



EFFLUENTS

A Day in the Life: The Routines and the Issues

Clay R. Madden
Columbia Generating Station
Chemistry Department

Presentation Outline

- The Day (Routines)
 - Data Review
 - Log Reviews
 - Condition Reports
- The Year (Selected Issues Faced)
 - Kaman Science Detector Replacement Project Status
 - Monitor Issues
 - Sample Analysis Improvements
 - Bases Documents & Records Retrieval
 - Drywell Leak Detection
 - Isokinetic Flow
 - Meteorological Tower Issues
 - Heating Steam Tritium

The Day (Routines)

- Logs
 - Chemistry Technicians

Plant Logging System at **ENERGY NORTHWEST**

Main Menu

Operations

PTL / Corrective Action Program

Health Physics

Chemistry

Work Control

Outage Management

Leakage Log

Engineering

Construction and Maintenance Services

Fire Protection / Barrier Permits

QUIT

Chemistry Shift Turnover Sheet

			Add	Browse	Copy	Edit	Find	Delete	Reports/Query	PQD Review	Quit
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Date **05/10/05** Shift **MIDS** Outgoing: **HOLMAN, LES**

Time **06:30** Incoming: **THURMAN, RUSSEL**

Reactor Mode/Power: **5** / **0** % SP-1 SP-8: Cond: **1.37 (G)** uS/cm

pH: **7.16** Cl: **2.10** SO₄: **1.71** Cl: **N/A**

	Time	Initials/Signature
<input checked="" type="checkbox"/> Shiftly Channel Checks:	1950	LDHo
<input checked="" type="checkbox"/> Daily Channel Checks:	1002	LDHe

LCO/RFO's in progress and/or Rad Monitor problems that require chemistry action:
 - CW pH INOP #9356. Grab sample once/8 hrs if CWBD on (currently using temp. pumps), due @ 1200.
 - TEA-SR-38 INOP #9364 (RFODCM), WR #29046569. 4 hr flow verifications at 1000, 1400, 1800.

Pending / overdue surveillance procedures, sampling, and analysis:
 - CSP-DO-M101 for DO-TK-2 awaiting Herguth off-site results.
 - PWC-AY-1 reagents replacement in Proc. in Prog. folder.

Current out of spec systems:

Current out-of-service lab/inline, counting rm instruments and corrective/required action:
 - DX300 - OOS, shut off

Equipment (Non-Lab/Ctg Rm) out of service/abnormal lineups:
 - OG-AY-12B.
 - CBD-RIS-608, partial CSP-INST-M201 will be needed when restored.
 - Corrosimeter 3510 (471 TG) not storing data.
 - CF-P-42A is OOS.
 - MMS Grnd(Fe) and flow readings INOP, no need to enter in WinCDMS.

The Day (Routines)

- Logs
 - Chemistry Technicians
 - Control Room Logs
 - INOP Equipment; Purges; Vents; etc)

Operations Logging System

Main Menu

Out Of Service EPNs

Inop. Equip/LCO/RFO Log

Control Room Log

Turnover Sheets

Diesel Generators Log

Personnel Logs

Rad Waste Log / Information

Tech. Spec. / EPN Log

Hose Control Log

Unavailable Systems

Aministrative Tasks

Maintenance / Surveillance Log

Electronic PERs

Follow-Up Assessment Of Oper.

OPS Issues

Extension Cord Control Log

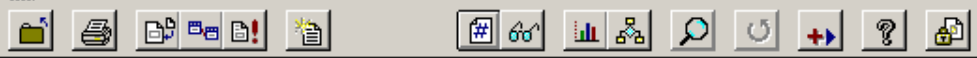
Function Key Setup

Utility Section

QUIT

The Day (Routines)

- Logs
- Data Review
 - WinCDMS32[®]
 - For Chemistry Routines

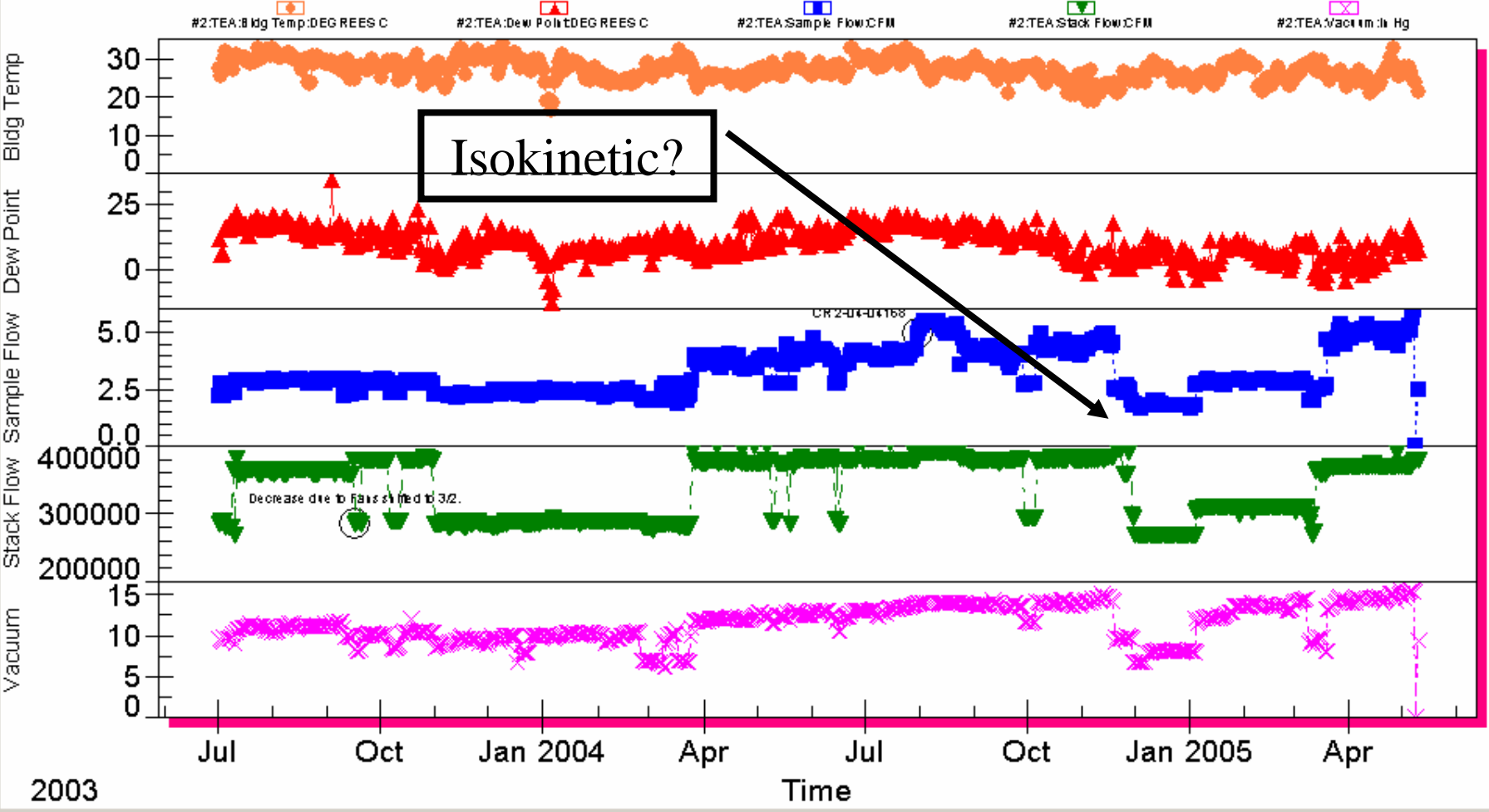


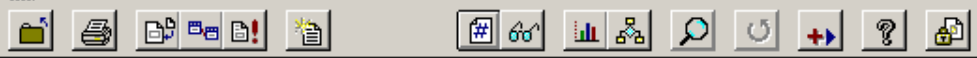
Interval: Custom Leg: 0.5 All Print
Start Date: 07/01/2003 Finish Date: 05/10/2005 To File
Refresh

Plot Name: All Plots
Turbine Building
Group Name: Effluents
Plot Navigation: Plot: 6 of 22
Display Options

Comments: Sample Analysis
Tech: Validated:

Turbine Building





Interval: Leg: 0.5 All Print

Start Date: Finish Date: To File Refresh

Plot Name: All Plots Tritium and Boron

Group Name: Effluents

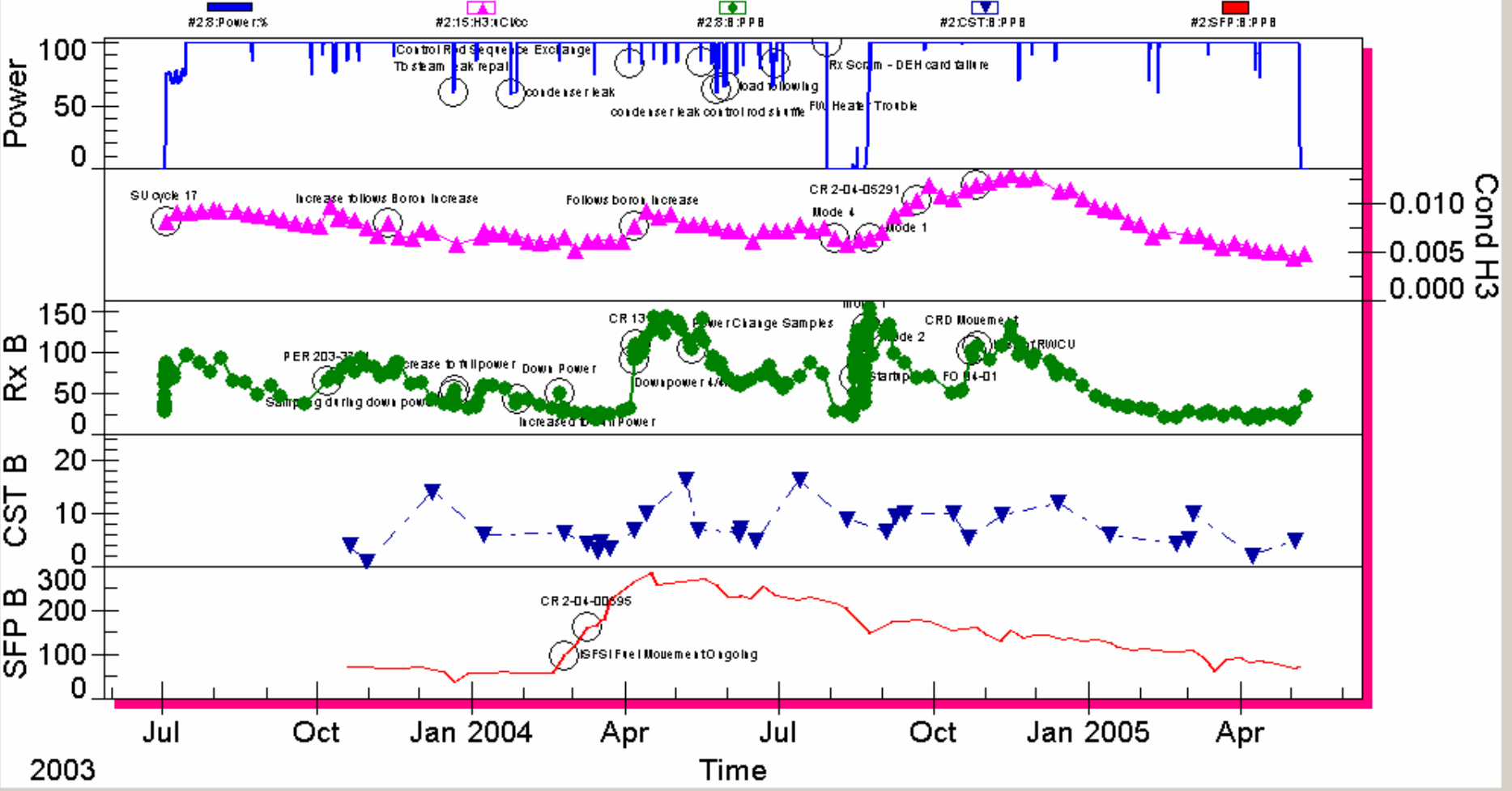
Plot Navigation: Plot: 1 of 22

Display Options

Comments: Sample Analysis

Tech: Validated:

