BUILDING A WORLD OF DIFFERENCE®

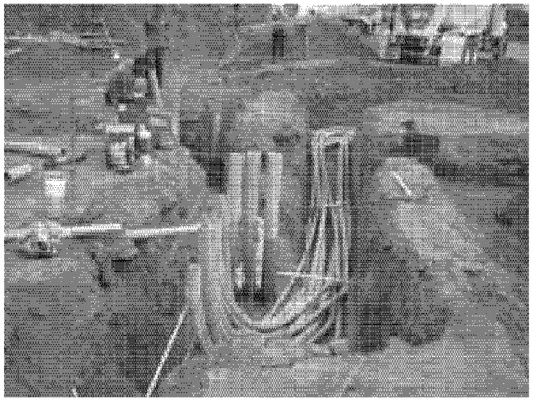
BLACK & VEATCH

Ghent Unit 3 PJFF challenges

- Site constraints
- Long ductwork for Unit 3
- Restricted access around the footprint of Unit 3 ESP – tight space
- Difficult crane access for tie in of Unit 3 fabric filter inlet/outlet ductwork

Ghent Unit 4 PJFF challenges

- Demolish and relocate underground utilities
  - Electrical manholes
  - Water wells
  - Storm sewer boxes and piping
  - Circulating cooling water piping

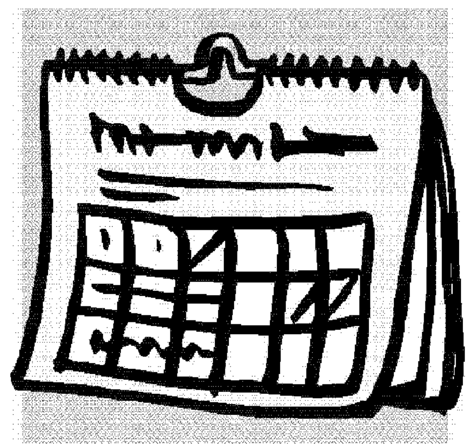


Typical PJFF schedule

- 32 to 36 months
  - Engineering & procurement – 16 months
  - Erect PJFF foundations – 6 months
  - Erect PJFF – 12 months
  - Tie-in outage – 1 month
  - Start-up – 1 month

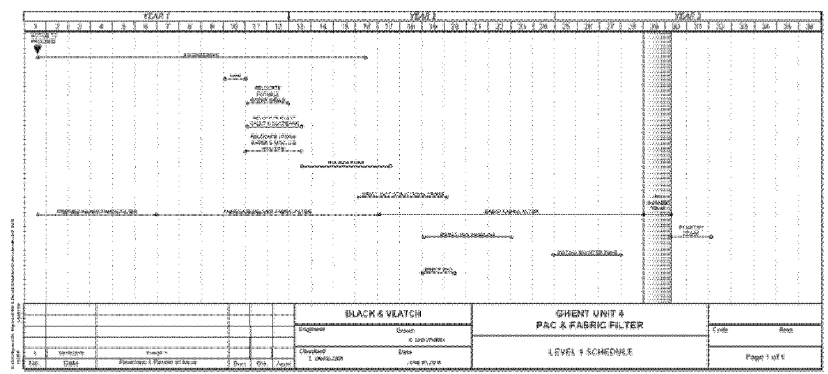
Typical SCR schedule

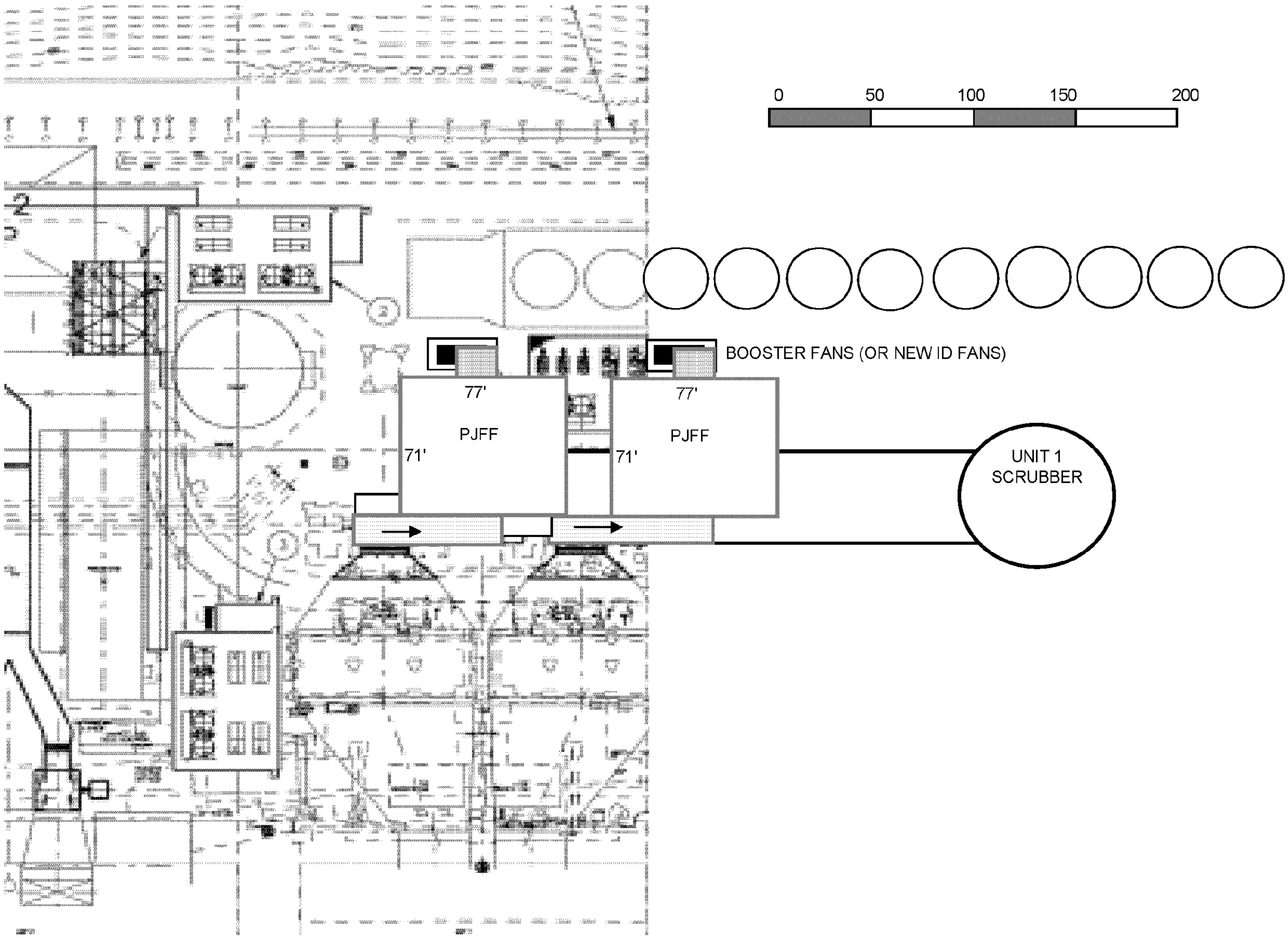
- 32 to 36 months
  - Engineering & procurement – 16 months
  - Erect SCR foundations – 4 months
  - Erect SCR support steel – 4 months
  - Erect SCR & ductwork – 8 months
  - Tie-in outage – 1 month
  - Start-up – 1 month

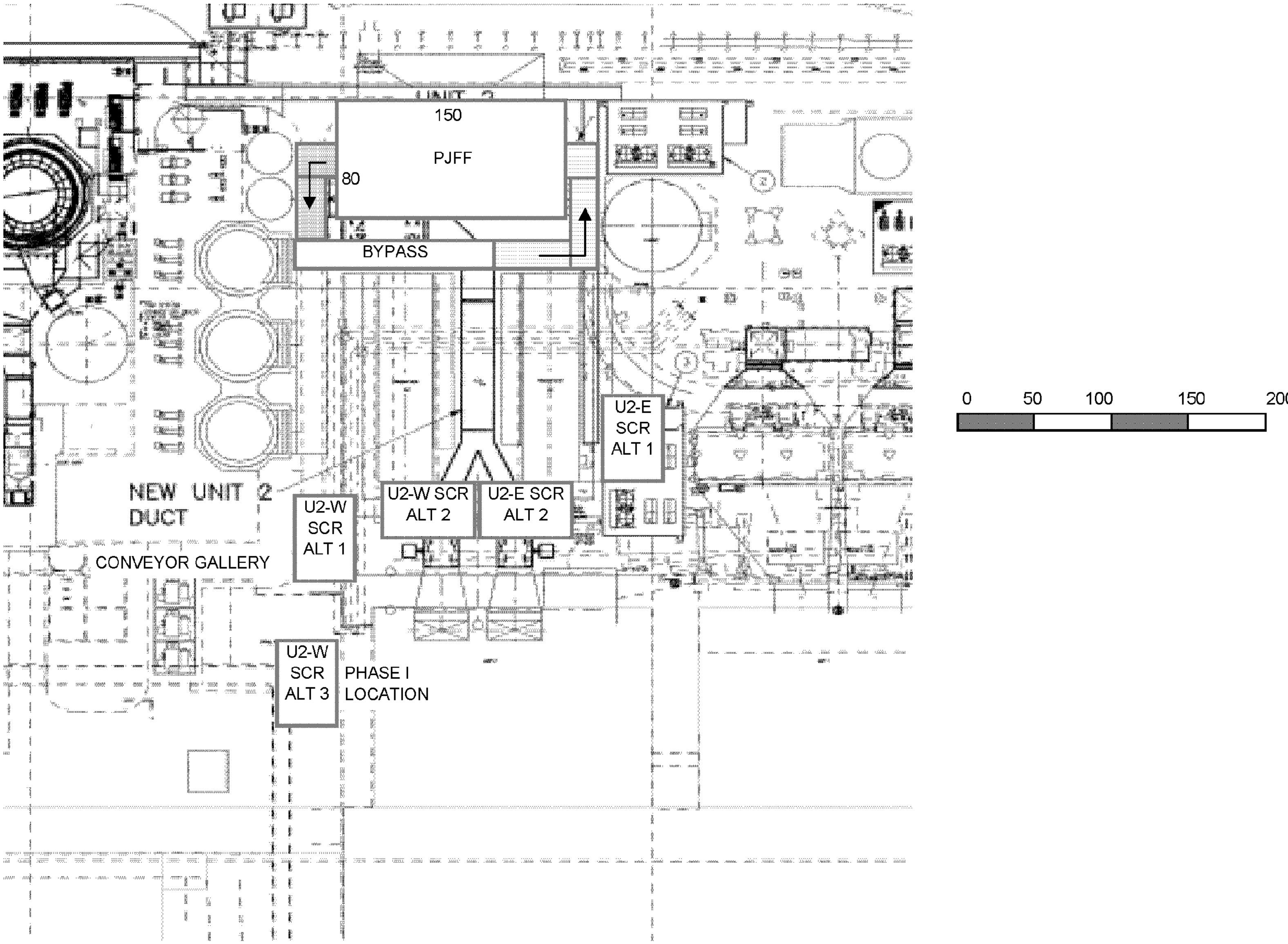


Phase I implementation schedule

- Ghent Unit 1 PJFF – 36 months
- Ghent Unit 2 SCR & PJFF – 44 months
- Ghent Unit 3 PJFF – 32 months
- Ghent Unit 4 PJFF – 32 months




0
50
100
150
200
BOOSTER FANS (OR NEW ID FANS)
77'
77'
PJFF
PJFF
71'
71'
UNIT 1
SCRUBBER


150
PJFF
80
BYPASS
NEW UNIT 2
DUCT
CONVEYOR GALLERY
U2-E
SCR
ALT 1
U2-W SCR
ALT 2
U2-E SCR
ALT 2
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SCR
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U2-W
SCR
ALT 3
PHASE I
LOCATION
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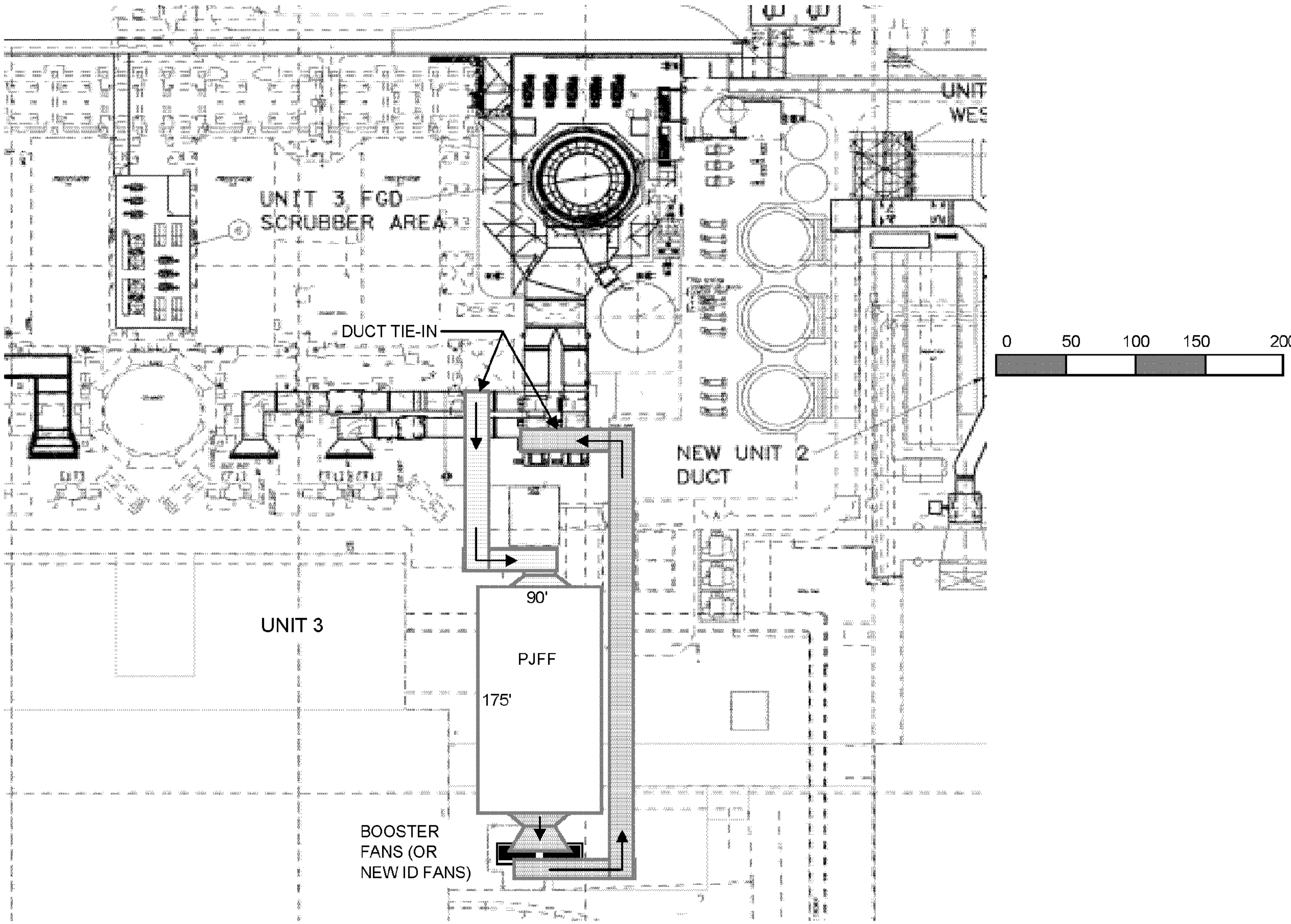
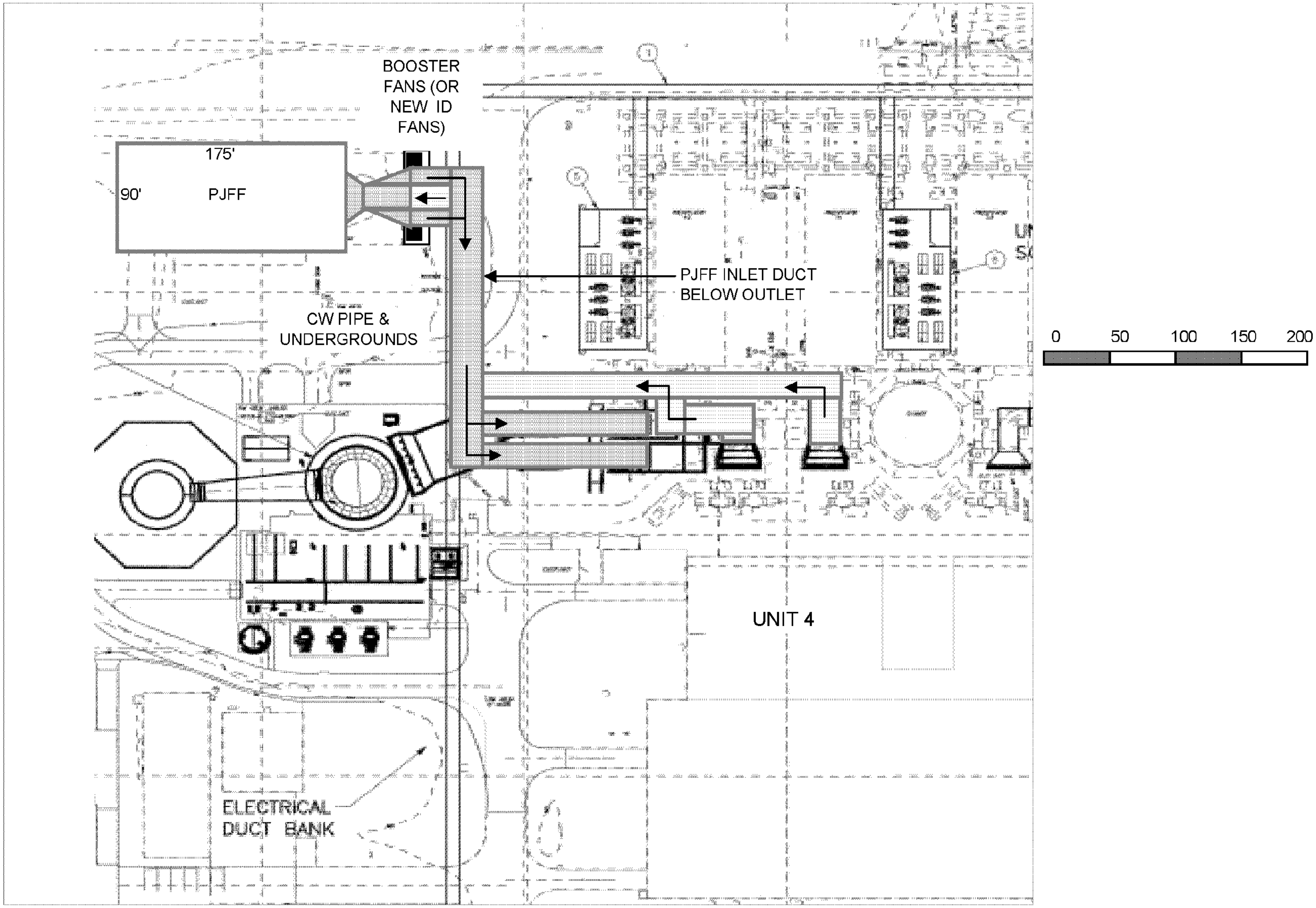

UNIT 3 FGD
SCRUBBER AREA
DUCT TIE-IN
NEW UNIT 2
DUCT
UNIT 3
90'
PJFF
175'
BOOSTER
FANS (OR
NEW ID FANS)
0
50
100
150
200


BOOSTER FANS (OR NEW ID FANS)
175'
90'
PJFF
PJFF INLET DUCT BELOW OUTLET
CW PIPE & UNDERGROUNDS
UNIT 4
ELECTRICAL DUCT BANK
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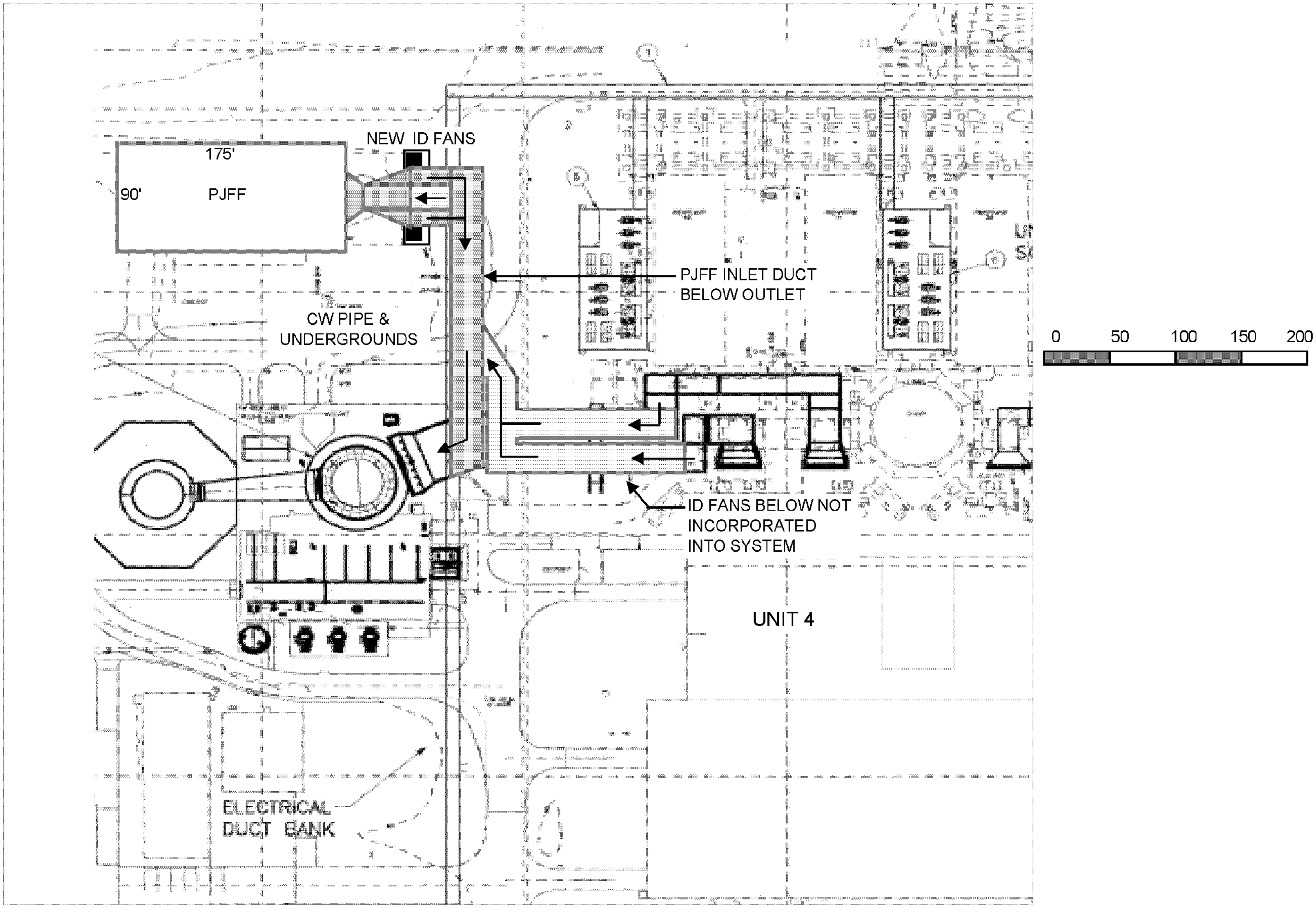
NEW ID FANS
175'
90'
PJFF
PJFF INLET DUCT
BELOW OUTLET
CW PIPE &
UNDERGROUNDS
ID FANS BELOW NOT
INCORPORATED
INTO SYSTEM
UNIT 4
ELECTRICAL
DUCT BANK
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From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	168908 E.ON-AQC; Jackson, Audrey; Crabtree, Jonathan D.; Mahabaleshwarkar, Anand; Wehrly, M. R.; Lausman, Rick L.; Hintz, Monty E.; Goodlet, Roger F.; Betz, Alex; Lucas, Kyle J.; Smith, Dave; Mehta, Pratik D.; Greenwell, Sarah
Sent:	11/29/2010 9:42:30 AM
Subject:	168908.28.3000 101129 - Action Item List
Attachments:	168908 LG&E AND KU ACTION ITEM LIST.xls

Eileen,

Attached is the updated action item list for our weekly Monday call.

Regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

	A	B	C	D	E	F	G	H	J	K	L	M
1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		DATE ADDED	IG DUE DA	RR DUE DA	OMPL DAT
2		DOC/MTNG	DATE				CO.	INITIAL				
3		**GENERAL**				n--	A					
4	27	Conf Call 10102	10/25/10	Prepare letter spec for Fabric Filter workshop.	41.0806	n--	B&V	AM/RL	10/19/10	TBD		
5		**MILL CREEK**				Mill Creek	A					
6	35	--	11/8/10	Incorporate LG&E and KU comments to Mill Creek PDM	22.1000	Mill Creek	B&V	MW/JC	11/08/10	11/16/10	11/29/10	
7	32	Email 41.0803 1	11/5/10	Provide comments and direction on Mill Creek Validation	41.0803	Mill Creek	LG&E/KU	ES	11/08/10	11/16/10	11/29/10	
8	43	Email 14.1000 1	11/16/10	Provide LG&E/KU comments on Mill Creek validation pr	14.1000	Mill Creek	LG&E/KU	ES	11/16/10	11/22/10	11/29/10	
9		**GHENT**				Ghent	A					
10	40	--	11/8/10	Incorporate LG&E and KU comments to Ghent PDM an	22.1000	Ghent	B&V	MW/JC	11/15/10	11/30/10	12/06/10	
11		**E.W. BROWN**				Brown	A					
12	41	Brown KO Mtg M	11/15/10	Review U3 SCR arrgmnts & comment on potential PJFF	14.1000	Brown	B&V	TH/ MH	11/16/10	12/10/10		
13	38	Brown KO Mtg M	11/15/10	Prepare Unit 1 and 2 sketches with and without SCR	14.1000	Brown	B&V	TH	11/15/10	01/10/11		
14	42	Email 14.1000 1	11/16/10	Provide LG&E/KU comments on Brown Kick Off Meetin	14.1000	Brown	LG&E/KU	ES	11/16/10	11/22/10	11/29/10	
15	44	Conf Call 10112	11/22/10	Establish date for Brown Validation meeting.	41.0803	Brown	LG&E/KU	ES	11/22/10	11/29/10		
16	45	Email 22.1000 1	11/24/10	Provide comments on Brown Project Design Memorand	22.1000	Brown	LG&E/KU	ES	11/29/10	12/03/10		
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1	STATUS	NOTES					
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4	Open	Discuss what the spec and workshop would look like during the 11/29 conference call (11/22)					
5							
6	In Progress						
7	Open						
8	Open						
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10	In Progress						
11							
12	Open	Pending the receipt of the Unit 3 SCR arrangements from the Brown Info Request					
13	Open						
14	Open						
15	Open	Potentially to be scheduled for the week of January 17th. (11/29)					
16	Open						
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1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		)ATE ADDE	IG DUE DA	RR DUE D/	OMPL DAT	STATUS
2		DOC/MTNG	DATE				CO.	INITIAL					
3	34	--	11/8/10	Prepare and issue draft of Project Design Memorandum	22.1000	Brown	B&V	TH	11/08/10	11/25/10		11/24/10	Complete
4	36	Brown KO Mtg	######	Provide a list of "sacred ground" areas at Brown.	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/23/10	Complete
5	39	Brown KO Mtg	######	Identify a contact person for data collection	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/22/10	Complete
6	33	--	11/8/10	Prepare Data Request for Brown Station.	41.0100	Brown	B&V	TH	11/08/10	11/18/10		11/19/10	Complete
7	37	Brown KO Mtg	######	Provide drawings of the Unit 3 SO3 mitigation project	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/11/10	Complete
8	25	Email 22.1000	######	Provide LG&E and KU comments on Ghent Project Des	22.1000	Ghent	LG&E/KU	ES	10/21/10	10/28/10		11/08/10	Complete
9	23	Conf Call 1010	######	Provide draft of Mill Creek Validation Report for LG&E/K	41.0803	Mill Creek	B&V	TH/MW	10/19/10	11/05/10		11/05/10	Complete
10	29	--	######	Provide Brown Kickoff presentation .	14.1000	Brown	B&V	TH	10/29/10	11/05/10		11/03/10	Complete
11	24	Conf Call 1010	######	Prepare differences between SCR and SNCR for Brown	14.1000	Brown	B&V	AM/RL	10/19/10	11/09/10		11/03/10	Complete
12	28	--	######	Provide Mill Creek Validation presentation.	41.0803	Mill Creek	B&V	TH	10/29/10	11/05/10		11/03/10	Complete
13	31	Email 14.1000	######	Provide comments on Brown Kickoff meeting agenda	14.1000	Brown	LG&E/KU	ES	10/27/10	11/02/10		11/01/10	Complete
14	30	Email 14.1000	######	Provide comments on Mill Creek Validation meeting age	14.1000	Mill Creek	LG&E/KU	ES	10/27/10	11/02/10		11/01/10	Complete
15	26	--	######	Provide sketches of Unit 4 AQC equipment in the thicke	41.0402	Mill Creek	B&V	MH	10/25/10	10/27/10	10/27/10	11/01/10	Complete
16	22	Email 14.1000	######	Provide LG&E/KU comments on Ghent Site Visit meeti	14.1000	Ghent	LG&E/KU	ES	10/15/10	10/19/10		10/22/10	Complete
17	11	KO & MC Site V	9/20/10	Evaluate pros and cons of NID system for November tec	14.1000	n--	B&V	AM/RL	09/21/10	Nov. 2010		10/21/10	Complete
18	21	Ghent Site Visit	######	Prepare Ghent Information Request.	41.0100	Ghent	B&V	TH	10/11/10	10/15/10		10/18/10	Complete
19	15	KO & MC Site V	9/20/10	Review B&V electrical study conducted in the 1990s	14.1000	Mill Creek	B&V	JB	09/21/10	09/24/10	TBD	10/18/10	Complete
20	18	Email 41.0100	9/29/10	Choose the coal fuel design basis for Mill Creek, Ghent,	41.0100	n--	LG&E/KU	ES	09/30/10	10/06/10		10/18/10	Complete
21	4	KO & MC Site V	9/20/10	Use B&V file system to set up LG&E/KU document stora	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/18/10	Complete
22	12	KO & MC Site V	9/20/10	Schedule vendors for evaluation of existing scrubbers	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/18/10	Complete
23	1	KO & MC Site V	9/20/10	Determine location for Mill Creek Task 6 Technology Se	14.1000	Mill Creek	LG&E/KU	ES	09/21/10	10/15/10		10/12/10	Complete
24	20	Email 22.1000	10/5/10	Provide comments on the Mill Creek Project Design Me	22.1000	Mill Creek	LG&E/KU	ES	10/11/10	10/12/10		10/12/10	Complete

	O	P	Q	R	S	T	U	V	W	X
1	NOTES									
2										
3	PDM issued for In-House Review (11/18)									
4	Added to Info Request Priority 1									
5										
6										
7										
8										
9										
10										
11	To be included in Brown KO presentation. Also include fabric filter discussion. (10/25)									
12	Final sent on 11/5									
13										
14	Confirmed LG&E and KU team is available for the afternoon on 11/9									
15										
16	Eileen has no comments (10/18). Waiting for comments from LG&E/KU members.									
17	Will send powerpoint presentation in the next couple of days (10/18).									
18										
19	B&V could not locate study. Added to Data Request. Will review when LG&E/KU provides study.									
20	Use future coal. (10/11) Chlorine needs to be corrected (10/18)									
21	Audrey is working on it (10/11). It is set up. Eileen to review (10/18).									
22	To be scheduled week of 10/25. B&V requested to be included in debriefing w/ each vendor.									
23	MC Technology selection meeting to be held in Louisville on 11/9 with Brown KO mtg on 11/10&11.									
24	Eileen's comments provided on 10/12. Sent to Alex for further comments.									

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25	13	KO & MC Site \	9/20/10	Provide structural steel study assessments	14.1000	n--	LG&E/KU	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
26	14	KO & MC Site \	9/20/10	Provide minimum access dimension box	14.1000	n--	LG&E/KU	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
27	7	KO & MC Site \	9/20/10	Determine personnel assignments for document review	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/04/10	Complete
28	19	Re: Email 41.01	9/30/10	B&V to provide schedule/deadlines for Mill Creek inform	41.0100	Mill Creek	B&V	TH	09/30/10	10/06/10		10/04/10	Complete
29	6	KO & MC Site \	9/20/10	Create IBackup FTP site for large file transfer	14.1000	--	B&V	KL	09/21/10	09/24/10		09/29/10	Complete
30	10	KO & MC Site \	9/20/10	Prepare data inventory and information request	14.1000	Mill Creek	B&V	MW/JC	09/21/10	09/24/10		09/29/10	Complete
31	5	KO & MC Site \	9/20/10	Provide engineering cost estimate at end of each month	14.1000	n--	B&V	TH	09/21/10	09/30/10		09/28/10	Complete
32	2	KO & MC Site \	9/20/10	Determine dates for Ghent kick-off meeting	14.1000	Ghent	LG&E/KU	ES	09/21/10	09/23/10		09/27/10	Complete
33	16	KO & MC Site \	9/20/10	Evaluate the possibility of accelerating the installation of	14.1000	Mill Creek	LG&E/KU	ES &TH	09/21/10	TBD		09/27/10	Complete
34	17	Email 14.1000	9/20/10	Provide LG&E/KU comments on Kick Off Meeting and M	14.1000	--	LG&E/KU	ES	09/21/10	09/24/10		09/24/10	Complete
35	3	KO & MC Site \	9/20/10	Provide DVD copy of Phase I Report	14.1000	--	B&V	TH	09/21/10	09/24/10		09/22/10	Complete
36	9	KO & MC Site \	9/20/10	Update PIM with Eileen's Ghent contact information	14.1000	--	B&V	MW	09/21/10	09/24/10		09/21/10	Complete
37	8	KO & MC Site \	9/20/10	Determine if a Monday, 2 pm EST project conference ca	14.1000	--	B&V	TH/MW	09/21/10	09/23/10		09/21/10	Complete
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25	CD received 9/27. Units 1, 2, and 4 on CD. Unit 3 still needed. Email request sent on 9/28.									
26	CD received 9/27. Access Dimension not included. Email request sent 9/28.									
27	MC - Alex Betz and a couple others at plant. Process in place (10/4)									
28										
29										
30										
31	Sent 9/28.									
32	Scheduled for October 6&7									
33	B&V email addressed the acceleration of the SCR install for MC 1 & 2 (9/17). LG&E/KU replied no change in direction at this time (9/27).									
34	Final issued on 9/24									
35	Set received on 9/22									
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1	LG&E/KU	LG&E and KU		
2	AB	Alex Betz - Mill Creek		
3	DS	Dave Smith - Ghent		
4	ES	Eileen Saunders		
5	GB	Greg Black		
6	GR	Gary Revlett		
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17	BV	Black & Veatch (B&V)		
18	TH	Tim Hillman		
19	KL	Kyle Lucas		
20	AM	Anand Mahabaleshwarker		
21	MK	Mike King		
22	RL	Rick Lausman		
23	MW	M.R. Wehrly		
24	MH	Monty Hintz		
25	JB	Jim Bayless		
26	JC	Jonathan Crabtree		

From: Saunders, Eileen
To: Straight, Scott; Kirkland, Mike
CC: Didelot, Joe; Buckner, Mike; Betz, Alex; 'Hillman, Timothy M.'
Sent: 10/25/2010 2:08:17 PM
Subject: FW: 168908.41.0803 101021 Mill Creek - Comparison Pros/Cons of NID System vs. CDS PowerPoint
Attachments: CDS vs NIDS.pdf

Scott and Mike,

Enclosed, please find additional information regarding NID Systems as requested.

Thank you,

Eileen

From: Hillman, Timothy M. [mailto:HillmanTM@bv.com]
Sent: Thursday, October 21, 2010 10:28 AM
To: Saunders, Eileen
Cc: Jackson, Audrey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mahabaleshwarkar, Anand
Subject: 168908.41.0803 101021 Mill Creek - Comparison Pros/Cons of NID System vs. CDS PowerPoint

Eileen,

During the Mill Creek kickoff meeting on September 15th, plant personnel requested a general comparison (pros and cons) of the NID system with a standard circulating dry scrubber (CDS). Therefore, in response to action item #11, please find subject attached for your review and consideration. We can also include this in the November 9th validation presentation if you desire.

Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

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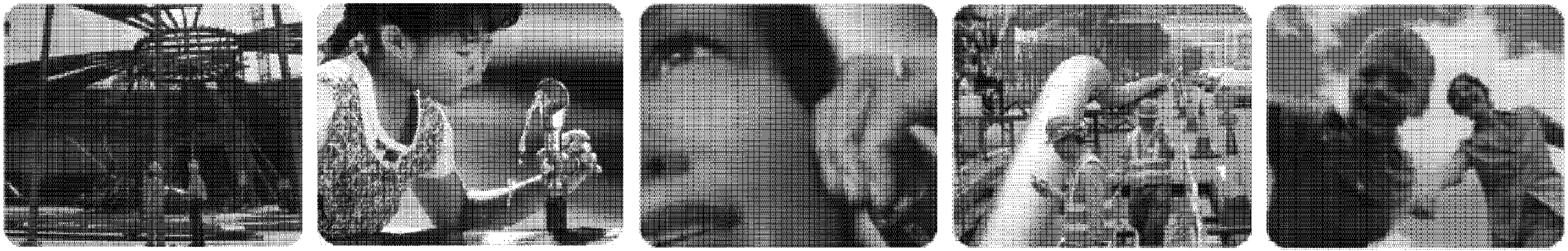


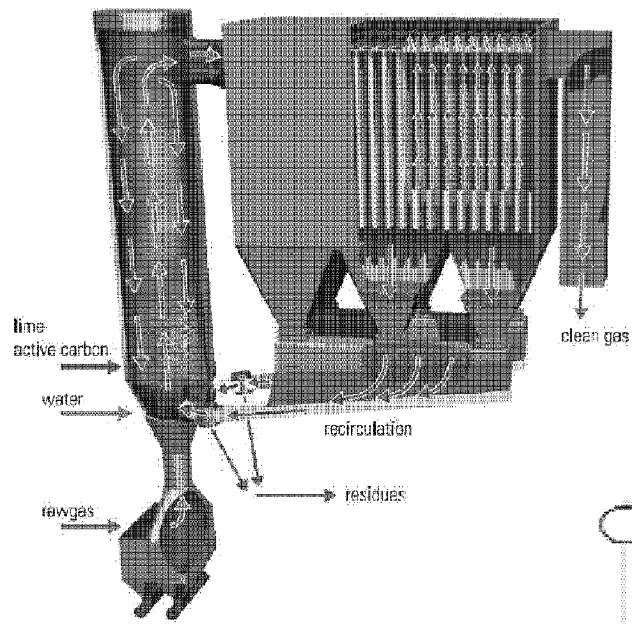
Circulating Dry Scrubber (CDS) vs Novel Innovative Desulfurization (NID) General Comparison

Black & Veatch

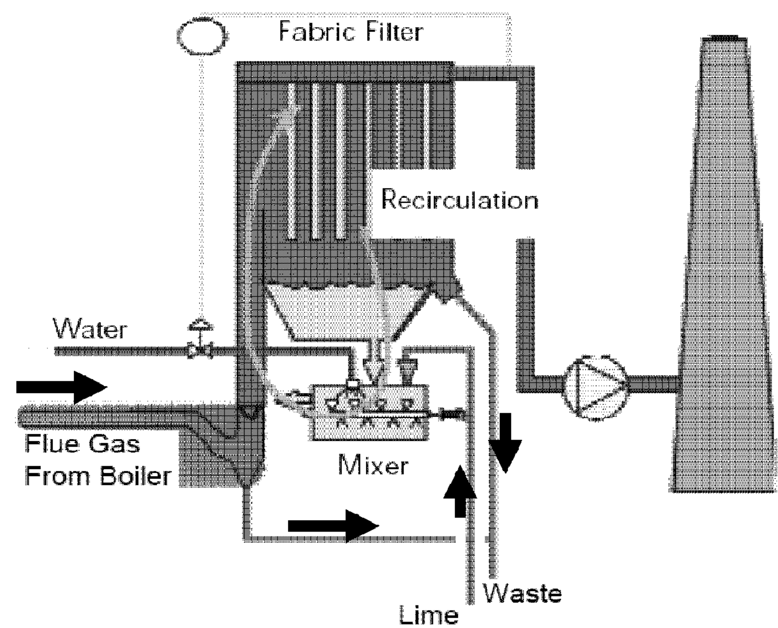
October 19, 2010

A Closer look at two dry FGD systems

Circulating Dry Scrubber - CDS



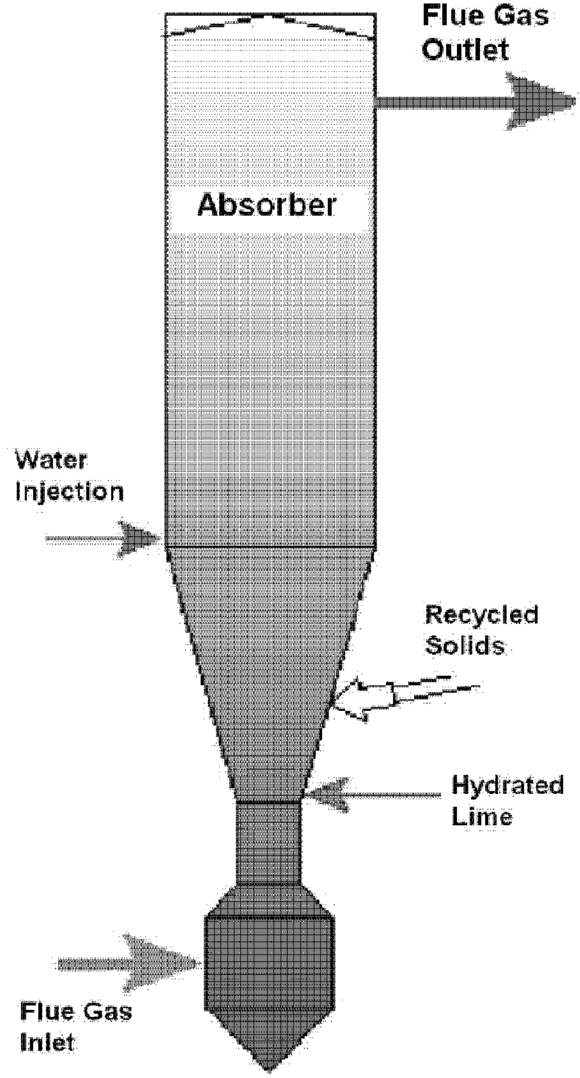
Novel Innovative Desulfurization - NID



Source: AE&E

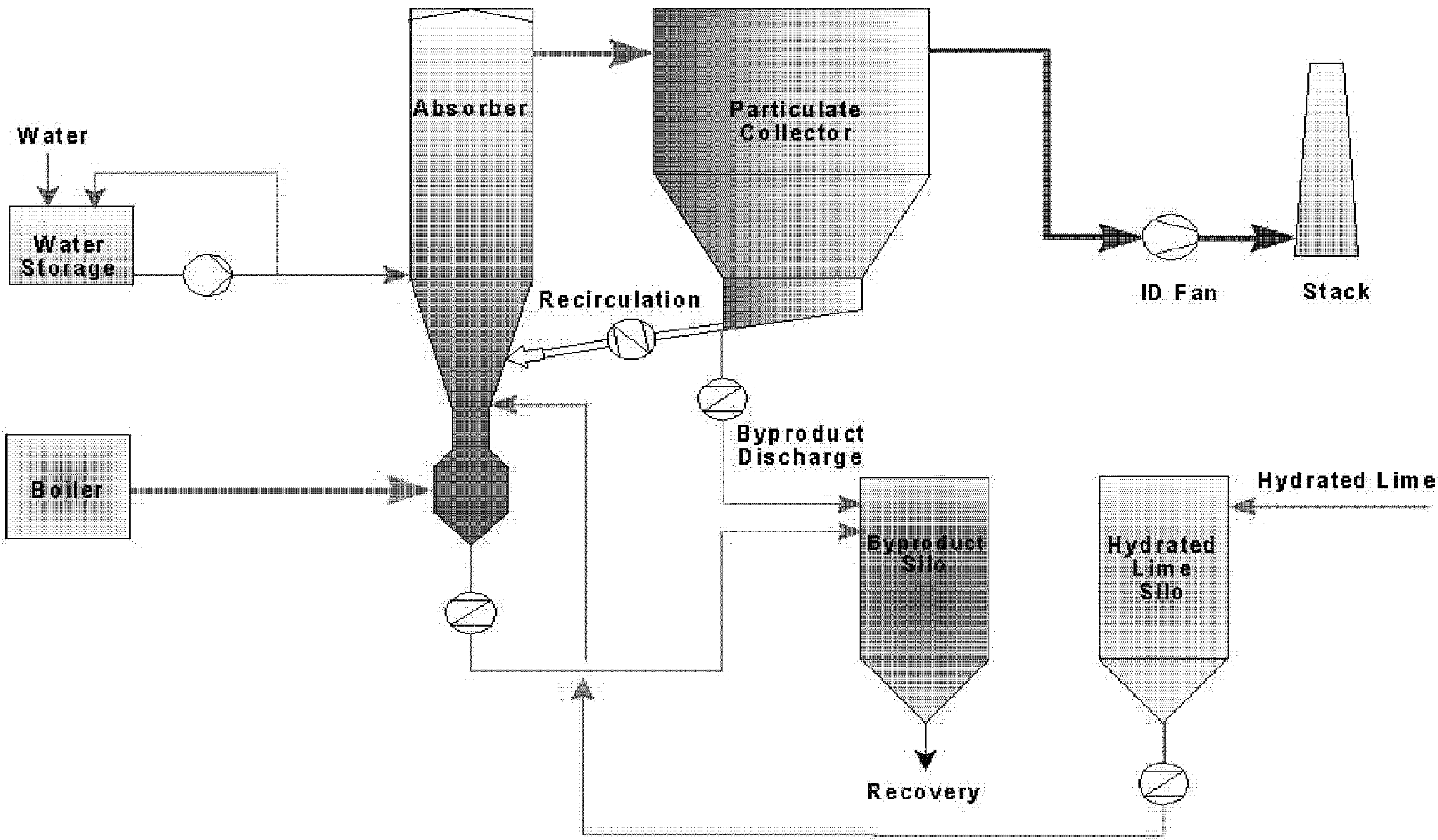
Circulating Dry Scrubber (CDS)

- Dry free flowing powder of $Ca(OH)_2$ reagent fed into vessel
- Fluid bed of recycled ash/byproduct solids, and fresh reagent
- Water injected separately
- High solids recycle rate



