PI Utilization in whole Complex

Sumitomo Chemical Co.,Ltd.
Ehime Works
Koichi Sakata

March.12th.2002

Agenda

- Company outline and Works Profile
- Our PI history and Current PI system
- Outline of the project
- PI utilization cases
- Conclusion

Company History

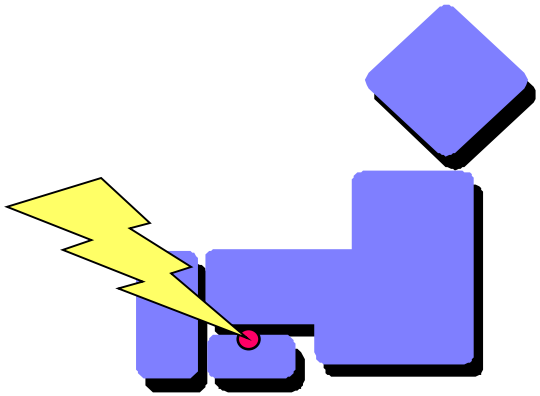
- Founded:September 22, 1913
- Sales: 8,401M US$ (Mar.31,2001 consolidated financial)
- Employees:5371(Sep.30,2001)
- Business Sector:

  Basic Chemicals, Petrochemicals & Plastics
  Fine Chemicals, Agricultural Chemicals

- Works:

  Ehime,Chiba,Osaka,Oita,Misawa

Ehime Works



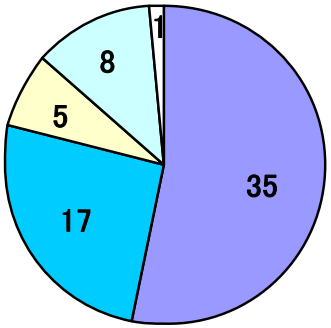
- Address:Niihama Ehime Japan
- Production items:
  Acrylic acid, Caprolactam, Acrylonitrile, Methionine, Carbazole violet, Polymethylmethacrylate, Epoxy resins, Optically functional films, High-purity alumina, High-purity aluminum
- Number of Process Plants:87
- Employees:Approx. 1500

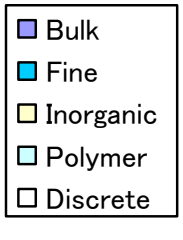
(including researchers)

Our PI History & Current Status

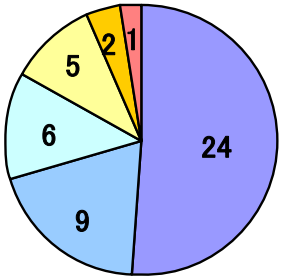
- First Installation 1998
  - 17 Plants
- Second Installation 1999
  - 40 Plants
- Current Status
  - 47,000 points(65,000 points licensed)
  - 47 interfaces for 66 Plants in 87 Plants (76%)
  - PI server: UNIX 1server
  - Using Datalink, Process Book, RLINK
  - PI Client Users: Approx.200

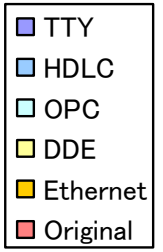
Detail of PI interfaces



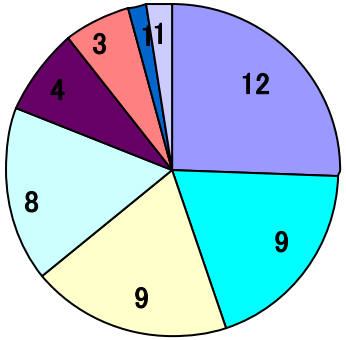


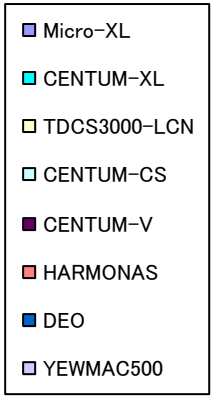
By Production Process Type





By Protocol





By DCS Type
In 47 interfaces

Outline of PI Utilization Project

- TPM activities in Ehime Works since 1996
  - Involve all departments,all employees and managements
- PI Utilization Project
  - As one of TPM activities
  - Promoting business re-engineering for plant management using PI
  - All Plants

Many application methods are proposed

- Monitoring other plant data
- Modify reporting-style using PI and projector
- Prediction of catalyst life
- Management of Pump running time
- Steam balance management with Steam97(Freeware)
- Wastewater balance monitoring
- Soft Sensor with process simulator(Aspen)
- Analysis of batch data

Applications

- Case-1
  Integrated Summarizing and accounting system from PI to SAP R/3
- Case-2
  Material balance monitoring for utilities and raw materials

Applications

- **Case-1**
  Integrated Summarizing and accounting system from PI to SAP R/3
- Case-2
  Material balance monitoring for utilities and raw materials

Case-1

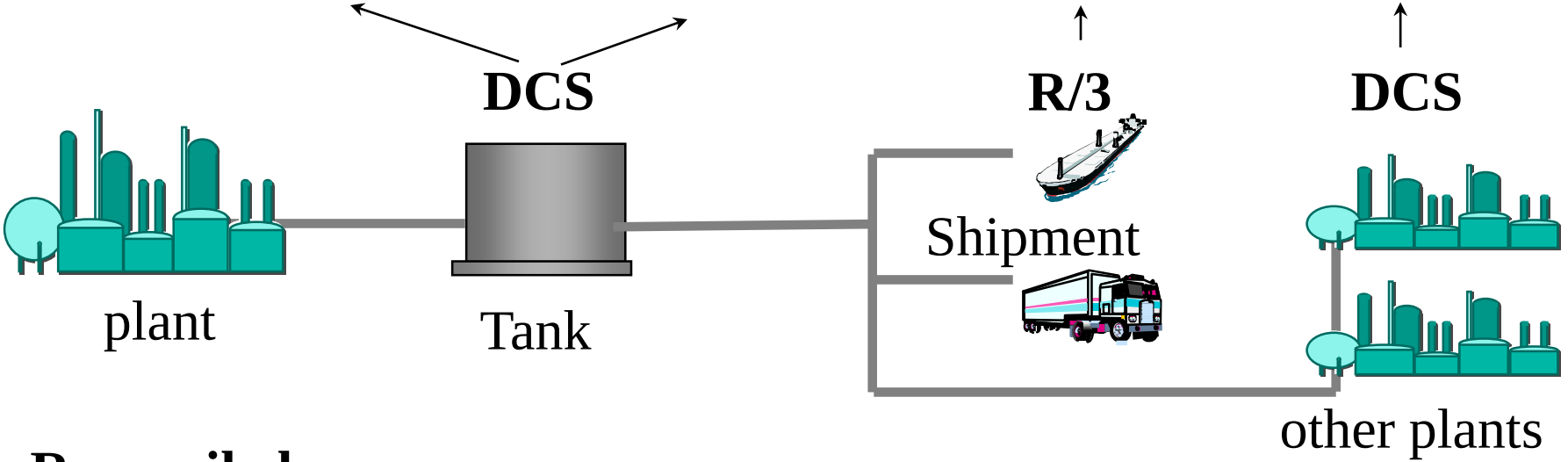
- Why?
  - Need to summarize and reconcile raw data everyday to use SAP R/3 efficiently
  - Avoid direct manual entry to SAP R/3
  - Use PI instead of legacy system
  - Want to simplify process of manual entry and calculation by relating daily report

Integrated summarizing and accounting system from PI to SAP R/3.