Tritium and Boron



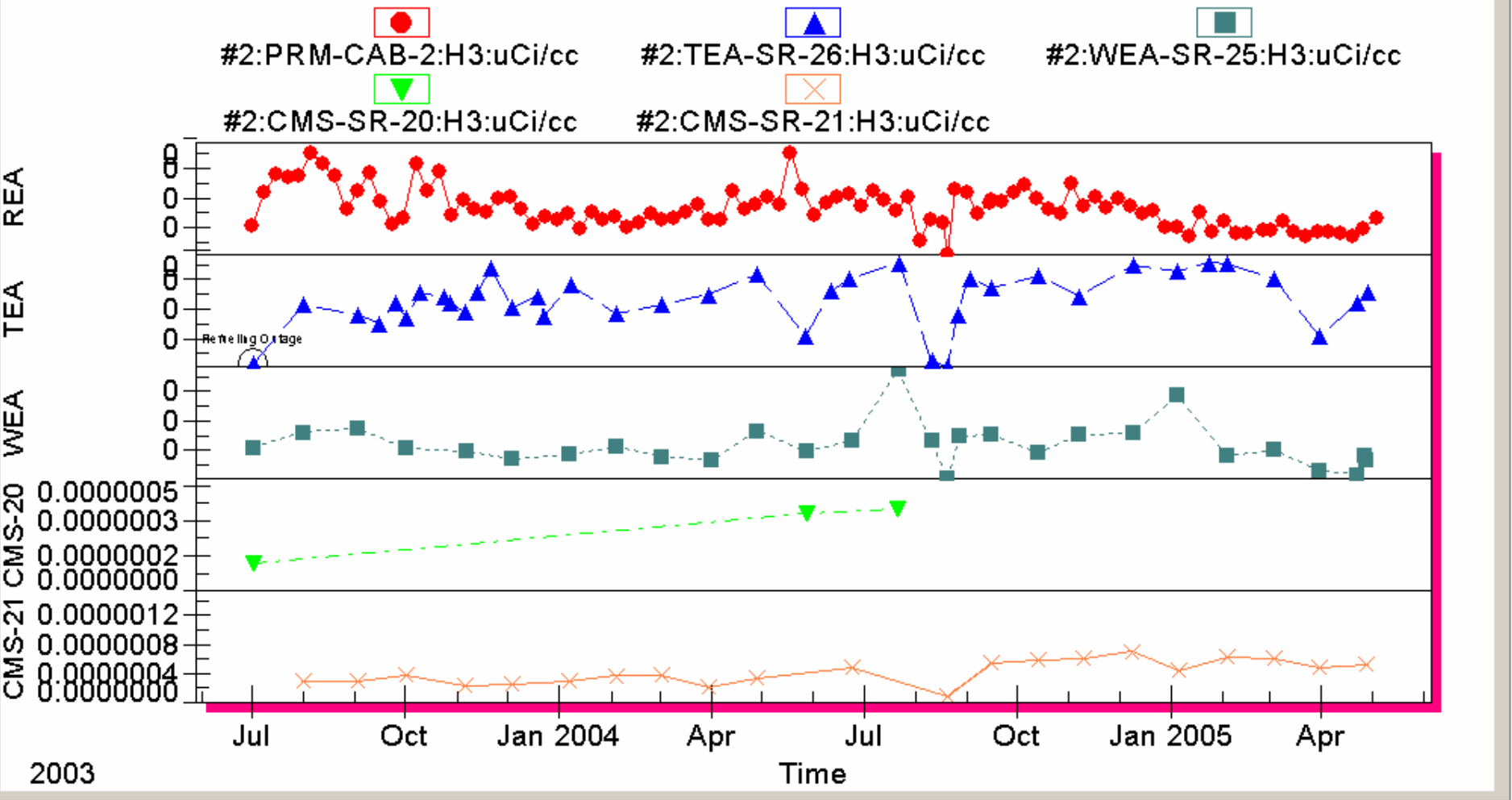


Interval: Custom Leg: 0.5 All Print
Start Date: 07/01/2003 Finish Date: 05/10/2005 To File
Refresh

Plot Name: All Plots
Gaseous Tritium
Group Name: Effluents
Plot Navigation: Plot: 1 of 22
Display Options

Comments: Sample Analysis
Tech: Validated:

Gaseous Tritium



The Day (Routines)

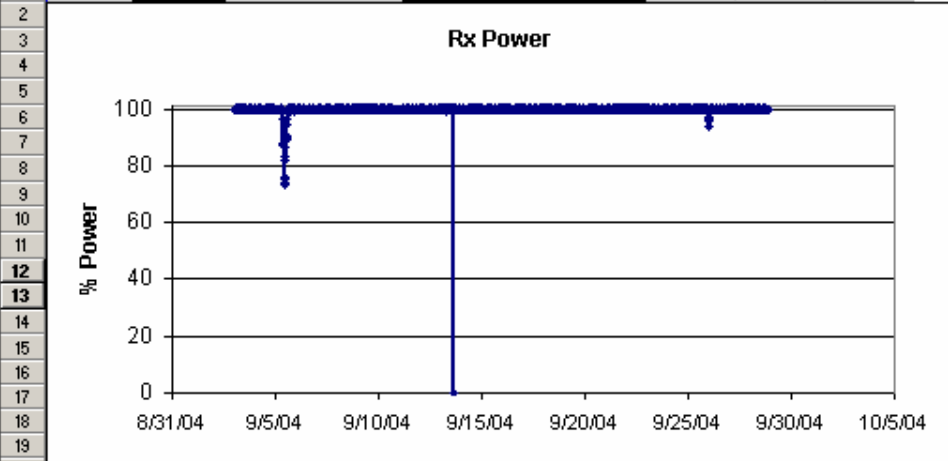
- Logs
- Data Review
 - WinCDMS32®
 - **Monitors**

Excel/iHistorian™

- [Effluent Monitors](#)
- [Containment Leak Detection](#)
- [Meteorological Tower](#)

Switching soon to Instep's eDNA

(www.instepsoftware.com)



MET a 33' 245'

Data Shown is for: June 9, 2005

	MetA	Met B
Temp at 33'	74	72
Temp at 245'	68	66
Wind Speed at 33'	90	2
Wind Speed at 245'	7	5
Wind Direction at 33'	80	90
Wind Direction at 245'	124	116
Relative Humidity at 33'	34	35
Barometric Pressure	29	

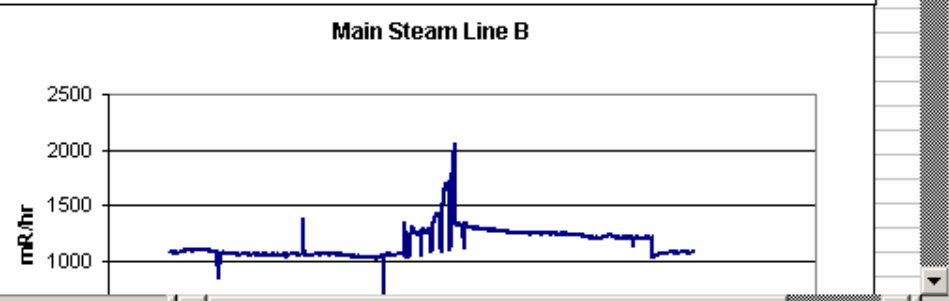
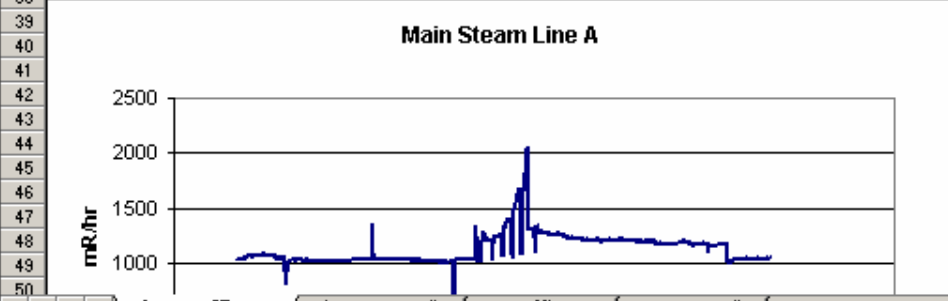
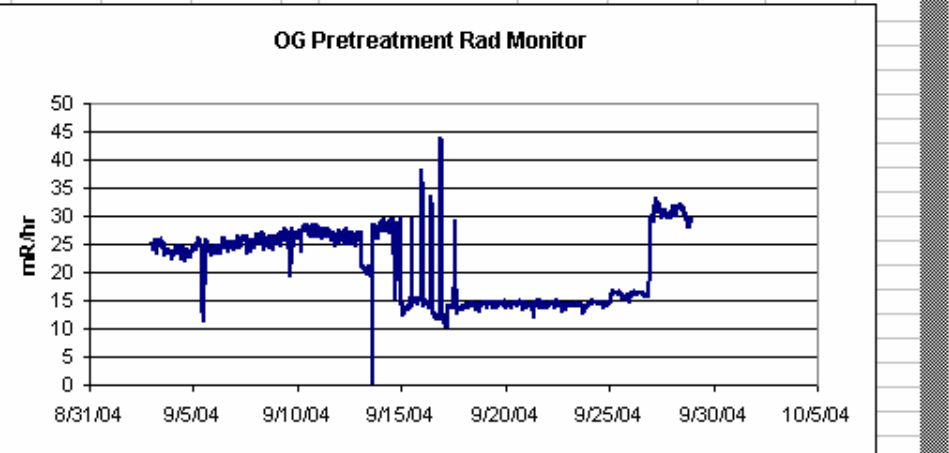
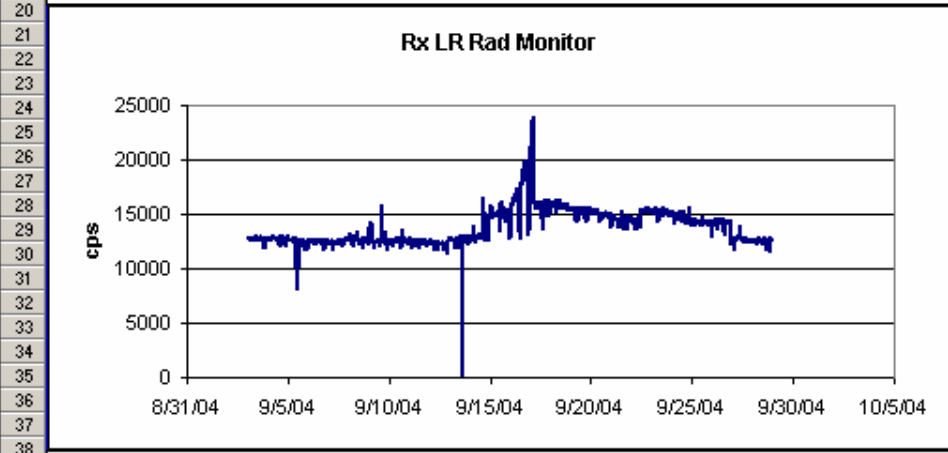
Extremely unstable, A

