

Physicist Resource Survey - update

Two pronged attack:

**Survey and analysis of experiments'
needs**

**Survey and analysis of NSF/DOE grants
constant effort**

introduction

history & "thanks"

One year ago, HEPAP University Representatives organized an informal survey

- *of a few of the large experiments' "needs" prior to 2009 for faculty/staff, post docs, and graduate students in operations/construction and analysis categories*

The results suggested a more in-depth review was warranted

This is a review of the status of that effort

- *It has been a large undertaking...*

Special thanks to:

- Ramona Winkelbauer at the NSF
- Brenda Wenzlick at MSU
- Donna Lang, Jim Reidy, Richard Imlay, Saul Gonzalez, PK Williams, Aesook Byon, Mike Procaro, and Kathy Turner at DOE

charge/membership

• email from Fred Gilman charging the Task Force to Study HEP Manpower 7.17.04

Formation of a Working Group to Study HEP Manpower

Following the discussion at the last HEPAP meeting, a Working Group is being formed to assess the question: Does the field have the manpower to carry out the experiments to which the U.S. program is committed until the end of the decade? The members of the Working Group will be drawn from both the HEP community and the agencies, DOE and NSF.

To answer the question at hand, each university and laboratory group will be requested to give its plan for the distribution of faculty/staff/postdocs/students among the various projects with which they are involved for each year through 2009. The funding assumption is constant level of effort, starting with 2004 as the base year.

These data will be compared with those supplied by the relevant collaborations, who will each be asked for their minimum year-by-year manpower needs. In addition, for on-shore experiments, their year-by-year expected U.S. and non-U.S. contributions will be requested.

An initial report from the Working Group will be presented to HEPAP at its meeting on September 23-24, 2004.

• Membership: Joel Butler, Sekhar Chivukula, Glen Crawford, Howard Gordon, Young-Kee Kim, Usha Mallik, Bill Molzon. Chairs: Jim Whitmore and Ray Brock

August/September 2004:

- *Committee jointly prepared* letters of introduction and instructions plus spreadsheets, including examples
- *They were sent to:*
 - all NSF experimental EPP grant PI's, including CESR
 - all DOE HEP grant PI's, including FNAL, BNL, SLAC, ANL, LBL, MITLNS
- Spokespersons (SP) of a selection of experiments agreed upon by the committee

September - last Wednesday:

- *reminding, cajoling, begging, threatening PI's and spokespeople to respond*
- *Eventually, nearly 100% of PI's responded in a useful way*
- *Essentially all experiments replied*
- *Data analysis started late last week*

PI response from universities and laboratories

Both PI's and SP were sent essentially identical letters

• PI's:

"To help us address this important issue, please provide us with the following information under the assumption that your funding will correspond to a constant level of effort starting in FY2004 and going through FY2009. Partly as a result of this study, we will learn whether this is an acceptable assumption or not, but please use it for answering this survey."

1) For this survey, we are only interested in personnel who appear in the mastheads of publications and contribute to the maintenance, operations and/or analysis of experiments. Definitions of FTE for

- Faculty (Fac): enter the fraction of the person's RESEARCH time;
- Research Scientist (RS): enter the fraction of the person's TOTAL time;
- Postdoc (PD): enter the fraction of the person's TOTAL time (realizing that part of their activities will likely be data analysis);
- Graduate Student (GS): enter the fraction of the person's TOTAL time (realizing that part of their activities will likely be data analysis);

2) IF you have strong reasons to change the assumption of constant level of effort (eg a new faculty member coming in a particular year), please state your reasons.

3) Note that the first year of this survey is an accounting of your current effort and as such are presumably precise numbers. Since the strategy for the survey is "constant effort," the sum of each category of personnel is expected to remain equal to the FY2004 totals (although see note 4) through the FY2005-2009 period. Please estimate the split among projects with the realization that the accuracy may only be at the level of 0.5 FTE.

4) Since there may be cases where you wish to change FTEs between categories, for this study please use the following conversions: 2 postdocs = 1 Research Scientist or 1 other; and 2 graduate students = 1 postdoc. While these are not intended as direct financial equivalents, they may be useful guides for converting effort between classes of individuals.

physicists: DAQ

This was completed for:

193 groups

81 NSF supported

135 DOE supported

(some with both sources)

53 projects with ≥ 2 PI's responding

597 group-projects

$\Rightarrow \sim 3$ projects per group

We have a scripted machinery to extract fields from 193 spreadsheets, combine, filter, for pivoting giving for 2004:

711 total faculty

270 research scientists

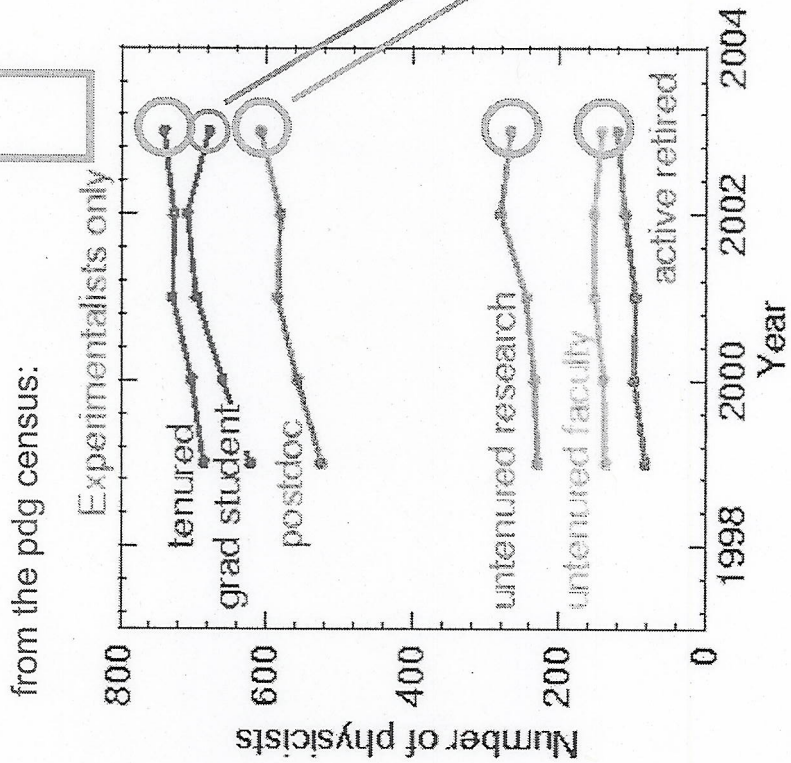
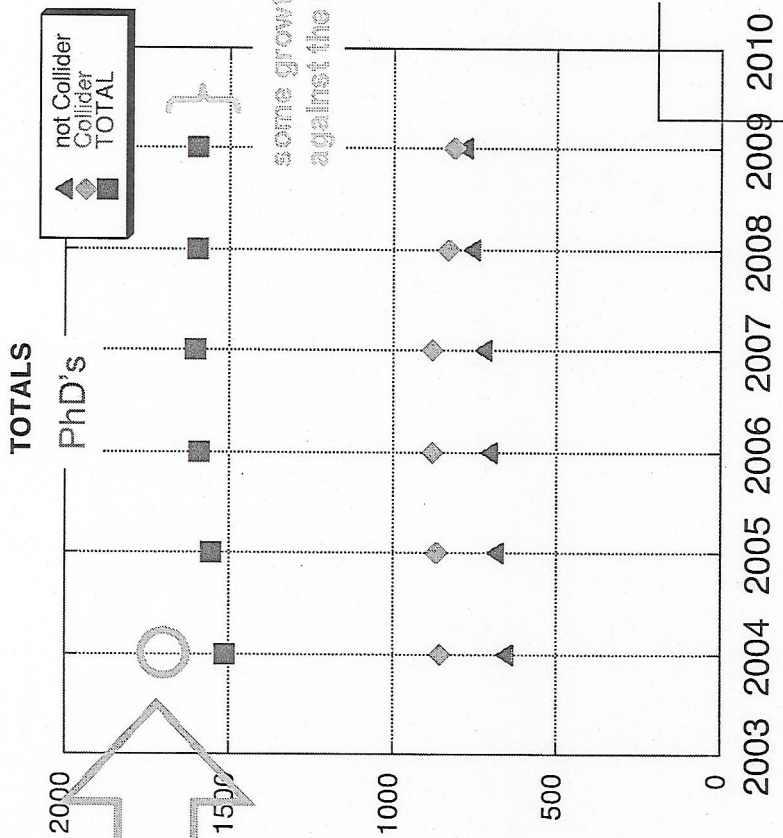
533 PD

690 GS

by resource
(faculty, RS, PS, GS) and by project
(experiment)

1 Institution:		Contact Person:		Funding agency(ies)		Projects working on between now (FY2004) and FY2009 (A, B,):	
A		B		C		D	
2		Numbers of current personnel in each category		Funded in FY04 from base	Funded in FY04 from off-base	Type of person	
Faculty		Research scientists					
Postdocs		Graduate Students					
Others (Identify type of person)							
3		Estimated number of FTE personnel working on each project in each category in each year (only from base funding):					
Faculty		FY2004	2005	2006	2007	2008	2009
Project A							
Project B							
Project C							
Project D							
Sums		0.0	0.0	0.0	0.0	0.0	0.0
Research Scientists		FY2004	2005	2006	2007	2008	2009
Project A							
Project B							
Project C							
Project D							
Sums		0.0	0.0	0.0	0.0	0.0	0.0
Postdocs		FY2004	2005	2006	2007	2008	2009
Project A							
Project B							
Project C							
Project D							
Sums		0.0	0.0	0.0	0.0	0.0	0.0
Graduate students		FY2004	2005	2006	2007	2008	2009
Project A							
Project B							
Project C							
Project D							
Sums		0.0	0.0	0.0	0.0	0.0	0.0

Ph.D.'s from the PI's: does it make sense?



from the previous slide, GS = 690.

from the previous slide, GS = 533.

"collider" = DØ, CDF, Atlas, CMS, BaBar, CLEOC

<http://hepfolk.lbl.gov/census/summary/2003/2003allgraphs.html>

Experiments

• **Spokespersons:**

"This present request is now for a "bottoms-up" estimate of your needs, starting with this year (FY2004) and projecting through FY2009 with a special emphasis on making sure that data from each experiment are in the same "currency." The original spreadsheet from last spring has been intentionally replicated as much as possible.