Sample of calculations

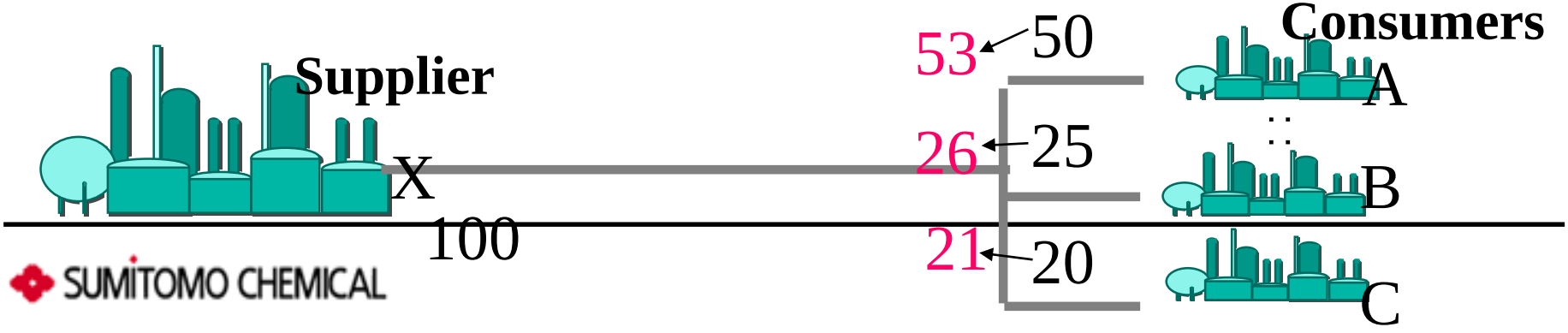
Production

=[Today's Stock] - [Yesterday's Stock] + [Shipment] + [Consumption]