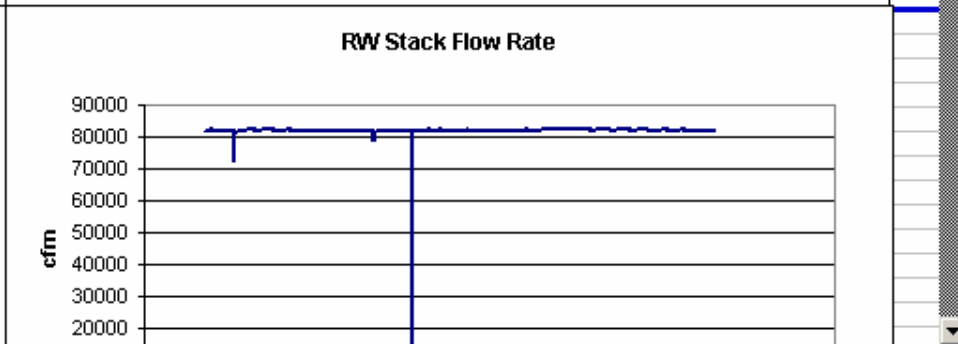
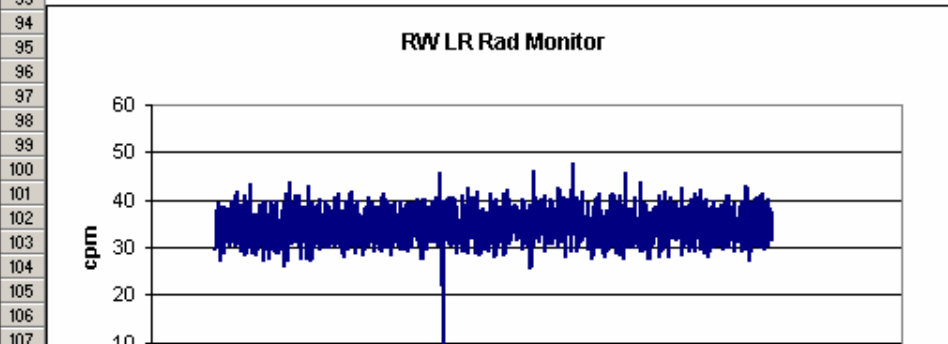
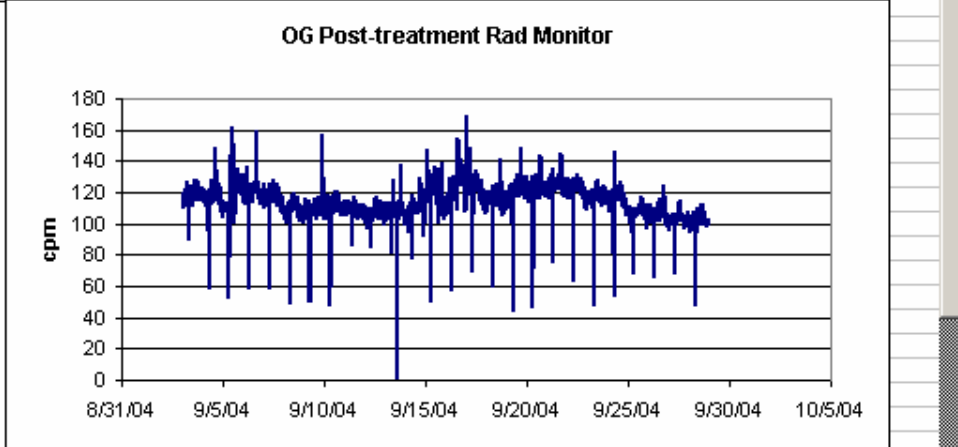
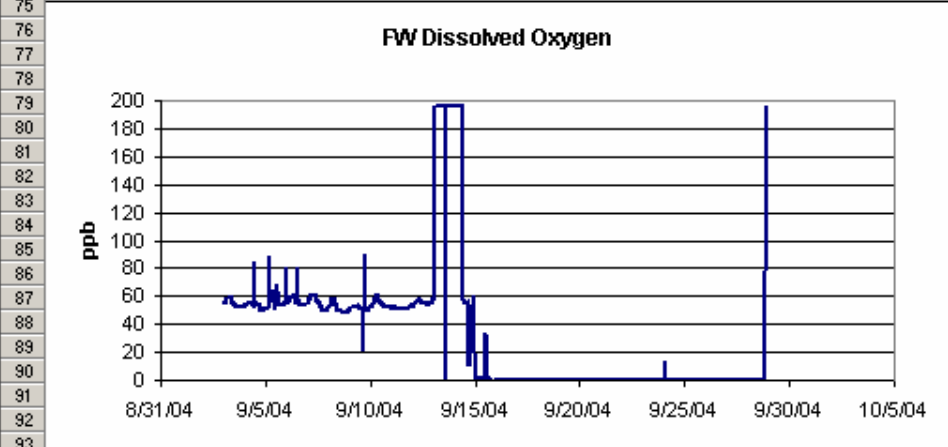
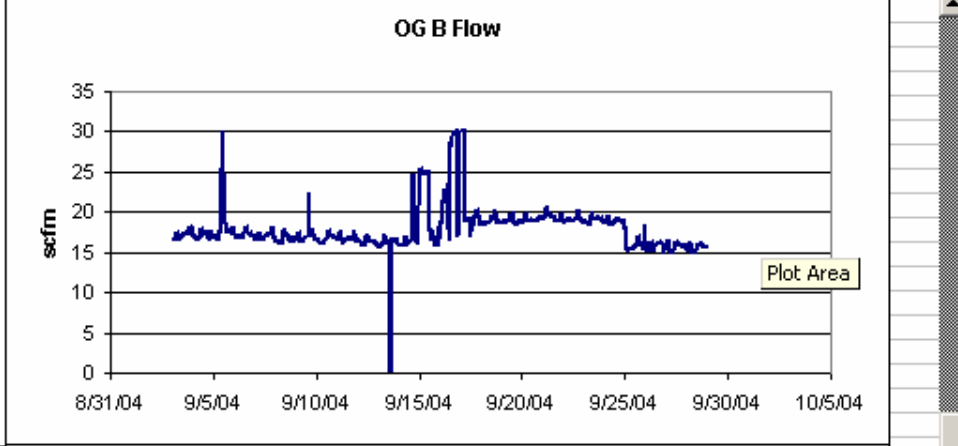
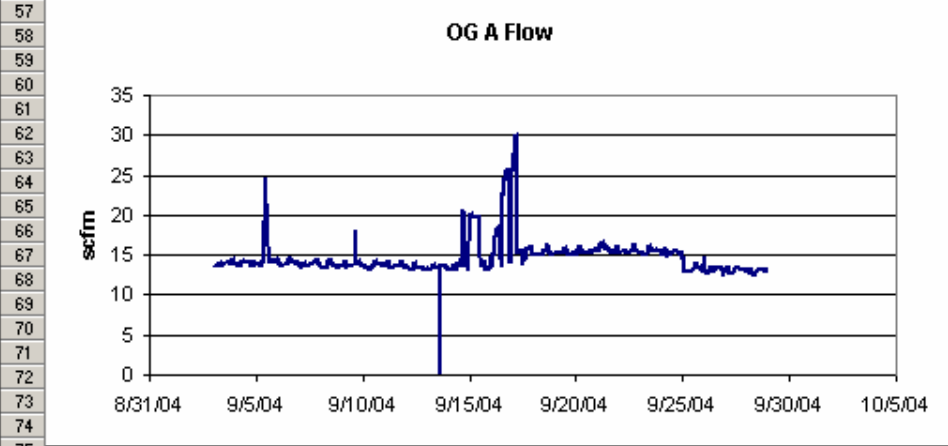
Current Temperature: 74 68

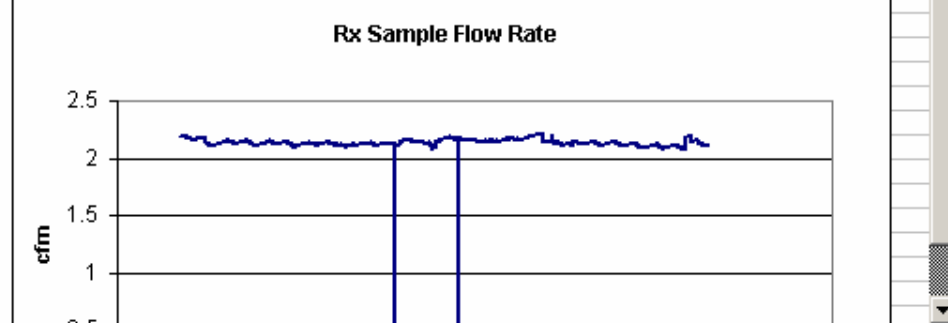
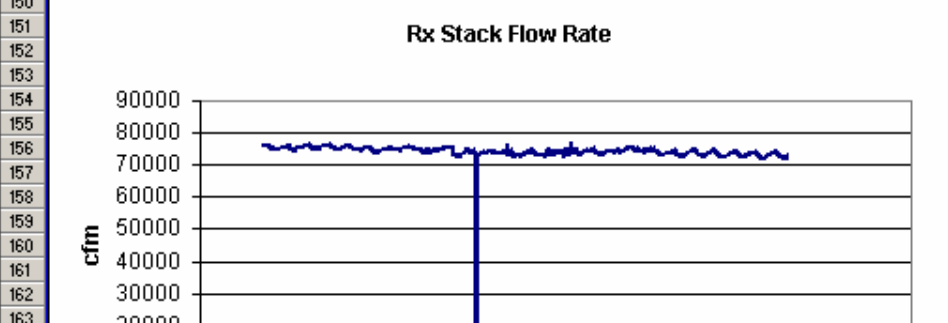
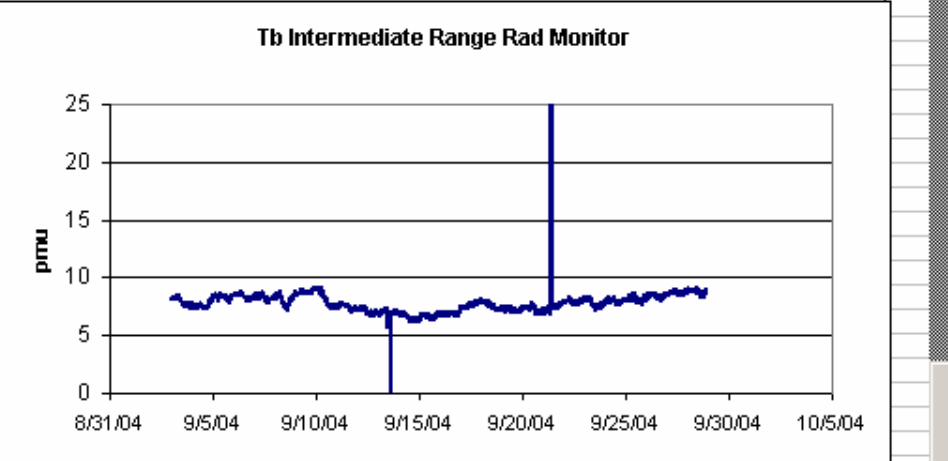
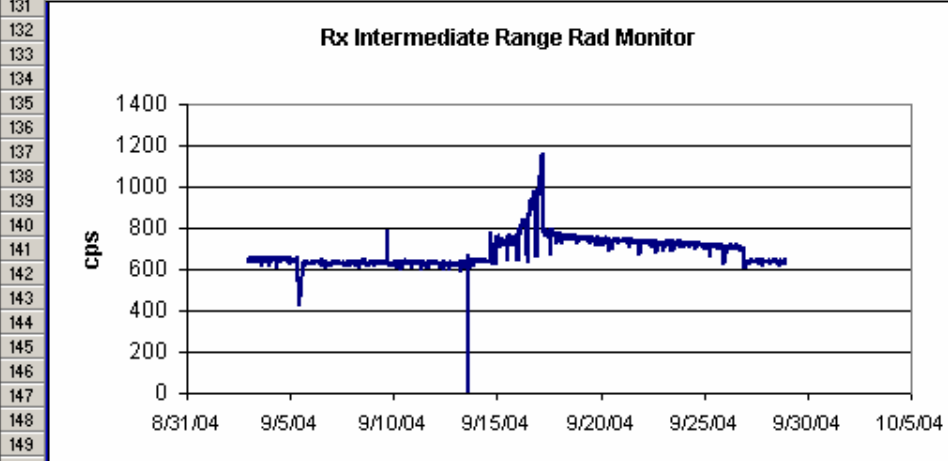
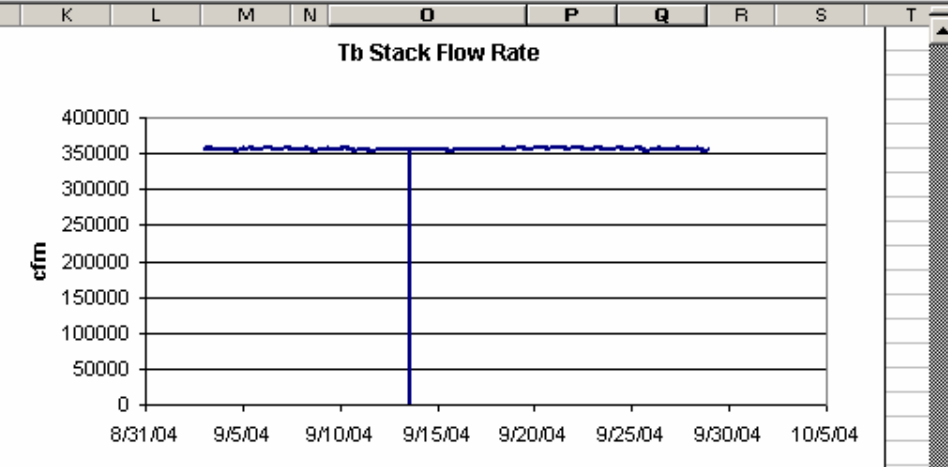
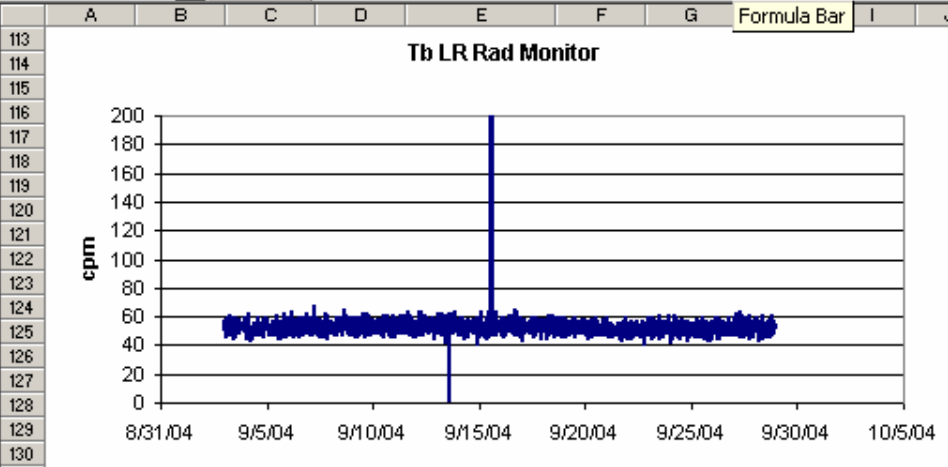
Current Wind Speed: 90 7