"So, please assess your needs to maintain and operate your experiment at a realistic minimum level of effort. There are two emphases in this assessment: a reasonably precise accounting of the current effort within your experiment (the FY2004 numbers) and an accurate estimate of your experiment's needs for out-years. In order to be concise, we're trying to assess these needs within two broad areas:

"a) **Maintenance and Operations**⁽¹⁾ (including Construction & Commissioning for experiments approved and under construction and/or undergoing upgrades), largely focused on data-taking operations with respect to detectors and beams and

"b) **Data Analysis**⁽²⁾."

⁽¹⁾Operations with respect to computing would include those efforts that go toward regular, production data handling and initial data reduction: operating analysis farms, maintaining cluster operations, scheduling job submission on (sometimes worldwide) clusters, and database designs and maintenance. Physicists from laboratories and universities often lead these efforts. So...the key for overall Operations is on the continuing, largely predictable, tasks of operating (or constructing/commissioning) equipment, taking and processing data and making it available.

⁽²⁾Analysis would center on development, including algorithm development for object id and device calibrations, as well as physics results analysis and Monte Carlo development. As "regular" physics analyses proceed, ID, scale determination, things involving deep detector understanding, are often revisited and pursued in parallel or in concert with the physics groups. So, we explicitly include these activities within Analysis, and recognize that predictability is more complicated than for Operations.

experiments' NEEDS: DAQ

We had responses from 18 experiments:

- DØ
- CDF
- BaBar
- Minos
- BTeV
- CLEO
- MECO
- KOPIO
- MiniBooNE
- SUPER K
- Atlas
- CMS
- SNAP
- STACEE
- VERITAS
- LIGO
- AUGER
- MINERVA

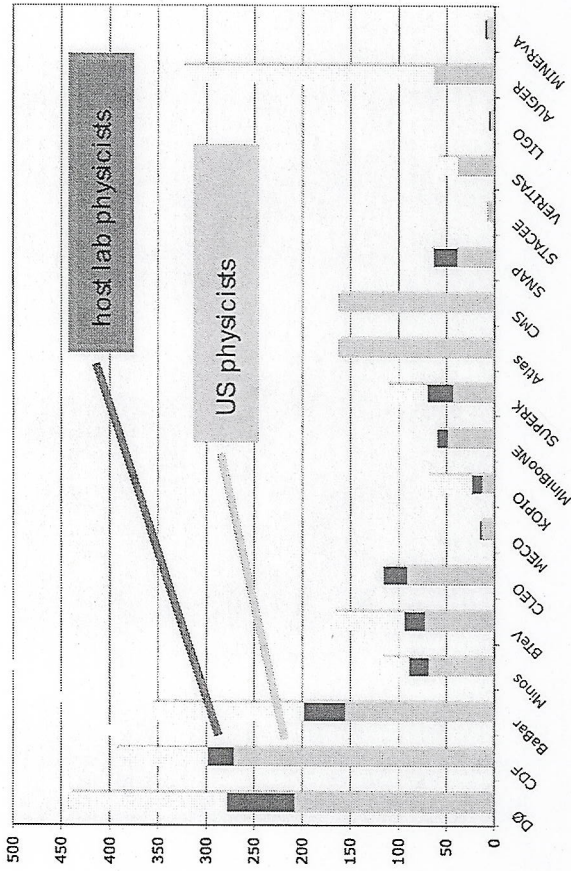
2004 is a special reporting year: a census within function (Operations/Analysis), within resource (faculty/staff, PD, GS), and within nationality (US, non-US)

n.b. in what comes: occasionally US outyear effort is estimated by scaling from the 2004 US/total fraction