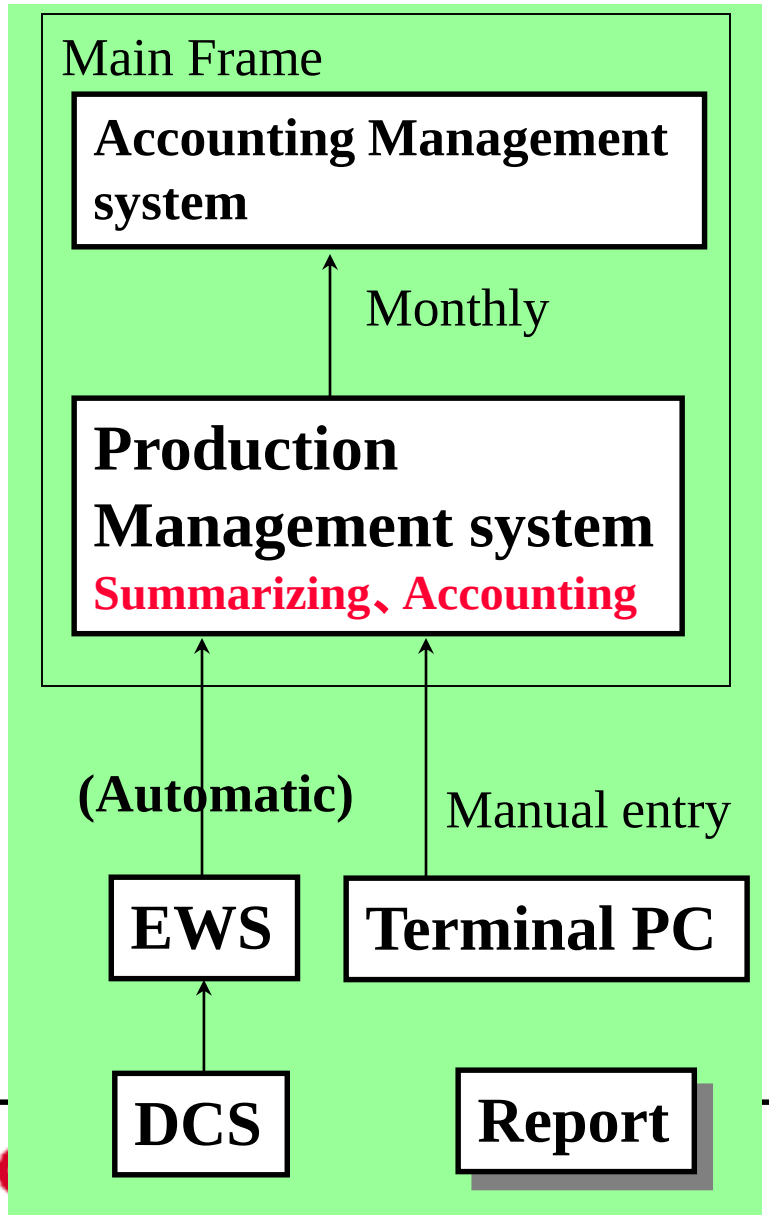


Reconciled

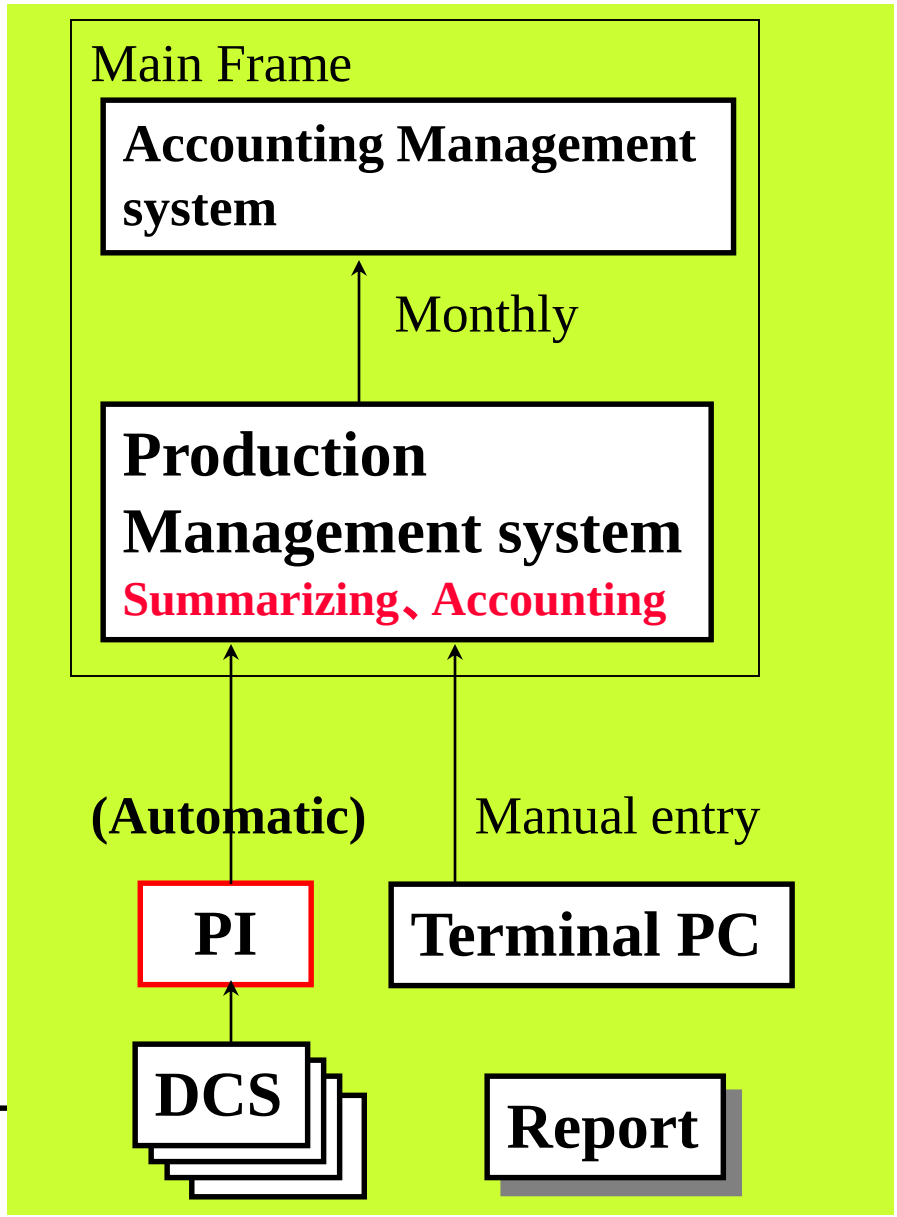
A' : 53=50 + (100-(50+25+20)) ∗ 50/(50+25+20)