Current Relative Humidity: 34 34

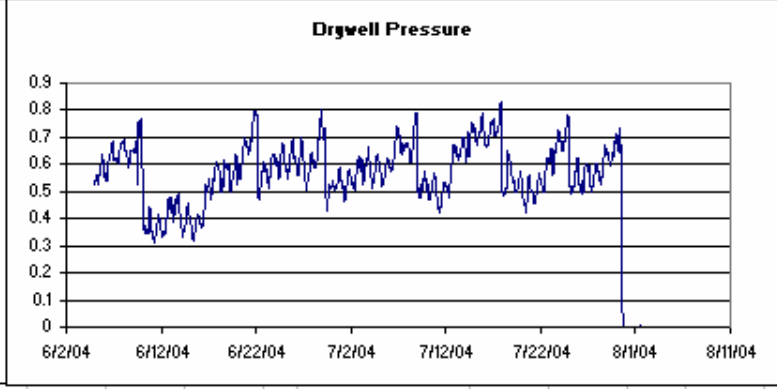
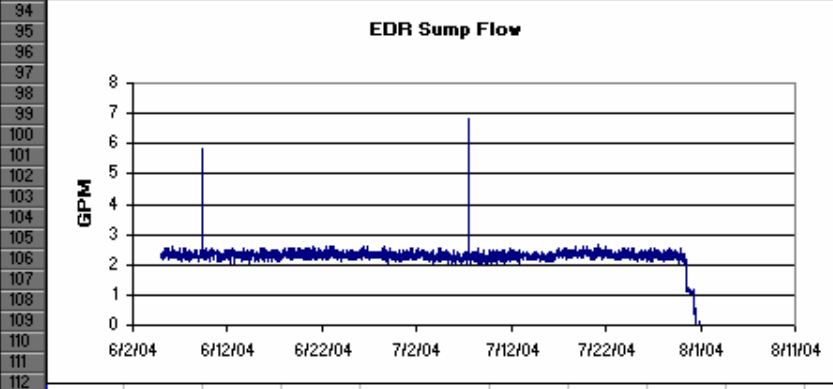
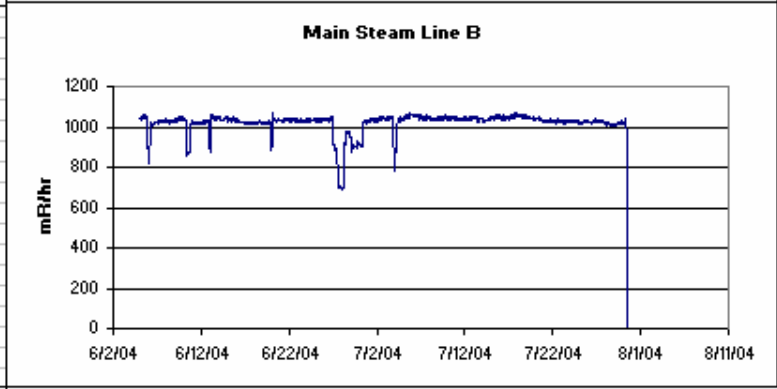
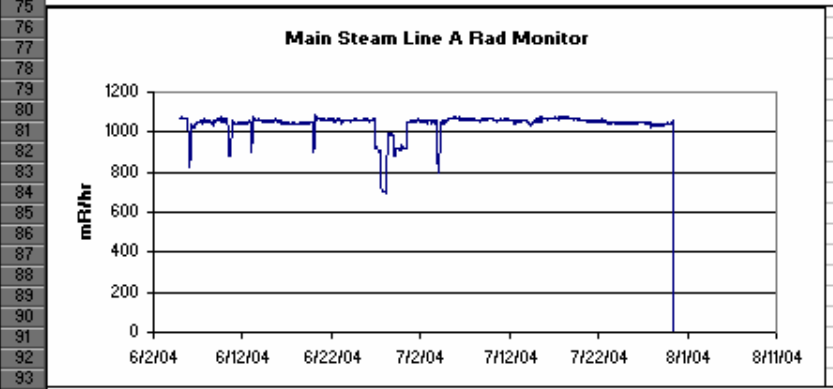
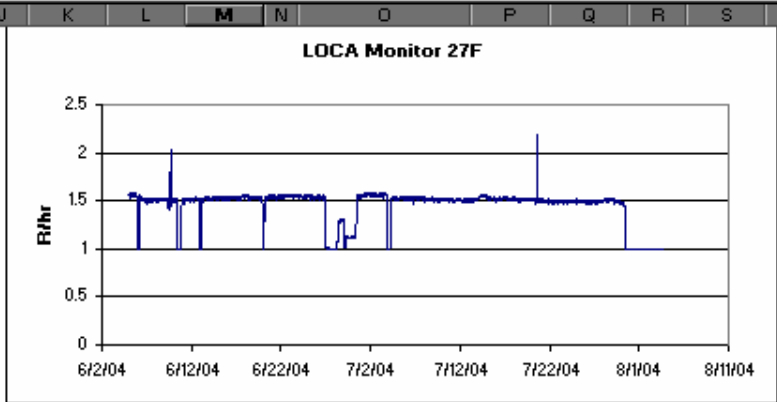
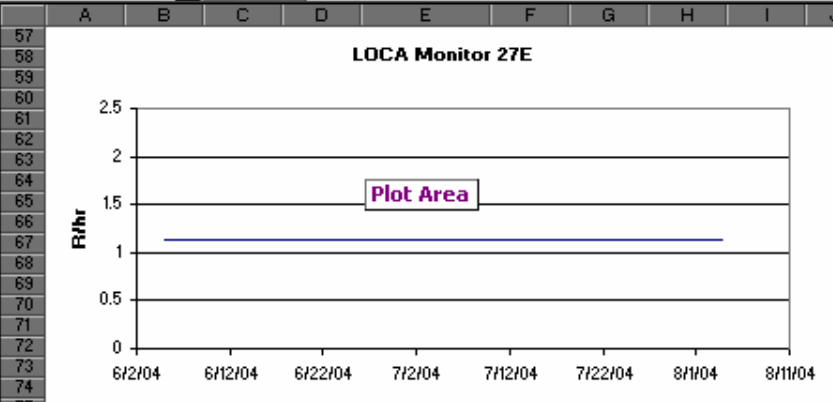
Current Wind Direction: 80 124

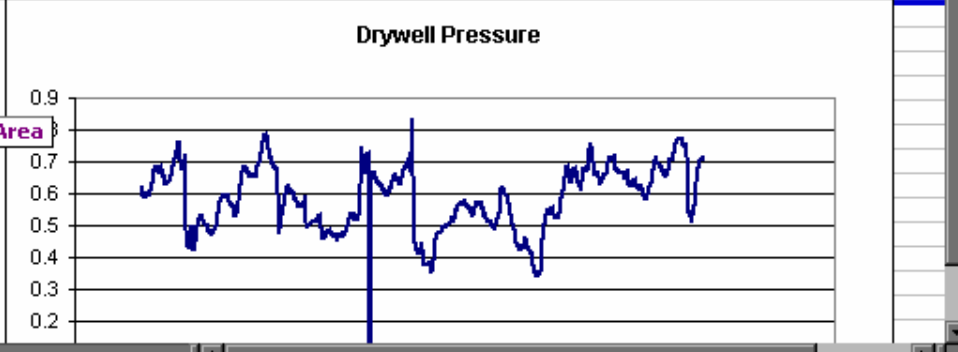
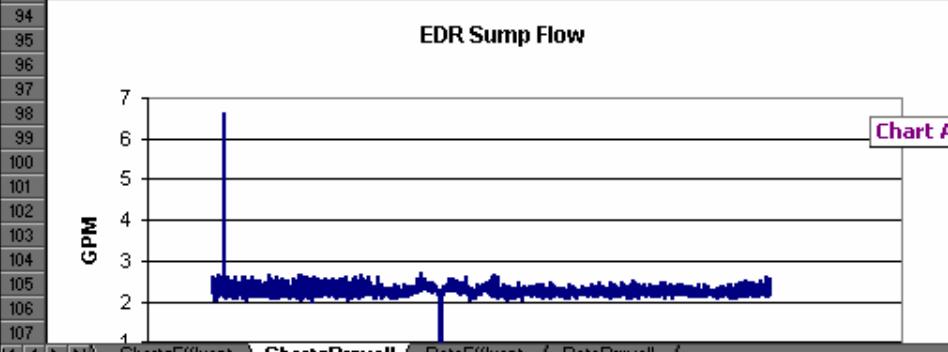
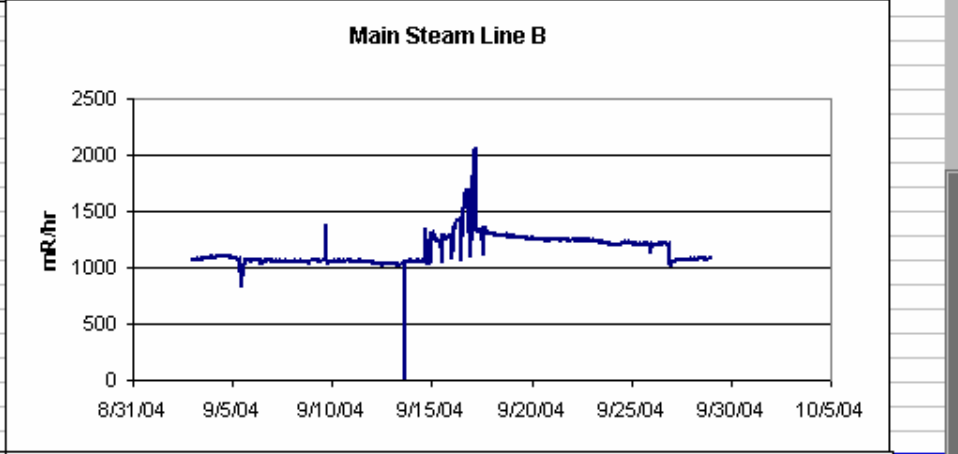
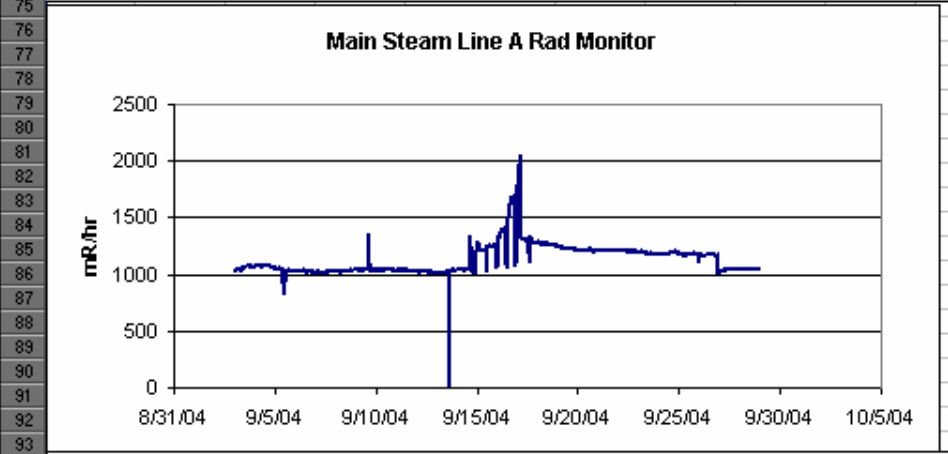
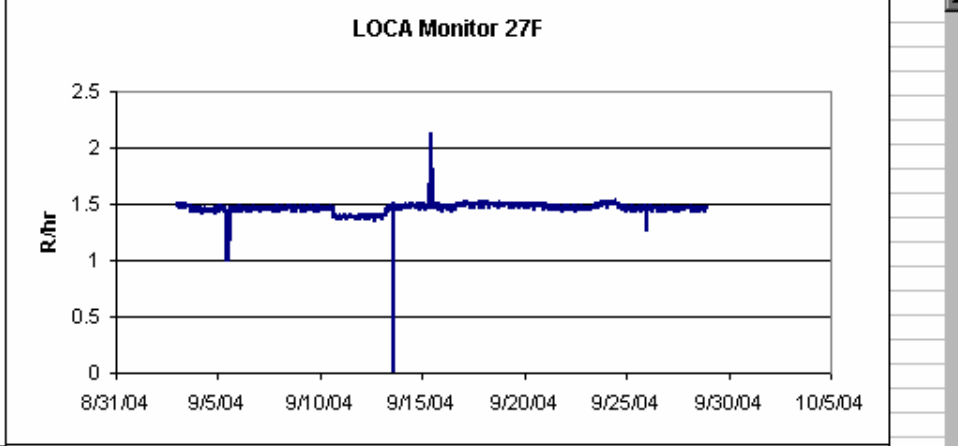
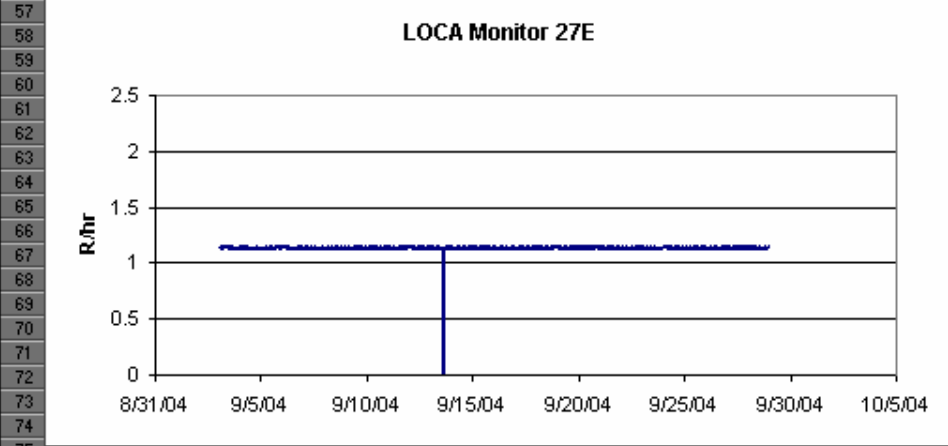