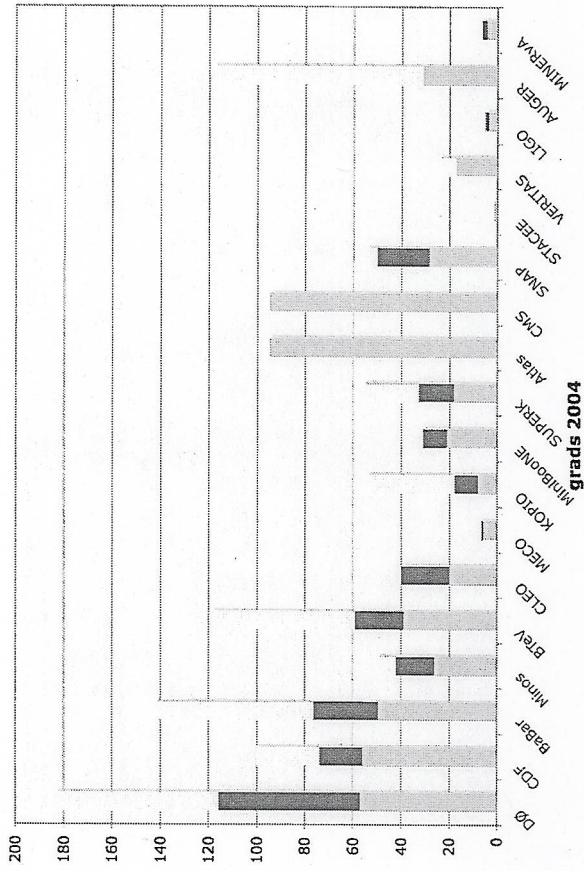
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z							
EXP A	Respondent: your name (yourname@exp.a.b.c)	date: yy/mm	ACTUAL	PERSONNEL	FY 04	NEEDED	PERSONNEL	FY 05	FY 06	FY 07	FY 08	FY 09	OPERATIONS	PERSONNEL	TOTAL FTE FAC	OPERATIONS	PERSONNEL	TOTAL FTE FAC	OPERATIONS	PERSONNEL	TOTAL FTE FAC	OPERATIONS	PERSONNEL	TOTAL FTE FAC	OPERATIONS	PERSONNEL	TOTAL FTE FAC					
			operations	FTE Fac-US institutions	0	operations	5	5	5	5	5	5		TOTAL FTE Fac	5																	
			FTE host lab staff		5																											
			FTE Fac/staff foreign institutes		0																											
			operations	FTE PD-US institution	7	operations	12	12	12	12	12	12		TOTAL FTE PD	12																	
			FTE PD-host lab		0																											
			FTE PD-foreign institutes		3																											
			operations	FTE GS-US institution	5	operations	10	10	10	10	10	10		TOTAL FTE GS	10																	
			FTE GS-foreign institutes		5																											
			TOTAL OPERATIONS		25			27	23.5	0	0	0		TOTAL OPERATIONS expected	27			40	40													
			analysis	FTE Fac-US institutions	25	analysis	40	40	40	40	40	40		TOTAL FTE Fac	40																	
			FTE host lab physics staff		5																											
			analysis	FTE Fac/staff foreign institutes	10																											
			FTE PD-US institution		7	analysis	10	10	10	10	10	10		TOTAL FTE PD	10																	
			FTE PD-host lab		0																											
			FTE PD-foreign institutes		3																											
			analysis	FTE GS-US institutions	10	analysis	20	20	20	20	20	20		TOTAL FTE GS	20																	
			FTE GS-foreign institutes		10																											
			TOTAL ANALYSIS		70			70	70	0	0	0		TOTAL ANALYSIS expected	70			70	70													
			FTE checksum	total faculty/staff	45	FTE checksum	45	45	45	45	45	45		total faculty/staff	45																	
			FTE checksum	total PD	20	FTE checksum	22	18.5	0	0	0	0		total PD	22																	
			FTE checksum	total GS	30	FTE checksum	30	30	30	30	30	30		total GS	30																	
			major tasks: 2005	upgrade installation, which involves an increase in FTE post 2005 by 2																												
			major tasks: 2006	upgrade complete, calibration of new upgrade components																												
			major tasks: 2007 - 2009																													
			Any general comments: We are considering another detector detector upgrade which might require more personnel.																													

outyears: only totals

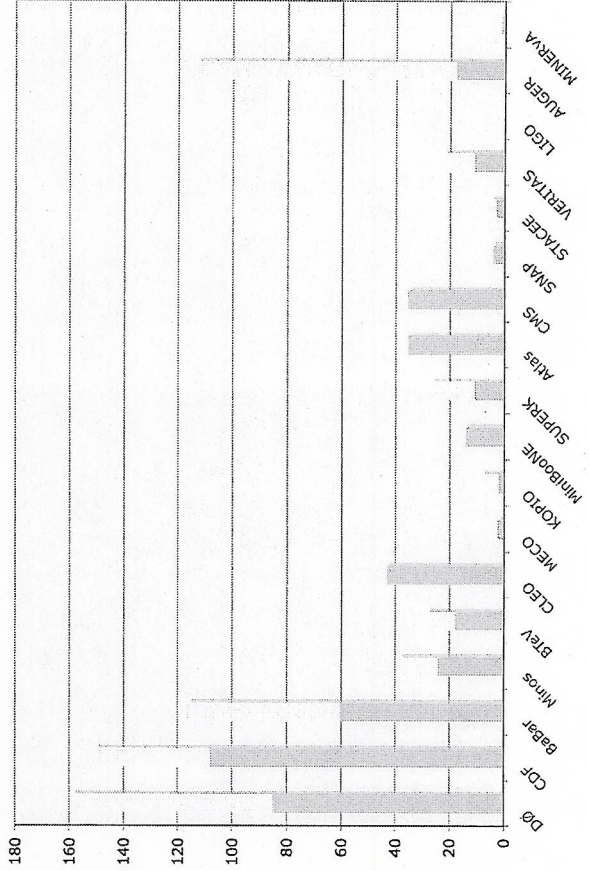
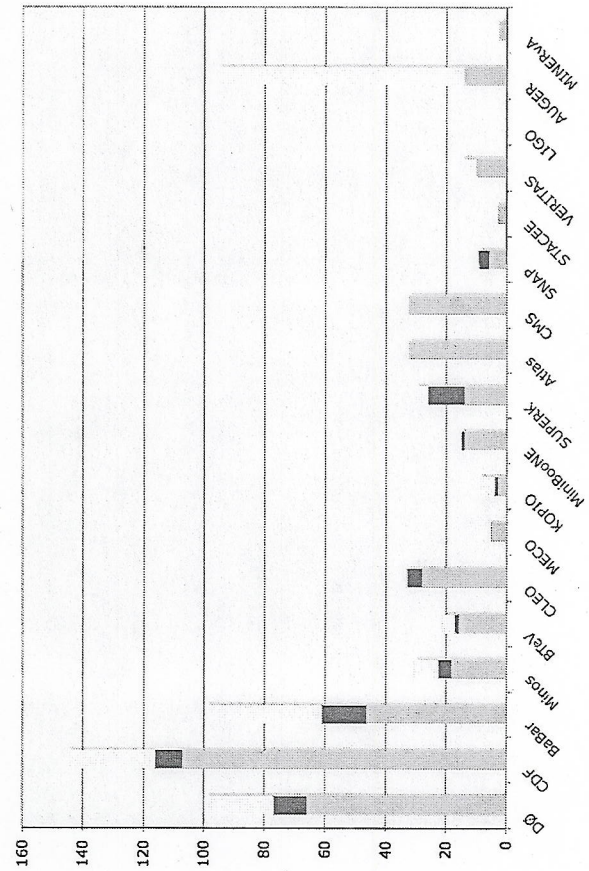
non-US institution physicists
collaborations 2004