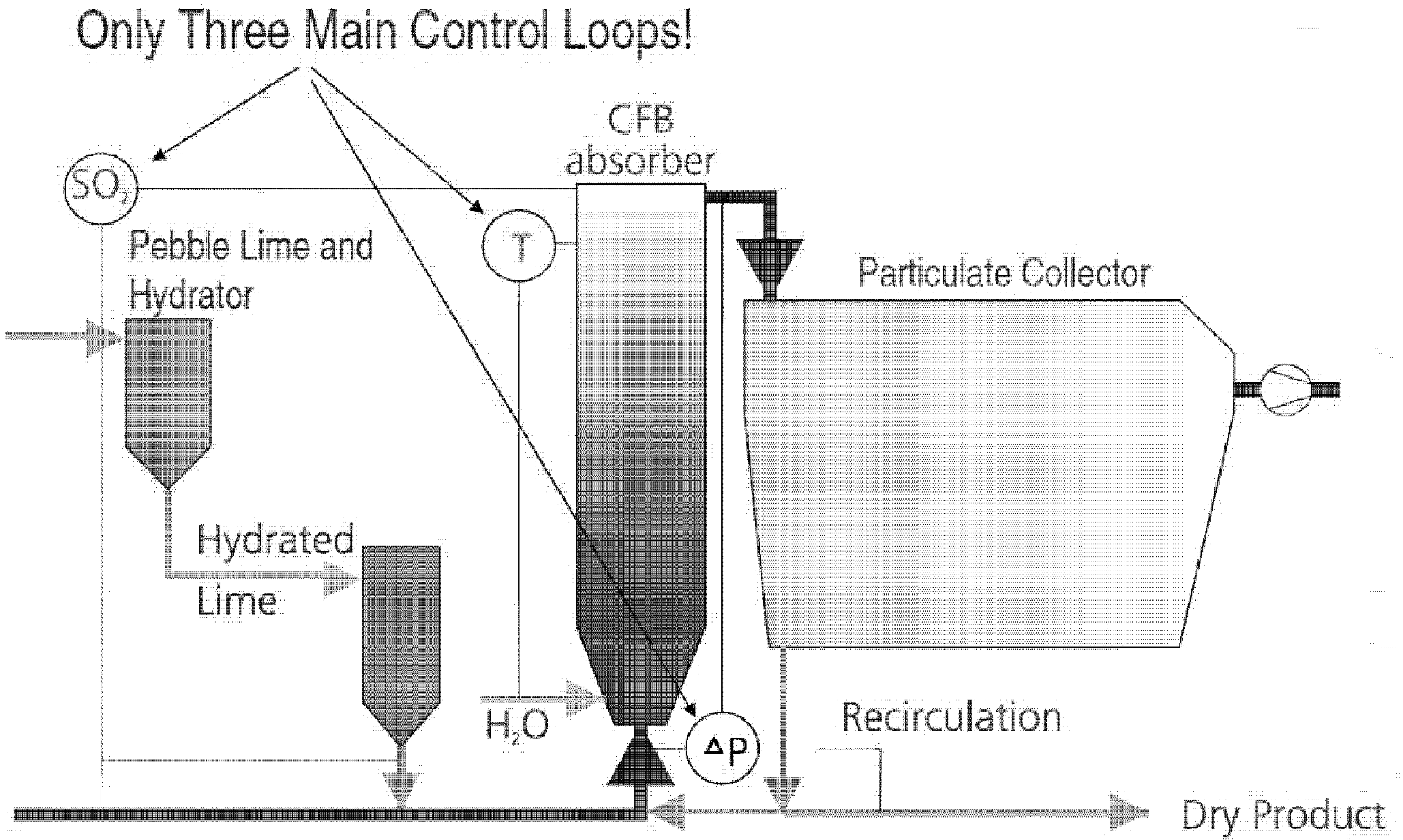
Source: Allied Environmental

CDS Process Flow Diagram



Source: Allied Environmental

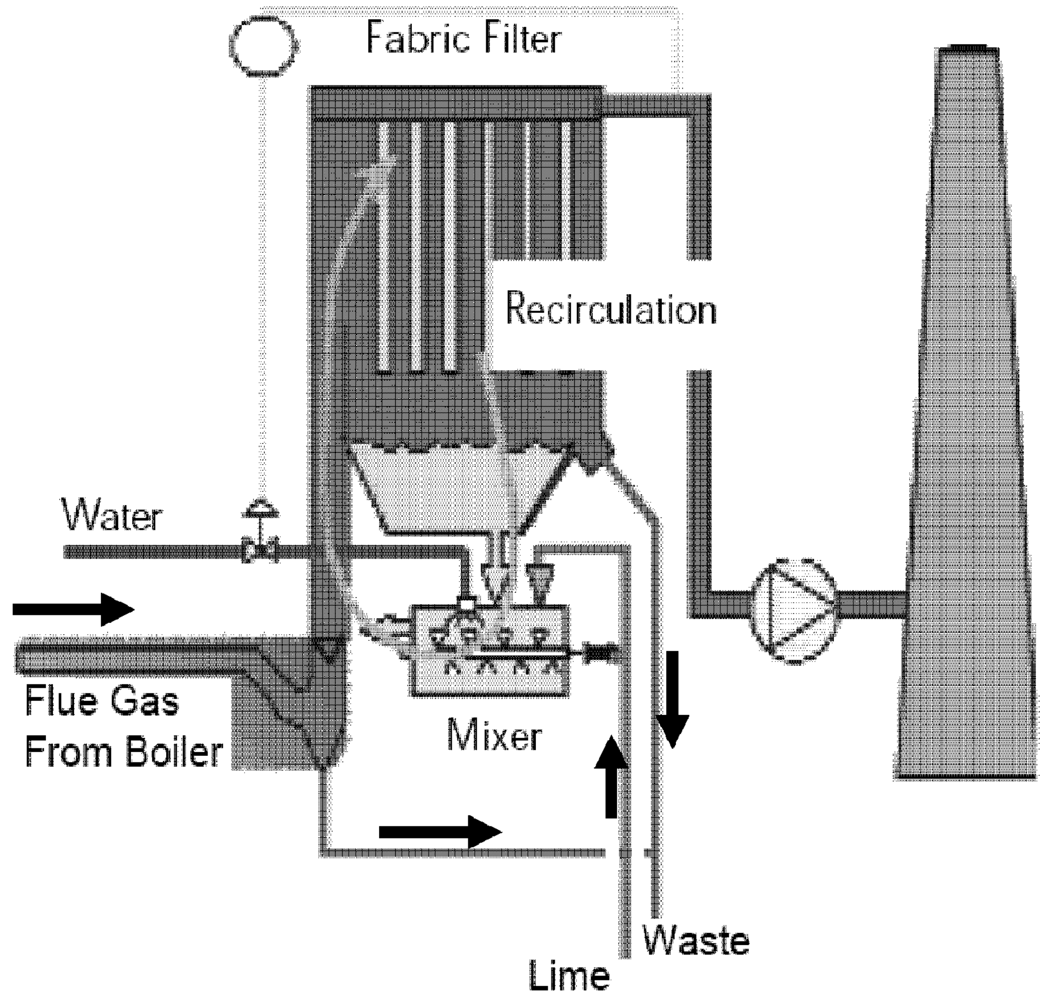
Process Control of CDS scrubber



Source: Allied Environmental

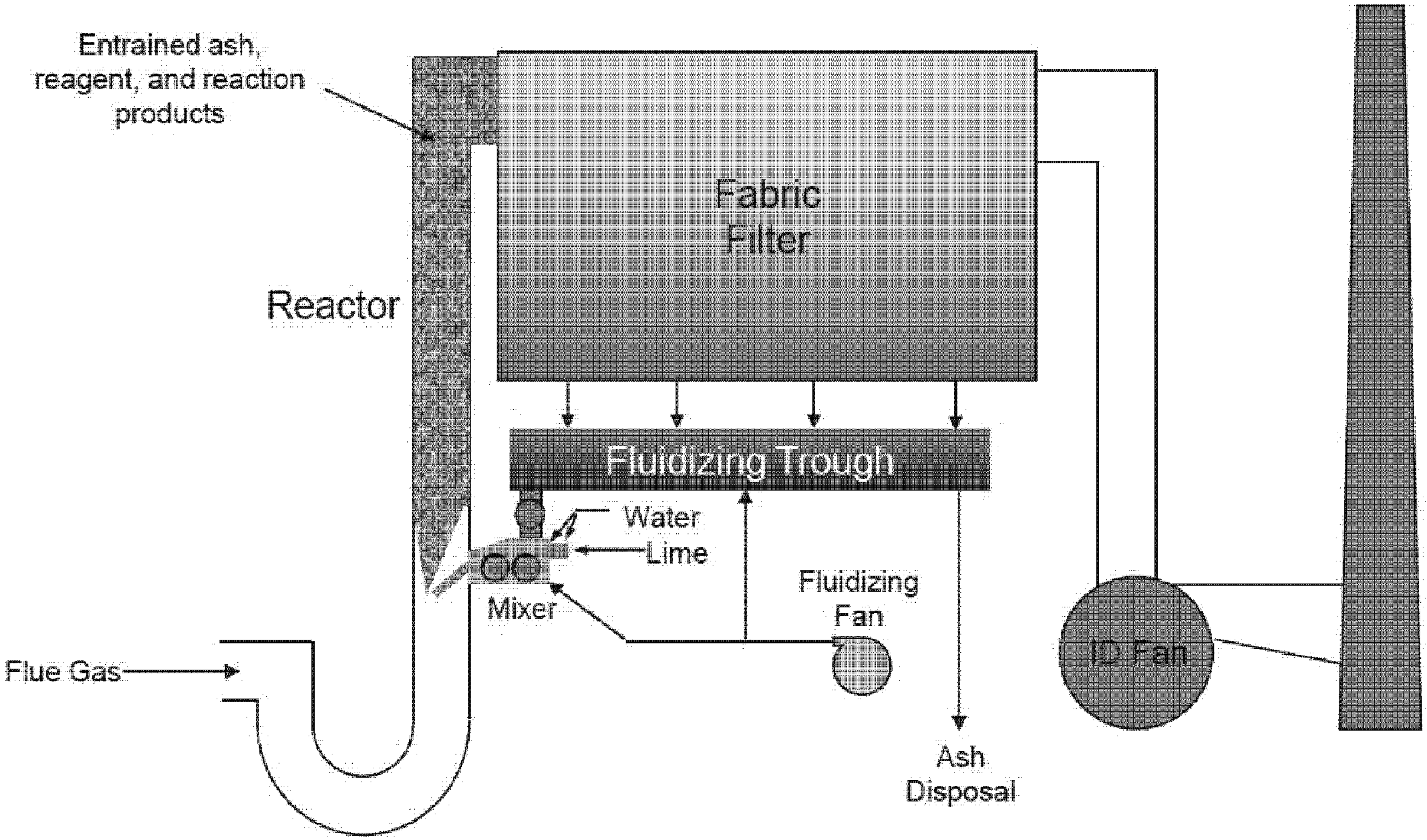
Novel Innovative Desulfurization (NID) Process

- Ash, byproduct, fresh lime and water recycled to the J-reactor
- Flue gas moves through J-reactor where major SO_2 capture takes place



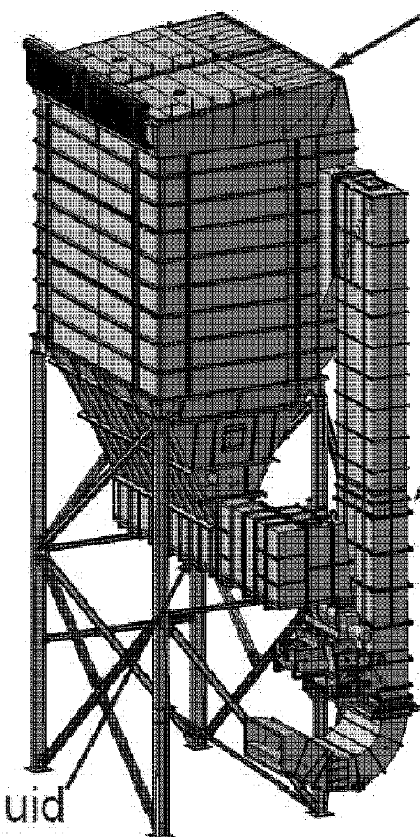
Source: Alstom

New Innovative Device (NID)

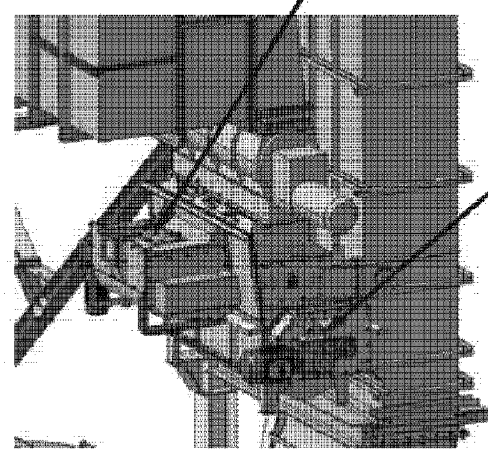


Source: Alstom

NID Components

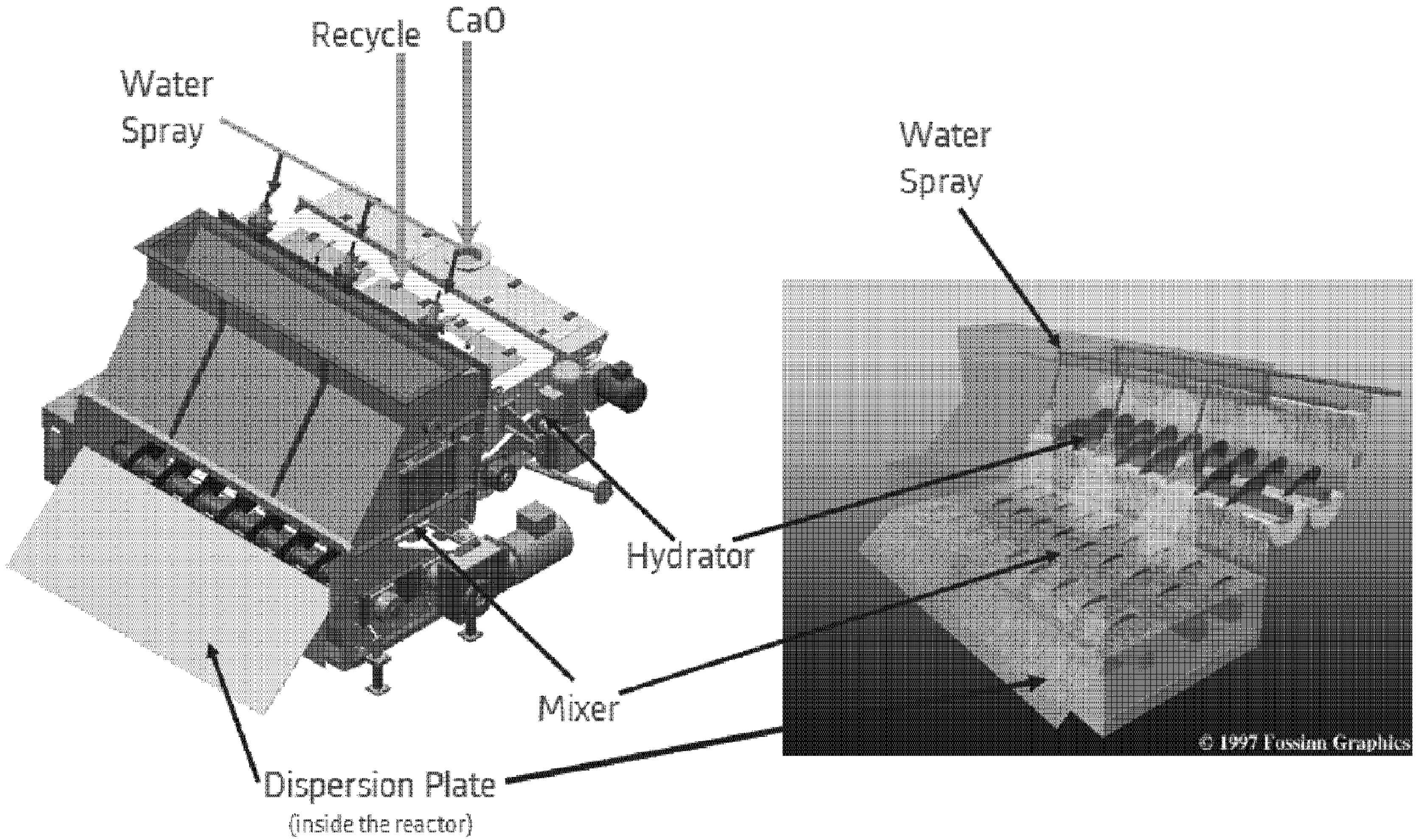


Key Components
- Fabric filter
- Reactor
- Mixer
- Hydrator
- Fluid bottom



Source: Alstom

NID Components



Source: Alstom

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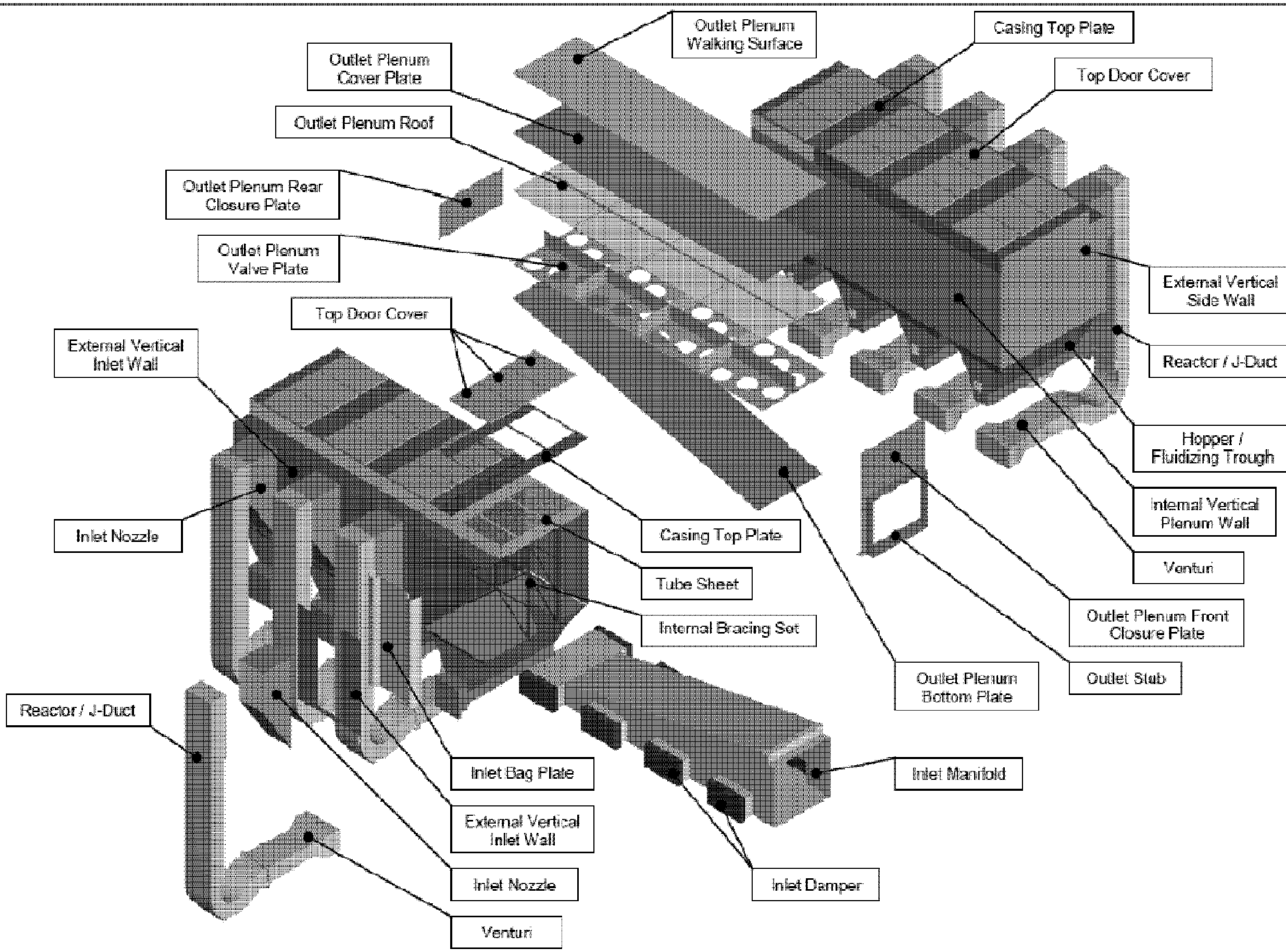
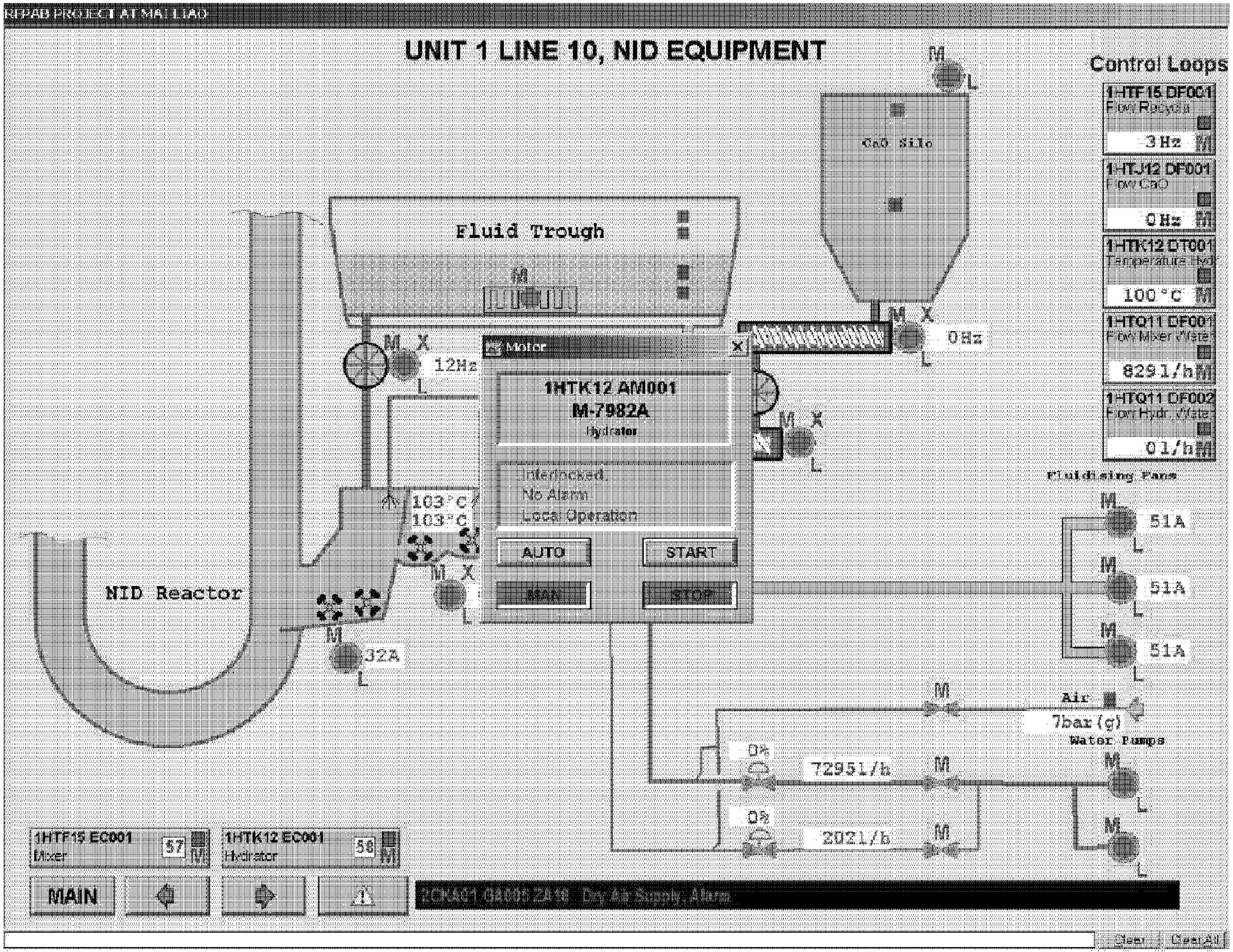
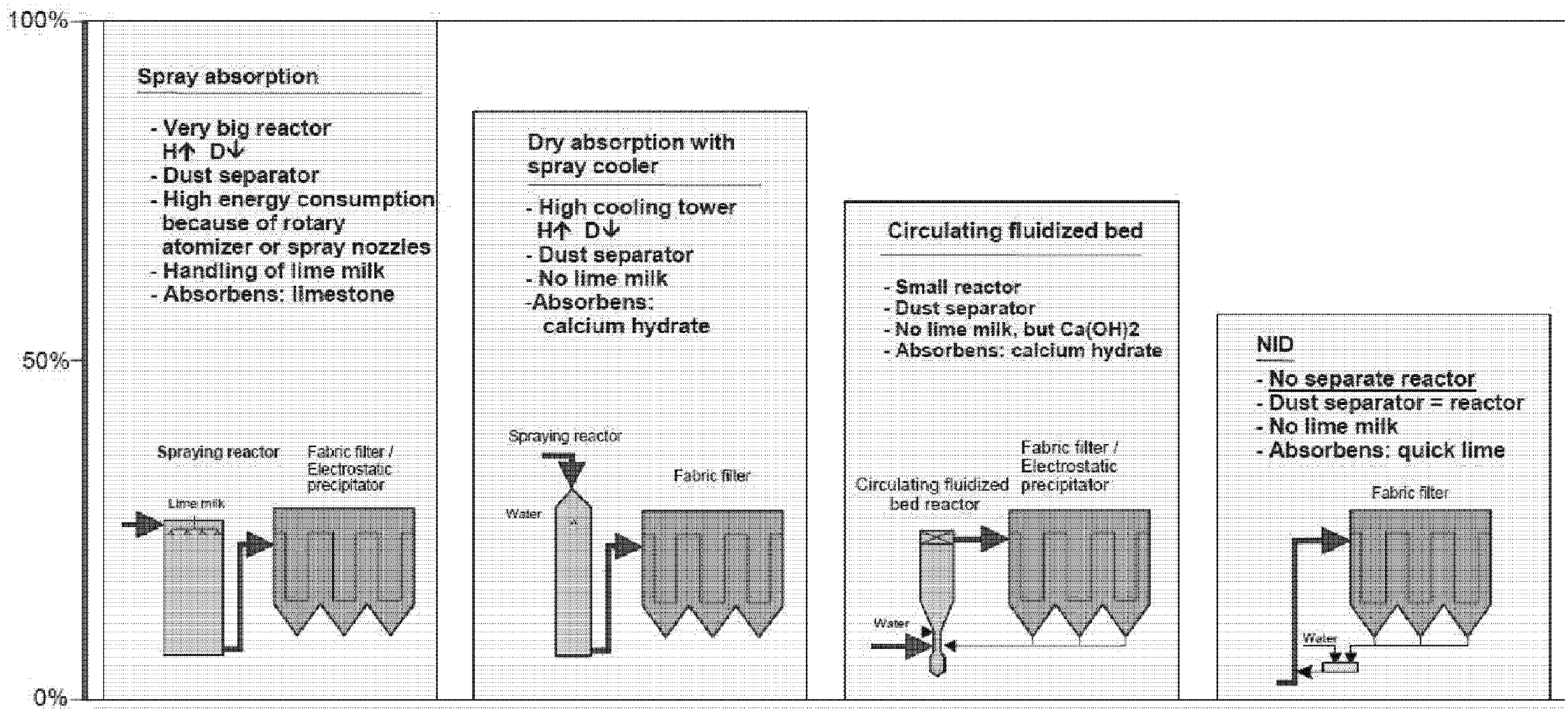
NID Components Schematic



NID Process Control



Footprint comparison



CDS / NID technology comparison

Factor	CDS	NID
Approach Temperature	30°F	25°F
Lime Consumption	SR of 1.7 – 1.85	SR of 2.0 – 2.25
Coal Sulfur Content	All	Low and Medium
Turndown	Recirculation fan for <50%	Excellent capabilities
Pluggage Potential	None	Potential at mixer-hydrator assembly

CDS / NID technology comparison

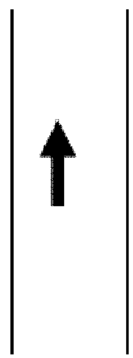
Factor	CDS	NID
Standard Lime Size	3/4" x 0"	1/8" x 0"
Plenum Design	Walk-in	Top Door
Footprint	Larger	Smaller
Pressure Drop	High	Less
Equipment Cost	Less	More

CDS / NID technology comparison

Factor	CDS	NID
Maintenance	Low	High
Corrosion potential	Low	High
Inlet Temperature Limitations	None	< 350 F
Auxiliary Power	High	Low
Water Requirements	Low	High

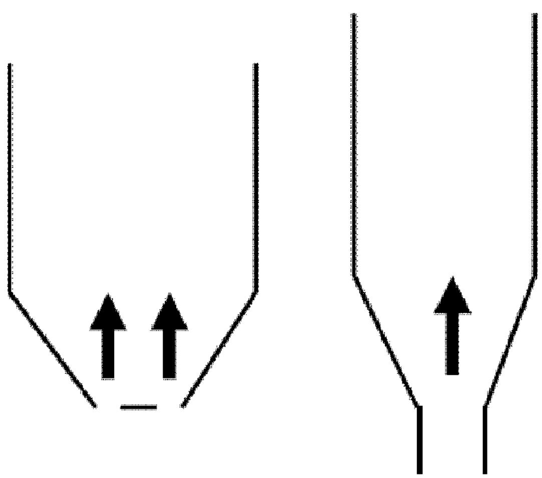
Flow Comparison

NID



- Same flow velocity in whole reactor.
- Same lifting force all the time
- Agglomerates are following the flow
- No water spraying inside reactor/flue gas

CDS

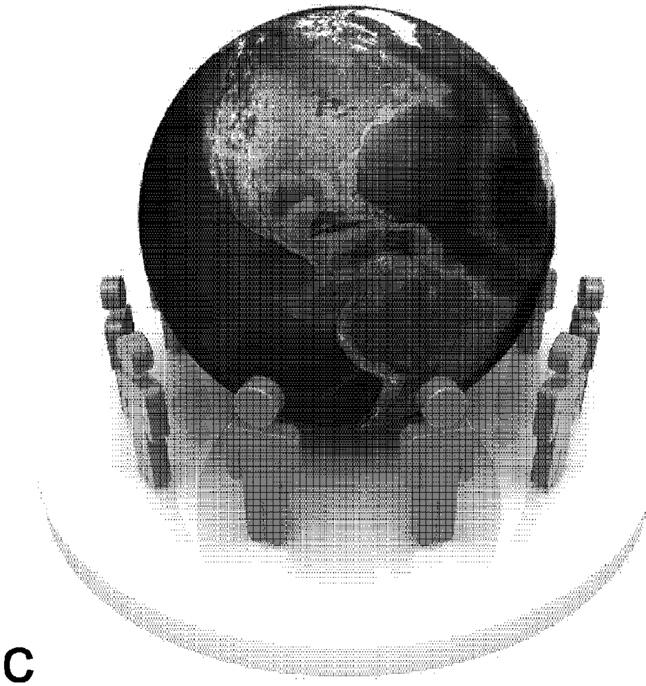


- Lower velocity in upper part of reactor, acceleration through venturi
- Lower lifting force in upper part
- Agglomerates are to a higher extend collected in the reactor and can't leave it
- Water addition inside reactor