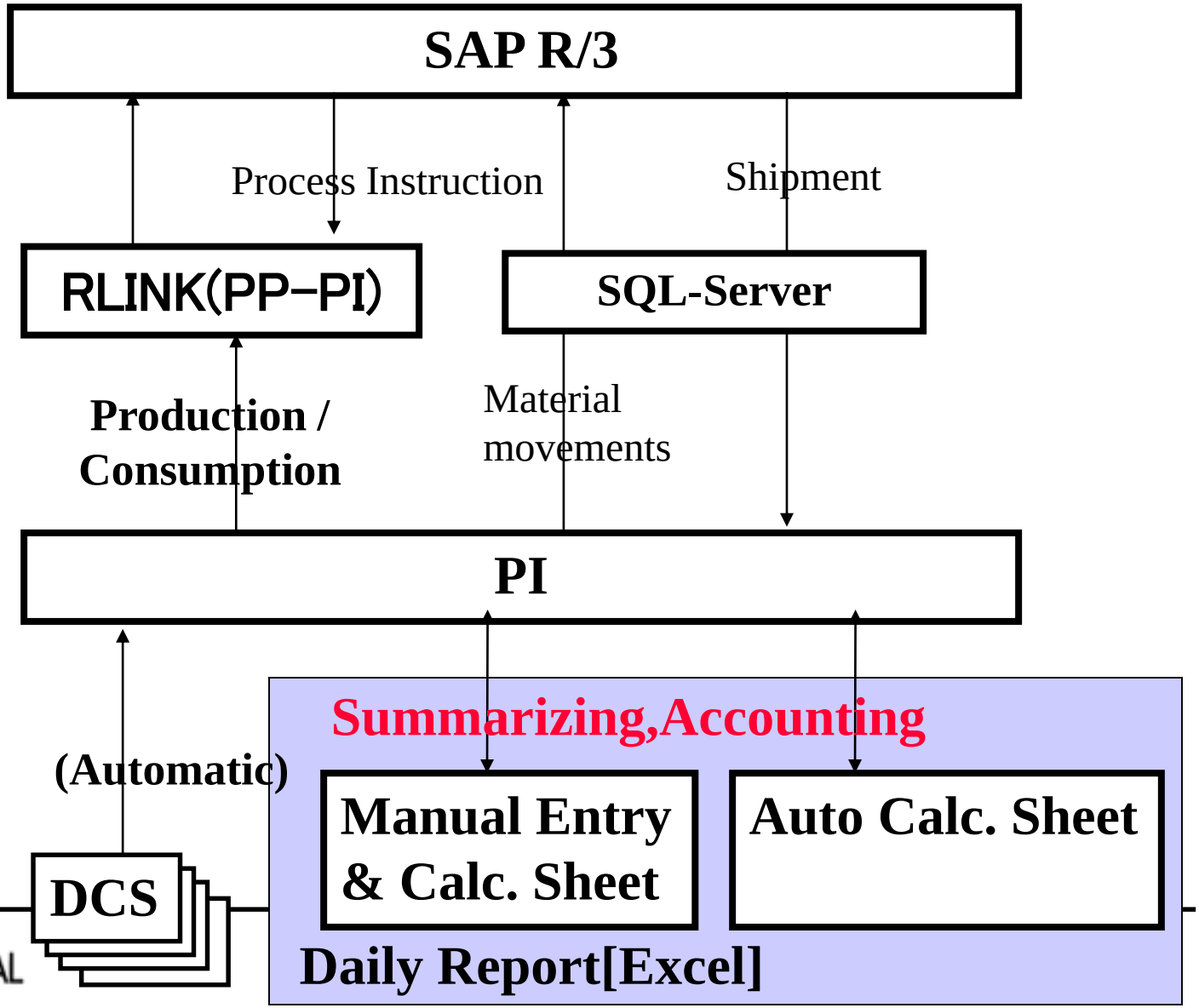
Before 1998

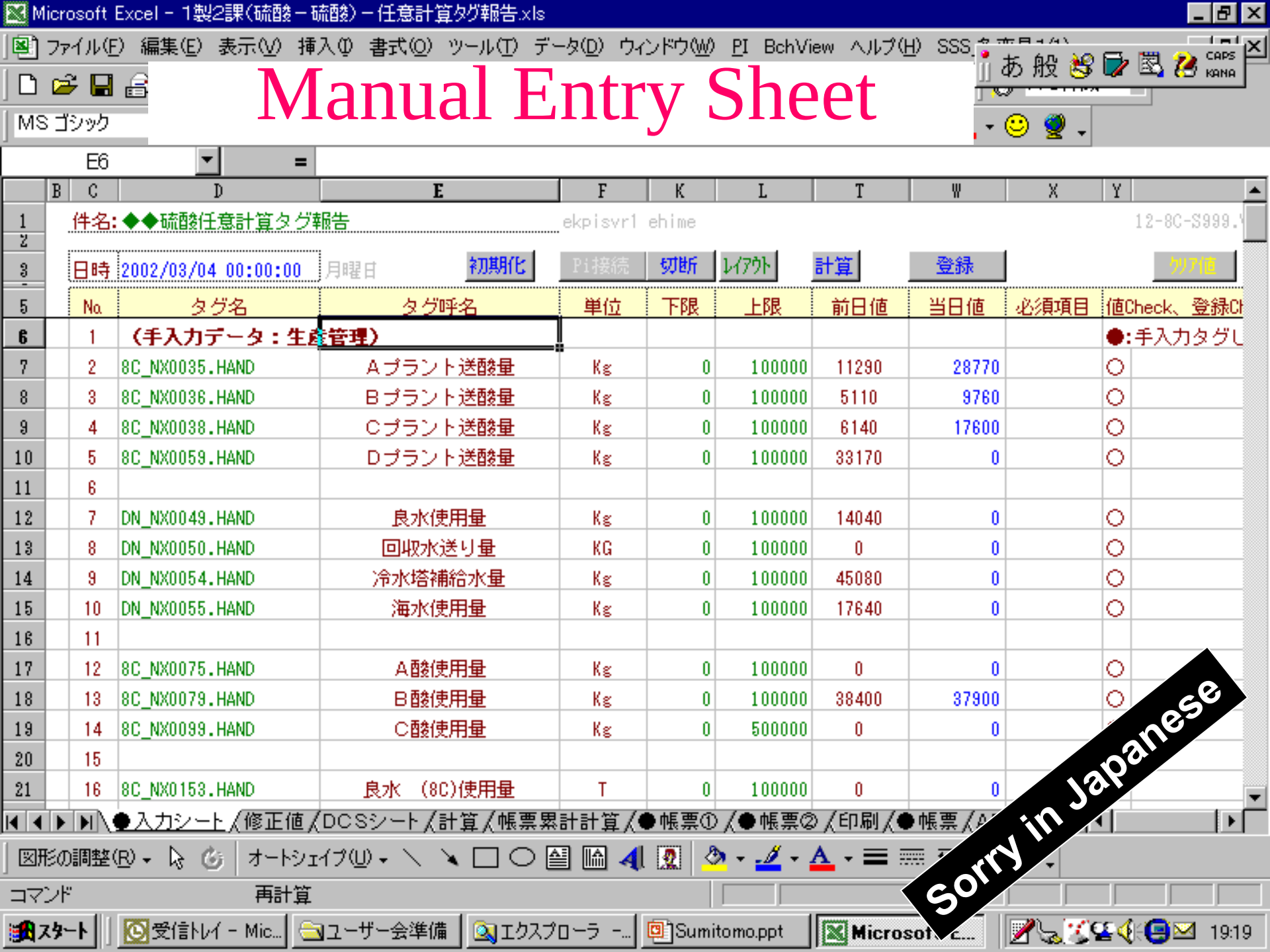


PI & Legacy system

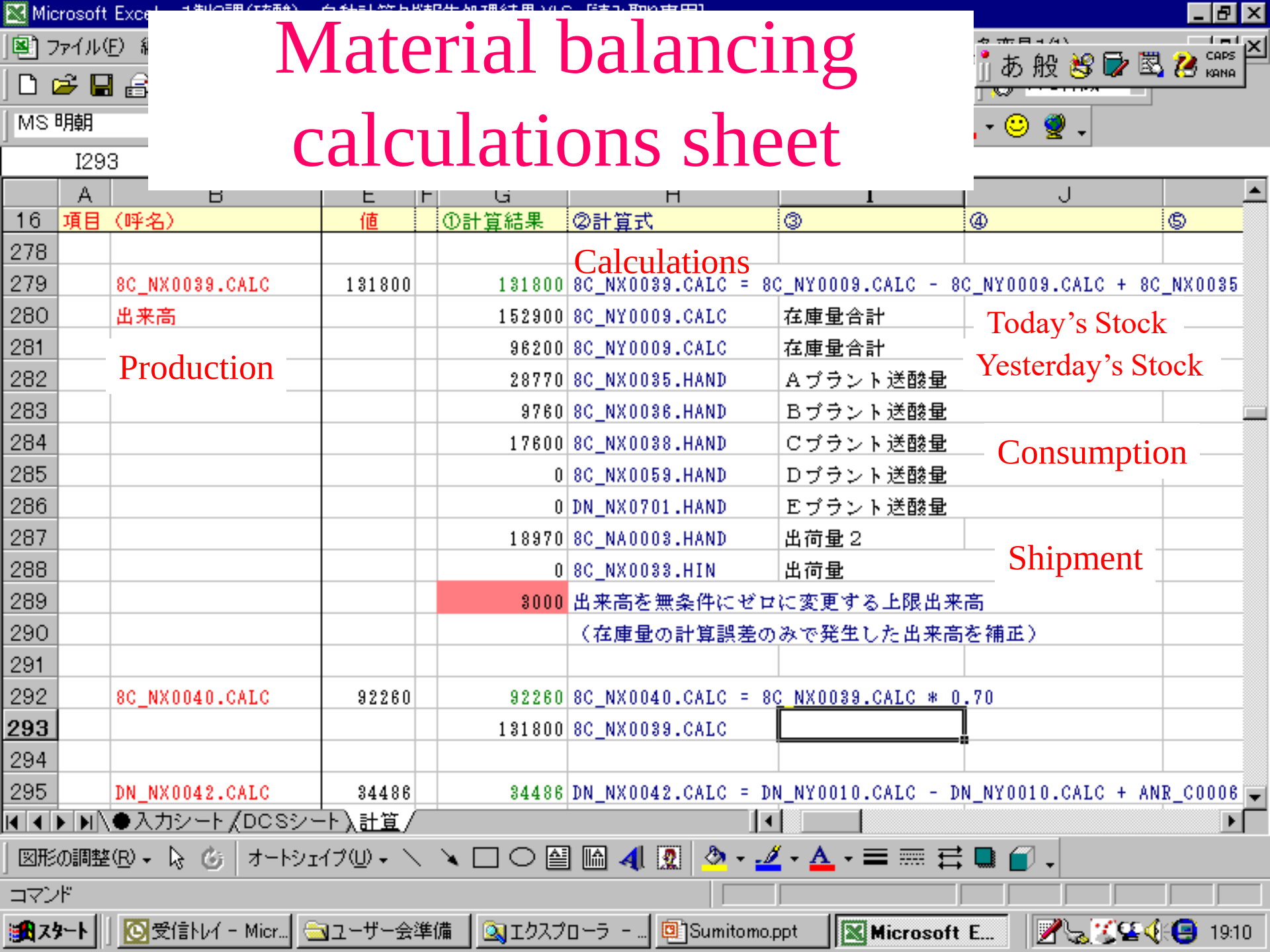


Configuration

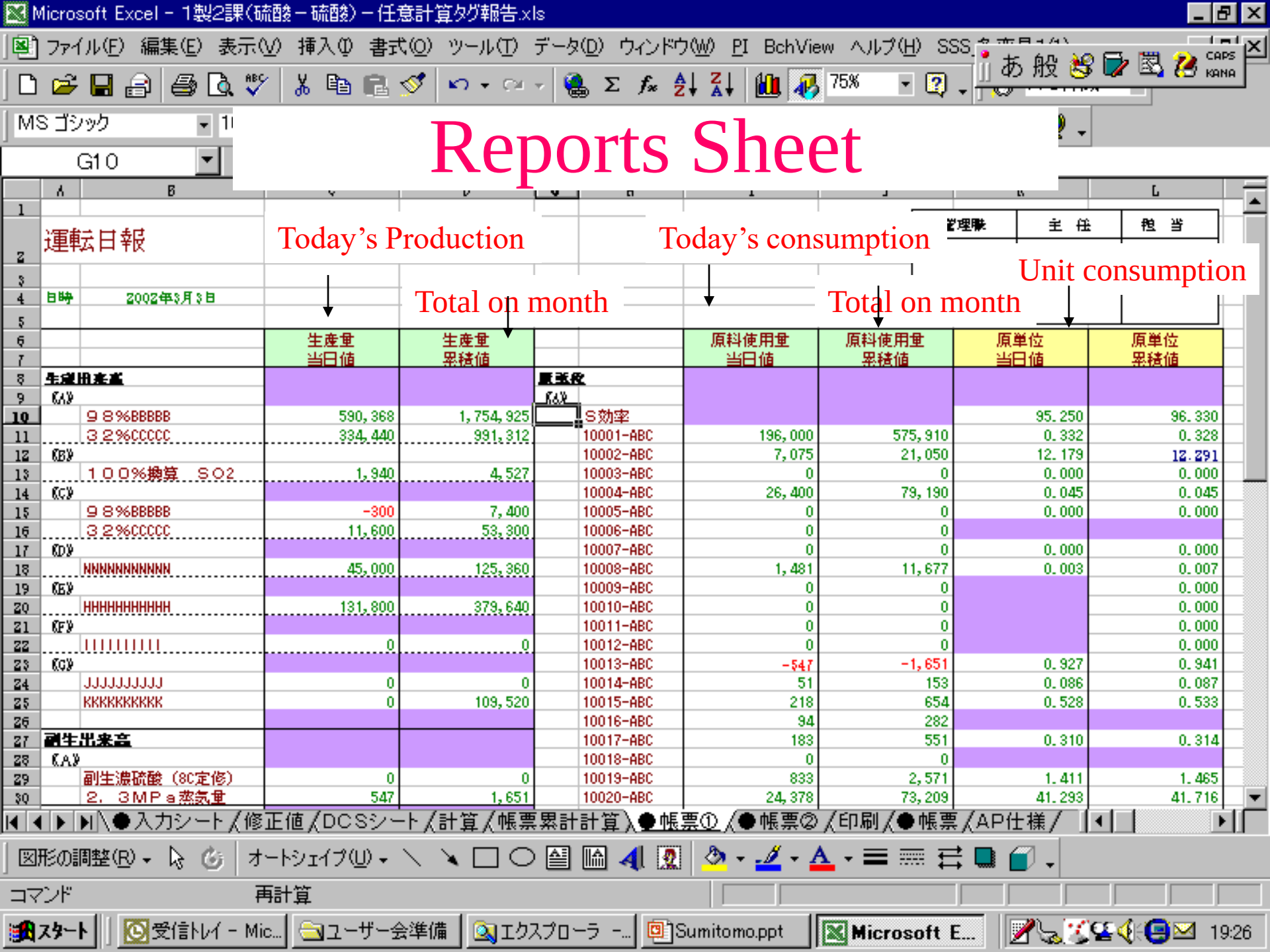



Microsoft Excel - 1製2課(硫酸－硫酸)－任意計算タグ報告.xls
Manual Entry Sheet
件名: ◆◆硫酸任意計算タグ報告
ekpisvr1 ehime
日時 2002/03/04 00:00:00 月曜日
初期化
Pi接続
切断
ﾚｲｱｳﾄ
計算
登録
ｸﾘｱ値
No. タグ名 タグ呼名 単位 下限 上限 前日値 当日値 必須項目 値Check、登録Ch
1 (手入力データ：生産管理) ●:手入力タグし
2 8C_NX0035.HAND Aプラント送酸量 Kg 0 100000 11290 28770
3 8C_NX0036.HAND Bプラント送酸量 Kg 0 100000 5110 9760
4 8C_NX0038.HAND Cプラント送酸量 Kg 0 100000 6140 17600
5 8C_NX0059.HAND Dプラント送酸量 Kg 0 100000 33170 0
6
7 DN_NX0049.HAND 良水使用量 Kg 0 100000 14040 0
8 DN_NX0050.HAND 回収水送り量 KG 0 100000 0 0
9 DN_NX0054.HAND 冷水塔補給水量 Kg 0 100000 45080 0
10 DN_NX0055.HAND 海水使用量 Kg 0 100000 17640 0
11
12 8C_NX0075.HAND A酸使用量 Kg 0 100000 0 0
13 8C_NX0079.HAND B酸使用量 Kg 0 100000 38400 37900
14 8C_NX0099.HAND C酸使用量 Kg 0 500000 0 0
15
16 8C_NX0153.HAND 良水 (8C)使用量 T 0 100000 0 0
●入力シート 修正値 DCSシート 計算 帳票累計計算 ●帳票① ●帳票② 印刷 ●帳票
コマンド
再計算
Sorry in Japanese