Spokespeople: total personnel, 2004
faculty/staff 2004



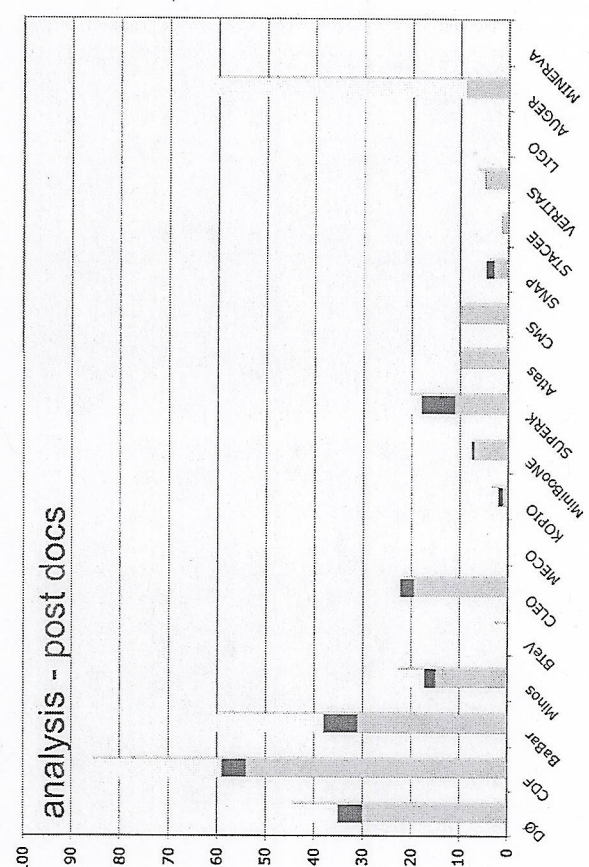
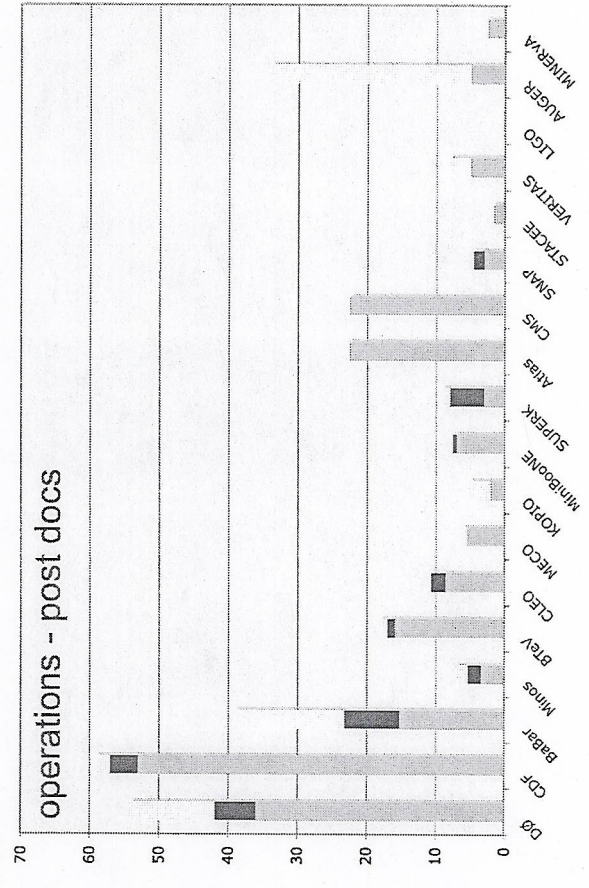
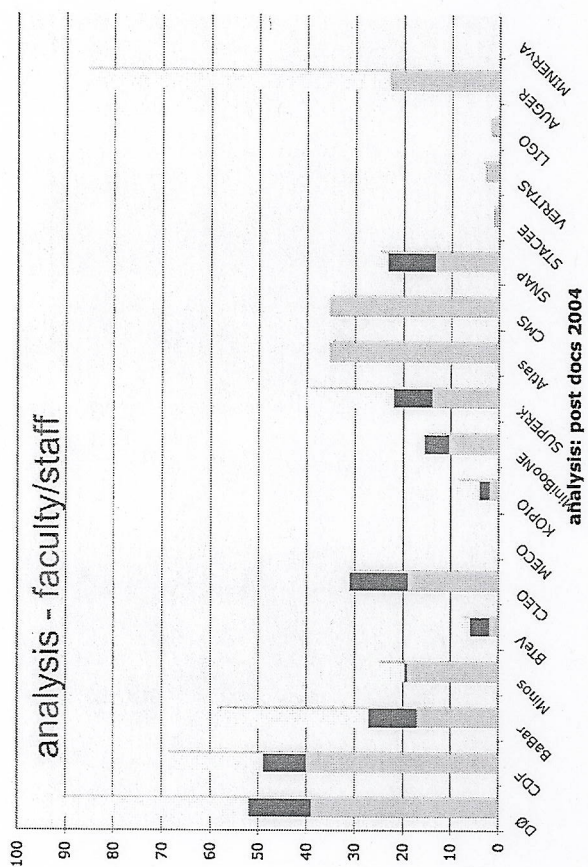
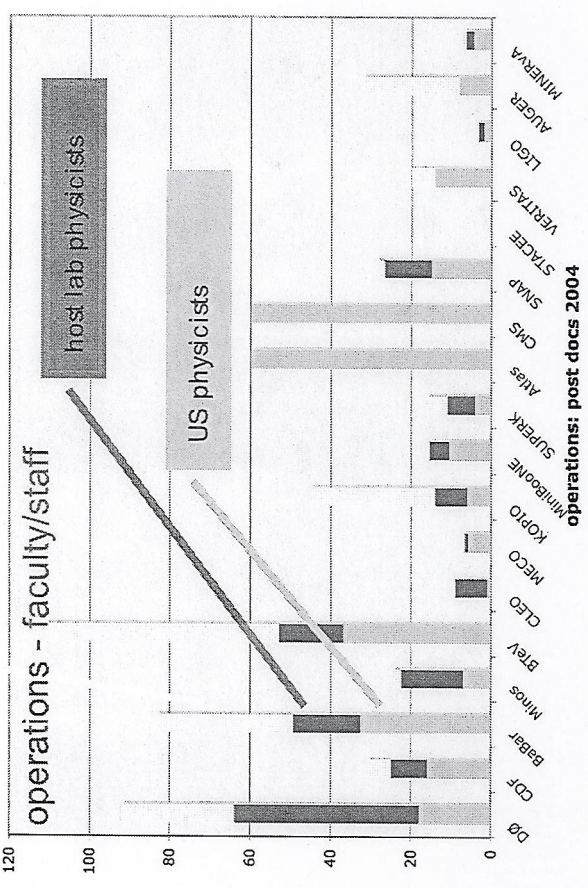
post docs 2004