NID has 4-8 week savings over CDS

Activity	NID 34-35 months	CDS 36 months
Engineering/ Procurement	12 months	12 months
Foundations	6 months	6 months
Erection	14-15 months (J-tubes shop fabricated in 3 pieces)	16 months (requires welding of reactor plates)
Tie-in Outage	1 month	1 month
Start-up	1 month	1 month

Vendors



NID system

- Alstom Power Inc

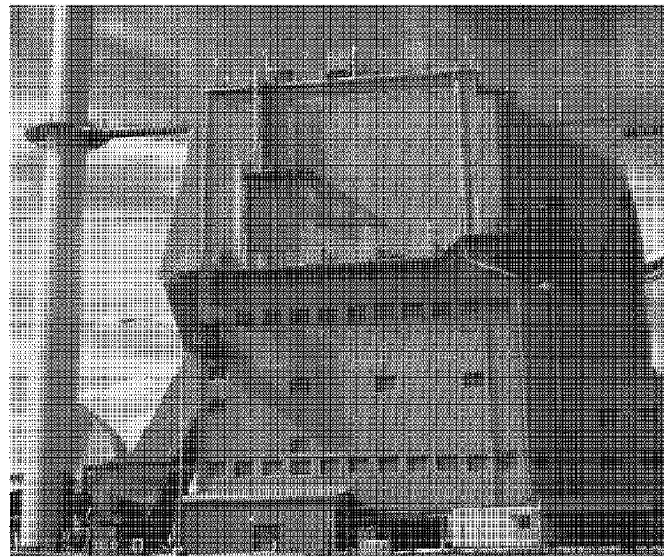
CDS system

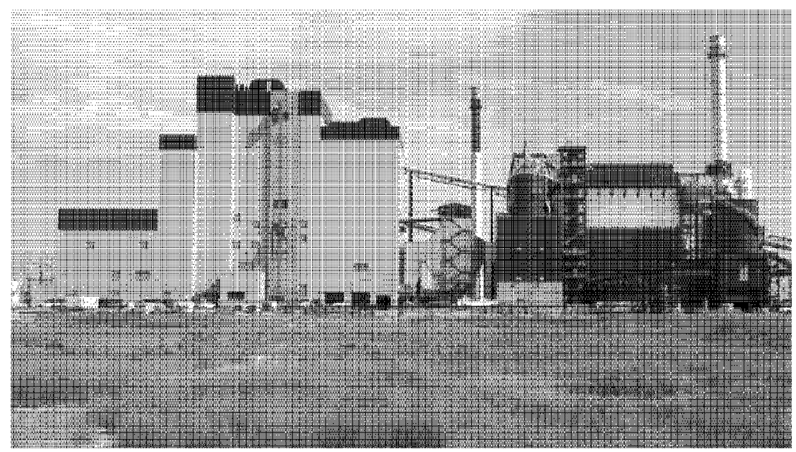
- Allied Environmental Inc
- Austrian Energy & Environmental Inc
- Babcock Power Environmental Inc
- Nooter Eriksen

Black & Veatch has recent experience with all of these vendors

B&V PC Boiler CDS/NID Experience

- First CDS scrubber in U.S.
  - Black Hills Power & Light – Wygen Station
  - Started up in 1995
  - 80 MW operating unit in Wyoming
- Currently installing CDS technology on 220 MW Whelan Energy Center #2
- NID on 5 x 5 MW industrial application in 1994





From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	168908 E.ON-AQC; Jackson, Audrey; Crabtree, Jonathan D.; Mahabaleshwarkar, Anand; Wehrly, M. R.; Hintz, Monty E.; Goodlet, Roger F.; Betz, Alex; Lucas, Kyle J.; Smith, Dave; Mehta, Pratik D.; Greenwell, Sarah
Sent:	12/6/2010 10:23:11 AM
Subject:	168908.28.3000 101206 - Action Item List
Attachments:	168908 LG&E AND KU ACTION ITEM LIST.xls

Eileen,

While we have cancelled the Monday conference call for today, I thought I would still send out the action item list. We may be able to find a few minutes to review after the validation presentation tomorrow.

Thanks,

TIM HILLMAN | Project Manager, Energy
Black & Veatch Corporation | 11401 Lamar Ave., Overland Park, KS 66211
+ 1 913-458-7928 P |HillmanTM@BV.com
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1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		DATE ADDE	IG DUE DA	RR DUE DA	OMPL DAT
2		DOC/MTNG	DATE				CO.	INITIAL				
3		**GENERAL**				n--	A					
4	27	Conf Call 10102	10/25/10	Prepare letter spec for Fabric Filter workshop.	41.0806	n--	B&V	AM/RL	10/19/10	TBD		
5		**MILL CREEK**				Mill Creek	A					
6	32	Email 41.0803 1	11/5/10	Provide comments and direction on Mill Creek Validatio	41.0803	Mill Creek	LG&E/KU	ES	11/08/10	11/16/10	12/10/10	
7	43	Email 14.1000 1	11/16/10	Provide LG&E/KU comments on Mill Creek validation pr	14.1000	Mill Creek	LG&E/KU	ES	11/16/10	11/22/10	12/10/10	
8		**GHENT**				Ghent	A					
9	40	--	11/8/10	Incorporate LG&E and KU comments to Ghent PDM an	22.1000	Ghent	B&V	MW/JC	11/15/10	11/30/10	12/10/10	
10		**E.W. BROWN**				Brown	A					
11	41	Brown KO Mtg M	11/15/10	Review U3 SCR arrgmnts & comment on potential PJFF	14.1000	Brown	B&V	TH/ MH	11/16/10	12/10/10	12/17/10	
12	38	Brown KO Mtg M	11/15/10	Prepare Unit 1 and 2 sketches with and without SCR	14.1000	Brown	B&V	TH	11/15/10	01/10/11		
13	42	Email 14.1000 1	11/16/10	Provide LG&E/KU comments on Brown Kick Off Meetin	14.1000	Brown	LG&E/KU	ES	11/16/10	11/22/10	12/10/10	
14	44	Conf Call 10112	11/22/10	Establish date for Brown Validation meeting.	41.0803	Brown	LG&E/KU	ES	11/22/10	11/29/10	12/10/10	
15	45	Email 22.1000 1	11/24/10	Provide comments on Brown Project Design Memorand	22.1000	Brown	LG&E/KU	ES	11/29/10	12/03/10	12/10/10	
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4	Open	Discuss after NID visit to E. KY Power on 12/1.					
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6	Open	No comments as of 11/29.					
7	Open						
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9	In Progress	Pending information for Load Model.					
10							
11	In Progress	Received Unit 3 arrangements on 12/02. Comments pending review of the drawings.					
12	Open						
13	Open						
14	Open	Potentially to be scheduled for the week of January 17th. Need to ask Jeff Railey (11/29)					
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1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		)ATE ADDE	IG DUE DA	RR DUE DA	OMPL DAT	STATUS
2		DOC/MTNG	DATE				CO.	INITIAL					
3	35	--	11/8/10	Incorporate LG&E and KU comments to Mill Creek PDM	22.1000	Mill Creek	B&V	MW/JC	11/08/10	11/16/10	11/29/10	11/29/10	Complete
4	34	--	11/8/10	Prepare and issue draft of Project Design Memorandum	22.1000	Brown	B&V	TH	11/08/10	11/25/10		11/24/10	Complete
5	36	Brown KO Mtg	######	Provide a list of "sacred ground" areas at Brown.	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/23/10	Complete
6	39	Brown KO Mtg	######	Identify a contact person for data collection	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/22/10	Complete
7	33	--	11/8/10	Prepare Data Request for Brown Station.	41.0100	Brown	B&V	TH	11/08/10	11/18/10		11/19/10	Complete
8	37	Brown KO Mtg	######	Provide drawings of the Unit 3 SO3 mitigation project	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/11/10	Complete
9	25	Email 22.1000	######	Provide LG&E and KU comments on Ghent Project Des	22.1000	Ghent	LG&E/KU	ES	10/21/10	10/28/10		11/08/10	Complete
10	23	Conf Call 1010	######	Provide draft of Mill Creek Validation Report for LG&E/K	41.0803	Mill Creek	B&V	TH/MW	10/19/10	11/05/10		11/05/10	Complete
11	29	--	######	Provide Brown Kickoff presentation .	14.1000	Brown	B&V	TH	10/29/10	11/05/10		11/03/10	Complete
12	24	Conf Call 1010	######	Prepare differences between SCR and SNCR for Browr	14.1000	Brown	B&V	AM/RL	10/19/10	11/09/10		11/03/10	Complete
13	28	--	######	Provide Mill Creek Validation presentation.	41.0803	Mill Creek	B&V	TH	10/29/10	11/05/10		11/03/10	Complete
14	31	Email 14.1000	######	Provide comments on Brown Kickoff meeting agenda	14.1000	Brown	LG&E/KU	ES	10/27/10	11/02/10		11/01/10	Complete
15	30	Email 14.1000	######	Provide comments on Mill Creek Validation meeting age	14.1000	Mill Creek	LG&E/KU	ES	10/27/10	11/02/10		11/01/10	Complete
16	26	--	######	Provide sketches of Unit 4 AQC equipment in the thicke	41.0402	Mill Creek	B&V	MH	10/25/10	10/27/10	10/27/10	11/01/10	Complete
17	22	Email 14.1000	######	Provide LG&E/KU comments on Ghent Site Visit meeti	14.1000	Ghent	LG&E/KU	ES	10/15/10	10/19/10		10/22/10	Complete
18	11	KO & MC Site \	9/20/10	Evaluate pros and cons of NID system for November te	14.1000	n--	B&V	AM/RL	09/21/10	Nov. 2010		10/21/10	Complete
19	21	Ghent Site Visit	######	Prepare Ghent Information Request.	41.0100	Ghent	B&V	TH	10/11/10	10/15/10		10/18/10	Complete
20	15	KO & MC Site \	9/20/10	Review B&V electrical study conducted in the 1990s	14.1000	Mill Creek	B&V	JB	09/21/10	09/24/10	TBD	10/18/10	Complete
21	18	Email 41.0100	9/29/10	Choose the coal fuel design basis for Mill Creek, Ghent,	41.0100	n--	LG&E/KU	ES	09/30/10	10/06/10		10/18/10	Complete
22	4	KO & MC Site \	9/20/10	Use B&V file system to set up LG&E/KU document stor	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/18/10	Complete
23	12	KO & MC Site \	9/20/10	Schedule vendors for evaluation of existing scrubbers	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/18/10	Complete
24	1	KO & MC Site \	9/20/10	Determine location for Mill Creek Task 6 Technology Se	14.1000	Mill Creek	LG&E/KU	ES	09/21/10	10/15/10		10/12/10	Complete

	O	P	Q	R	S	T	U	V	W	X
1	NOTES									
2										
3										
4	PDM issued for In-House Review (11/18)									
5	Added to Info Request Priority 1									
6										
7										
8										
9										
10										
11										
12	To be included in Brown KO presentation. Also include fabric filter discussion. (10/25)									
13	Final sent on 11/5									
14										
15	Confirmed LG&E and KU team is available for the afternoon on 11/9									
16										
17	Eileen has no comments (10/18). Waiting for comments from LG&E/KU members.									
18	Will send powerpoint presentation in the next couple of days (10/18).									
19										
20	B&V could not locate study. Added to Data Request. Will review when LG&E/KU provides study.									
21	Use future coal. (10/11) Chlorine needs to be corrected (10/18)									
22	Audrey is working on it (10/11). It is set up. Eileen to review (10/18).									
23	To be scheduled week of 10/25. B&V requested to be included in debriefing w/ each vendor.									
24	MC Technology selection meeting to be held in Louisville on 11/9 with Brown KO mtg on 11/10&11.									

	A	B	C	D	E	F	G	H	J	K	L	M	N
25	20	Email 22.1000	10/5/10	Provide comments on the Mill Creek Project Design Me	22.1000	Mill Creek	LG&E/KU	ES	10/11/10	10/12/10		10/12/10	Complete
26	13	KO & MC Site V	9/20/10	Provide structural steel study assessments	14.1000	n--	LG&E/KU	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
27	14	KO & MC Site V	9/20/10	Provide minimum access dimension box	14.1000	n--	LG&E/KU	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
28	7	KO & MC Site V	9/20/10	Determine personnel assignments for document review	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/04/10	Complete
29	19	Re: Email 41.01	9/30/10	B&V to provide schedule/deadlines for Mill Creek inform	41.0100	Mill Creek	B&V	TH	09/30/10	10/06/10		10/04/10	Complete
30	6	KO & MC Site V	9/20/10	Create IBackup FTP site for large file transfer	14.1000	--	B&V	KL	09/21/10	09/24/10		09/29/10	Complete
31	10	KO & MC Site V	9/20/10	Prepare data inventory and information request	14.1000	Mill Creek	B&V	MW/JC	09/21/10	09/24/10		09/29/10	Complete
32	5	KO & MC Site V	9/20/10	Provide engineering cost estimate at end of each month	14.1000	n--	B&V	TH	09/21/10	09/30/10		09/28/10	Complete
33	2	KO & MC Site V	9/20/10	Determine dates for Ghent kick-off meeting	14.1000	Ghent	LG&E/KU	ES	09/21/10	09/23/10		09/27/10	Complete
34	16	KO & MC Site V	9/20/10	Evaluate the possibility of accelerating the installation of	14.1000	Mill Creek	LG&E/KU	ES &TH	09/21/10	TBD		09/27/10	Complete
35	17	Email 14.1000	9/20/10	Provide LG&E/KU comments on Kick Off Meeting and M	14.1000	--	LG&E/KU	ES	09/21/10	09/24/10		09/24/10	Complete
36	3	KO & MC Site V	9/20/10	Provide DVD copy of Phase I Report	14.1000	--	B&V	TH	09/21/10	09/24/10		09/22/10	Complete
37	9	KO & MC Site V	9/20/10	Update PIM with Eileen's Ghent contact information	14.1000	--	B&V	MW	09/21/10	09/24/10		09/21/10	Complete
38	8	KO & MC Site V	9/20/10	Determine if a Monday, 2 pm EST project conference ca	14.1000	--	B&V	TH/MW	09/21/10	09/23/10		09/21/10	Complete
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25	Eileen's comments provided on 10/12. Sent to Alex for further comments.									
26	CD received 9/27. Units 1, 2, and 4 on CD. Unit 3 still needed. Email request sent on 9/28.									
27	CD received 9/27. Access Dimension not included. Email request sent 9/28.									
28	MC - Alex Betz and a couple others at plant. Process in place (10/4)									
29										
30										
31										
32	Sent 9/28.									
33	Scheduled for October 6&7									
34	B&V email addressed the acceleration of the SCR install for MC 1 & 2 (9/17). LG&E/KU replied no change in direction at this time (9/27).									
35	Final issued on 9/24									
36	Set received on 9/22									
37										
38	Scheduled									
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	A	B	C	D
1	LG&E/KU	LG&E and KU		
2	AB	Alex Betz - Mill Creek		
3	DS	Dave Smith - Ghent		
4	ES	Eileen Saunders		
5	GB	Greg Black		
6	GR	Gary Revlett		
7				
8				
9				
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11				
12				
13				
14				
15				
16				
17	BV	Black & Veatch (B&V)		
18	TH	Tim Hillman		
19	KL	Kyle Lucas		
20	AM	Anand Mahabaleshwarker		
21	MK	Mike King		
22	RL	Rick Lausman		
23	MW	M.R. Wehrly		
24	MH	Monty Hintz		
25	JB	Jim Bayless		
26	JC	Jonathan Crabtree		

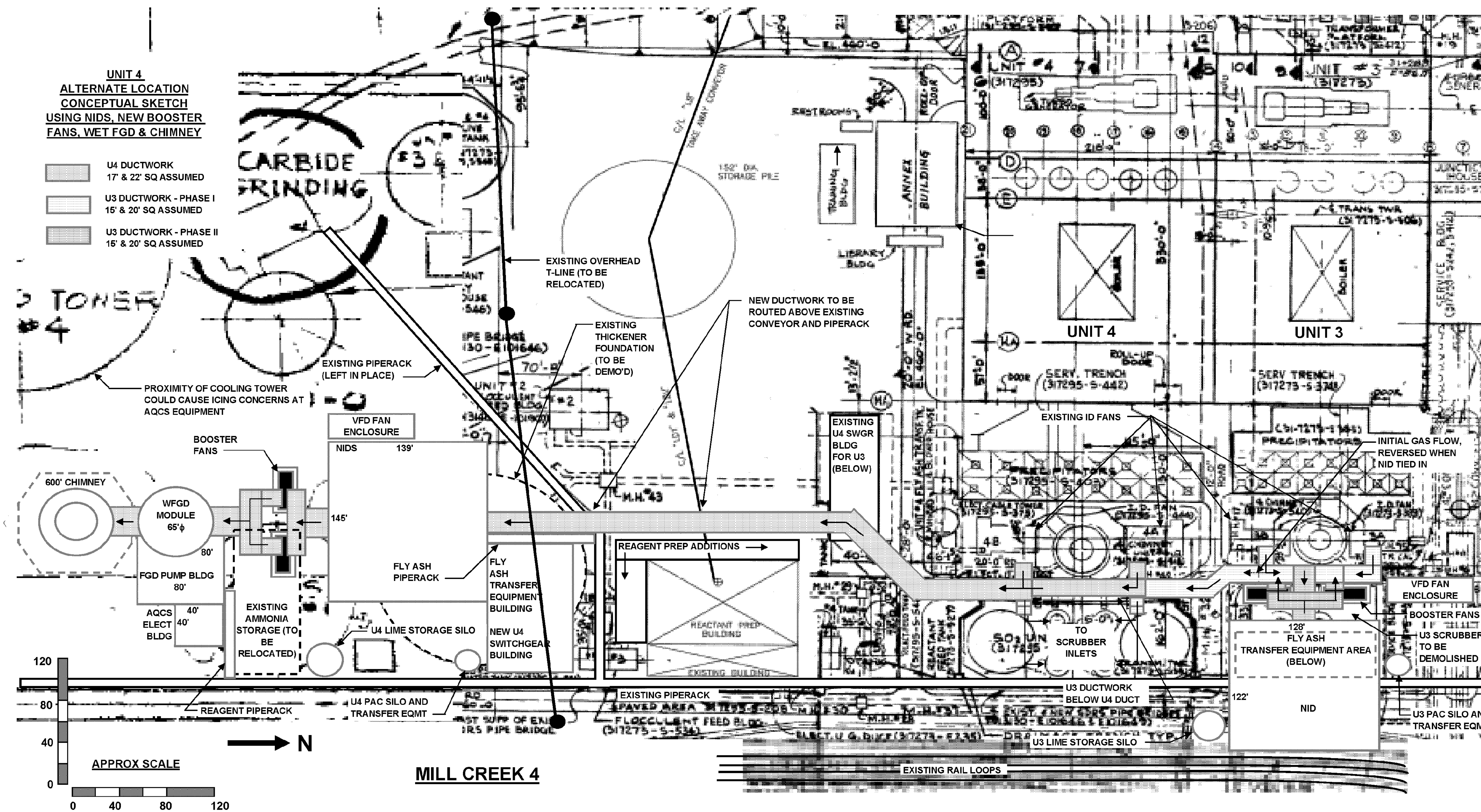
From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	Jackson, Audrey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mehta, Pratik D.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Goodlet, Roger F.; Ballard, Michael W; Hintz, Monty E.
Sent:	10/27/2010 3:19:36 PM
Subject:	168908.41.0803 101027 - Mill Creek U4 Alternative AQC Arrangement Sketches for Nov 1st Conference Call
Attachments:	MC U3-U4 NID Sketch Alt.pdf; MC U3-U4 NID Sketch.pdf; MC U3-U4 PJFF Sketch Alt.pdf; MC U3-U4 PJFF Sketch.pdf

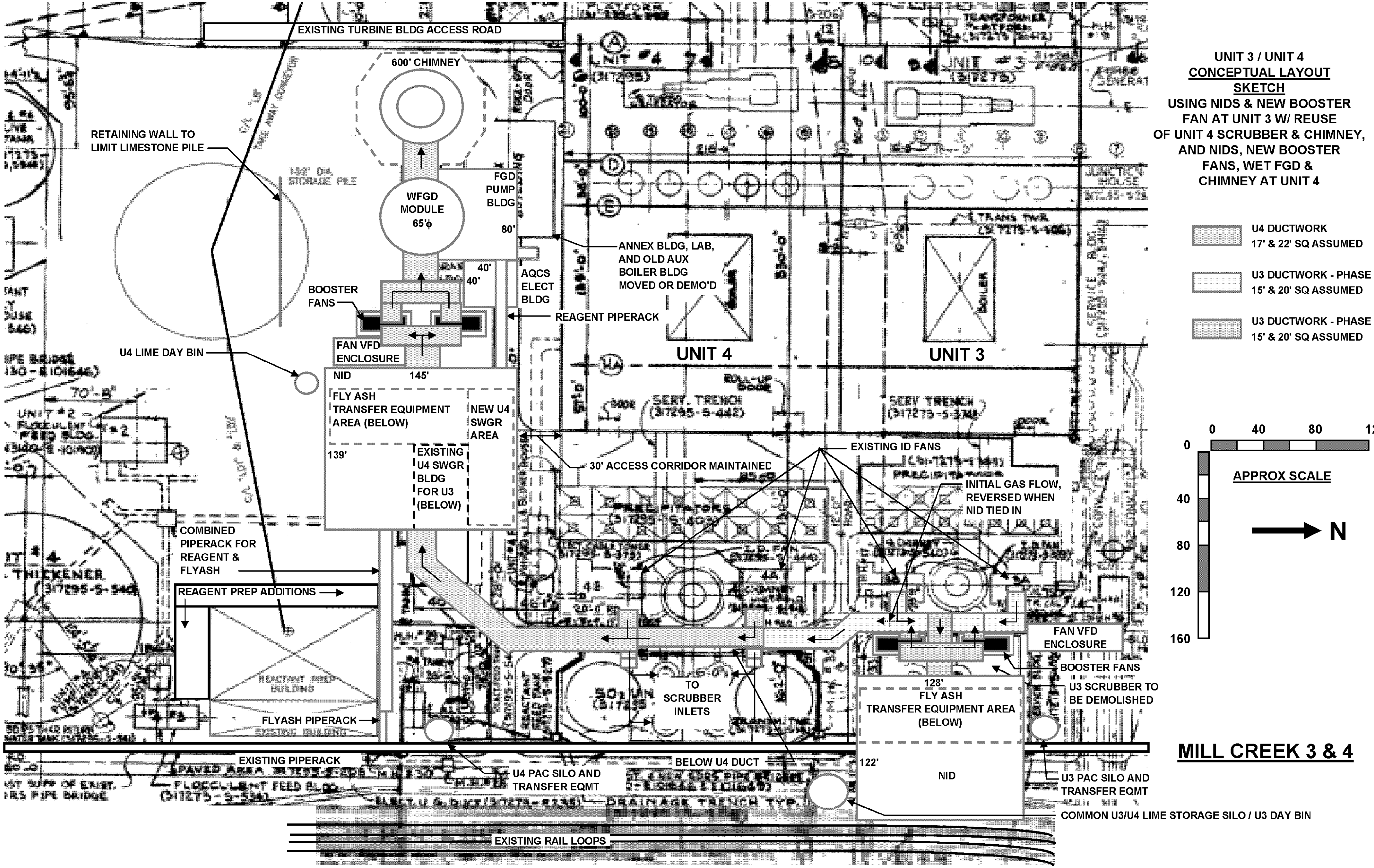
Eileen,

In preparation for our Nov 1st conference call, please find attached sketches of the potential Mill Creek U4 AQC arrangements. The sketches include both NID and PJFF versions of an east-west configuration along the south side of U4, and a north-south configuration in the old thickener area.

Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**


UNIT 4
ALTERNATE LOCATION
CONCEPTUAL SKETCH
USING NIDS, NEW BOOSTER
FANS, WET FGD & CHIMNEY
U4 DUCTWORK
17' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I
15' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II
15' & 20' SQ ASSUMED
EXISTING OVERHEAD
T-LINE (TO BE
RELOCATED)
NEW DUCTWORK TO BE
ROUTED ABOVE EXISTING
CONVEYOR AND PIPERACK
EXISTING
THICKENER
FOUNDATION
(TO BE
DEMO'D)
EXISTING PIPERACK
(LEFT IN PLACE)
PROXIMITY OF COOLING TOWER
COULD CAUSE ICING CONCERNS AT
AQCS EQUIPMENT
VFD FAN
ENCLOSURE
NIDS
139'
BOOSTER
FANS
600' CHIMNEY
WFGD
MODULE
65'ϕ
145'
80'
FGD PUMP BLDG
80'
AQCS
ELECT
BLDG
40'
40'
EXISTING
AMMONIA
STORAGE (TO
BE
RELOCATED)
FLY ASH
PIPERACK
FLY
ASH
TRANSFER
EQUIPMENT
BUILDING
NEW U4
SWITCHGEAR
BUILDING
U4 LIME STORAGE SILO
REAGENT PREP ADDITIONS
EXISTING
U4 SWGR
BLDG
FOR U3
(BELOW)
EXISTING ID FANS
INITIAL GAS FLOW,
REVERSED WHEN
NID TIED IN
UNIT 4
UNIT 3
VFD FAN
ENCLOSURE
BOOSTER FANS
U3 SCRUBBER
TO BE
DEMOLISHED
TO
SCRUBBER
INLETS
128'
FLY ASH
TRANSFER EQUIPMENT AREA
(BELOW)
122'
NID
U3 DUCTWORK
BELOW U4 DUCT
U3 PAC SILO AND
TRANSFER EQMT
U3 LIME STORAGE SILO
EXISTING PIPERACK
REAGENT PIPERACK
U4 PAC SILO AND
TRANSFER EQMT
EXISTING RAIL LOOPS
CARBIDE
GRINDING
ANNEX
BUILDING
N
120
80
40
0
APPROX SCALE
0
40
80
120
MILL CREEK 4



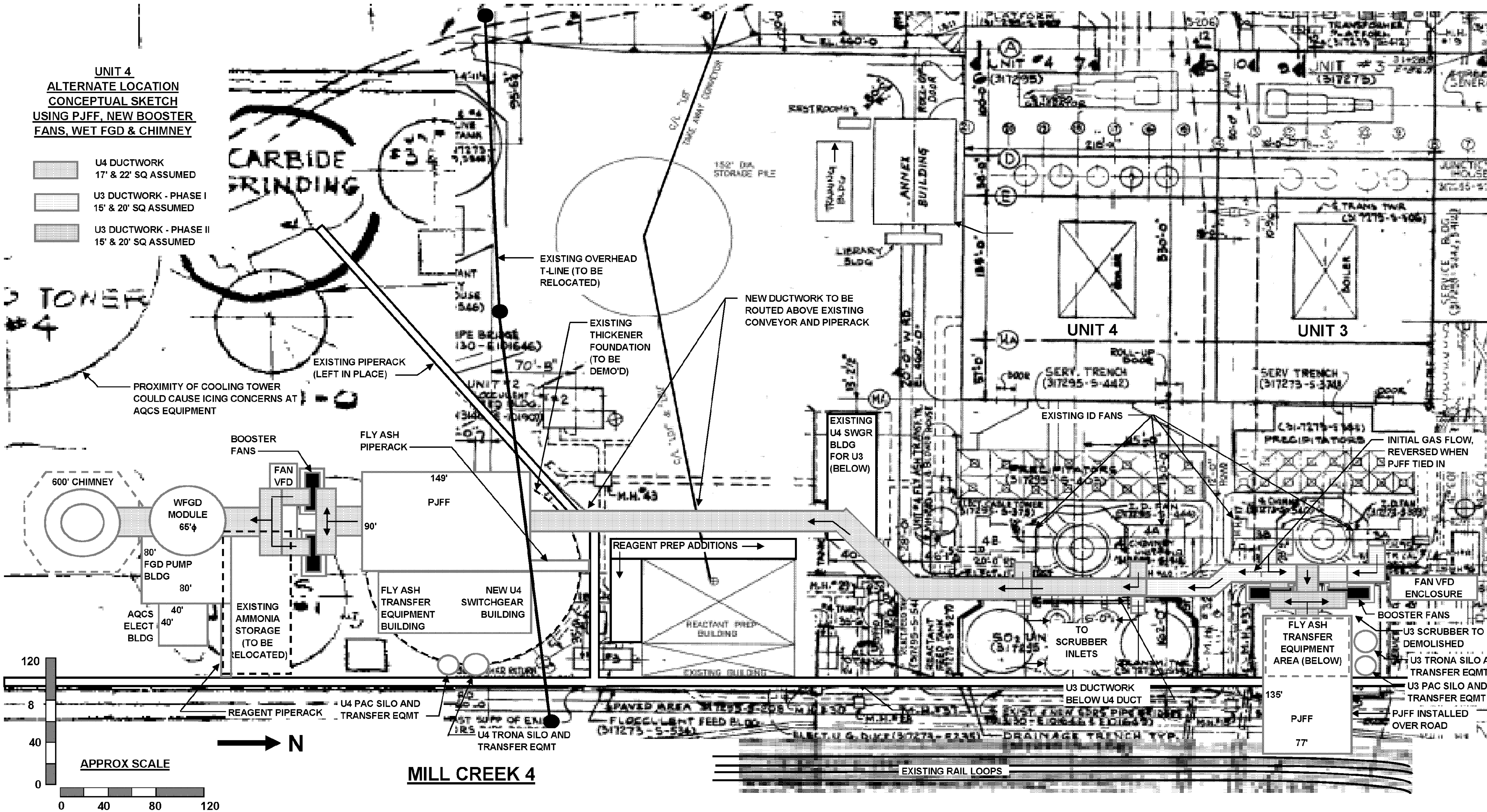
UNIT 3 / UNIT 4
CONCEPTUAL LAYOUT
SKETCH
USING NIDS & NEW BOOSTER FAN AT UNIT 3 W/ REUSE OF UNIT 4 SCRUBBER & CHIMNEY, AND NIDS, NEW BOOSTER FANS, WET FGD & CHIMNEY AT UNIT 4

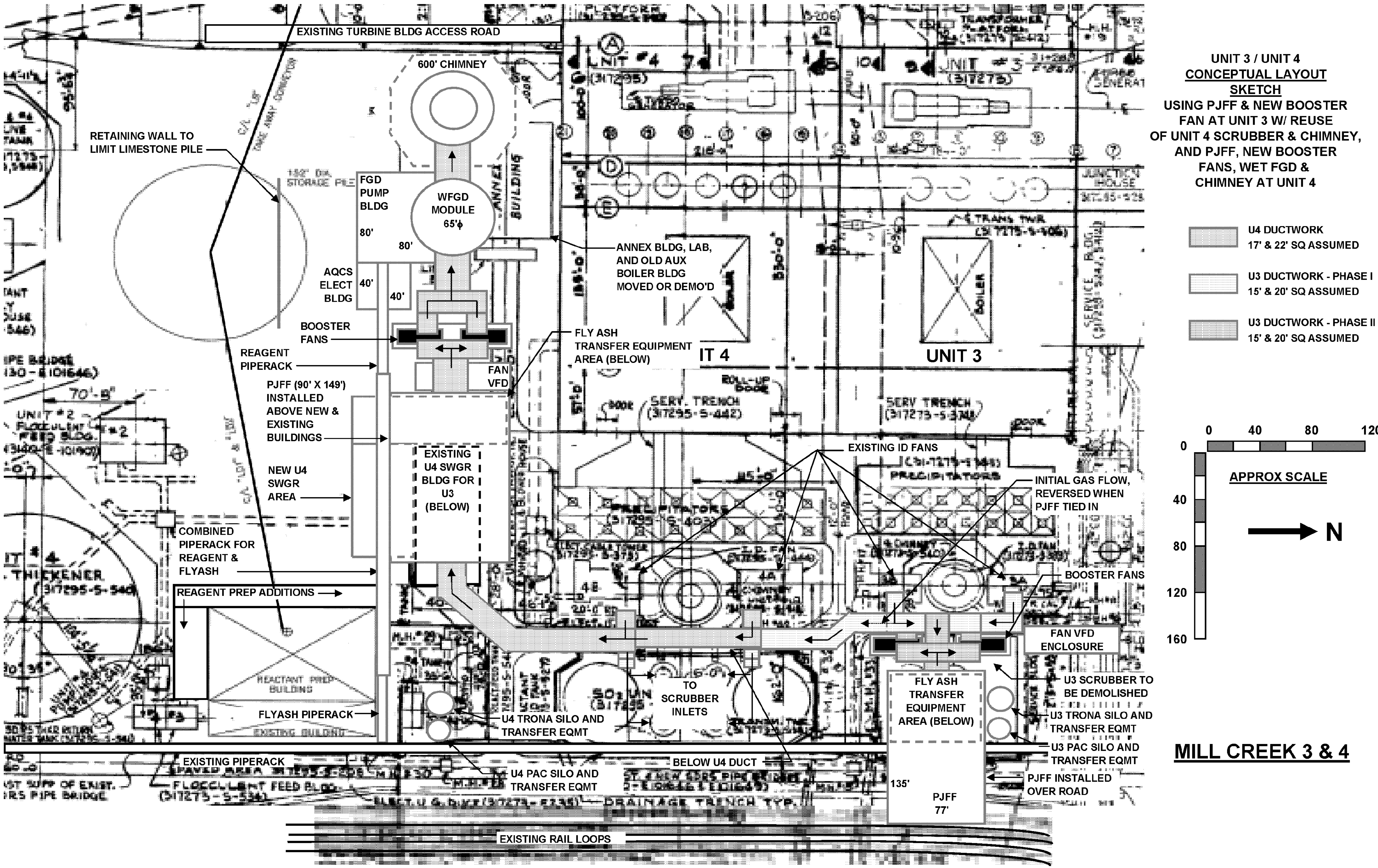
U4 DUCTWORK
17' & 22' SQ ASSUMED

U3 DUCTWORK - PHASE I
15' & 20' SQ ASSUMED

U3 DUCTWORK - PHASE II
15' & 20' SQ ASSUMED

MILL CREEK 3 & 4


UNIT 4
ALTERNATE LOCATION
CONCEPTUAL SKETCH
USING PJFF, NEW BOOSTER
FANS, WET FGD & CHIMNEY
U4 DUCTWORK
17' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I
15' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II
15' & 20' SQ ASSUMED
EXISTING OVERHEAD T-LINE (TO BE RELOCATED)
NEW DUCTWORK TO BE ROUTED ABOVE EXISTING CONVEYOR AND PIPERACK
EXISTING THICKENER FOUNDATION (TO BE DEMO'D)
EXISTING PIPERACK (LEFT IN PLACE)
PROXIMITY OF COOLING TOWER COULD CAUSE ICING CONCERNS AT AQCS EQUIPMENT
BOOSTER FANS
FAN VFD
FLY ASH PIPERACK
600' CHIMNEY
WFGD MODULE 65'ϕ
149'
PJFF
90'
80'
FGD PUMP BLDG
80'
40'
40'
AQCS ELECT BLDG
EXISTING AMMONIA STORAGE (TO BE RELOCATED)
FLY ASH TRANSFER EQUIPMENT BUILDING
NEW U4 SWITCHGEAR BUILDING
REAGENT PREP ADDITIONS
EXISTING U4 SWGR BLDG FOR U3 (BELOW)
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN PJFF TIED IN
UNIT 4
UNIT 3
FAN VFD ENCLOSURE
BOOSTER FANS
TO SCRUBBER INLETS
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
U3 SCRUBBER TO BE DEMOLISHED
U3 TRONA SILO AND TRANSFER EQMT
U3 PAC SILO AND TRANSFER EQMT
U3 DUCTWORK BELOW U4 DUCT
135'
PJFF
77'
PJFF INSTALLED OVER ROAD
REAGENT PIPERACK
U4 PAC SILO AND TRANSFER EQMT
U4 TRONA SILO AND TRANSFER EQMT
EXISTING RAIL LOOPS
N
APPROX SCALE
120
80
40
0
0 40 80 120
MILL CREEK 4


EXISTING TURBINE BLDG ACCESS ROAD
600' CHIMNEY
RETAINING WALL TO
LIMIT LIMESTONE PILE
FGD
PUMP
BLDG
80'
80'
WFGD
MODULE
65'ϕ
AQCS
ELECT
BLDG
40'
40'
BOOSTER
FANS
REAGENT
PIPERACK
FAN
VFD
FLY ASH
TRANSFER EQUIPMENT
AREA (BELOW)
ANNEX BLDG, LAB,
AND OLD AUX
BOILER BLDG
MOVED OR DEMO'D
IT 4
UNIT 3
PJFF (90' X 149')
INSTALLED
ABOVE NEW &
EXISTING
BUILDINGS
EXISTING
U4 SWGR
BLDG FOR
U3
(BELOW)
NEW U4
SWGR
AREA
EXISTING ID FANS
INITIAL GAS FLOW,
REVERSED WHEN
PJFF TIED IN
COMBINED
PIPERACK FOR
REAGENT &
FLYASH
REAGENT PREP ADDITIONS
BOOSTER FANS
FAN VFD
ENCLOSURE
TO
SCRUBBER
INLETS
FLY ASH
TRANSFER
EQUIPMENT
AREA (BELOW)
U3 SCRUBBER TO
BE DEMOLISHED
FLYASH PIPERACK
U4 TRONA SILO AND
TRANSFER EQMT
U3 TRONA SILO AND
TRANSFER EQMT
U3 PAC SILO AND
TRANSFER EQMT
EXISTING PIPERACK
BELOW U4 DUCT
U4 PAC SILO AND
TRANSFER EQMT
135'
PJFF
77'
PJFF INSTALLED
OVER ROAD
EXISTING RAIL LOOPS
UNIT 3 / UNIT 4
CONCEPTUAL LAYOUT
SKETCH
USING PJFF & NEW BOOSTER
FAN AT UNIT 3 W/ REUSE
OF UNIT 4 SCRUBBER & CHIMNEY,
AND PJFF, NEW BOOSTER
FANS, WET FGD &
CHIMNEY AT UNIT 4
U4 DUCTWORK
17' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I
15' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II
15' & 20' SQ ASSUMED
0
40
80
120
160
APPROX SCALE
N
MILL CREEK 3 & 4

From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	Jackson, Audrey; 168908 E.ON-AQC; Wehrly, M. R.; Lucas, Kyle J.
Sent:	10/27/2010 3:23:07 PM
Subject:	168908.14.1000 101027 Draft Meeting Agendas for Mill Creek Validation and Brown Kickoff
Attachments:	EON Brown Kickoff Meeting Agenda.doc; EON Mill Creek Validation Meeting Agenda.doc

Eileen,

Please find attached draft meeting agendas for the Mill Creek validation meeting on Nov 9th, and the Brown Kickoff meeting Nov 10-11. Please advise of any comments or edits. Also, for the Mill Creek validation meeting, we anticipate you will distribute the electronic validation report to the E.ON meeting attendees, as we have an agenda item (# IV) to review the report during the meeting.

Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

AGENDA

Phase II Air Quality Control Study
Brown Kickoff Meeting and Site Visit
November 10 - 11, 2010
Location: Brown Generating Station

Day 1, November 10th, B&V arrives at approximately 8:30 am

I. Introductions (Starts at 9 am)
II. Project/Scope Description (E.ON – Eileen S.)
III. Environmental Drivers Presentation (E.ON – Gary R.)
IV. Phase I Study Results/AQC Overview Presentation (B&V – Anand M.)
V. Lunch (on site)
VI. Begin Escorted Site Walk Down and Data Collection

Day 2, November 11th, B&V arrives at approximately 8:30 am

I. Continue Escorted Site Walk Down and Data Collection
II. Lunch (on site)
III. Site Debriefing Meeting
IV. Additional Walk Down Time if Required
V. B&V Depart (no later than 4 pm)

AGENDA

Phase II Air Quality Control Study
Mill Creek Validation Meeting
November 9, 2010
Location: Mill Creek Generating Station

November 9th, B&V arrives at approximately 8:30 am

I. Introductions (Starts at 9 am)
II. Meeting Purpose (E.ON – Eileen S.)
III. Project Status and Background (B&V – Tim H.)
IV. AQC Validation Report Summary (B&V – M.R. W.)
V. AQC Validation Arrangement Presentation (B&V – Anand M.)
VI. Lunch (on site)
VII. Open Discussion and Next Steps
VIII. B&V Depart

From:	Lucas, Kyle J.
To:	Saunders, Eileen
CC:	Wehrly, M. R.; Hillman, Timothy M.; Mahabaleshwarkar, Anand; Mehta, Pratik D.; Crabtree, Jonathan D.
Sent:	12/8/2010 2:45:55 PM
Subject:	168908 101208 - Example Mill Creek Unit 1 AQC Table
Attachments:	Mill Creek Unit 1.pdf

Eileen,
As discussed yesterday on our conference call with Scott Straight, please find attached a draft table containing a high level summary of Mill Creek Unit 1's AQC equipment. The table includes those pollutants from the Phase II project which we are targeting specific emissions reductions (illustrated in a percent removal). Also, the table includes a notation for certain AQC equipment which has the potential to provide a level of co-benefit control of certain pollutants (removal efficiencies not provided as they have not been calculated for this project). Please review this example table and provide your comments. Once we have these, we'll draft 17 other tables, one for each of the remaining coal-fired units. It would be helpful to receive your comments by COB today to allow us to complete these additional tables by Friday.
Regards,
Kyle

Kyle Lucas | Environmental Permitting Manager
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-9062** | Fax: **(913) 458-9062**
Email: **lucaskj@bv.com**

AQC Technologies for Mill Creek Unit 1		
Equipment	**Pollutant Control**	**Removal Efficiency**
Boiler with Existing Low NOx Burners and Existing Over-Fire Air	NO_x Control	-- (1)
New Neural Networks	CO Control	-- (2)
	PM Control	-- (3)
	NO_x Control	-- (4)
New SCR	NO_x Control	56.14% (5)
	Hg Control	-- (6)
	SO_3 Control	-- (7)
Existing Air Heater	SO_3 Control	-- (8)
New Cold-Side Dry ESP	PM Control	-- (9)
	Hg Control	-- (10)
	Dioxin/Furan Control	-- (11)
New Sorbent Injection	SO_3 Control	93.91% (12)
	HCl Control	-- (13)
	SO_2 Control	-- (14)
New PAC Injection	Hg Control	90% (15)
	Dioxin/Furan Control	-- (16)
	SO_3 Control	-- (17)
New PJFF	PM Control	99.66% (18)
	HCl Control	-- (19)
	Hg Control	-- (20)
	Dioxin/Furan Control	-- (21)
	SO_3 Control	-- (22)
Refurbished existing WFGD	SO_2 Control	96% (23)
	HCl Control	98.64% (24)
	SO_3 Control	-- (25)
	Hg Control	-- (26)

Notes:

(1) Combustion control provides co-benefit for NO_x removal. Percentage removal efficiency is not considered.

(2) CO is an operational constraint which can be managed in optimization process. Neural networks may reduce CO to 0.1 lb/MBtu. Percentage removal efficiency can not be determined.

(3) Neural network provides co-benefit for PM removal by reducing the LOI content.

(4) Neural network provides co-benefit for NO_x removal. Percentage removal efficiency is not considered.

(5) NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.3169 lb/MBtu and NO_x outlet concentration of 0.139 lb/MBtu.

(6) SCR provides co-benefit for Hg removal by increasing the oxidation of Hg. Percentage removal efficiency is not considered.

(7) SCR increases the amount of SO_3 content in the flue gas by oxidation of SO_2.

(8) Air heater provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.

(9) Cold-side dry ESP provides co-benefit for PM removal. Percentage removal efficiency is not considered.

(10) Cold-side dry ESP provides co-benefit for Hg removal. Percentage removal efficiency is not considered.

(11) Cold-side dry ESP provides co-benefit for dioxin/furan removal. Percentage removal efficiency can not be determined.

(12) SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 82 ppmvd and SO_3 outlet concentration of 5 ppmvd.

(13) Sorbent injection provides co-benefit for HCl removal. Percentage removal efficiency is not considered.

(14) Sorbent injection provides co-benefit for SO_2 removal. Percentage removal efficiency is not considered.

(15) Hg removal efficiency for PAC injection is based on Hg inlet concentration of 10.71 lb/TBtu and Hg outlet concentration of 1.07 lb/TBtu.

(16) PAC injection may reduce dioxin/furan up to 15 x 10^{-18} lb/MBtu. Percentage removal efficiency can not be determined.

(17) PAC injection provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.

(18) PM removal efficiency for PJFF is based on PM inlet concentration of 8.746 lb/MBtu and PM outlet concentration of 0.03 lb/MBtu.

(19) PJFF provides co-benefit for HCl removal. Percentage removal efficiency is not considered.

(20) PJFF provides co-benefit for Hg removal. Percentage removal efficiency is not considered.

(21) PJFF provides co-benefit for dioxin/furan removal. Percentage removal efficiency can not be determined.

(22) PJFF provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.

(23) Expected efficiency based on LG&E prediction.

(24) HCl removal efficiency for WFGD is based on HCl inlet concentration of 0.147 lb/MBtu and HCl outlet concentration of 0.002 lb/MBtu.

(25) WFGD provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.

(26) WFGD provides co-benefit for Hg removal. Percentage removal efficiency is not considered.

From:	Crabtree, Jonathan D.
To:	Saunders, Eileen; Betz, Alex
CC:	Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Sent:	10/27/2010 7:00:54 PM
Subject:	168908. 41.0100 101027 Mill Creek Information Request - PDM Tables
Attachments:	Environmental Compliance Proj quality data.xlsx

Eileen,

Since it is getting late in eastern time, I am responding by email. I listened to your voicemail that Tim forwarded me regarding Table 1-4: Limestone Properties. The response below will hopefully clarify any questions you had in regards to Table 1-4. Also, your email mentioned you had questions regarding Table 1-2. If so, please feel free to call me at your convenience tomorrow at 913-458-2403 or send me an email. I'll be in the office tomorrow from 8:30am - 6:30pm EST.

Table 1-4:
The top half of the table "Dry Basis, Percent by Weight" has two columns: "% Guaranteed" and "Nominal". I filled out the "% Guaranteed" column based on the attached spreadsheet provided during Phase I. In PDMs from past projects, we have had the "nominal" column for typical/expected values. The highlighted values are old values from a past PDM. If E.ON has numbers readily available to replace them, please update the table those values. Otherwise, we can just delete that half of the column for this phase of the project. Additionally, information that is shown as crossed out and highlighted are values that are typically included in our PDM table but have not yet been provided. If this information is available, please update the table or we will just leave them out for this phase of the project.

The bottom half of the table "Bulk Density Design basis" has only a "Nominal" column. The values highlighted are standard numbers that B&V uses for Limestone Bulk Density. If E.ON has their own values for these parameters, please update the table or else we will just use the standard numbers at this time.

Please let me know if you have any further questions. And as I mentioned before, if you would like to discuss another table or info request, please give me a call or send me an email.

Thanks,

Jonathan D. Crabtree
Black & Veatch Corporation
11401 Lamar Avenue
Overland Park, KS 66211 USA
* CrabtreeJD@bv.com
((913) 458-2403

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From: Saunders, Eileen [mailto:Eileen.Saunders@eon-us.com]
Sent: Wednesday, October 27, 2010 4:29 PM
To: Crabtree, Jonathan D.; Betz, Alex
Cc: Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: RE: 168908. 41.0100 101012 Mill Creek Information Request from PDM

Jonathan,

I am working with Alex to complete Table 1-2 and I have a few clarifying questions. Would you please contact me at Ghent on 502-347-4023 sometime today or tomorrow morning? I also left Tim a voice mail detailing some of my questions.

Thanks,

Eileen

From: Crabtree, Jonathan D. [mailto:CrabtreeJD@bv.com]
Sent: Tuesday, October 12, 2010 5:33 PM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: 168908. 41.0100 101012 Mill Creek Information Request from PDM

Alex,

As you may have recently seen, there are tables in the Mill Creek Project Design Memorandum (PDM) that were requested to be filled in or confirmed by E.ON. In response to Eileen's comments, we would like to add these fill-in tables from the PDM to the Information Request, which will hopefully clarify some of the existing requests.

Attached are the following four word documents:
Table 1-2 - Design Basis Water Analysis - This information was previously requested on the Information Request under "3. Plant Data g. Water analyses and supply information." This table is an example of the kind of information we are looking for and in what form it will be placed in the PDM. (PRIORITY LVL 4)

Table 1-4 - Limestone Properties - This information was previously requested on the Information Request under "3. Plant Data o. Need current limestone quality analysis." From Phase I of this project, we had information that filled out the "%Guaranteed" column but are still interested if you have information that can fill in the "Nominal" column or any of the values under "Bulk Density Design Basis". I reviewed the limestone quality you uploaded on i-backup and if you prefer those values could be used to fill in the first two rows under the "Nominal" column. (PRIORITY LVL 2)

Table 1-11 and 1-12 - Electrical Design Data and Electrical Equipment and System Voltages - This information could not be filled in based on previously supplied electrical information. If possible, it would be helpful if these values could be filled in and confirmed by someone on site or in the T&D group. (PRIORITY LVL 4)

Table 1-14 (mislabeled in PDM as 1-11) - Load Model - Recent operating information will be helpful when performing economic analysis of the different equipment options. (PRIORITY LVL 4)
Feel free to fill out the tables in the attached word documents or provide the necessary data to fill in these tables, whichever is easier for you. These tables can be placed in i-Backup or emailed to us.

Let me know if you have any questions.

Thanks,

Jonathan D. Crabtree
Black & Veatch Corporation
11401 Lamar Avenue
Overland Park, KS 66211 USA
* CrabtreeJD@bv.com
((913) 458-2403

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From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Tuesday, October 12, 2010 3:12 PM
To: Crabtree, Jonathan D.
Cc: Saunders, Eileen; Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: RE: 168908. 41.0100 101011 Mill Creek Information Request

Jonathan,

Sorry about forgetting the attachment yesterday. It should be attached this time.

We had already found one drawing on Unit 2 that was requested, so I am uploading it today. We will mark that one as being complete and if you find otherwise, please let me know.

We do have percent volume CO2 at the stack and I am in the process of getting that data (should be tomorrow). I am planning to get the year-to-date data, if you need more, let me know.

I'm not positive I can find testing results in those areas, but I would say they probably have been done before. I will try to find any test results I can.

I will get an uncorrupted version of "MC 3 SCR General Arrangt Plan Section E-20.pdf" uploaded tomorrow.

What address, and to whose attention, should the B&V Short Circuit Study be sent?

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Crabtree, Jonathan D. [mailto:CrabtreeJD@bv.com]
Sent: Monday, October 11, 2010 5:11 PM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: 168908. 41.0100 101011 Mill Creek Information Request

Alex,

Thanks for the update. I believe your attachment did not make it on there with your email. Feel free to resend it or wait until your next update.

Regarding the plant arrangements, if the ones we requested are Unit 2 drawings, we already have clear copies of those and you do not need to rescan them. Unless you have additional Unit 1 plant arrangement drawings, we will assume we have everything we need and we can close that item.

Additionally, in response to the "Not measured" items on the data request (air heater leakage, precipitator leakage, and stack gas outlet oxygen percent) please provide information regarding the following (if available):

1) Do you have measurements of percent volume CO2 at the stack on any or all units?