Material balancing calculations sheet



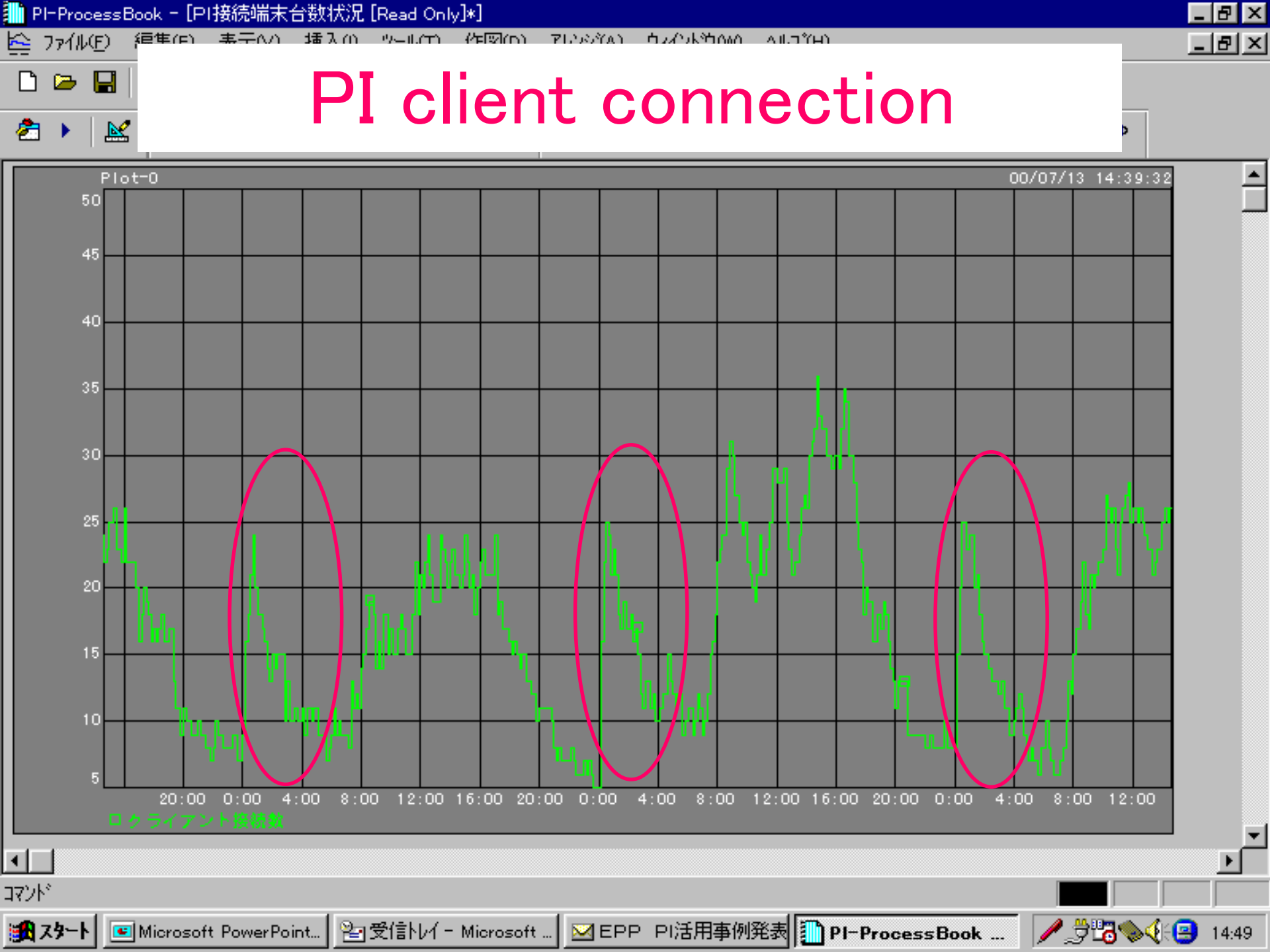
	A	B	E	F	G	H	I	J	K
16	項目	（呼名）	値		①計算結果	②計算式	③	④	⑤
278									
279		8C_NX0039.CALC	131800		131800	8C_NX0039.CALC = 8C_NY0009.CALC - 8C_NY0009.CALC + 8C_NX0035			
280		出来高			152900	8C_NY0009.CALC	在庫量合計		
281					96200	8C_NY0009.CALC	在庫量合計		
282					28770	8C_NX0035.HAND	Aプラント送酸量		
283					9760	8C_NX0036.HAND	Bプラント送酸量		
284					17600	8C_NX0038.HAND	Cプラント送酸量		
285					0	8C_NX0059.HAND	Dプラント送酸量		
286					0	DN_NX0701.HAND	Eプラント送酸量		
287					18970	8C_NA0003.HAND	出荷量２		
288					0	8C_NX0033.HIN	出荷量		
289					3000	出来高を無条件にゼロに変更する上限出来高			
290						（在庫量の計算誤差のみで発生した出来高を補正）			
291									
292		8C_NX0040.CALC	92260		92260	8C_NX0040.CALC = 8C_NX0039.CALC * 0.70			
293					131800	8C_NX0039.CALC			
294									
295		DN_NX0042.CALC	34486		34486	DN_NX0042.CALC = DN_NY0010.CALC - DN_NY0010.CALC + ANR_C0006			


Microsoft Excel - 1製2課(硫酸－硫酸)－任意計算タグ報告.xls
Reports Sheet
運転日報
Today's Production
Today's consumption
Unit consumption
Total on month
Total on month
日時
2002年3月3日
生産量 当日値
生産量 累積値
原料使用量 当日値
原料使用量 累積値
原単位 当日値
原単位 累積値
生産用来高
副生出来高
９８%BBBBB
３２%CCCCC
１００%換算 ＳＯ2
ＮＮＮＮＮＮＮＮＮＮ
ＨＨＨＨＨＨＨＨＨＨ
ＪＪＪＪＪＪＪＪＪ
ＫＫＫＫＫＫＫＫＫ
副生濃硫酸（8C定修）
２．３ＭＰａ蒸気量
590,368
1,754,925
334,440
991,312
1,940
4,527
-300
7,400
11,600
53,300
45,000
125,360
131,800
379,640
0
0
0
109,520
547
1,651
S効率
10001-ABC
10002-ABC
10003-ABC
10004-ABC
10005-ABC
10006-ABC
10007-ABC
10008-ABC
10009-ABC
10010-ABC
10011-ABC
10012-ABC
10013-ABC
10014-ABC
10015-ABC
10016-ABC
10017-ABC
10018-ABC
10019-ABC
10020-ABC
95.250
96.330
196,000
575,910
0.332
0.328
7,075
21,050
12.179
12.291
0
0
0.000
0.000
26,400
79,190
0.045
0.045
0
0
0.000
0.000
0
0
0
0
0
0
0.000
0.000
1,481
11,677
0.003
0.007
0
0
0.000
0
0
0.000
0
0
0.000
0
0
0.000
-547
-1,651
0.927
0.941
51
153
0.086
0.087
218
654
0.528
0.533
94
282
183
551
0.310
0.314
0
0
833
2,571
1.411
1.465
24,378
73,209
41.293
41.716
入力シート
修正値
DCSシート
計算
帳票累計計算
帳票①
帳票②
印刷
帳票
AP仕様
コマンド
再計算
スタート
受信トレイ - Mic...
ユーザー会準備
エクスプローラ -...
Sumitomo.ppt
Microsoft E...
19:26