non-US Institution
physicists

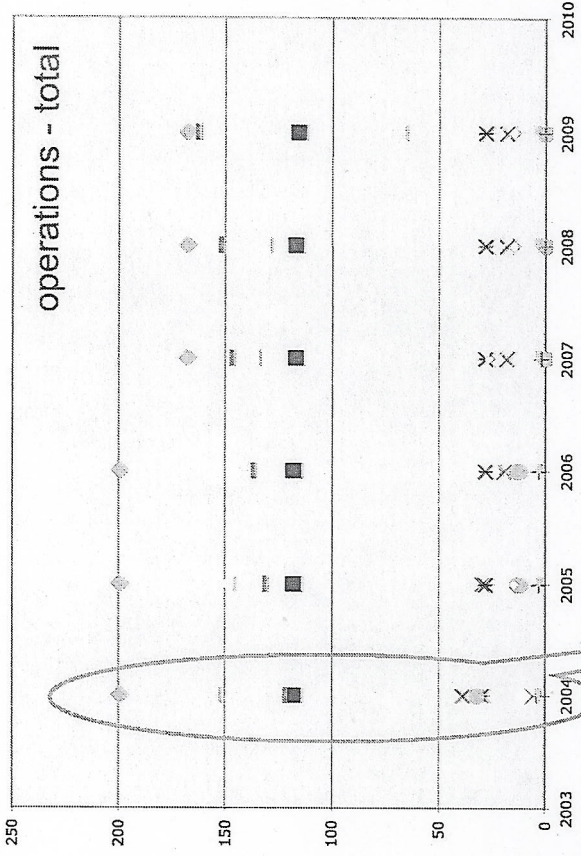
Spokespeople: operations and analysis, Ph.D's 2004