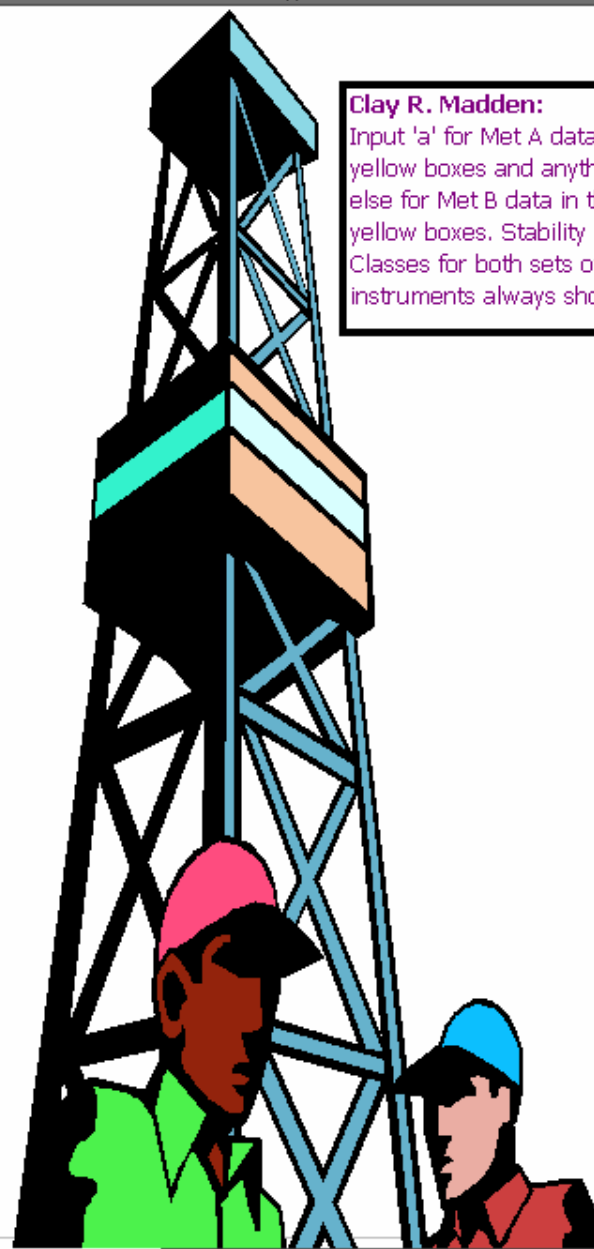


M1





	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Start	6/5/2004 0:00											
2	milliseconds	2073600	2074	Sec Ave	35	Min. Ave	1	Hour Ave	0	day ave			
3		Power	Rx Pressur	Noble Gas	articulate Di	ble Gas Dir	articulate Di	27E	27F	MSLM A	MSLM B	R Sump Fl	W Pressure
4	signal	pwrav	x133	x469	x470	x398	x413	x432	x399	x169	x215	x181	x361
5	05-Jun-04 00:34:34	99.91291063	3591179	119.5286	111.2971	183.1282	327.6058	1.135002	1.5697777774	1072.847	1038.066	2.373822	0.528943
6	05-Jun-04 01:09:07	99.74961807	3578379	118.8178	120.9714	181.8811	348.7353	1.13599	1.566196801	1066.477	1038.148	2.22991	0.53104
7	05-Jun-04 01:43:41	99.85867554	3586170	122.2783	130.6173	180.991	349.7298	1.133427	1.531897387	1072.546	1039.781	2.317284	0.554242
8	05-Jun-04 02:18:14	99.88812924	3585884	123.4737	120.1716	185.0503	341.2051	1.132809	1.575166259	1071.119	1037.595	2.425258	0.559041
9	05-Jun-04 02:52:48	99.79925081	3583530	119.3576	125.7849	180.8851	339.9324	1.133429	1.571490333	1069.517	1032.51	2.228237	0.561
10	05-Jun-04 03:27:22	99.99951829	3593076	119.1874	122.2145	180.7035	334.8926	1.132975	1.575878953	1071.264	1036.008	2.345301	0.557769
11	05-Jun-04 04:01:55	99.99570058	3593296	115.3199	123.5728	179.5316	343.2047	1.134924	1.567070785	1072.564	1038.705	2.220474	0.548691
12	05-Jun-04 04:36:29	99.99778557	3594047	116.8825	120.3614	172.2053	337.479	1.134918	1.574521113	1073.515	1036.348	2.223359	0.54242
13	05-Jun-04 05:11:02	99.9121164	3586812	125.2734	125.1432	173.9286	325.1617	1.135141	1.575561486	1070.374	1033.973	2.342895	0.539932
14	05-Jun-04 05:45:36	99.86463125	3588696	125.097	120.8408	185.7776	340.6852	1.132473	1.579116923	1073.017	1036.158	2.141609	0.538081
15	05-Jun-04 06:20:10	100.1034866	3594891	118.5363	121.2896	188.0913	336.7156	1.137074	1.575395799	1074.078	1042.551	2.219685	0.535704
16	05-Jun-04 06:54:43	99.90906513	3591598	119.6247	120.6664	184.8509	326.0806	1.135335	1.564621957	1071.905	1048.319	2.249253	0.532469
17	05-Jun-04 07:29:17	99.98538922	3589352	121.2737	125.2953	180.5316	335.8406	1.130588	1.547834804	1072.249	1059.267	2.386729	0.528488
18	05-Jun-04 08:03:50	99.96478248	3588707	126.7437	121.7529	184.9326	331.0555	1.132198	1.580042643	1070.88	1047.61	2.525046	0.532824
19	05-Jun-04 08:38:24	99.89818194	3584546	115.7457	127.1641	183.1336	330.1394	1.134657	1.573749942	1068.563	1047.927	2.397521	0.542549
20	05-Jun-04 09:12:58	99.81908649	3583519	112.5441	128.9434	176.8291	333.5189	1.133336	1.572581459	1073.426	1048.061	2.331244	0.55403
21	05-Jun-04 09:47:31	99.80741893	3582046	119.843	122.1853	180.9586	340.4437	1.133272	1.567603971	1070.902	1038.132	2.493801	0.553881
22	05-Jun-04 10:22:05	99.88021175	3585881	126.6357	116.587	184.3571	344.2483	1.133734	1.563475138	1072.401	1047.174	2.41151	0.556912
23	05-Jun-04 10:56:38	99.91158063	3589554	121.8329	126.1494	180.0807	328.1423	1.13404	1.570719425	1067.26	1049.426	2.325245	0.559508
24	05-Jun-04 11:31:12	99.86311241	3587836	119.8568	121.5048	169.1187	349.4224	1.133023	1.563417473	1071.978	1046.857	2.388507	0.558053
25	05-Jun-04 12:05:46	99.88066442	3587701	124.7359	122.7361	180.4272	341.1968	1.133421	1.572623195	1071.944	1043.273	2.477537	0.563939
26	05-Jun-04 12:40:19	99.89897971	3587180	118.5223	118.3793	184.0814	339.8751	1.13356	1.566508221	1069.322	1042.332	2.537709	0.566332
27	05-Jun-04 13:14:53	99.85768553	3584866	117.7881	123.9898	184.3533	344.3408	1.136261	1.541580182	1069.775	1050.779	2.53122	0.570389
28	05-Jun-04 13:49:26	100.0467708	3596567	113.54	121.7813	186.0871	334.0396	1.132227	1.577120296	1071.567	1060.079	2.321976	0.562621
29	05-Jun-04 14:24:00	99.80171255	3582414	117.1794	127.1346	184.9097	348.3937	1.135299	1.566548567	1070.423	1050.584	2.265663	0.575218
30	05-Jun-04 14:58:34	99.96719028	3590090	123.9677	126.5421	177.072	330.5374	1.134003	1.57886754	1071.31	1056.73	2.396261	0.587011
31	05-Jun-04 15:33:07	99.8761354	3588358	110.8183	123.1695	187.3814	328.8538	1.133571	1.572167747	1071.976	1057.216	2.439136	0.596892
32	05-Jun-04 16:07:41	99.92606791	3591549	124.6866	123.0152	185.0557	344.9514	1.135729	1.572657197	1071.851	1057.383	2.185477	0.602301
33	05-Jun-04 16:42:14	99.96367316	3589294	117.619	125.1876	176.5913	337.2918	1.134238	1.56792641	1072.64	1056.592	2.444127	0.614297
34	05-Jun-04 17:16:48	99.88149288	3590901	118.5064	126.8347	182.7075	346.5823	1.135066	1.5695642	1071.134	1054.267	2.513624	0.623274
35	05-Jun-04 17:51:22	99.92558493	3590600	123.0065	118.367	185.9215	335.0144	1.135607	1.574731879	1068.923	1044.926	2.469756	0.631434
36	05-Jun-04 18:25:55	100.0308306	3593724	117.709	116.9827	187.7537	329.3021	1.133911	1.542378978	1068.445	1038.533	2.378485	0.637277
37	05-Jun-04 19:00:29	100.0322792	3596231	119.1393	130.4716	178.601	332.7723	1.136551	1.571992503	1065.475	1040.164	2.297283	0.639822
38	05-Jun-04 19:35:02	99.91550955	3589352	120.0752	125.1877	185.7609	342.7254	1.133902	1.572930856	1061.4	1040.741	2.364465	0.634756
39	05-Jun-04 20:09:36	99.89593612	3588547	115.6426	121.7729	187.9042	343.087	1.135469	1.573993615	1066.5	1040.498	2.269941	0.626982



Clay R. Madden:
 Input 'a' for Met A data in the yellow boxes and anything else for Met B data in the yellow boxes. Stability Classes for both sets of instruments always shown.