2) Has the plant conducted any flue gas testing on any of the units at the air heater gas outlets and/or the cold-side ESPs? The type of information we would be looking for would again be percent volume O2 and/or CO2.

Lastly, in the priority 2 folder, the "MC 3 SCR General Arrangt Plan Section E-20.pdf" appears to be corrupted and we are unable to open it. If possible, please send another copy.

Thanks for your help,

Jonathan D. Crabtree
Black & Veatch Corporation
11401 Lamar Avenue
Overland Park, KS 66211 USA
* CrabtreeJD@bv.com
((913) 458-2403

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From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Monday, October 11, 2010 2:59 PM
To: Wehrly, M. R.
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101011 Mill Creek Information Request

M.R.,

Thanks for the feedback on these issues. I will get the AH info uploaded as soon as possible. We're looking for the prints you've listed below. We've found some, but they are not the latest revisions you've listed. Just for clarification, these prints you've listed are for Unit 2, not Unit 1.

Once again, the sheet is attached. There wasn't much that was added today, only 4 foundation prints under the Priority 2 folder.

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Wehrly, M. R. [mailto:WehrlyMR@bv.com]
Sent: Monday, October 11, 2010 10:03 AM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: 168908. 41.0143 101011 Mill Creek Information Request

Alex,
Sorry for any confusion on the Unit 1 Plant arrangements.

There are six Unit 1 PA drawings that just fuzz out to the point you can't read the characters when you blow them up to readable size. It may just be bad files or poor copies of good files. The six drawings are:

F-663-253-16, -16A, & 16B (drawings are actually numbered as F-663-253, shts 1 of 3, 2 of 3 & 3 of 3)
F-663-254-12, -12A, & 12B (drawings are actually numbered as F-663-254, shts 1 of 3, 2 of 3 & 3 of 3)

Please do the best you can. If the originals are real light, they may never scan well.

I'll let you know if we need anything further on Limestone.

Thanks,
M.R.

From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Friday, October 08, 2010 2:19 PM
To: Wehrly, M. R.
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

M.R.,

Attached is the updated spreadsheet for today. There is some confusion on the Unit 1 Plant Arrangement Drawings. If possible, please list the drawing numbers of the prints that are unreadable or the file names and I will look for better copies of those prints.

Also, please check the limestone analysis file I uploaded to see if that is the information you're looking for.

Thanks,

Alex Betz

(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Betz, Alex
Sent: Thursday, October 07, 2010 3:18 PM
To: 'Wehrly, M. R.'
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

M.R.,

Attached is the updated spreadsheet for today. A lot of information has been added. We are having trouble finding "Original/Operating performance data" for the Air Heaters. We do have actual operating data, but are not sure if that's what you're looking for. Please advise on that item.

The Excess O2 spreadsheet shows the actual data in 4 hour averages for the year to date. If you need more data, please let me know.

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Wehrly, M. R. [mailto:WehrlyMR@bv.com]
Sent: Wednesday, October 06, 2010 8:59 PM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

Alex,
Thanks for the update.
Send the study when you can. With the transformer nameplate pictures/drawings, we should be able to get started on the electrical review.

I've forwarded the structural steel study information on to Monty and if we think it will be useful, we'll try to get it from our storage.
M.R.

From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Wednesday, October 06, 2010 2:23 PM
To: Wehrly, M. R.
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

M.R.,

I am in the process of getting you a copy of the study, but I doubt it will be to you by Friday.

The attached sheet shows everything that I've uploaded to the website. Notice that some of the items could not be found either because we don't measure them, can't find them, or they don't exist. For the MC3 FD Fan Curve and MC1 & MC2 ID Booster Fan Curves, please see the comments in the "Completed" column.

I did find a structural report on Unit 3 FGD from 1993 by B&V, but it does not look that helpful, especially since it's from 1993. The cover letter is attached which shows the B&V Project and File number for you to reference in the B&V files if you think it would be valuable.

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Wehrly, M. R. [mailto:WehrlyMR@bv.com]
Sent: Tuesday, October 05, 2010 10:22 PM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

Alex,
Thanks for finding this information.
Yes we can still use SKM although we have a newer version and we'd have to update the data anyway.
Our Ann Arbor office told us they have the SKM model disks also, so we can get them from them if we need to.
Just a copy of the report would do it for now.
Thanks,
M.R.

From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Tuesday, October 05, 2010 12:16 PM
To: Wehrly, M. R.
Cc: Saunders, Eileen; Hillman, Timothy M.
Subject: B&V Short Circuit Study

M.R.,

I have located the short circuit study, but I also found out from the guy who has the study that he has a model in an SKM (PTW) format. I think I remember you mentioning that format during the conference call yesterday, but don't remember if you said you could use that or couldn't use that, so please let me know.

Thanks,

Alex Betz
Mechanical Engineer II
LG&E - Mill Creek Station
14660 Dixie Hwy
Louisville, KY 40272
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**E.ON U.S. Corporate Fuels**														
2	**Environmental Compliance Project - Coal Quality Data**														
3	5/3/10														
4															
5												Ultimate			
6	**Coal Quality Average for 2009**			Moisture	Ash AR	Volatile AR	ixed Carbon A	BTU AR	Sulfur AR	lkalinity AF	Carbon AR	Hydrogen AF	Nitrogen AF	Oxygen AR	uminum Oxi
7				%	%	%	%	BTU/lb	%	mg/L	%	%	%	%	%
8	Brown Average			6.01	10.62	36.72	46.65	12,403	1.51	0.19	69.39	4.67	1.37	6.42	27.93
9									2.44		100.00				
10	Green River Average			10.55	8.60	36.71	44.15	11,827	2.36	0.21	66.00	4.46	1.34	6.69	19.54
11									3.99		100.00				
12	Cane Run Average			13.59	10.36	34.92	41.13	10,933	2.72	0.21	60.83	4.18	1.34	6.99	23.42
13									4.97		100.00				
14	Ghent Average			10.77	11.27	35.66	42.30	11,286	2.81	0.22	62.70	4.31	1.27	6.88	21.41
15									4.98		100.00				
16	Mill Creek Average			11.43	11.36	35.68	41.54	11,115	3.02	0.23	61.67	4.22	1.28	7.01	20.89
17									5.44		100.00				
18	Trimble County Average			10.30	11.96	35.67	42.07	11,261	3.09	0.24	62.36	4.31	1.26	6.72	22.62
19									5.48		100.00				
20															
21															
22	**TYPICAL/Average Quality for Future Coals**														
23	**Ghent, Mill Creek, Cane Run, Trimble C**			**11.00**	**12.00**	**36.00**	**42.00**	**11,200**	**3.36**	**0.22**	**61.21**	**4.28**	**1.27**	**6.89**	**21.69**
24									6.00		100.01				
25	**Brown Low Sulfur Coal**			**6.50**	**11.50**	**37.00**	**47.00**	**12,000**	**1.50**	**0.19**	**68.04**	**4.67**	**1.37**	**6.42**	**27.93**
26									2.50		100.00				
27	**Green River Average**			**10.50**	**9.00**	**37.00**	**44.00**	**11,600**	**2.60**	**0.21**	**65.41**	**4.46**	**1.34**	**6.69**	**19.45**
28									4.48		100.00				
29	**PRB for TC2 Blend**			**28.00**	**7.00**	**36.00**	**30.00**	**8,500**	**0.60**	**0.40**	**48.00**	**3.53**	**0.86**	**12.01**	**18.00**
30											100.00				

	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1																
2																
3																
4																
5	Ash Analysis															
6	arium Oxic	alcium Oxic	Iron Oxide	agnesium Oxi	anganese Oxi	sphorus Pento	otassium Oxid	licon Dioxi	odium Oxic	rontium Oxi	ulfur Trioxi	anium Diox	Silica	Undetermined	Antimony, SE	Arsenic, As
7	%	%	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm
8	0.13	1.40	12.63	0.84	0.03	0.35	2.21	51.11	0.33	0.15	1.09	1.55	77.53	0.25	0.76	21
9																
10	0.06	2.89	19.97	0.91	0.04	0.21	2.41	49.61	0.77	0.04	2.47	1.08	67.72		1.07	10
11																
12	0.05	1.21	22.91	0.99	0.03	0.24	2.63	45.95	0.31	0.05	0.95	1.10	64.72	0.17	1.37	15
13																
14	0.07	2.70	21.39	0.89	0.04	0.24	2.24	46.56	0.52	0.05	2.58	1.07	65.14	0.25	1.00	13
15																
16	0.08	3.41	21.84	0.92	0.04	0.27	2.37	45.26	0.48	0.04	3.36	1.00	63.44	0.04	1.12	12
17																
18	0.08	2.57	22.23	0.92	0.04	0.29	2.39	45.09	0.45	0.06	2.24	1.01	63.70		0.94	13
19																
20																
21																
22																
23	0.07	2.74	21.80	0.91	0.04	0.26	2.33	45.88	0.48	0.05	2.58	1.04	64.37	0.12	1.05	13
24																
25	0.13	1.40	12.63	0.84	0.03	0.35	2.21	51.11	0.33	0.15	1.09	1.55	77.53	0.25	0.76	21
26																
27	0.06	2.89	19.90	0.91	0.04	0.21	2.41	49.65	0.77	0.04	2.47	1.08	67.72	0.13	1.07	10
28																
29	0.40	17.00	5.10	3.60	0.03	0.50	0.90	40.27	1.60	0.40	11.00	1.20	58.00		2.00	4
30																

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS
1														
2														
3														
4														
5	Trace Elements													
6	Barium, Ba	Cadmium, Cd	Chlorine, Cl	Chromium, Cr	Flourine, Fl	Lead, Pb	Magnesium, Mg	Mercury, Hg	Nickel, Ni	Selenium, Se	Strontium, Sr	Vanadium, V	Zinc, Zn	
7	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
8	115	0.08	863	20	85	8	547	0.12	15	4.73	135	31	14	
9														
10	49	0.30	1,845	17	71	11	509	0.10	14	1.93	30	40	50	
11														
12	63	0.20	155	23	86	12	721	0.09	29	2.32	58	48	32	
13														
14	72	0.60	964	21	93	12	663	0.13	19	3.16	56	40	44	
15														
16	77	0.68	622	23	102	10	703	0.13	20	2.65	47	37	51	
17														
18	79	0.89	624	25	108	11	693	0.12	21	3.02	67	39	59	
19														
20														
21														
22														
23	74	0.65	1,600	23	98	11	684	0.12	20	2.94	56	40	48	
24														
25	115	0.08	863	20	85	8	547	0.12	15	4.73	135	31	14	
26														
27	49	0.30	1,845	17	71	11	509	0.10	14	1.93	30	40	50	
28														
29	270	1.40	125	10	63	4	1,525	0.08	7	2.00	250	28	11	
30														

Limestone Quality

Mill Creek, Trimble County and Ghent

§6.1 Specifications. The limestone delivered hereunder shall conform to the foll

specifications on a "dry" basis:

Active Ingredient Proportions	(%) Guaranteed
Surface Moisture	7.0% Maximum
$CaCO_3$	90.0% Minimum *
$MgCO_3$	6.0% Maximum
SiO_2	3.5% Maximum
Fe_2O_3	1.5% Maximum
Al_2O_3	4.30% Maximum
Inerts	7.0% Maximum
Flouride	500 PPM
Chloides	550PPM
Bond Work Index	12 Maximum

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
51																	
52				* The Seller shall use its best efforts to supply limestone containing a minimum of 9													
53				$CaCO_3$.													
54																	
55																	
56																	
57																	
58																	

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52	?2.0%	
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Limestone Quality

Brown

§6.1 Specifications. The limestone delivered hereunder shall conform to the follo

specifications on an "as received" basis:

Active Ingredient Proportions	(%) Guaranteed
Surface Moisture	4.0% Maximum
$CaCO_3$	92.0% Minimum
$MgCO_3$	6.0% Maximum
SiO_2	3.5% Maximum
Fe_2O_3	1.0% Maximum
$R_2O_3(Al_2O_3+Fe_2O_3)$	.90% Typical
S	.05% Maximum
P_2O_5	.40% Maximum
Alkali (Na_2O+K_2O)	1.0% Maximum
Al_2O_3	1.5% Maximum

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Inerts	3.0% Maximum
Flouride	1,250 PPM
Chlorides	250 PPM
Bond Work Index	10.5 Maximum

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From:	Lucas, Kyle J.
To:	Saunders, Eileen
CC:	Wehrly, M. R.; Hillman, Timothy M.; Mahabaleshwarkar, Anand; Mehta, Pratik D.; Crabtree, Jonathan D.
Sent:	12/10/2010 11:56:26 AM
Subject:	168908 101210 - AQC Summary Table for 18 Coal-Fired Units
Attachments:	AQC Technologies 121010.pdf

Eileen,
Attached, please a draft table containing a high level summary of the AQC technologies for the 18 coal-fired units. The table includes those pollutants from the Phase II project which we are targeting specific emissions reductions (illustrated in a percent removal). Also, the table includes a notation for certain AQC equipment which has the potential to provide a level of co-benefit of control of certain pollutants (removal efficiencies not provided as they have not been calculated for this project). Additionally, those Phase I units do not contain specific emission reductions as they are not part of the Phase II study. However, similar to those Phase II units, an indication has been made for co-benefit should technology be implemented for these units.

Please let me know if you have any questions.

Have a nice weekend,
Regards,
Kyle

Kyle Lucas | Environmental Permitting Manager
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-9062** | Fax: **(913) 458-9062**
Email: **lucaskj@bv.com**

		Phase II Study											Phase I Study					
		Mill Creek Removal Efficiency				Ghent Removal Efficiency				Brown Removal Efficiency			Cane Run Removal Efficiency			Green River Removal Efficiency		Trimble County Removal Efficiency
Equipment	Pollutant Control	Unit 1	Unit 2	Unit 3	Unit 4	Unit 1	Unit 2	Unit 3	Unit 4	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 3	Unit 4	Unit 1
Boiler with Existing Low NOx Burners and Existing Over-Fire Air	NO_x Control	-- [1]	-- [1]	N/A	N/A	N/A	-- [1]	-- [1]	-- [1]	N/A	-- [1]	-- [1]	N/A	N/A	N/A	N/A	N/A	-- [1]
Boiler with Existing Low NOx Burners	NO_x Control	N/A	N/A	-- [1]	-- [1]	-- [1]	N/A	N/A	N/A	-- [1]	N/A	N/A	-- [1]	-- [1]	N/A	-- [1]	-- [1]	N/A
Boiler with Existing Over-Fire Air	NO_x Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [1]	N/A	N/A	N/A
New Neural Networks	CO Control	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]	-- [2]
	PM Control	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]	-- [3]
	NO_x Control	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]	-- [4]
Existing Hot-Side Dry ESP	PM Control	N/A	N/A	N/A	N/A	N/A	-- [9]	-- [9]	-- [9]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [9]	N/A
	Hg Control	N/A	N/A	N/A	N/A	N/A	-- [10]	-- [10]	-- [10]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [10]	N/A
	Dioxin/Furan Control	N/A	N/A	N/A	N/A	N/A	-- [11]	-- [11]	-- [11]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [11]	N/A
Existing SCR	NO_x Control	N/A	N/A	N/A [12]	N/A [12]	N/A [12]	N/A	N/A [12]	N/A [12]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A [12]
	Hg Control	N/A	N/A	-- [6]	-- [6]	-- [6]	N/A	-- [6]	-- [6]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [6]
	SO_3 Control	N/A	N/A	-- [7]	-- [7]	-- [7]	N/A	-- [7]	-- [7]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [7]
New SCR	NO_x Control	56.14% [5]	55.72% [26]	N/A	N/A	N/A	85.14% [28]	N/A	N/A	65.04% [30]	64.33% [32]	N/A [12]	N/A [35]	N/A [35]	N/A [35]	N/A [35]	N/A [35]	N/A
	Hg Control	-- [6]	-- [6]	N/A	N/A	N/A	-- [6]	N/A	N/A	-- [6]	-- [6]	-- [6]	-- [6]	-- [6]	-- [6]	-- [6]	-- [6]	N/A
	SO_3 Control	-- [7]	-- [7]	N/A	N/A	N/A	-- [7]	N/A	N/A	-- [7]	-- [7]	-- [7]	-- [7]	-- [7]	-- [7]	-- [7]	-- [7]	N/A
Existing Air Heater	SO_3 Control	-- [8]	-- [8]	-- [8]	-- [8]	-- [8]	-- [8]	-- [8]	-- [8]	-- [8]	-- [8]	-- [8]	N/A	N/A	N/A	N/A	-- [8]	-- [8]
New Air Heater	SO_3 Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [8]	-- [8]	-- [8]	-- [8]	N/A	N/A
Existing Cold-Side Dry ESP	PM Control	N/A	N/A	-- [9]	-- [9]	-- [9]	N/A	N/A	N/A	-- [9]	-- [9]	-- [9]	N/A	N/A	N/A	N/A	N/A	-- [9]
	Hg Control	N/A	N/A	-- [10]	-- [10]	-- [10]	N/A	N/A	N/A	-- [10]	-- [10]	-- [10]	N/A	N/A	N/A	N/A	N/A	-- [10]
	Dioxin/Furan Control	N/A	N/A	-- [11]	-- [11]	-- [11]	N/A	N/A	N/A	-- [11]	-- [11]	-- [11]	N/A	N/A	N/A	N/A	N/A	-- [11]
New Cold-Side Dry ESP	PM Control	-- [9]	-- [9]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Hg Control	-- [10]	-- [10]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Dioxin/Furan Control	-- [11]	-- [11]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Existing Sorbent Injection	SO_3 Control	N/A	N/A	N/A [12]	N/A [12]	N/A [12]	N/A	N/A [12]	N/A [12]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A [12]
	HCl Control	N/A	N/A	-- [13]	-- [13]	-- [13]	N/A	-- [13]	-- [13]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [13]
	SO_2 Control	N/A	N/A	-- [14]	-- [14]	-- [14]	N/A	-- [14]	-- [14]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [14]
New Sorbent Injection	SO_3 Control	N/A [12]	N/A [12]	N/A	N/A	N/A	93.51% [29]	N/A	N/A	93.24% [31]	94.05% [33]	94.12% [34]	N/A [35]	N/A [35]	N/A [35]	N/A	N/A	N/A
	HCl Control	-- [13]	-- [13]	N/A	N/A	N/A	-- [13]	N/A	N/A	-- [13]	-- [13]	-- [13]	-- [13]	-- [13]	-- [13]	N/A	N/A	N/A
	SO_2 Control	-- [14]	-- [14]	N/A	N/A	N/A	-- [14]	N/A	N/A	-- [14]	-- [14]	-- [14]	-- [14]	-- [14]	-- [14]	N/A	N/A	N/A
New PAC Injection	Hg Control	90% [15]	90% [15]	90% [15]	90% [15]	90% [15]	90% [15]	90% [15]	90% [15]	90% [15]	90% [15]	90% [15]	N/A [35]	N/A [35]	N/A [35]	N/A [35]	N/A [35]	N/A [35]
	Dioxin/Furan Control	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]	-- [16]
	SO_3 Control	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]	-- [17]
New PJFF	PM Control	99.66% [18]	99.66% [18]	99.66% [18]	99.66% [18]	99.66% [18]	99.66% [18]	99.66% [18]	99.66% [18]	99.66% [18]	99.66% [18]	99.66% [18]	N/A [35]	N/A [35]	N/A [35]	N/A	N/A	N/A [35]
	HCl Control	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	-- [19]	N/A	N/A	-- [19]
	Hg Control	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	-- [20]	N/A	N/A	-- [20]
	Dioxin/Furan Control	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	N/A	N/A	-- [21]
	SO_3 Control	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	N/A	N/A	-- [22]
Existing WFGD	SO_2 Control	N/A [12]	N/A [12]	N/A [12]	N/A	N/A [12]	N/A [12]	N/A [12]	N/A [12]	N/A [12]	N/A [12]	N/A [12]	N/A	N/A	N/A	N/A	N/A	N/A [12]
	HCl Control	N/A [12]	N/A [12]	N/A [12]	N/A	N/A [12]	N/A [12]	N/A [12]	N/A [12]	N/A [12]	N/A [12]	N/A [12]	N/A	N/A	N/A	N/A	N/A	N/A [12]
	SO_3 Control	-- [24]	-- [24]	-- [24]	N/A	-- [24]	-- [24]	-- [24]	-- [24]	-- [24]	-- [24]	-- [24]	N/A	N/A	N/A	N/A	N/A	-- [24]
	Hg Control	-- [25]	-- [25]	-- [25]	N/A	-- [25]	-- [25]	-- [25]	-- [25]	-- [25]	-- [25]	-- [25]	N/A	N/A	N/A	N/A	N/A	-- [25]
New WFGD	SO_2 Control	N/A	N/A	N/A	98% [27]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A [35]	N/A [35]	N/A [35]	N/A	N/A	N/A
	HCl Control	N/A	N/A	N/A	98.64% [23]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A [35]	N/A [35]	N/A [35]	N/A	N/A	N/A
	SO_3 Control	N/A	N/A	N/A	-- [24]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [24]	-- [24]	-- [24]	N/A	N/A	N/A
	Hg Control	N/A	N/A	N/A	-- [25]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [25]	-- [25]	-- [25]	N/A	N/A	N/A
New Semi-Dry Scrubber	SO_2 Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A [35]	N/A [35]	N/A
	HCl Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A [35]	N/A [35]	N/A
	SO_3 Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A [35]	N/A [35]	N/A
	PM Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A [35]	N/A [35]	N/A
	Hg Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [20]	-- [20]	N/A
	Dioxin/Furan Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- [21]	-- [21]	N/A

Notes:
1. Combustion control provides co-benefit for NOx removal. Percentage removal efficiency is not considered.
2. CO is an operational constraint which can be managed in optimization process. Neural networks may reduce CO to 0.1 lb/MBtu. Percentage removal efficiency can not be determined.
3. Neural network provides co-benefit for PM removal by reducing the LOI content.
4. Neural network provides co-benefit for NO_x removal. Percentage removal efficiency is not considered.
5. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.3169 lb/MBtu and NO_x outlet concentration of 0.139 lb/MBtu.
6. SCR provides co-benefit for Hg removal by increasing the oxidation of Hg. Percentage removal efficiency is not considered.
7. SCR increases the amount of SO_3 content in the flue gas by oxidation of SO_2.
8. Air heater provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.
9. Cold-side dry ESP provides co-benefit for PM removal. Percentage removal efficiency is not considered.
10. Cold-side dry ESP provides co-benefit for Hg removal. Percentage removal efficiency is not considered.
11. Cold-side dry ESP provides co-benefit for dioxin/furan removal. Percentage removal efficiency can not be determined.
12. Not applicable for Phase II study.
13. Sorbent injection provides co-benefit for HCl removal. Percentage removal efficiency is not considered.
14. Sorbent injection provides co-benefit for SO_2 removal. Percentage removal efficiency is not considered.
15. Hg removal efficiency for PAC injection is based on Hg inlet concentration of 10.71 lb/TBtu and Hg outlet concentration of 1.07 lb/TBtu.
16. PAC injection may reduce dioxin/furan up to 15×10^{-18} lb/MBtu. Percentage removal efficiency can not be determined.
17. PAC injection provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.
18. PM removal efficiency for PJFF is based on PM inlet concentration of 8.746 lb/MBtu and PM outlet concentration of 0.03 lb/MBtu.
19. PJFF provides co-benefit for HCl removal. Percentage removal efficiency is not considered.
20. PJFF provides co-benefit for Hg removal. Percentage removal efficiency is not considered.
21. PJFF provides co-benefit for dioxin/furan removal. Percentage removal efficiency can not be determined.
22. PJFF provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.
23. HCl removal efficiency for WFGD is based on HCl inlet concentration of 0.147 lb/MBtu and HCl outlet concentration of 0.002 lb/MBtu.
24. WFGD provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.
25. WFGD provides co-benefit for Hg removal. Percentage removal efficiency is not considered.
26. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.3139 lb/MBtu and NO_x outlet concentration of 0.139 lb/MBtu.
27. SO_2 removal efficiency of WFGD is based on SO_2 inlet concentration of 6.0 lb/MBtu and SO_2 outlet concentration of 0.12 lb/MBtu.
28. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.276 lb/MBtu and NO_x outlet concentration of 0.041 lb/MBtu.
29. SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 77 ppmvd and SO_3 outlet concentration of 5 ppmvd.
30. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.4463 lb/MBtu and NO_x outlet concentration of 0.156 lb/MBtu.
31. SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 74 ppmvd and SO_3 outlet concentration of 5 ppmvd.
32. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.4374 lb/MBtu and NO_x outlet concentration of 0.156 lb/MBtu.
33. SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 84 ppmvd and SO_3 outlet concentration of 5 ppmvd.
34. SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 85 ppmvd and SO_3 outlet concentration of 5 ppmvd.
35. Final emission limit and equipment yet to be determined. Not part of Phase II study.

From:	Saunders, Eileen
To:	Billiter, Delbert
CC:	Betz, Alex
Sent:	10/28/2010 8:44:16 AM
Subject:	FW: 168908. 41.0100 101027 Mill Creek Information Request - PDM Tables
Attachments:	Environmental Compliance Proj quality data.xlsx; Table 1_04 Limestone Props.doc

Delbert,

Alex Betz and I have been working with B&V on the Mill Creek portion of the Phase II Environmental Compliance Study. The attached Excel Spreadsheet was provided to B&V during Phase I. Is it ok to use that original information for Phase II or should we update them on the word document (Table 1-4)?

Also, the Bulk Density numbers in the second part of Table 1-4 are standard numbers that B&V uses. Should we allow them to continue with those numbers or should do we have new inputs for them?

In addition to the two attachments, please see the emails below for further details of their request.

I would appreciate any guidance you can give us.