analysis: faculty/staff 2004



Spokespeople: operations/analysis projections

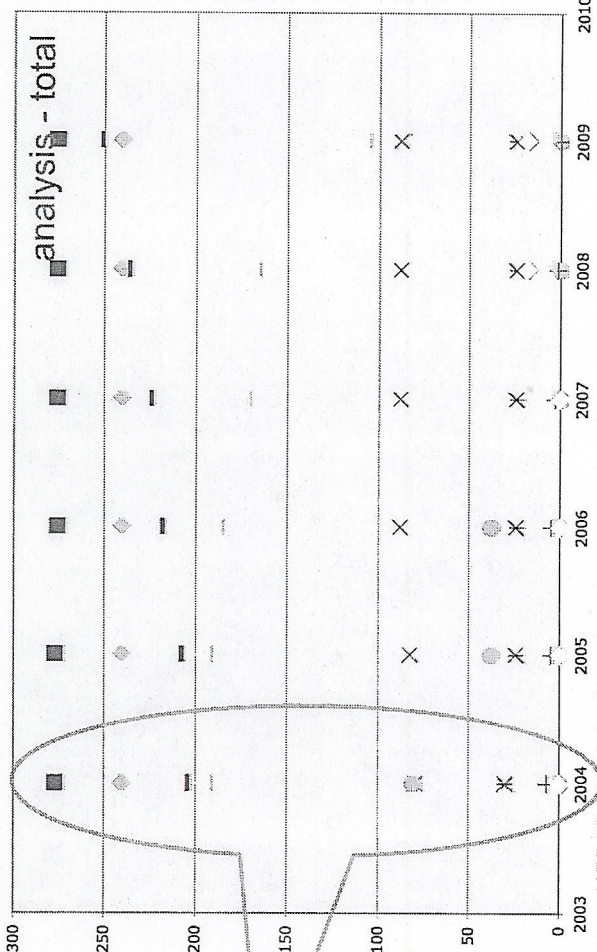
operations: running



Broadly, running experiments needs are not envisioned to diminish in time in either operations or analysis.

- ◆ DØ
- CDF
- ▲ BaBar
- × Minos
- ✱ MiniBooNE
- SUPER K
- + STACEE
- LIGO
- AUGER
- MINERVA