Feature

- Easy maintenance by user
- Automatically display tags where is required
- Manual input is done in all Control Room during 0:00AM – 4:00AM everyday

PI client connection



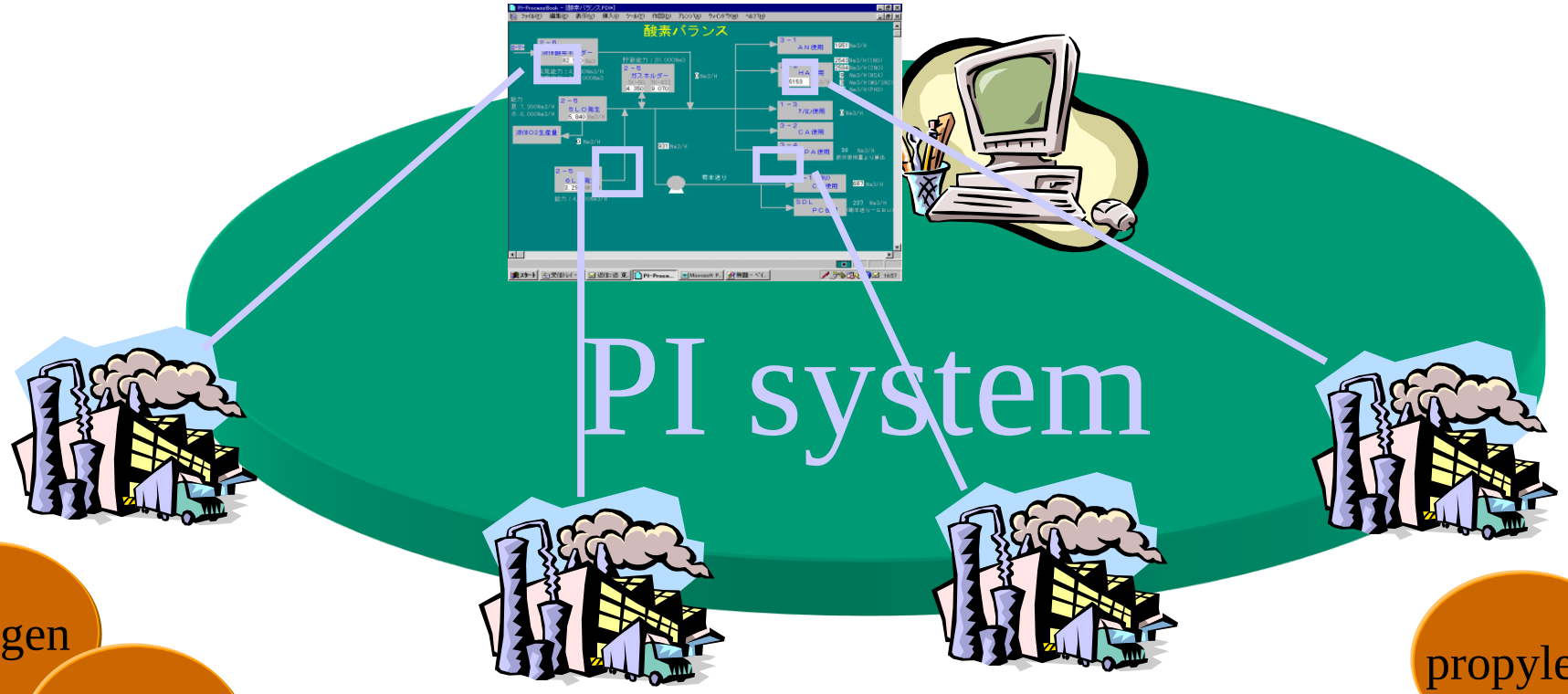
Applications

- Case-1
  Integrated Summarizing and accounting system from PI to SAP R/3
- **Case-2**
  Material balance monitoring for utilities and raw materials