Thank you,

Eileen

From: Crabtree, Jonathan D. [mailto:CrabtreeJD@bv.com]
Sent: Wednesday, October 27, 2010 7:01 PM
To: Saunders, Eileen; Betz, Alex
Cc: Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: 168908. 41.0100 101027 Mill Creek Information Request - PDM Tables

Eileen,

Since it is getting late in eastern time, I am responding by email. I listened to your voicemail that Tim forwarded me regarding Table 1-4: Limestone Properties. The response below will hopefully clarify any questions you had in regards to Table 1-4. Also, your email mentioned you had questions regarding Table 1-2. If so, please feel free to call me at your convenience tomorrow at 913-458-2403 or send me an email. I'll be in the office tomorrow from 8:30am - 6:30pm EST.

<u>Table 1-4:</u>
The top half of the table "Dry Basis, Percent by Weight" has two columns: "% Guaranteed" and "Nominal". I filled out the "% Guaranteed" column based on the attached spreadsheet provided during Phase I. In PDMs from past projects, we have had the "nominal" column for typical/expected values. The highlighted values are old values from a past PDM. If E.ON has numbers readily available to replace them, please update the table those values. Otherwise, we can just delete that half of the column for this phase of the project. Additionally, information that is shown as crossed out and highlighted are values that are typically included in our PDM table but have not yet been provided. If this information is available, please update the table or we will just leave them out for this phase of the project.

The bottom half of the table "Bulk Density Design basis" has only a "Nominal" column. The values highlighted are standard numbers that B&V uses for Limestone Bulk Density. If E.ON has their own values for these parameters, please update the table or else we will just use the standard numbers at this time.

Please let me know if you have any further questions. And as I mentioned before, if you would like to discuss another table or info request, please give me a call or send me an email.

Thanks,

Jonathan D. Crabtree
Black & Veatch Corporation
11401 Lamar Avenue
Overland Park, KS 66211 USA

* CrabtreeJD@bv.com
((913) 458-2403

Building a World of Difference®

From: Saunders, Eileen [mailto:Eileen.Saunders@eon-us.com]
Sent: Wednesday, October 27, 2010 4:29 PM
To: Crabtree, Jonathan D.; Betz, Alex
Cc: Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: RE: 168908. 41.0100 101012 Mill Creek Information Request from PDM

Jonathan,

I am working with Alex to complete Table 1-2 and I have a few clarifying questions. Would you please contact me at Ghent on 502-347-4023 sometime today or tomorrow morning? I also left Tim a voice mail detailing some of my questions.

Thanks,

Eileen

From: Crabtree, Jonathan D. [mailto:CrabtreeJD@bv.com]
Sent: Tuesday, October 12, 2010 5:33 PM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: 168908. 41.0100 101012 Mill Creek Information Request from PDM

Alex,

As you may have recently seen, there are tables in the Mill Creek Project Design Memorandum (PDM) that were requested to be filled in or confirmed by E.ON. In response to Eileen's comments, we would like to add these fill-in tables from the PDM to the Information Request, which will hopefully clarify some of the existing requests.

Attached are the following four word documents:
Table 1-2 - Design Basis Water Analysis - This information was previously requested on the Information Request under "3. Plant Data g. Water analyses and supply information." This table is an example of the kind of information we are looking for and in what form it will be placed in the PDM. (PRIORITY LVL 4)

Table 1-4 - Limestone Properties - This information was previously requested on the Information Request under "3. Plant Data o. Need current limestone quality analysis." From Phase I of this project, we had information that filled out the "%Guaranteed" column but are still interested if you have information that can fill in the "Nominal" column or any of the values under "Bulk Density Design Basis". I reviewed the limestone quality you uploaded on i-backup and if you prefer those values could be used to fill in the first two rows under the "Nominal" column. (PRIORITY LVL 2)

Table 1-11 and 1-12 - Electrical Design Data and Electrical Equipment and System Voltages - This information could not be filled in based on previously supplied electrical information. If possible, it would be helpful if these values could be filled in and confirmed by someone on site or in the T&D group. (PRIORITY LVL 4)

Table 1-14 (mislabeled in PDM as 1-11) - Load Model - Recent operating information will be helpful when performing economic analysis of the different equipment options. (PRIORITY LVL 4)
Feel free to fill out the tables in the attached word documents or provide the necessary data to fill in these tables, whichever is easier for you. These tables can be placed in i-Backup or emailed to us.

Let me know if you have any questions.

Thanks,

Jonathan D. Crabtree
Black & Veatch Corporation
11401 Lamar Avenue
Overland Park, KS 66211 USA
* CrabtreeJD@bv.com
((913) 458-2403

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From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Tuesday, October 12, 2010 3:12 PM
To: Crabtree, Jonathan D.
Cc: Saunders, Eileen; Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: RE: 168908. 41.0100 101011 Mill Creek Information Request

Jonathan,

Sorry about forgetting the attachment yesterday. It should be attached this time.

We had already found one drawing on Unit 2 that was requested, so I am uploading it today. We will mark that one as being complete and if you find otherwise, please let me know.

We do have percent volume CO2 at the stack and I am in the process of getting that data (should be tomorrow). I am planning to get the year-to-date data, if you need more, let me know.

I'm not positive I can find testing results in those areas, but I would say they probably have been done before. I will try to find any test results I can.

I will get an uncorrupted version of "MC 3 SCR General Arrangt Plan Section E-20.pdf" uploaded tomorrow.

What address, and to whose attention, should the B&V Short Circuit Study be sent?

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Crabtree, Jonathan D. [mailto:CrabtreeJD@bv.com]
Sent: Monday, October 11, 2010 5:11 PM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Wehrly, M. R.; 168908 E.ON-AQC
Subject: 168908. 41.0100 101011 Mill Creek Information Request

Alex,

Thanks for the update. I believe your attachment did not make it on there with your email. Feel free to resend it or wait until your next update.

Regarding the plant arrangements, if the ones we requested are Unit 2 drawings, we already have clear copies of those and you do not need to rescan them. Unless you have additional Unit 1 plant arrangement drawings, we will assume we have everything we need and we can close that item.

Additionally, in response to the "Not measured" items on the data request (air heater leakage, precipitator leakage, and stack gas outlet oxygen percent) please provide information regarding the following (if available):

1) Do you have measurements of percent volume CO2 at the stack on any or all units?

2) Has the plant conducted any flue gas testing on any of the units at the air heater gas outlets and/or the cold-side ESPs? The type of information we would be looking for would again be percent volume O2 and/or CO2.

Lastly, in the priority 2 folder, the "MC 3 SCR General Arrangt Plan Section E-20.pdf" appears to be corrupted and we are unable to open it. If possible, please send another copy.

Thanks for your help,

Jonathan D. Crabtree
Black & Veatch Corporation
11401 Lamar Avenue
Overland Park, KS 66211 USA
* CrabtreeJD@bv.com
((913) 458-2403

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From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Monday, October 11, 2010 2:59 PM
To: Wehrly, M. R.
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101011 Mill Creek Information Request

M.R.,

Thanks for the feedback on these issues. I will get the AH info uploaded as soon as possible. We're looking for the prints you've listed below. We've found some, but they are not the latest revisions you've listed. Just for clarification, these prints you've listed are for Unit 2, not Unit 1.

Once again, the sheet is attached. There wasn't much that was added today, only 4 foundation prints under the Priority 2 folder.

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Wehrly, M. R. [mailto:WehrlyMR@bv.com]
Sent: Monday, October 11, 2010 10:03 AM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: 168908. 41.0143 101011 Mill Creek Information Request

Alex,
Sorry for any confusion on the Unit 1 Plant arrangements.

There are six Unit 1 PA drawings that just fuzz out to the point you can't read the characters when you blow them up to readable size. It may just be bad files or poor copies of good files. The six drawings are:

F-663-253-16, -16A, & 16B (drawings are actually numbered as F-663-253, shts 1 of 3, 2 of 3 & 3 of 3)
F-663-254-12, -12A, & 12B (drawings are actually numbered as F-663-254, shts 1 of 3, 2 of 3 & 3 of 3)

Please do the best you can. If the originals are real light, they may never scan well.

I'll let you know if we need anything further on Limestone.

Thanks,

M.R.

From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Friday, October 08, 2010 2:19 PM
To: Wehrly, M. R.
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

M.R.,

Attached is the updated spreadsheet for today. There is some confusion on the Unit 1 Plant Arrangement Drawings. If possible, please list the drawing numbers of the prints that are unreadable or the file names and I will look for better copies of those prints.

Also, please check the limestone analysis file I uploaded to see if that is the information you're looking for.

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Betz, Alex
Sent: Thursday, October 07, 2010 3:18 PM
To: 'Wehrly, M. R.'
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

M.R.,

Attached is the updated spreadsheet for today. A lot of information has been added. We are having trouble finding "Original/Operating performance data" for the Air Heaters. We do have actual operating data, but are not sure if that's what you're looking for. Please advise on that item.

The Excess O2 spreadsheet shows the actual data in 4 hour averages for the year to date. If you need more data, please let me know.

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Wehrly, M. R. [mailto:WehrlyMR@bv.com]
Sent: Wednesday, October 06, 2010 8:59 PM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

Alex,
Thanks for the update.
Send the study when you can. With the transformer nameplate pictures/drawings, we should be able to get started on the electrical review.

I've forwarded the structural steel study information on to Monty and if we think it will be useful, we'll try to get it from our storage.
M.R.

From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Wednesday, October 06, 2010 2:23 PM
To: Wehrly, M. R.
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: RE: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

M.R.,

I am in the process of getting you a copy of the study, but I doubt it will be to you by Friday.

The attached sheet shows everything that I've uploaded to the website. Notice that some of the items could not be found either because we don't measure them, can't find them, or they don't exist. For the MC3 FD Fan Curve and MC1 & MC2 ID Booster Fan Curves, please see the comments in the "Completed" column.

I did find a structural report on Unit 3 FGD from 1993 by B&V, but it does not look that helpful, especially since it's from 1993. The cover letter is attached which shows the B&V Project and File number for you to reference in the B&V files if you think it would be valuable.

Thanks,

Alex Betz
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

From: Wehrly, M. R. [mailto:WehrlyMR@bv.com]
Sent: Tuesday, October 05, 2010 10:22 PM
To: Betz, Alex
Cc: Saunders, Eileen; Hillman, Timothy M.; Bayless, James W. III (Jim); 168908 E.ON-AQC; Crabtree, Jonathan D.
Subject: 168908. 41.0143 101005 Mill Creek RE: B&V Short Circuit Study

Alex,
Thanks for finding this information.
Yes we can still use SKM although we have a newer version and we'd have to update the data anyway.
Our Ann Arbor office told us they have the SKM model disks also, so we can get them from them if we need to.
Just a copy of the report would do it for now.
Thanks,
M.R.

From: Betz, Alex [mailto:Alex.Betz@eon-us.com]
Sent: Tuesday, October 05, 2010 12:16 PM
To: Wehrly, M. R.
Cc: Saunders, Eileen; Hillman, Timothy M.
Subject: B&V Short Circuit Study

M.R.,

I have located the short circuit study, but I also found out from the guy who has the study that he has a model in an SKM (PTW) format. I think I remember you mentioning that format during the conference call yesterday, but don't remember if you said you could use that or couldn't use that, so please let me know.

Thanks,

Alex Betz
Mechanical Engineer II
LG&E - Mill Creek Station
14660 Dixie Hwy
Louisville, KY 40272
(502) 933-6602 Office
(502) 217-2286 Fax
(502) 817-3733 Cell

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	A–C	D	E	F	G	H	I	J	K	L	M	N	O
1	**E.ON U.S. Corporate Fuels**												
2	**Environmental Compliance Project - Coal Quality Data**												
3	**5/3/10**												
4													
5									Ultimate				
6	**Coal Quality Average for 2009**	Moisture	Ash AR	Volatile AR	ixed Carbon A	BTU AR	Sulfur AR	lkalinity AF	Carbon AR	Hydrogen AF	Nitrogen AF	Oxygen AR	uminum Oxi
7		%	%	%	%	BTU/lb	%	mg/L	%	%	%	%	%
8	Brown Average	6.01	10.62	36.72	46.65	12,403	1.51	0.19	69.39	4.67	1.37	6.42	27.93
9							2.44		100.00				
10	Green River Average	10.55	8.60	36.71	44.15	11,827	2.36	0.21	66.00	4.46	1.34	6.69	19.54
11							3.99		100.00				
12	Cane Run Average	13.59	10.36	34.92	41.13	10,933	2.72	0.21	60.83	4.18	1.34	6.99	23.42
13							4.97		100.00				
14	Ghent Average	10.77	11.27	35.66	42.30	11,286	2.81	0.22	62.70	4.31	1.27	6.88	21.41
15							4.98		100.00				
16	Mill Creek Average	11.43	11.36	35.68	41.54	11,115	3.02	0.23	61.67	4.22	1.28	7.01	20.89
17							5.44		100.00				
18	Trimble County Average	10.30	11.96	35.67	42.07	11,261	3.09	0.24	62.36	4.31	1.26	6.72	22.62
19							5.48		100.00				
20													
21													
22	**TYPICAL/Average Quality for Future Coals**												
23	Ghent, Mill Creek, Cane Run, Trimble C	11.00	12.00	36.00	42.00	11,200	3.36	0.22	61.21	4.28	1.27	6.89	21.69
24							6.00		100.01				
25	Brown Low Sulfur Coal	6.50	11.50	37.00	47.00	12,000	1.50	0.19	68.04	4.67	1.37	6.42	27.93
26							2.50		100.00				
27	Green River Average	10.50	9.00	37.00	44.00	11,600	2.60	0.21	65.41	4.46	1.34	6.69	19.45
28							4.48		100.00				
29	PRB for TC2 Blend	28.00	7.00	36.00	30.00	8,500	0.60	0.40	48.00	3.53	0.86	12.01	18.00
30									100.00				

	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1																
2																
3																
4																
5	Ash Analysis															
6	arium Oxic	alcium Oxic	Iron Oxide	agnesium Oxi	anganese Oxi	sphorus Pento	otassium Oxid	licon Dioxi	odium Oxid	rontium Oxi	ulfur Trioxi	anium Diox	Silica	Undetermined	Antimony, SE	Arsenic, As
7	%	%	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm
8	0.13	1.40	12.63	0.84	0.03	0.35	2.21	51.11	0.33	0.15	1.09	1.55	77.53	0.25	0.76	21
9																
10	0.06	2.89	19.97	0.91	0.04	0.21	2.41	49.61	0.77	0.04	2.47	1.08	67.72		1.07	10
11																
12	0.05	1.21	22.91	0.99	0.03	0.24	2.63	45.95	0.31	0.05	0.95	1.10	64.72	0.17	1.37	15
13																
14	0.07	2.70	21.39	0.89	0.04	0.24	2.24	46.56	0.52	0.05	2.58	1.07	65.14	0.25	1.00	13
15																
16	0.08	3.41	21.84	0.92	0.04	0.27	2.37	45.26	0.48	0.04	3.36	1.00	63.44	0.04	1.12	12
17																
18	0.08	2.57	22.23	0.92	0.04	0.29	2.39	45.09	0.45	0.06	2.24	1.01	63.70		0.94	13
19																
20																
21																
22																
23	0.07	2.74	21.80	0.91	0.04	0.26	2.33	45.88	0.48	0.05	2.58	1.04	64.37	0.12	1.05	13
24																
25	0.13	1.40	12.63	0.84	0.03	0.35	2.21	51.11	0.33	0.15	1.09	1.55	77.53	0.25	0.76	21
26																
27	0.06	2.89	19.90	0.91	0.04	0.21	2.41	49.65	0.77	0.04	2.47	1.08	67.72	0.13	1.07	10
28																
29	0.40	17.00	5.10	3.60	0.03	0.50	0.90	40.27	1.60	0.40	11.00	1.20	58.00		2.00	4
30																

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS
1														
2														
3														
4														
5	Trace Elements													
6	Barium, Ba	Cadmium, Cd	Chlorine, Cl	Chromium, Cr	Flourine, Fl	Lead, Pb	Magnesium, Mg	Mercury, Hg	Nickel, Ni	Selenium, Se	Strontium, Sr	Vanadium, V	Zinc, Zn	
7	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
8	115	0.08	863	20	85	8	547	0.12	15	4.73	135	31	14	
9														
10	49	0.30	1,845	17	71	11	509	0.10	14	1.93	30	40	50	
11														
12	63	0.20	155	23	86	12	721	0.09	29	2.32	58	48	32	
13														
14	72	0.60	964	21	93	12	663	0.13	19	3.16	56	40	44	
15														
16	77	0.68	622	23	102	10	703	0.13	20	2.65	47	37	51	
17														
18	79	0.89	624	25	108	11	693	0.12	21	3.02	67	39	59	
19														
20														
21														
22														
23	74	0.65	1,600	23	98	11	684	0.12	20	2.94	56	40	48	
24														
25	115	0.08	863	20	85	8	547	0.12	15	4.73	135	31	14	
26														
27	49	0.30	1,845	17	71	11	509	0.10	14	1.93	30	40	50	
28														
29	270	1.40	125	10	63	4	1,525	0.08	7	2.00	250	28	11	
30														

Limestone Quality

Mill Creek, Trimble County and Ghent

§6.1 Specifications. The limestone delivered hereunder shall conform to the foll

specifications on a "dry" basis:

Active Ingredient Proportions	(%) Guaranteed
Surface Moisture	7.0% Maximum
$CaCO_3$	90.0% Minimum *
$MgCO_3$	6.0% Maximum
SiO_2	3.5% Maximum
Fe_2O_3	1.5% Maximum
Al_2O_3	4.30% Maximum
Inerts	7.0% Maximum
Flouride	500 PPM
Chloides	550PPM
Bond Work Index	12 Maximum

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* The Seller shall use its best efforts to supply limestone containing a minimum of 9
$CaCO_3$.

	R	S
51		
52	?2.0%	
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Limestone Quality

Brown

§6.1 Specifications. The limestone delivered hereunder shall conform to the follo

specifications on an "as received" basis:

Active Ingredient Proportions	(%) Guaranteed
Surface Moisture	4.0% Maximum
$CaCO_3$	92.0% Minimum
$MgCO_3$	6.0% Maximum
SiO_2	3.5% Maximum
Fe_2O_3	1.0% Maximum
$R_2O_3(Al_2O_3+Fe_2O_3)$	.90% Typical
S	.05% Maximum
P_2O_5	.40% Maximum
Alkali (Na_2O+K_2O)	1.0% Maximum
Al_2O_3	1.5% Maximum

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Inerts	3.0% Maximum
Flouride	1,250 PPM
Chlorides	250 PPM
Bond Work Index	10.5 Maximum

	R	S
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Table 1-4 Limestone Properties [E.ON TO CONFIRM]		
Dry Basis, Percent (%) by Weight	Nominal	% Guaranteed
Calcium Carbonate, $CaCO_3$	94%	90% minimum
Magnesium Carbonate, $MgCO_3$	3%	6% maximum ~~(1.5% max insoluble)~~
Silica Dioxide, SiO_2	-	3.5% maximum
Ferric Oxide, Fe_2O_3	-	1.5% maximum
Aluminum Oxide, Al_2O_3	-	4.3% maximum
Total Inerts (non $CaCO_3$)	6%	7% maximum
~~Moisture~~	~~5%~~	~~12% maximum~~
Bond Work Index (kWh/t)	12	12 maximum ~~4 minimum~~
Surface Moisture	12%	7% maximum
Fluorides	500	ppm
Chlorides	550	ppm
Bulk Density Design Basis		
Volumentric Sizing	55	pcf
Structural Loading	115	pcf
Angle of Repose	30	degree
Surcharge Angle	25	degree
Maximum lump size	¾	inch
Data from Environmental Compliance Project Quality Data spreadsheet.		

From: Lucas, Kyle J.
To: Saunders, Eileen
CC: Wehrly, M. R.; Hillman, Timothy M.; Mahabaleshwarkar, Anand; Mehta, Pratik D.; Crabtree, Jonathan D.
Sent: 12/10/2010 2:47:23 PM
Subject: RE: 168908 101210 - AQC Summary Table for 18 Coal-Fired Units
Attachments: AQC Technologies.xls

Eileen,
As requested.

Kyle Lucas | Environmental Permitting Manager
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-9062** | Fax: **(913) 458-9062**
Email: **lucaskj@bv.com**

From: Lucas, Kyle J.
Sent: Friday, December 10, 2010 10:56 AM
To: 'Saunders, Eileen'
Cc: Wehrly, M. R.; Hillman, Timothy M.; Mahabaleshwarkar, Anand; Mehta, Pratik D.; Crabtree, Jonathan D.
Subject: 168908 101210 - AQC Summary Table for 18 Coal-Fired Units

Eileen,
Attached, please a draft table containing a high level summary of the AQC technologies for the 18 coal-fired units. The table includes those pollutants from the Phase II project which we are targeting specific emissions reductions (illustrated in a percent removal). Also, the table includes a notation for certain AQC equipment which has the potential to provide a level of co-benefit of control of certain pollutants (removal efficiencies not provided as they have not been calculated for this project). Additionally, those Phase I units do not contain specific emission reductions as they are not part of the Phase II study. However, similar to those Phase II units, an indication has been made for co-benefit should technology be implemented for these units.

Please let me know if you have any questions.

Have a nice weekend,
Regards,
Kyle

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	A	B	C	D	E	F	G	H	I	J
1			**Phase II Study**							
2			**Mill Creek Removal Efficiency**				**Ghent Removal Efficiency**			
3	**Equipment**	**Pollutant Control**	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**
4	Boiler with Existing Low NOx Burners ar	NO_x Control	-- (1)	-- (1)	N/A	N/A	N/A	-- (1)	-- (1)	-- (1)
5	Boiler with Existing Low NOx Burners	NO_x Control	N/A	N/A	-- (1)	-- (1)	-- (1)	N/A	N/A	N/A
6	Boiler with Existing Over-Fire Air	NO_x Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	New Neural Networks	CO Control	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)
8		PM Control	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)
9		NO_x Control	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)
10	Existing Hot-Side Dry ESP	PM Control	N/A	N/A	N/A	N/A	N/A	-- (9)	-- (9)	-- (9)
11		Hg Control	N/A	N/A	N/A	N/A	N/A	-- (10)	-- (10)	-- (10)
12		Dioxin/Furan Control	N/A	N/A	N/A	N/A	N/A	-- (11)	-- (11)	-- (11)
13	Existing SCR	NO_x Control	N/A	N/A	N/A (12)	N/A (12)	N/A (12)	N/A	N/A (12)	N/A (12)
14		Hg Control	N/A	N/A	-- (6)	-- (6)	-- (6)	N/A	-- (6)	-- (6)
15		SO_3 Control	N/A	N/A	-- (7)	-- (7)	-- (7)	N/A	-- (7)	-- (7)
16	New SCR	NO_x Control	56.14% (5)	55.72% (26)	N/A	N/A	N/A	85.14% (28)	N/A	N/A
17		Hg Control	-- (6)	-- (6)	N/A	N/A	N/A	-- (6)	N/A	N/A
18		SO_3 Control	-- (7)	-- (7)	N/A	N/A	N/A	-- (7)	N/A	N/A
19	Existing Air Heater	SO_3 Control	-- (8)	-- (8)	-- (8)	-- (8)	-- (8)	-- (8)	-- (8)	-- (8)
20	New Air Heater	SO_3 Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	Existing Cold-Side Dry ESP	PM Control	N/A	N/A	-- (9)	-- (9)	-- (9)	N/A	N/A	N/A
22		Hg Control	N/A	N/A	-- (10)	-- (10)	-- (10)	N/A	N/A	N/A
23		Dioxin/Furan Control	N/A	N/A	-- (11)	-- (11)	-- (11)	N/A	N/A	N/A
24	New Cold-Side Dry ESP	PM Control	-- (9)	-- (9)	N/A	N/A	N/A	N/A	N/A	N/A
25		Hg Control	-- (10)	-- (10)	N/A	N/A	N/A	N/A	N/A	N/A
26		Dioxin/Furan Control	-- (11)	-- (11)	N/A	N/A	N/A	N/A	N/A	N/A
27	Existing Sorbent Injection	SO_3 Control	N/A	N/A	N/A (12)	N/A (12)	N/A (12)	N/A	N/A (12)	N/A (12)
28		HCl Control	N/A	N/A	-- (13)	-- (13)	-- (13)	N/A	-- (13)	-- (13)
29		SO_2 Control	N/A	N/A	-- (14)	-- (14)	-- (14)	N/A	-- (14)	-- (14)
30	New Sorbent Injection	SO_3 Control	N/A (12)	N/A (12)	N/A	N/A	N/A	93.51% (29)	N/A	N/A
31		HCl Control	-- (13)	-- (13)	N/A	N/A	N/A	-- (13)	N/A	N/A
32		SO_2 Control	-- (14)	-- (14)	N/A	N/A	N/A	-- (14)	N/A	N/A
33	New PAC Injection	Hg Control	90% (15)	90% (15)	90% (15)	90% (15)	90% (15)	90% (15)	90% (15)	90% (15)
34		Dioxin/Furan Control	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)
35		SO_3 Control	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)
36	New PJFF	PM Control	99.66% (18)	99.66% (18)	99.66% (18)	99.66% (18)	99.66% (18)	99.66% (18)	99.66% (18)	99.66% (18)
37		HCl Control	-- (19)	-- (19)	-- (19)	-- (19)	-- (19)	-- (19)	-- (19)	-- (19)
38		Hg Control	-- (20)	-- (20)	-- (20)	-- (20)	-- (20)	-- (20)	-- (20)	-- (20)

