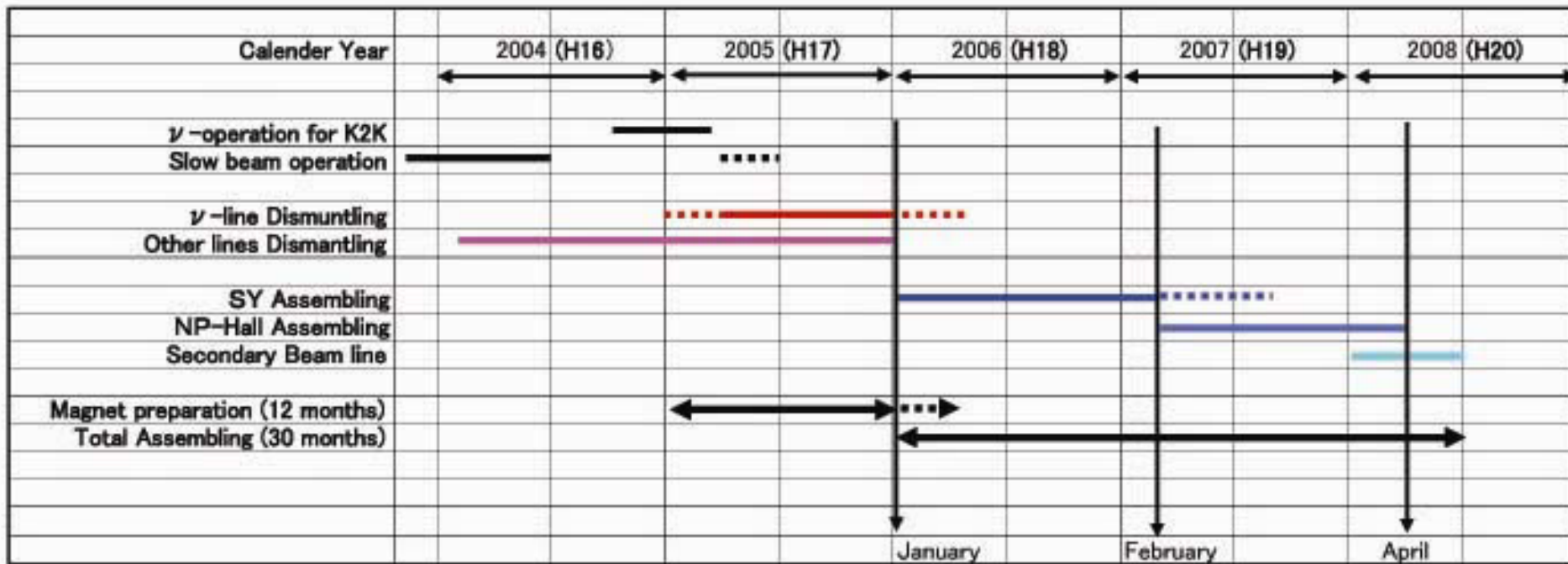
Magnets etc. at **SY:2006(H18)**

Magnets etc. at NP-Hall:2007(H19)