245'
Current Temperature
 63
Current Wind Speed
 16
Current Wind Direction
 265



Current Relative Humidity
 67

Stability Class (A Instruments)
 Slightly stable, E

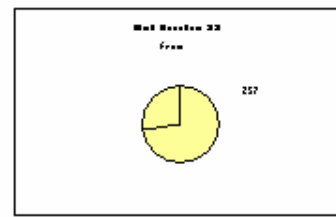
Stability Class (B Instruments)
 Moderately stable, F

	Inst	Inst	Ave	Ave
	MetA	Met B	MetA	Met B
Temp at 33'	63	60	64	61
Temp at 245'	63	62	63	63
Wind Speed at 33'	8	9	12	12
Wind Speed at 245'	16	13	17	17
Wind Direction at 33'	257	262	273	272
Wind Direction at 245'	265	252	272	262
Relative Humidity at 33'	67	74	66	0
Barometric Pressure	29			

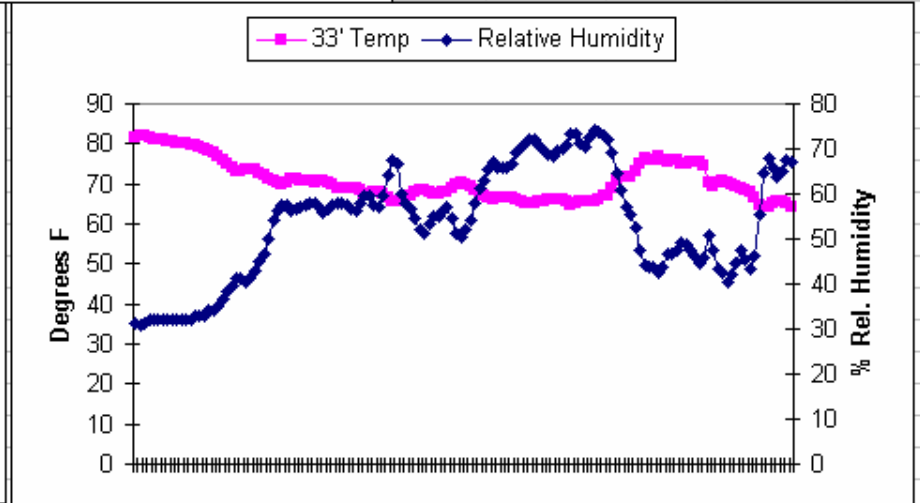
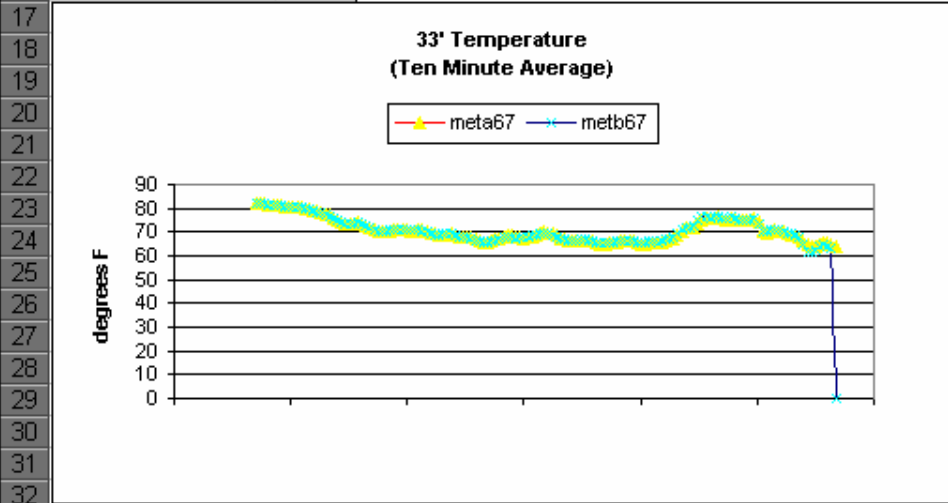
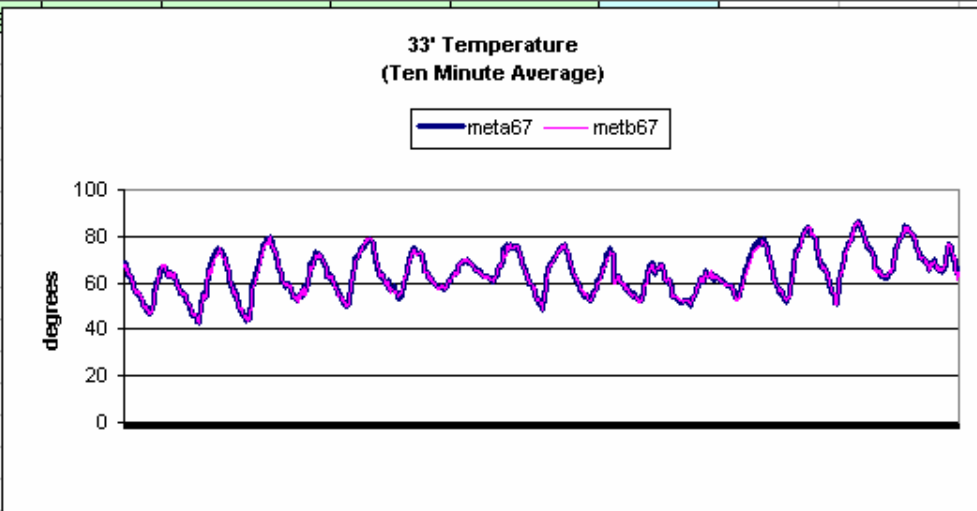
Slightly stable, E Moderately stable, F
 #NAME?

Clay R. Madden:
 If the Met B instrument readings deviate more than about 10% from the met A readings, the font will change to red.

33'
Current Temperature
 63
Current Wind Speed
 8
Current Wind Direction
 257



1	17	days
2		
3		
4		
5	1	
6	2	
7	3	
8	4	
9	5	
10	6	
11	7	
12	8	
13	9	
14	10	
15	11	
16	12	



33	29	
34	30	
35	31	
36	32	
37	33	
38	34	
39	35	

The Day (Routines)

- Logs
- Data Review
 - WinCDMS32[®]
 - Monitors
 - Condition Reports (CRs) from Previous 24 hrs
 - Discuss Issues with Engineering



PTL Condition Report (CR) Review



VIEW: Facility: Columbia Generating Station Status: ALL Sort By: CR Number

CR #: 2-05-02954 Originator: MEE, DAVID L EXT: 2360 Org: 52830 Status: REVIEWED

Facility: Columbia Generating Station Discovery: 05/05/2005 16:15

PER: Summary: Isotopic analyses of the TEA effluent exhaust particulate samples have

PTL: A 227062 identified low level Iodine 133 activity for the last 4 weeks

Detailed Desc.: The weekly TEA effluent exhaust particulate samples for the last 4 weeks indicate that low levels of I-133 are being released from this location. I-133 has been identified on the weekly samples from 4/12/05 to 5/3/05 with activity levels trending up from 4.75 E-14 to 1.30 E-13 uCi/cc. Iodines are not normally identified from this sample location with only one other iodine identification having been made this fuel cycle.

The activity levels identified are low level and just above the isotopic counting systems lower level of detection for this nuclide. No other isotopes were identified on these samples. It is not believed that the increase in I-133 activity will have a significant effect on off-site dose rates. Chemistry has calculated that the estimated off-site organ dose from the Turbine Building for the last week of April is

Actions Taken: Confirmed I-133 identification, noted trend, wrote CR. Recommends this as a trend CR only.

The Day (Routines)

- Logs
- Data Review
- Document Issues –
 - Trending Log
 - CRs
 - WinCDMS32[®]
 - Intranet Training

Chemistry Effluent Log

Table of Contents

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Turbine Building Effluent Log

Reactor Building Effluent Log

Radwaste Building Effluent Log

Plant Transients Log

Off Gas System Log

Service Water Systems Log

Containment Monitoring System Log

Main Steam System Log

LOCA Monitors

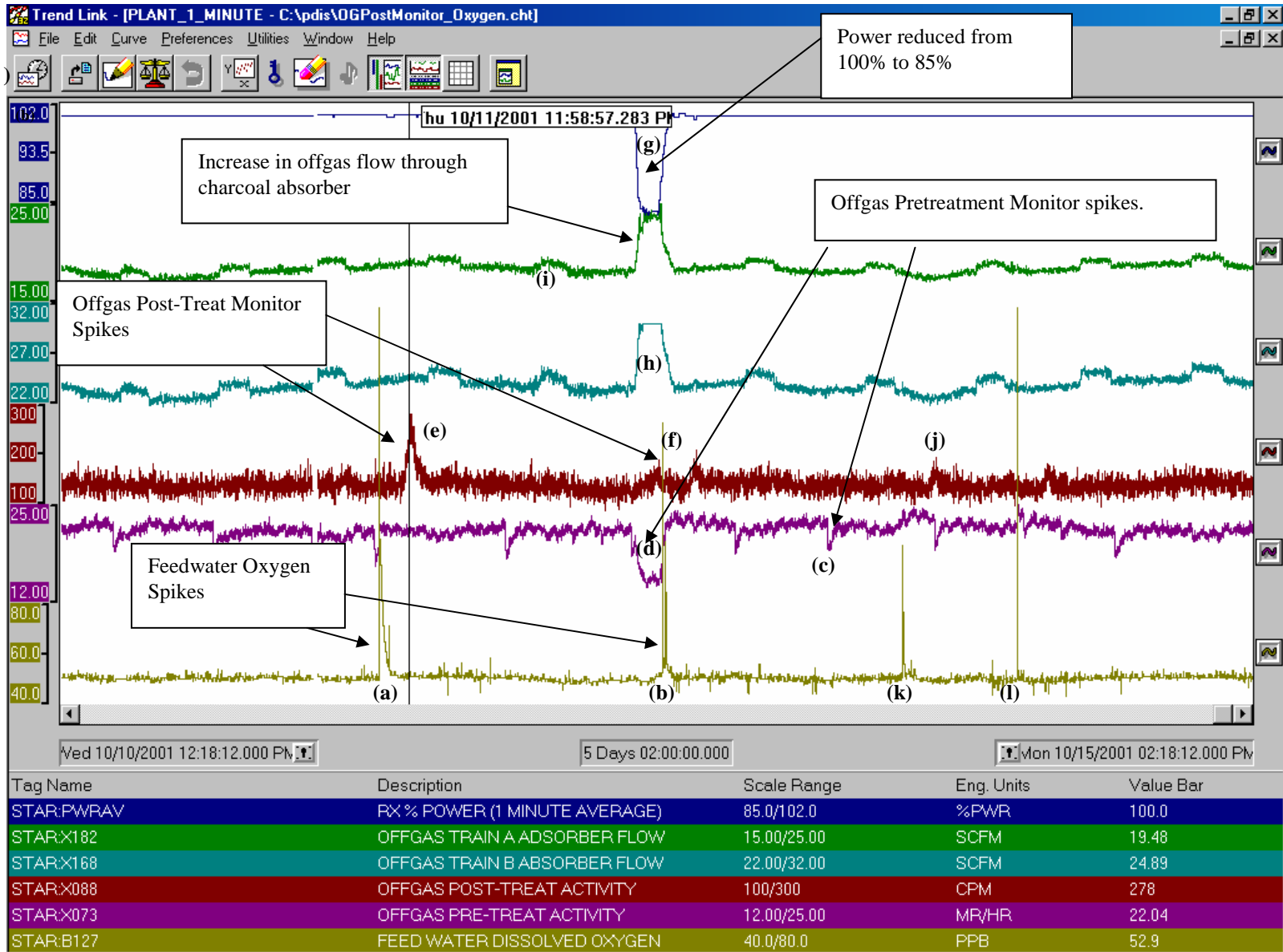
Met Tower Log

Miscellaneous Effluent Info

Turbine Building Effluent Log

- 5/9/05 Spiking on TEA-RIS-13A from 5/4 to 5/6 due to performance of CC/RC. I&C replaced ratemeter, looks like detector restored on morning of 5/06, however detector is still in loop status.
- 5/5/05 Spiking on TEA-13 on 5/4 at ~-730 and 1430 due to monthly source check.
- 4/27/05 Spiking on TEA-RIS-13a on 4/26 and 4/28 due to performance on CC/RC. 5/2/05 Detector remains OOS due to too high of background for MCR.
- 4/25/05 TEA-RIS-13A declared OOS by MCR due to it reading too high for current conditions. See loop 9325, WR 29046234 and CR 2-05-02552.
- 4/5/04 Spiking on TEA-RIS-13A on 4/4/05 from performance of CC/RC. Detector back in service at 1713 on 04/04/05. Spiking on TEA-RIS-14 at