analysis: running

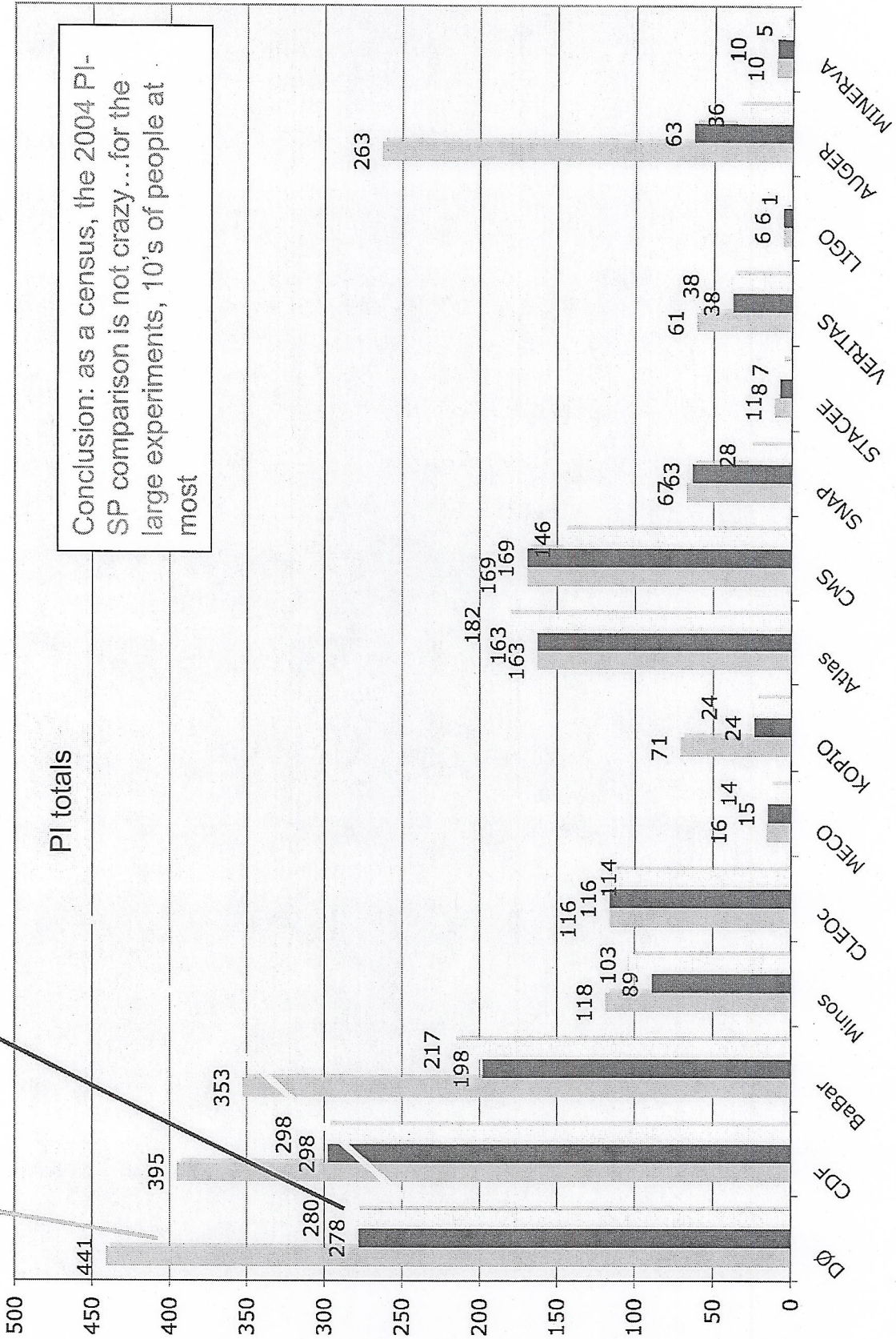


previous slides

PI & experiment-needs: preliminary comparisons

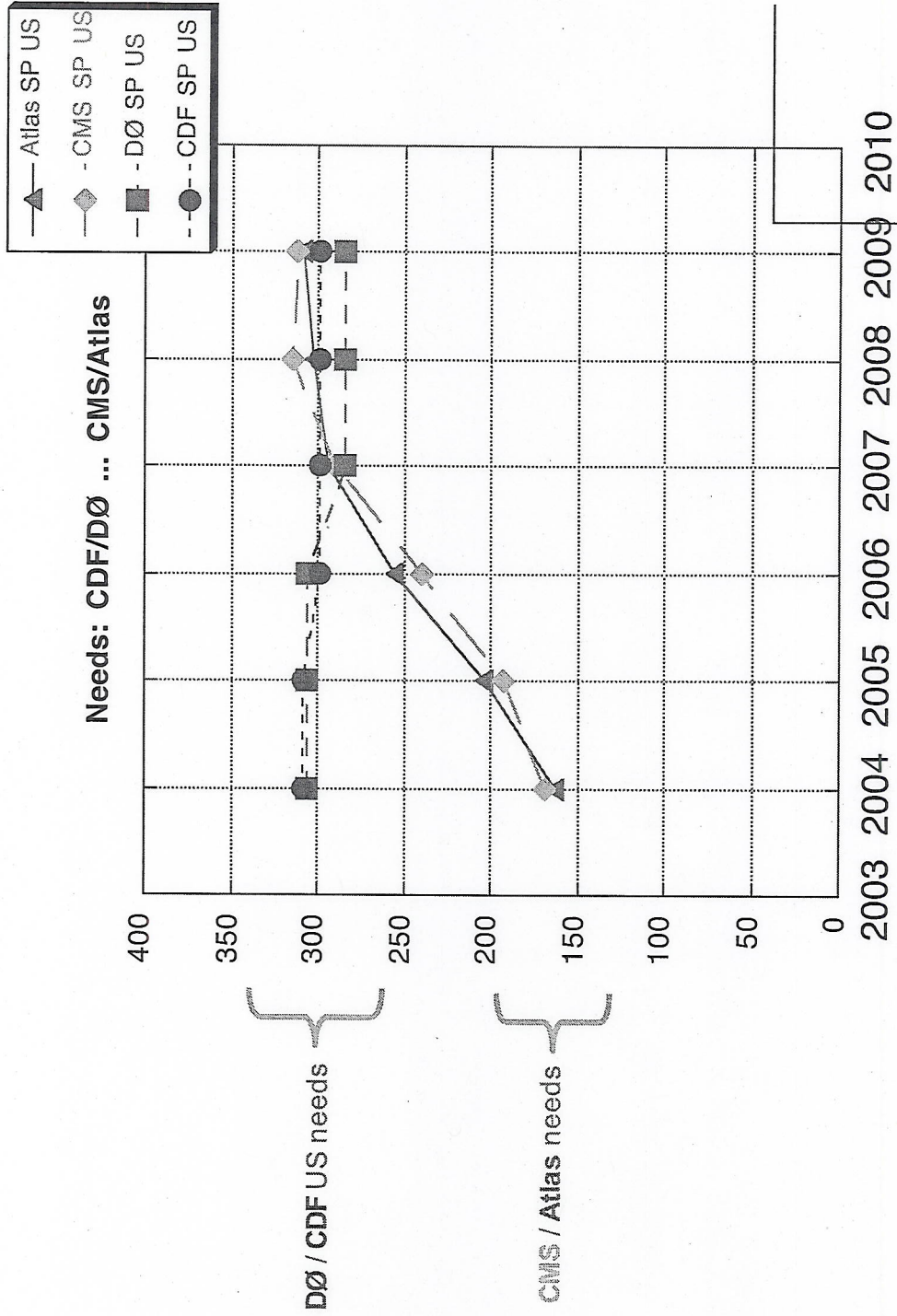
Total Personnel, PI + SP 2004 results:

SP totals
 SP US-only totals



Conclusion: as a census, the 2004 PI-SP comparison is not crazy...for the large experiments, 10's of people at most

Total Personnel: DØ/CDF & Atlas/CMS - needs



- **The scripted data analysis is too new to report out-year trends...more consistency checking must be done**
 - *No problems have been identified*
 - *It might be worth a more detailed look at the pdg survey for consistency*
 - *We want to do some more by-hand checking from multiple perspectives*
- **The committee needs to “meet” to assimilate the results**
 - *before the next HEPAP meeting*
- **The 250-or so people who worked hard deserve some writeup eventually**