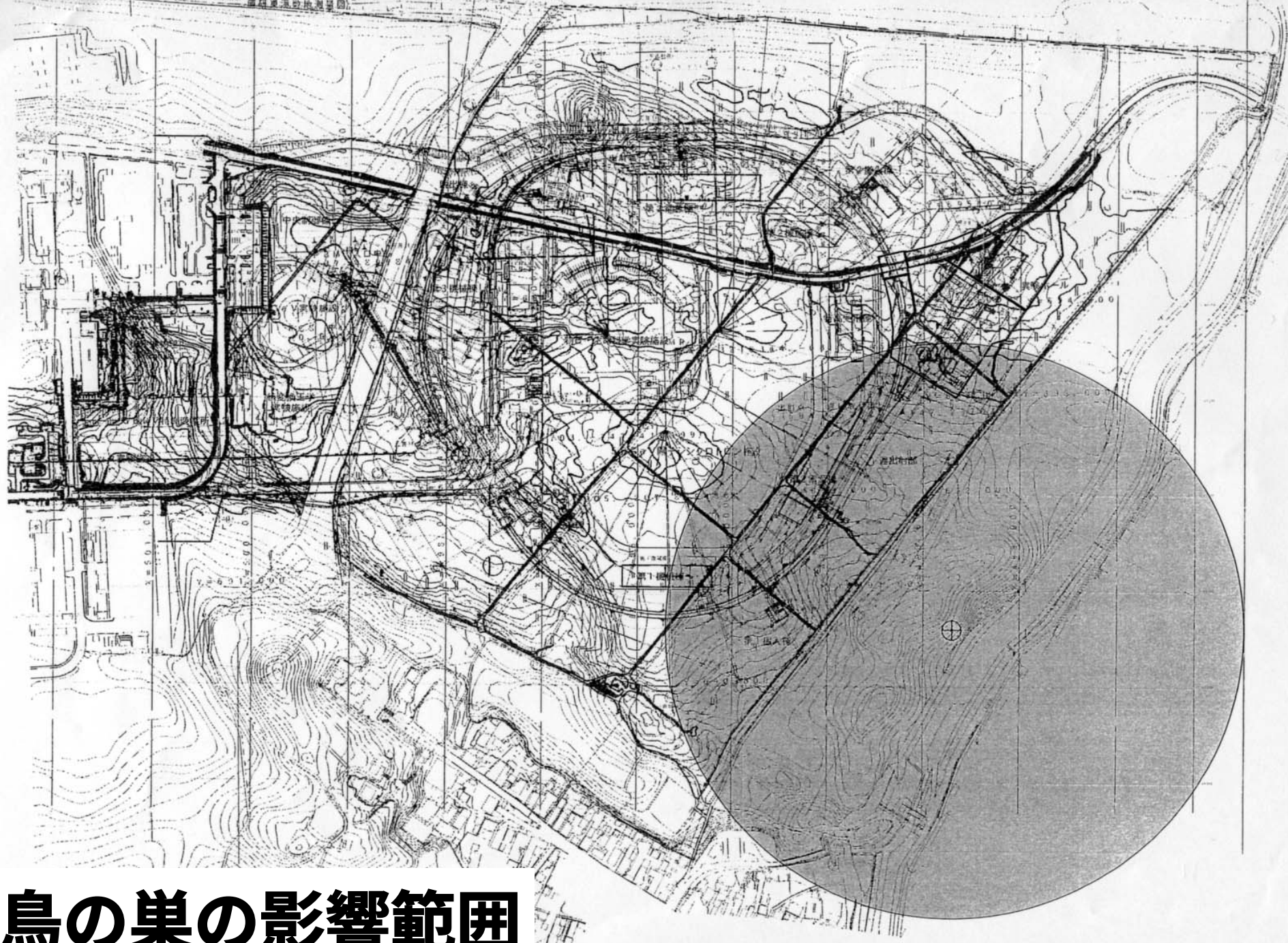
The first Beam to NP-Hall:2008(H20)?

v-Beam:2009(H21)