Monitor Trends on Intranet



The Year (Selected Issues)

Kaman Science Detector Replacement Project

- Monitors Involved
- Project Engineers, Lost Knowledge

The Year (Selected Issues)

Kaman Science Detector Replacement Project

- Monitors Involved
- Project Engineers, Lost Knowledge
- Source Checks and Check Sources

EPRI TR-102644 Draft Fig 5-20

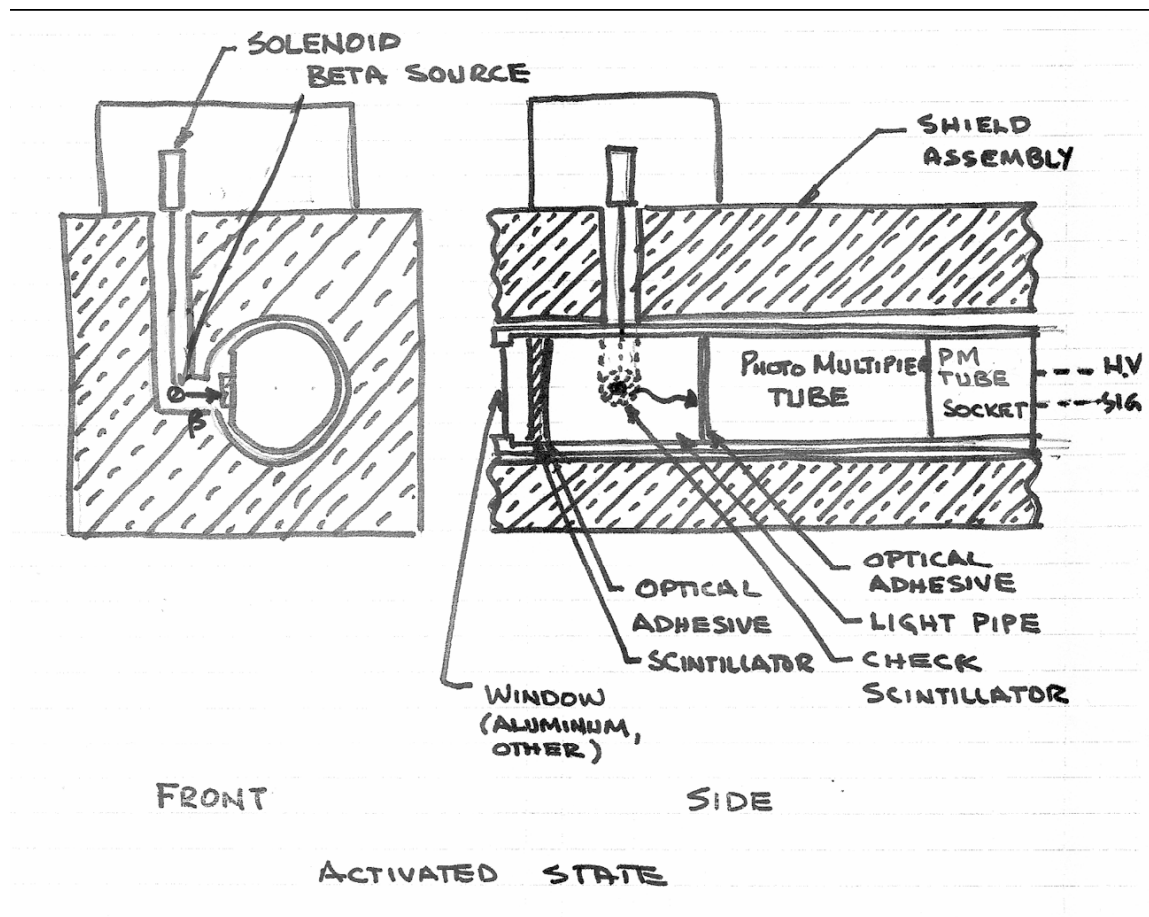


Figure 5-20
Beta Scintillator Check Source – Activated State

“Source Check” Conflict

Offsite Dose Calculation Manual definition

"A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to a radioactive source."

Detector Design

Check Source does not stimulate historic concept of ‘channel sensor’.

‘Channel sensor’ not defined in NUREG-0473 or -1302

‘Qualitative assessment’ allows appropriate flexibility

Source Check Resolution

- Purpose: Is the monitor responding to radioactive material?
- No change to the ODCM is planned
 - Offgas system design
 - Background trending for window.
 - Check source trending for detectors.
 - Negative impact of daily detector removal.
 - Transfer source check every 24 months.
 - Grab sample verification as needed.
 - The 'detector assembly' = window, detector, and photomultiplier tube/preamplifier.

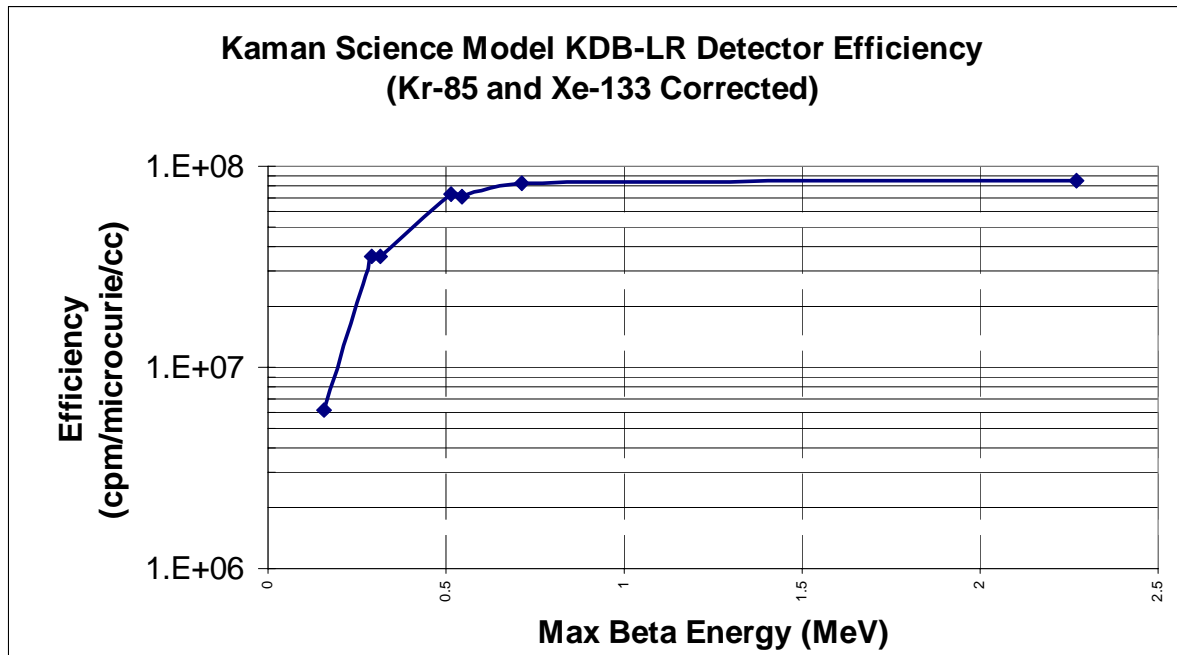
The Year (Selected Issues)

Kaman Science Detector Replacement Project

- Monitors Involved
- Project Engineers, Lost Knowledge
- Source Checks and Check Sources
- Setpoint Calculations

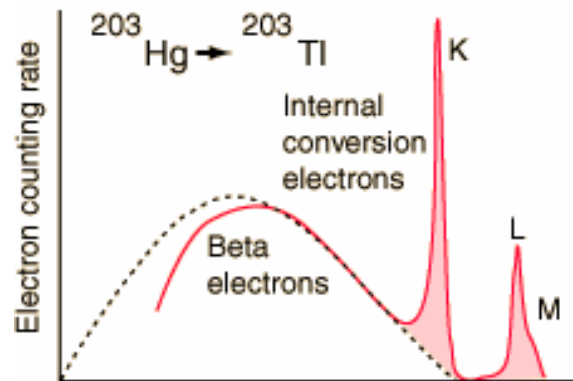
Relative Efficiency Bases

- Bases document not valid
- Kaman Recommendation: Use beta max energy vs efficiency curve



Problems with Relative Efficiencies

- Electrons and betas look the same to a detector.
 - One energy listed for Electrons
 - Range of energies listed for Betas
- Max energy is not always most probable emission



Kr-85 Example

Beta Emission Products: Kr-85			
	Maximum	Average	
Fraction	Energy(MeV)	Energy(Mev)	(Fract)(Ave Energy)
0.00437	0.17301	0.0475	0.000207575
<u>0.99563</u>	<u>0.687</u>	0.2514	0.250301382
			0.250508957

- Most probable emission energy will be average energy, not maximum energy.
- Efficiency drops off fast at lower energies.

Xe-133

Beta Emission Products: Xe-133			
	Maximum	Average	
Fraction	Energy(MeV)	Energy(Mev)	(Fract)(Ave Energy)
0.000076	0.0435	0.0111	8.436E-07
0.0069	0.26668	0.0751	0.00051819
<u>0.993</u>	<u>0.3463</u>	0.1006	0.0998958

Electron Emission Products: Xe-133			
Fraction	Energy(MeV)		(Fract)(Energy)
0.003291	0.043636		0.000143606
0.004342	0.080766		0.000350686
0.016709	0.07978		0.001333044
0.056275	0.0255		0.001435013
0.081358	0.075283		0.006124874
0.49693	0.00355		0.001764102
0.53266	0.045012		0.023976092
			0.13554225

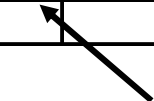
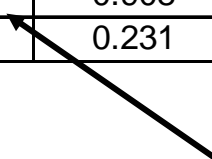
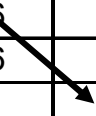
Xe-138

Beta Emission Products: Xe-138

	Maximum	Average	
Fraction	Energy(MeV)	Energy(Mev)	(Fract)(Ave Energy)
0.0016	1.3679	0.498	0.0007968
0.00168	1.68	0.63717	0.001070446
0.0019	1.5348	0.571	0.0010849
0.00227	0.23162	0.064	0.00014528
0.0023	0.94599	0.323	0.0007429
0.0027	1.788	0.682	0.0018414
0.0028	0.71788	0.233	0.0006524
0.0046	0.24903	0.07	0.000322
0.0306	0.40242	0.119	0.0036414
0.05	<u>2.7292</u>	1.099	0.05495
0.051	2.4816	0.996	0.050796
0.09	2.7243	1.107	0.09963
0.095	0.47694	0.145	0.013775
0.138	2.3279	0.925	0.12765
0.201	2.2898	0.908	0.182508
0.326	0.71332	0.231	0.075306

Electron Emission Products: Xe-138

Fraction	Energy(MeV)		(Fract)(Energy)
0.001077	0.36045		0.000388205
0.002406	0.20658		0.000497031
0.002723	0.39851		0.001085143
0.002898	0.2526		0.000732035
0.003394	0.14804		0.000502448
0.004235	0.0255		0.000107993
0.016074	0.11777		0.001893035
0.01805	0.22233		0.004013057
0.034251	0.010619		0.000363711
0.10373	0.009633		0.000999231
0.10587	0.004619		0.000489014
0.32089	0.003633		0.001165793
0.49107	0.00355		0.001743299
<u>0.50958</u>	0.005136		0.002617203
			0.631509722