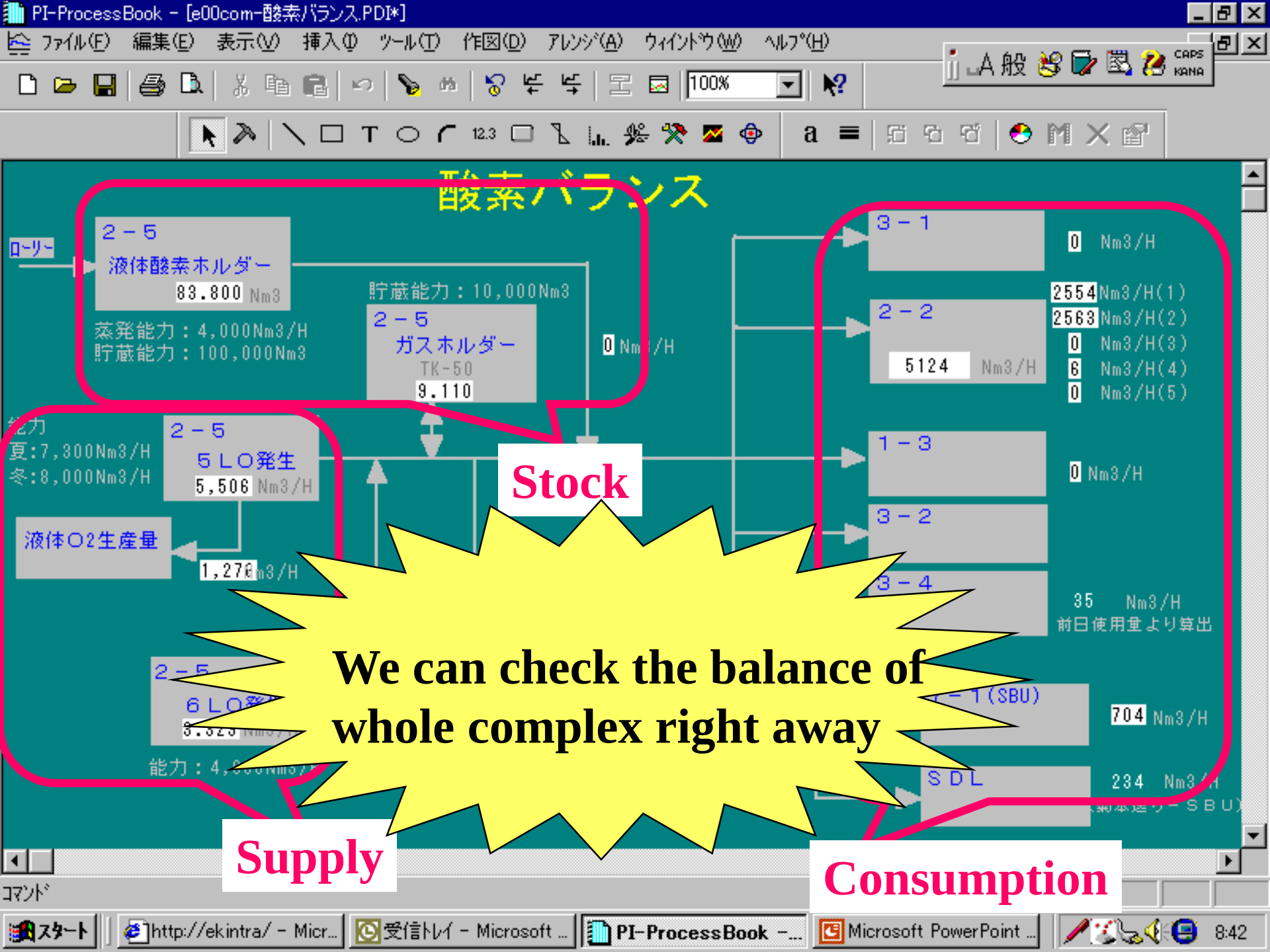
Case-2

- Situation Before PI
  - In case of emergency,
    it took a long time to get the information of all plants condition
  - Because of calling to all plants
  - Need detail information of all plants timely to make decision efficiently

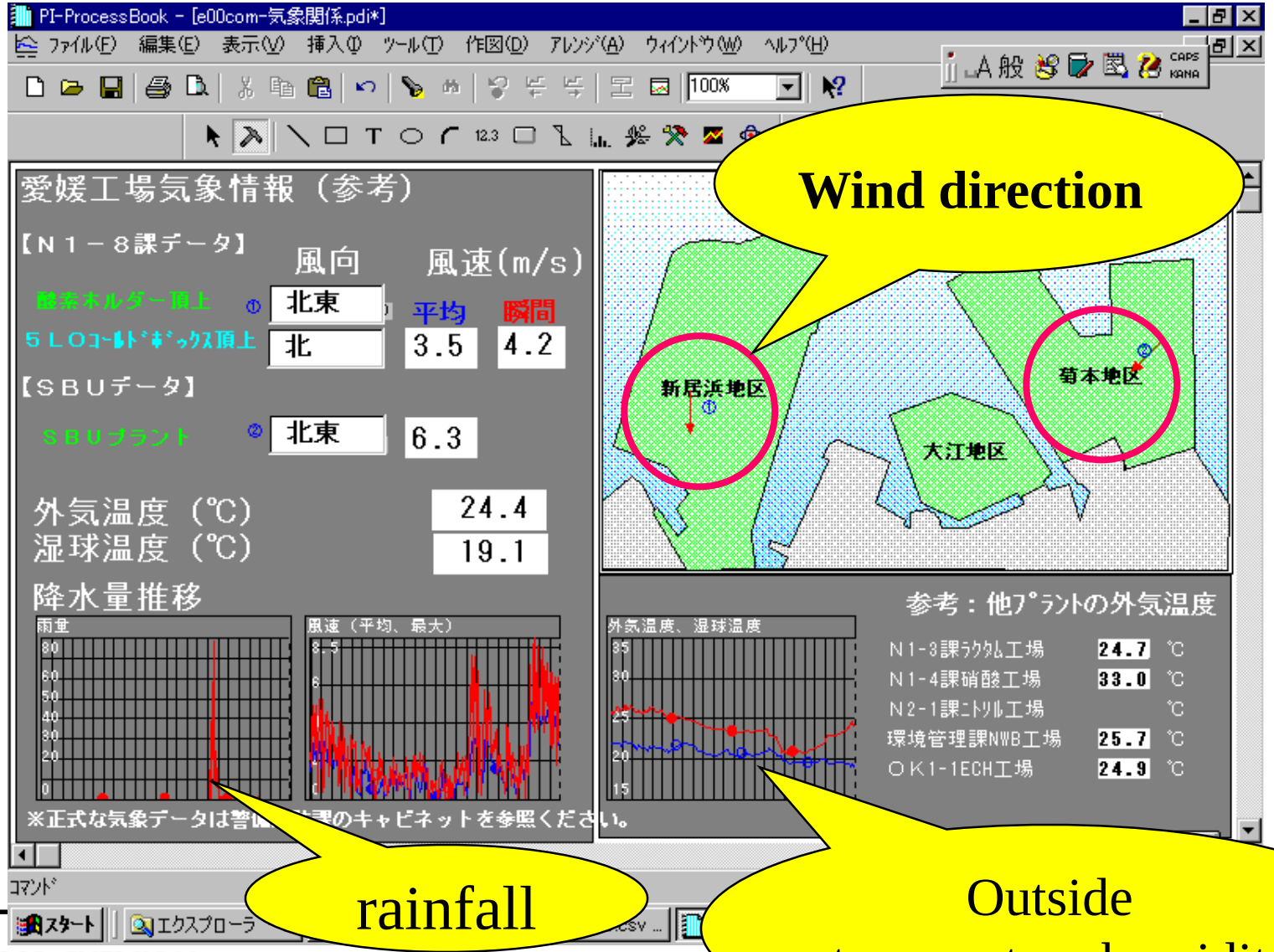
Utilities and Raw material balance in whole complex



nitrogen
oxygen
hydrogen
carbon
Mono oxi
Industrial
water
steam
air
chlorine
LPG
propylene
weather


PI-ProcessBook - [e00com-酸素バランス.PDI*]
酸素バランス
2－5
液体酸素ホルダー
83,800 Nm3
蒸発能力：4,000Nm3/H
貯蔵能力：100,000Nm3
貯蔵能力：10,000Nm3
2－5
ガスホルダー
TK-50
9,110
0 Nm3/H
2－5
５ＬＯ発生
5,506 Nm3/H
液体Ｏ2生産量
1,270 Nm3/H
3－1
0 Nm3/H
2－2
5124 Nm3/H
2554 Nm3/H(1)
2563 Nm3/H(2)
0 Nm3/H(3)
6 Nm3/H(4)
0 Nm3/H(5)
1－3
0 Nm3/H
3－2
3－4
35 Nm3/H
前日使用量より算出
704 Nm3/H
ＳＤＬ
234 Nm3/H
Stock
Supply
Consumption
We can check the balance of whole complex right away

Weather condition



Conclusion

- We encourage PI utilization on all plants in Ehime works.
- PI has changed our working style.
- PI is used as a business re-engineering tool not only as data analysis for engineering staff.

A r i g a t o u

(Thank You)