Dates of Remember



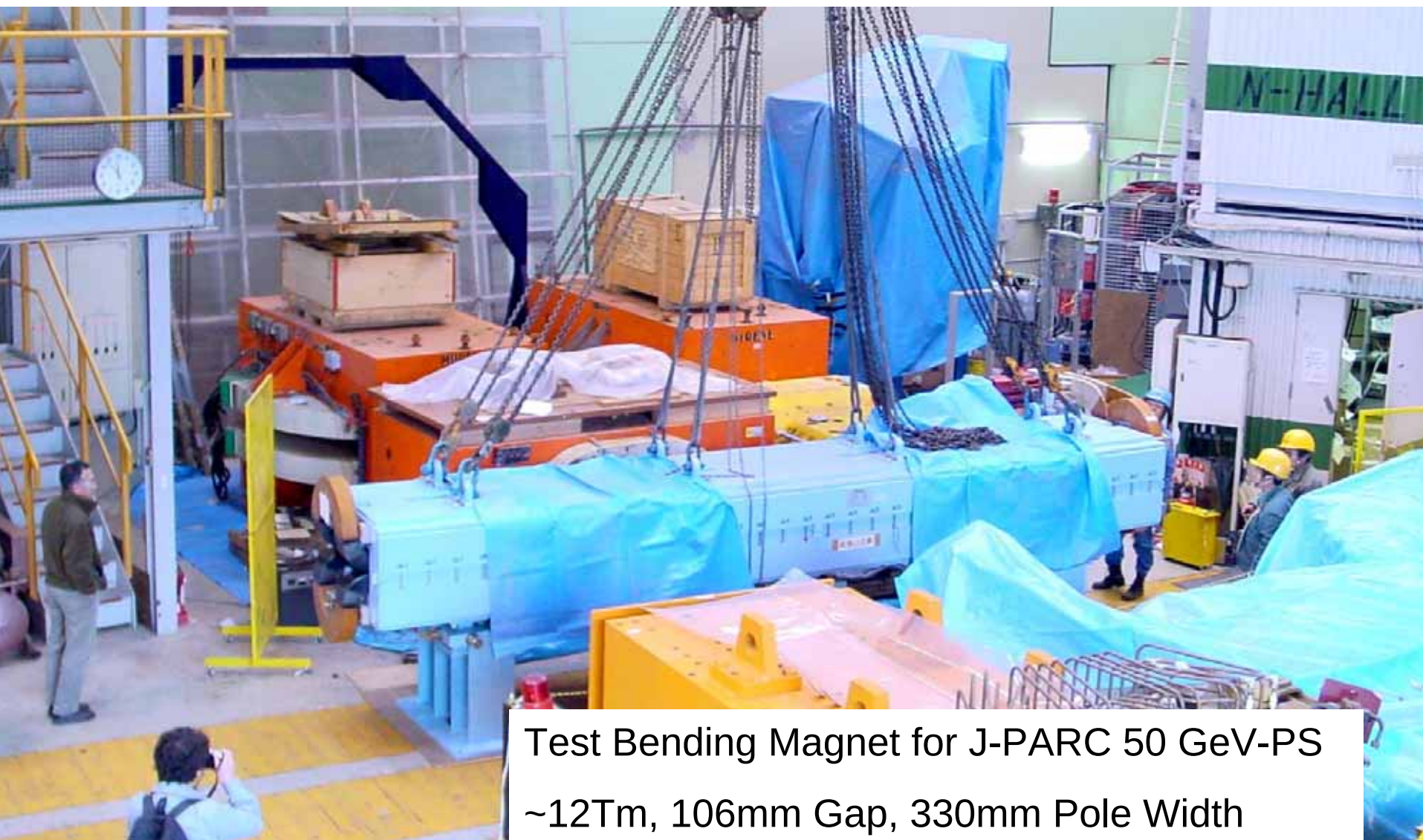
- **January 2006:** We can start SY settings
- **January 2006:** The most magnets should be ready
 - **January 2005:** We would like to start recycling magnets
 - **January 2005:** K2K should be shut down, *please!*
 - Now **March 2005:** K2K shut down
 - Now **June 2005:** KEK-PS shut down
 - Till **June 2005** the most of construction team should take care of the external beam lines of the KEK-PS.
- **February 2007:** We can start NP-Hall settings
- **April 2008:** The construction should be completed (officially) & the first beam!



鳥の巣の影響範囲

Magnet Collection Project

Our Latest Acquisition!



Test Bending Magnet for J-PARC 50 GeV-PS
~12Tm, 106mm Gap, 330mm Pole Width

18D72 Magnet from FNAL?



Radioactive Iron from DURATEK



- 1\$/10t in US
- 170\$/1t including transport cost for J-PARC.
- 1/4 of Normal Iron?
- Less than 2nCi/g (74Bq/g)
- Max. 2mR at Surface.
- It's NOT Nuclear Wastes.
- Possible in Japanese Law?

Hadron Beam Sub-Group