Efficiency Comparison

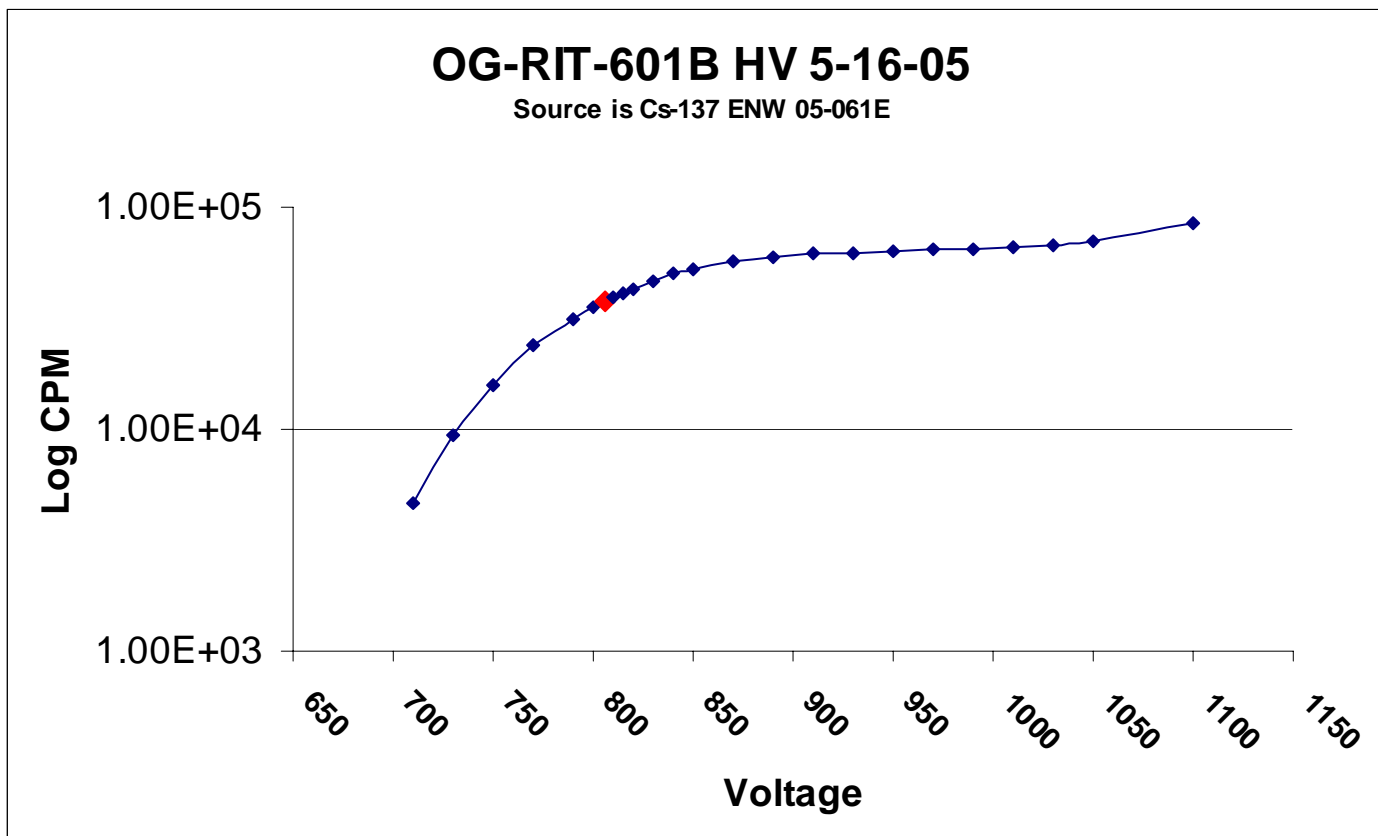
Nuclide	Current Relative Efficiency	Relative Efficiency (max energy)	Relative Efficiency (ave energy)
Kr83m	0.00233	0.01	0.07
Kr85m	1.88	1.63	4.63
Kr87	4.19	1.73	13.66
Kr88	2.05	1.67	7.15
Kr89	2.56	1.73	13.66
Xe131m	0.456	0.12	0.99
Xe133m	0.674	0.20	1.63
Xe133	1	1.00	1.00
Xe135m	0.233	0.04	0.36
Xe135	1.93	1.65	5.85
Xe137	2.56	1.71	13.66
Xe138	2.4	1.71	13.01
Kr-85		1.67	4.23
Rb-88		1.71	13.66
Ar-41		1.67	10.24

The Year (Selected Issues)

Kaman Science Detector Replacement Project

- Monitors Involved
- Project Engineers, Lost Knowledge
- Source Checks and Check Sources
- Setpoint Calculations
- Primary Calibration
- HV Plateau

HV Plateau



The Year (Selected Issues)

- **Monitor Issues**
 - **Poor Peak Resolution – Cable Issues**
 - **Sodium Light Ring Waves**
 - **INOPERABLE Monitors**
 - **Cross Talk Between Divisions**
 - **Noise from Check Source Mechanism**
 - **Channel Checks with LOCA Monitors**
 - **Loop Drift and Uncertainty**

Check Source Noise

- Monthly Source Check response lower than expected
- Resolution:
 - It was found that by pressing the check source button 2 or 3 times quickly and then holding the button in that the final detector response could be changed from 600 – 2000 cpm.
 - Work Order written to investigate source check position assembly or noise

LOCA Monitor Channel Checks

- One of two monitors flat. Channel Check difficult.
- Resolution: None
 - Ion chambers
 - At low end of range
 - Monitor is partially shielded by structural supports
 - Noise

Loop Uncertainties & Drift

- Incorporate Loop Uncertainties and Drift in ODCM-based effluent monitor setpoints?
- Resolution: No
 - Only RG 1.97/PAM
 - No ODCM requirement
 - Manpower
 - Current setpoints already conservative

The Year (Selected Issues)

- Sample Analysis Improvements
 - Noble Gas Sampling
 - Tritium Sampling

Noble Gas Sampling Issue

- Noble Gas Grab sample of system under vacuum.
 - Quick Disconnect to hose to 100 cc vial or 4150 cc Marinelli
 - Volume of gas in 100 cc vial at -17” Hg is 43 cc at STP
 - Pressure equalization requires sufficient hose volume to supply 57 ml of sample. A 31.5” length of 3/8” ID hose is needed
 - A 4150 cc Marinelli needs 108’ of 3/8” hose at -17” Hg
- Possible Resolutions:
 - longer hoses
 - second vial upstream of sample vial
 - Use a sample pump to get positive pressure.

Tritium Sampling

- Dew Point/humidity measurement errors.
 - ~12 hour grab sample
 - Diurnal fluctuations large (20 – 80%)
 - Building vs sample line humidity
- Resolution:
 - Modification of sampling apparatus to permit gravimetric analysis of moisture content.
 - F&J flow meter

The Year (Selected Issues)

- Bases Documents & Records Retrieval
 - Documentation for ODCM/RG 1.21 Bases not retrievable.
 - Resolution: Recreate documents
 - Error Analysis
 - GASPAR input values
 - XOQDOQ input values
 - 50-Mile Land Use Study

The Year (Selected Issues)

- Drywell Leak Detection
 - RG 1.45
 - 12 hour grab sample required.
 - Particulate monitors effective at identifying leak.

The Year (Selected Issues)

- Isokinetic Flow
 - Corrections for linear velocity mismatches
 - CGS uses ANSI N13.1-1969, Appendix C
 - Particle Size needed
 - Mass loading analysis vs cascade impactor
 - ASHRAE: 99% LE 1 micron
 - No clogging or hot spots on sample lines
 - Buildup of particulates on nozzles
 - Appendix C removed from 2001 version

Mass Loading

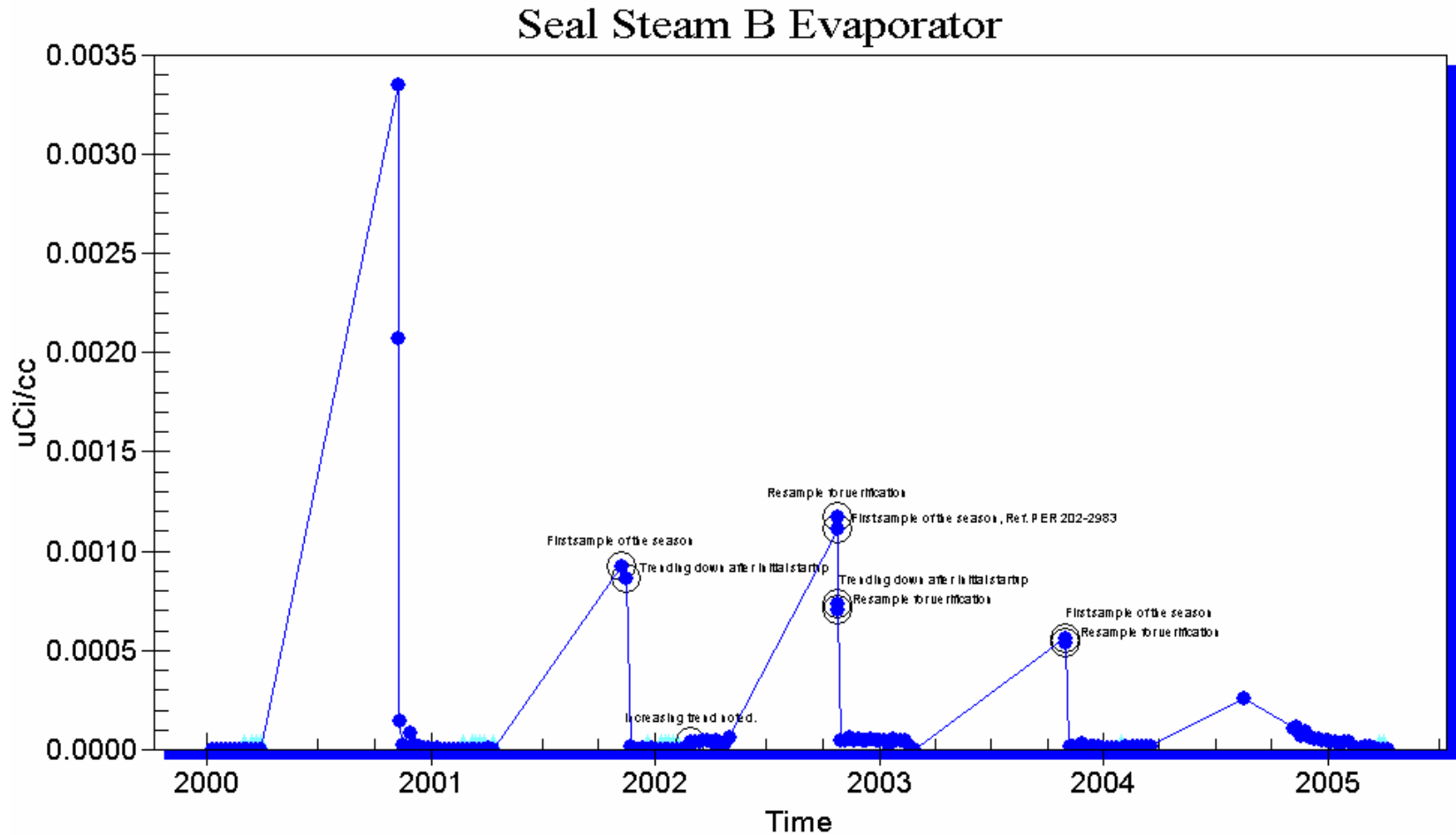
	Reactor Bldg	Turbine Bldg-L	Turbine Bldg -R	Radwaste Bldg-A	Radwaste Bldg-B	Radwaste Bldg-C
Tare	0.1113	0.1185	0.119	0.1144	0.1136	0.1186
July 3rd	0.1134	0.1194	0.1197	0.1126	0.1147	0.1198
Mass Loading (gms)	0.0021	0.0009	0.0007	-0.0018	0.0011	0.0012
Total cc's	6.44E+08	8.02E+08	8.02E+08	8.76E+07	8.07E+08	8.02E+08
grams/cc	3.26E-12	1.12E-12	8.72E-13	-2.06E-11	1.36E-12	1.50E-12

The Year (Selected Issues)

- Meteorological Tower Issues
 - Stability class (delta T) errors since 1995
 - New JFD software & Initial recalculation results
 - Followup analysis
 - Litigation defense analysis
 - Find portal warning to plant records
 - Resend JFD tables
 - Straight line plume vs puff models

The Year (Selected Issues)

- Heating Steam Tritium



The Year (Selected Issues)

- Circ Water/Service Water spikes following Mt. St. Helens eruption
- Sodium light ring waves
- Removal of HVAC Part/Iodine Monitors
- **Insignificant release paths**

Insignificant Release Paths

- Roll up doors/ Hatches/ Doors propped with hoses/ HVAC outages/ etc.
- Regulatory Guide 1.21, Page 3
- 2. Location of Monitoring - All major and potentially significant paths for release of radioactive material during normal reactor operation, including anticipated operational occurrences, should be monitored.
Measurements of effluent volume, rates of release and specific radionuclides should be made, insofar as practicable, at the point(s) which would provide data that are the most representative of effluent releases to the plant environs.

END OF PRESENTATION