	K	L	M	N	O	P	Q	R	S	T
1				**Phase I Study**						
2	**Brown Removal Efficiency**			**Cane Run Removal Efficiency**			**Green River Removal Efficiency**		**County Removal Efficiency**	
3	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	**Unit 3**	**Unit 4**	**Unit 1**	
4	N/A	-- (1)	-- (1)	N/A	N/A	N/A	N/A	N/A	-- (1)	
5	-- (1)	N/A	N/A	-- (1)	-- (1)	N/A	-- (1)	-- (1)	N/A	
6	N/A	N/A	N/A	N/A	N/A	-- (1)	N/A	N/A	N/A	
7	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)	-- (2)	
8	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)	-- (3)	
9	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)	-- (4)	
10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- (9)	N/A	
11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- (10)	N/A	
12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- (11)	N/A	
13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A (12)	
14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- (6)	
15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- (7)	
16	65.04% (30)	64.33% (32)	N/A (12)	N/A (35)	N/A (35)	N/A (35)	N/A (35)	N/A (35)	N/A	
17	-- (6)	-- (6)	-- (6)	-- (6)	-- (6)	-- (6)	-- (6)	-- (6)	N/A	
18	-- (7)	-- (7)	-- (7)	-- (7)	-- (7)	-- (7)	-- (7)	-- (7)	N/A	
19	-- (8)	-- (8)	-- (8)	N/A	N/A	N/A	N/A	-- (8)	-- (8)	
20	N/A	N/A	N/A	-- (8)	-- (8)	-- (8)	-- (8)	N/A	N/A	
21	-- (9)	-- (9)	-- (9)	N/A	N/A	N/A	N/A	N/A	-- (9)	
22	-- (10)	-- (10)	-- (10)	N/A	N/A	N/A	N/A	N/A	-- (10)	
23	-- (11)	-- (11)	-- (11)	N/A	N/A	N/A	N/A	N/A	-- (11)	
24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A (12)	
28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- (13)	
29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-- (14)	
30	93.24% (31)	94.05% (33)	94.12% (34)	N/A (35)	N/A (35)	N/A (35)	N/A	N/A	N/A	
31	-- (13)	-- (13)	-- (13)	-- (13)	-- (13)	-- (13)	N/A	N/A	N/A	
32	-- (14)	-- (14)	-- (14)	-- (14)	-- (14)	-- (14)	N/A	N/A	N/A	
33	90% (15)	90% (15)	90% (15)	N/A (35)	N/A (35)	N/A (35)	N/A (35)	N/A (35)	N/A (35)	
34	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)	-- (16)	
35	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)	-- (17)	
36	99.66% (18)	99.66% (18)	99.66% (18)	N/A (35)	N/A (35)	N/A (35)	N/A	N/A	N/A (35)	
37	-- (19)	-- (19)	-- (19)	-- (19)	-- (19)	-- (19)	N/A	N/A	-- (19)	
38	-- (20)	-- (20)	-- (20)	-- (20)	-- (20)	-- (20)	N/A	N/A	-- (20)	

	A	B	C	D	E	F	G	H	I	J
39		Dioxin/Furan Control	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]	-- [21]
40		SO_3 Control	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]	-- [22]
41	Existing WFGD	SO_2 Control	N/A [12]	N/A [12]	N/A [12]	N/A	N/A [12]	N/A [12]	N/A [12]	N/A [12]
42		HCl Control	N/A [12]	N/A [12]	N/A [12]	N/A	N/A [12]	N/A [12]	N/A [12]	N/A [12]
43		SO_3 Control	-- [24]	-- [24]	-- [24]	N/A	-- [24]	-- [24]	-- [24]	-- [24]
44		Hg Control	-- [25]	-- [25]	-- [25]	N/A	-- [25]	-- [25]	-- [25]	-- [25]
45	New WFGD	SO_2 Control	N/A	N/A	N/A	98% [27]	N/A	N/A	N/A	N/A
46		HCl Control	N/A	N/A	N/A	98.64% [23]	N/A	N/A	N/A	N/A
47		SO_3 Control	N/A	N/A	N/A	-- [24]	N/A	N/A	N/A	N/A
48		Hg Control	N/A	N/A	N/A	-- [25]	N/A	N/A	N/A	N/A
49	New Semi-Dry Scrubber	SO_2 Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
50		HCl Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
51		SO_3 Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
52		PM Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
53		Hg Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
54		Dioxin/Furan Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	K	L	M	N	O	P	Q	R	S	T
39	-- (21)	-- (21)	-- (21)	-- (21)	-- (21)	-- (21)	N/A	N/A	-- (21)	
40	-- (22)	-- (22)	-- (22)	-- (22)	-- (22)	-- (22)	N/A	N/A	-- (22)	
41	N/A (12)	N/A (12)	N/A (12)	N/A	N/A	N/A	N/A	N/A	N/A (12)	
42	N/A (12)	N/A (12)	N/A (12)	N/A	N/A	N/A	N/A	N/A	N/A (12)	
43	-- (24)	-- (24)	-- (24)	N/A	N/A	N/A	N/A	N/A	-- (24)	
44	-- (25)	-- (25)	-- (25)	N/A	N/A	N/A	N/A	N/A	-- (25)	
45	N/A	N/A	N/A	N/A (35)	N/A (35)	N/A (35)	N/A	N/A	N/A	
46	N/A	N/A	N/A	N/A (35)	N/A (35)	N/A (35)	N/A	N/A	N/A	
47	N/A	N/A	N/A	-- (24)	-- (24)	-- (24)	N/A	N/A	N/A	
48	N/A	N/A	N/A	-- (25)	-- (25)	-- (25)	N/A	N/A	N/A	
49	N/A	N/A	N/A	N/A	N/A	N/A	N/A (35)	N/A (35)	N/A	
50	N/A	N/A	N/A	N/A	N/A	N/A	N/A (35)	N/A (35)	N/A	
51	N/A	N/A	N/A	N/A	N/A	N/A	N/A (35)	N/A (35)	N/A	
52	N/A	N/A	N/A	N/A	N/A	N/A	N/A (35)	N/A (35)	N/A	
53	N/A	N/A	N/A	N/A	N/A	N/A	-- (20)	-- (20)	N/A	
54	N/A	N/A	N/A	N/A	N/A	N/A	-- (21)	-- (21)	N/A	

	A
55	Notes:
56	1. Combustion control provides co-benefit for NOx removal. Percentage removal efficiency is not considered.
57	2. CO is an operational constraint which can be managed in optimization process. Neural networks may reduce CO to 0.1 lb
58	3. Neural network provides co-benefit for PM removal by reducing the LOI content.
59	4. Neural network provides co-benefit for NO_x removal. Percentage removal efficiency is not considered.
60	5. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.3169 lb/MBtu and NO_x outlet concentration of 0
61	6. SCR provides co-benefit for Hg removal by increasing the oxidation of Hg. Percentage removal efficiency is not consider
62	7. SCR increases the amount of SO_3 content in the flue gas by oxidation of SO_2.
63	8. Air heater provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.
64	9. Cold-side dry ESP provides co-benefit for PM removal. Percentage removal efficiency is not considered.
65	10. Cold-side dry ESP provides co-benefit for Hg removal. Percentage removal efficiency is not considered.
66	11. Cold-side dry ESP provides co-benefit for dioxin/furan removal. Percentage removal efficiency can not be determined.
67	12. Not applicable for Phase II study.
68	13. Sorbent injection provides co-benefit for HCl removal. Percentage removal efficiency is not considered.
69	14. Sorbent injection provides co-benefit for SO_2 removal. Percentage removal efficiency is not considered.
70	15. Hg removal efficiency for PAC injection is based on Hg inlet concentration of 10.71 lb/TBtu and Hg outlet concentratio
71	16. PAC injection may reduce dioxin/furan up to 15 x 10^{-18} lb/MBtu. Percentage removal efficiency can not be determined.
72	17. PAC injection provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.
73	18. PM removal efficiency for PJFF is based on PM inlet concentration of 8.746 lb/MBtu and PM outlet concentration of 0.0
74	19. PJFF provides co-benefit for HCl removal. Percentage removal efficiency is not considered.
75	20. PJFF provides co-benefit for Hg removal. Percentage removal efficiency is not considered.
76	21. PJFF provides co-benefit for dioxin/furan removal. Percentage removal efficiency can not be determined.
77	22. PJFF provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.
78	23. HCl removal efficiency for WFGD is based on HCl inlet concentration of 0.147 lb/MBtu and HCl outlet concentration o
79	24. WFGD provides co-benefit for SO_3 removal. Percentage removal efficiency is not considered.
80	25. WFGD provides co-benefit for Hg removal. Percentage removal efficiency is not considered.
81	26. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.3139 lb/MBtu and NO_x outlet concentration of
82	27. SO_2 removal efficiency of WFGD is based on SO_2 inlet concentration of 6.0 lb/MBtu and SO_2 outlet concentration of 0.1

	K	L	M	N	O	P	Q	R	S	T
55										
56										
57	/MBtu. Percentage removal efficiency can not be determined.									
58										
59										
60	.139 lb/MBtu.									
61	ed.									
62										
63										
64										
65										
66										
67										
68										
69										
70	n of 1.07 lb/TBtu.									
71										
72										
73	)3 lb/MBtu.									
74										
75										
76										
77										
78	f 0.002 lb/MBtu.									
79										
80										
81	0.139 lb/MBtu.									
82	2 lb/MBtu.									

	A	B	C	D	E	F	G	H	I	J
83	28. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.276 lb/MBtu and NO_x outlet concentration of 0									
84	29. SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 77 ppmvd and SO_3 outlet concentrati									
85	30. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.4463 lb/MBtu and NO_x outlet concentration of									
86	31. SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 74 ppmvd and SO_3 outlet concentrati									
87	32. NO_x removal efficiency of SCR is based on NO_x inlet concentration of 0.4374 lb/MBtu and NO_x outlet concentration of									
88	33. SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 84 ppmvd and SO_3 outlet concentrati									
89	34. SO_3 removal efficiency for sorbent injection is based on SO_3 inlet concentration of 85 ppmvd and SO_3 outlet concentrati									
90	35. Final emission limit and equipment yet to be determined. Not part of Phase II study.									
91										

	K	L	M	N	O	P	Q	R	S	T
83	.041 lb/MBtu.									
84	on of 5 ppmvd.									
85	0.156 lb/MBtu.									
86	on of 5 ppmvd.									
87	0.156 lb/MBtu.									
88	on of 5 ppmvd.									
89	on of 5 ppmvd.									
90										
91										

From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	168908 E.ON-AQC; Jackson, Audrey; Crabtree, Jonathan D.; Mahabaleshwarkar, Anand; Wehrly, M. R.; Hintz, Monty E.; Goodlet, Roger F.; Betz, Alex; Lucas, Kyle J.; Smith, Dave; Mehta, Pratik D.; Greenwell, Sarah
Sent:	12/13/2010 11:40:34 AM
Subject:	168908.28.3000 101213 - Action Item List
Attachments:	168908 LG&E AND KU ACTION ITEM LIST.xls

Eileen,

Attached is the action item list for our weekly Monday conference call.

Regards,

TIM HILLMAN | Project Manager, Energy
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Building a World of Difference.®

	A	B	C	D	E	F	G	H	J	K	L	M
1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		DATE ADDE	IG DUE DA	RR DUE DA	OMPL DAT
2		DOC/MTNG	DATE				CO.	INITIAL				
3		**GENERAL**				n--	A					
4	27	Conf Call 10102	10/25/10	Prepare letter spec for Fabric Filter workshop.	41.0806	n--	B&V	AM/RL	10/19/10	TBD		
5		**MILL CREEK**				Mill Creek	A					
6	46	Conf Call 10120	12/7/10	Develop high level cost comparison between the installa	14.1000	Mill Creek	B&V	TH	12/13/10	TBD		
7	32	Email 41.0803 1	11/5/10	Provide comments and direction on Mill Creek Validatio	41.0803	Mill Creek	LG&E/KU	ES	11/08/10	11/16/10	12/13/10	
8	43	Email 14.1000 1	11/16/10	Provide LG&E/KU comments on Mill Creek validation pr	14.1000	Mill Creek	LG&E/KU	ES	11/16/10	11/22/10	12/13/10	
9		**GHENT**				Ghent	A					
10	40	--	11/8/10	Incorporate LG&E and KU comments to Ghent PDM an	22.1000	Ghent	B&V	MW/JC	11/15/10	11/30/10	12/20/10	
11	55	Ghent Val Mtg M	12/7/10	Provide reference/experience list for plants who inject tr	14.1000	Ghent	B&V	AM	12/13/10	12/17/10		
12	56	Ghent Val Mtg M	12/7/10	Provide a qualitative comparison between unit sorbent i	14.1000	Ghent	B&V	AM	12/13/10	12/17/10		
13	51	Ghent Val Mtg M	12/7/10	Provide suggestions to balance/bias the flows downstre	14.1000	Ghent	B&V	MW	12/13/10	01/07/11		
14	52	Ghent Val Mtg M	12/7/10	Include demolition costs in the project cost estimate as	14.1000	Ghent	B&V	RF	12/13/10	st estimate)		
15	48	Ghent Val Mtg M	12/7/10	Provide technical information on PJFF to LG&E/KU for	14.1000	Ghent	B&V	AM	12/13/10	TBD		
16	57	Ghent Val Mtg M	12/7/10	Jeff Joyce from LG&E/KU will investigate what the plant	14.1000	Ghent	LG&E/KU	JJ	12/13/10	12/13/10		
17	54	Ghent Val Mtg M	12/7/10	Review and provide comments on the Ghent Validation	14.1000	Ghent	LG&E/KU	Ghent Tea	12/13/10	12/14/10		
18	50	Ghent Val Mtg M	12/7/10	Confirm if there will be any issues or concerns if the exi	14.1000	Ghent	LG&E/KU	ES	12/13/10	12/17/10		
19	53	Ghent Val Mtg M	12/7/10	LG&E/KU to schedule visit to Trimble County Unit 2	14.1000	Ghent	LG&E/KU	ES	12/13/10	12/17/10		
20	58	Email 14.1000 1	12/10/10	Provide comments on Ghent Validation Meeting Minute	14.1000	Ghent	LG&E/KU	ES	12/13/10	12/17/10		
21	47	Ghent Val Mtg M	12/7/10	Review requirements for fire protection on PJFFs.	14.1000	Ghent	LG&E/KU	ES	12/13/10	12/30/10		
22	49	Ghent Val Mtg M	12/7/10	Inform professionals involved in the Ghent ash handling	14.1000	Ghent	LG&E/KU	ESMW	12/13/10	12/17/10		
23		**E.W. BROWN**				Brown	A					
24	41	Brown KO Mtg M	11/15/10	Review U3 SCR arrgmnts & comment on potential PJF	14.1000	Brown	B&V	TH/ MH	11/16/10	12/10/10	12/17/10	

	N	O	P	Q	R	S	T
1	STATUS	NOTES					
2							
3							
4	Open	Discuss after NID visit to E. KY Power on 12/1.					
5							
6	Open						
7	Open	No comments as of 11/29.					
8	Open						
9							
10	In Progress	Pending information for Load Model.					
11	Open						
12	Open						
13	Open						
14	Open						
15	Open						
16	Open	Jeff will attend the Monday conference call 12/13 to discuss specifics with B&V.					
17	Open						
18	Open	LG&E/KU to check with their Environmental Affairs Department.					
19	Open						
20	Open						
21	Open						
22	Open						
23							
24	In Progress	Received Unit 3 arrangements on 12/02. Comments pending review of the drawings.					

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25	38	Brown KO Mtg M	11/15/10	Prepare Unit 1 and 2 sketches with and without SCR	14.1000	Brown	B&V	TH	11/15/10	01/10/11		
26	42	Email 14.1000 1	11/16/10	Provide LG&E/KU comments on Brown Kick Off Meetin	14.1000	Brown	LG&E/KU	ES	11/16/10	11/22/10	12/13/10	
27	44	Conf Call 101112	11/22/10	Establish date for Brown Validation meeting.	41.0803	Brown	LG&E/KU	ES	11/22/10	11/29/10	12/10/10	
28	45	Email 22.1000 1	11/24/10	Provide comments on Brown Project Design Memorand	22.1000	Brown	LG&E/KU	ES	11/29/10	12/03/10	12/10/10	
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25	Open						
26	Open						
27	Open	Potentially to be scheduled for the week of January 17th. Need to ask Jeff Railey (11/29)					
28	Open						
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1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		)ATE ADDE	IG DUE DA	RR DUE DA	OMPL DAT	STATUS
2		DOC/MTNG	DATE				CO.	INITIAL					
3	35	--	11/8/10	Incorporate LG&E and KU comments to Mill Creek PDM	22.1000	Mill Creek	B&V	MW/JC	11/08/10	11/16/10	11/29/10	11/29/10	Complete
4	34	--	11/8/10	Prepare and issue draft of Project Design Memorandum	22.1000	Brown	B&V	TH	11/08/10	11/25/10		11/24/10	Complete
5	36	Brown KO Mtg	######	Provide a list of "sacred ground" areas at Brown.	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/23/10	Complete
6	39	Brown KO Mtg	######	Identify a contact person for data collection	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/22/10	Complete
7	33	--	11/8/10	Prepare Data Request for Brown Station.	41.0100	Brown	B&V	TH	11/08/10	11/18/10		11/19/10	Complete
8	37	Brown KO Mtg	######	Provide drawings of the Unit 3 SO3 mitigation project	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/11/10	Complete
9	25	Email 22.1000	######	Provide LG&E and KU comments on Ghent Project Des	22.1000	Ghent	LG&E/KU	ES	10/21/10	10/28/10		11/08/10	Complete
10	23	Conf Call 1010	######	Provide draft of Mill Creek Validation Report for LG&E/K	41.0803	Mill Creek	B&V	TH/MW	10/19/10	11/05/10		11/05/10	Complete
11	29	--	######	Provide Brown Kickoff presentation .	14.1000	Brown	B&V	TH	10/29/10	11/05/10		11/03/10	Complete
12	24	Conf Call 1010	######	Prepare differences between SCR and SNCR for Brown	14.1000	Brown	B&V	AM/RL	10/19/10	11/09/10		11/03/10	Complete
13	28	--	######	Provide Mill Creek Validation presentation.	41.0803	Mill Creek	B&V	TH	10/29/10	11/05/10		11/03/10	Complete
14	31	Email 14.1000	######	Provide comments on Brown Kickoff meeting agenda	14.1000	Brown	LG&E/KU	ES	10/27/10	11/02/10		11/01/10	Complete
15	30	Email 14.1000	######	Provide comments on Mill Creek Validation meeting age	14.1000	Mill Creek	LG&E/KU	ES	10/27/10	11/02/10		11/01/10	Complete
16	26	--	######	Provide sketches of Unit 4 AQC equipment in the thicke	41.0402	Mill Creek	B&V	MH	10/25/10	10/27/10	10/27/10	11/01/10	Complete
17	22	Email 14.1000	######	Provide LG&E/KU comments on Ghent Site Visit meeti	14.1000	Ghent	LG&E/KU	ES	10/15/10	10/19/10		10/22/10	Complete
18	11	KO & MC Site V	9/20/10	Evaluate pros and cons of NID system for November tec	14.1000	n--	B&V	AM/RL	09/21/10	Nov. 2010		10/21/10	Complete
19	21	Ghent Site Visit	######	Prepare Ghent Information Request.	41.0100	Ghent	B&V	TH	10/11/10	10/15/10		10/18/10	Complete
20	15	KO & MC Site V	9/20/10	Review B&V electrical study conducted in the 1990s	14.1000	Mill Creek	B&V	JB	09/21/10	09/24/10	TBD	10/18/10	Complete
21	18	Email 41.0100	9/29/10	Choose the coal fuel design basis for Mill Creek, Ghent,	41.0100	n--	LG&E/KU	ES	09/30/10	10/06/10		10/18/10	Complete
22	4	KO & MC Site V	9/20/10	Use B&V file system to set up LG&E/KU document stora	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/18/10	Complete
23	12	KO & MC Site V	9/20/10	Schedule vendors for evaluation of existing scrubbers	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/18/10	Complete
24	1	KO & MC Site V	9/20/10	Determine location for Mill Creek Task 6 Technology Se	14.1000	Mill Creek	LG&E/KU	ES	09/21/10	10/15/10		10/12/10	Complete

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1	NOTES									
2										
3										
4	PDM issued for In-House Review (11/18)									
5	Added to Info Request Priority 1									
6										
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12	To be included in Brown KO presentation. Also include fabric filter discussion. (10/25)									
13	Final sent on 11/5									
14										
15	Confirmed LG&E and KU team is available for the afternoon on 11/9									
16										
17	Eileen has no comments (10/18). Waiting for comments from LG&E/KU members.									
18	Will send powerpoint presentation in the next couple of days (10/18).									
19										
20	B&V could not locate study. Added to Data Request. Will review when LG&E/KU provides study.									
21	Use future coal. (10/11) Chlorine needs to be corrected (10/18)									
22	Audrey is working on it (10/11). It is set up. Eileen to review (10/18).									
23	To be scheduled week of 10/25. B&V requested to be included in debriefing w/ each vendor.									
24	MC Technology selection meeting to be held in Louisville on 11/9 with Brown KO mtg on 11/10&11.									

	A	B	C	D	E	F	G	H	J	K	L	M	N
25	20	Email 22.1000	10/5/10	Provide comments on the Mill Creek Project Design Me	22.1000	Mill Creek	LG&E/KU	ES	10/11/10	10/12/10		10/12/10	Complete
26	13	KO & MC Site \	9/20/10	Provide structural steel study assessments	14.1000	n--	LG&E/KU	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
27	14	KO & MC Site \	9/20/10	Provide minimum access dimension box	14.1000	n--	LG&E/KU	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
28	7	KO & MC Site \	9/20/10	Determine personnel assignments for document review	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/04/10	Complete
29	19	Re: Email 41.01	9/30/10	B&V to provide schedule/deadlines for Mill Creek inform	41.0100	Mill Creek	B&V	TH	09/30/10	10/06/10		10/04/10	Complete
30	6	KO & MC Site \	9/20/10	Create IBackup FTP site for large file transfer	14.1000	--	B&V	KL	09/21/10	09/24/10		09/29/10	Complete
31	10	KO & MC Site \	9/20/10	Prepare data inventory and information request	14.1000	Mill Creek	B&V	MW/JC	09/21/10	09/24/10		09/29/10	Complete
32	5	KO & MC Site \	9/20/10	Provide engineering cost estimate at end of each month	14.1000	n--	B&V	TH	09/21/10	09/30/10		09/28/10	Complete
33	2	KO & MC Site \	9/20/10	Determine dates for Ghent kick-off meeting	14.1000	Ghent	LG&E/KU	ES	09/21/10	09/23/10		09/27/10	Complete
34	16	KO & MC Site \	9/20/10	Evaluate the possibility of accelerating the installation of	14.1000	Mill Creek	LG&E/KU	ES &TH	09/21/10	TBD		09/27/10	Complete
35	17	Email 14.1000	9/20/10	Provide LG&E/KU comments on Kick Off Meeting and M	14.1000	--	LG&E/KU	ES	09/21/10	09/24/10		09/24/10	Complete
36	3	KO & MC Site \	9/20/10	Provide DVD copy of Phase I Report	14.1000	--	B&V	TH	09/21/10	09/24/10		09/22/10	Complete
37	9	KO & MC Site \	9/20/10	Update PIM with Eileen's Ghent contact information	14.1000	--	B&V	MW	09/21/10	09/24/10		09/21/10	Complete
38	8	KO & MC Site \	9/20/10	Determine if a Monday, 2 pm EST project conference ca	14.1000	--	B&V	TH/MW	09/21/10	09/23/10		09/21/10	Complete
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25	Eileen's comments provided on 10/12. Sent to Alex for further comments.									
26	CD received 9/27. Units 1, 2, and 4 on CD. Unit 3 still needed. Email request sent on 9/28.									
27	CD received 9/27. Access Dimension not included. Email request sent 9/28.									
28	MC - Alex Betz and a couple others at plant. Process in place (10/4)									
29										
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31										
32	Sent 9/28.									
33	Scheduled for October 6&7									
34	B&V email addressed the acceleration of the SCR install for MC 1 & 2 (9/17). LG&E/KU replied no change in direction at this time (9/27).									
35	Final issued on 9/24									
36	Set received on 9/22									
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1	LG&E/KU	LG&E and KU		
2	AB	Alex Betz - Mill Creek		
3	DS	Dave Smith - Ghent		
4	ES	Eileen Saunders		
5	GB	Greg Black		
6	GR	Gary Revlett		
7	JJ	Jeff Joyce - Ghent		
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17	BV	Black & Veatch (B&V)		
18	TH	Tim Hillman		
19	KL	Kyle Lucas		
20	AM	Anand Mahabaleshwarker		
21	MK	Mike King		
22	RL	Rick Lausman		
23	MW	M.R. Wehrly		
24	MH	Monty Hintz		
25	JB	Jim Bayless		
26	JC	Jonathan Crabtree		
27	RF	Ron Fields		

From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	Jackson, Audrey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mahabaleshwarkar, Anand
Sent:	10/21/2010 10:27:51 AM
Subject:	168908.41.0803 101021 Mill Creek - Comparison Pros/Cons of NID System vs. CDS PowerPoint
Attachments:	CDS vs NIDS.pdf

Eileen,

During the Mill Creek kickoff meeting on September 15th, plant personnel requested a general comparison (pros and cons) of the NID system with a standard circulating dry scrubber (CDS). Therefore, in response to action item #11, please find subject attached for your review and consideration. We can also include this in the November 9th validation presentation if you desire.

Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

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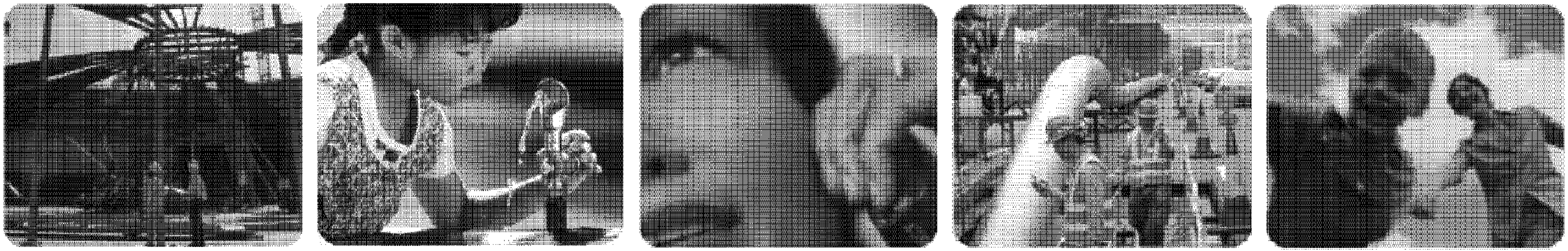


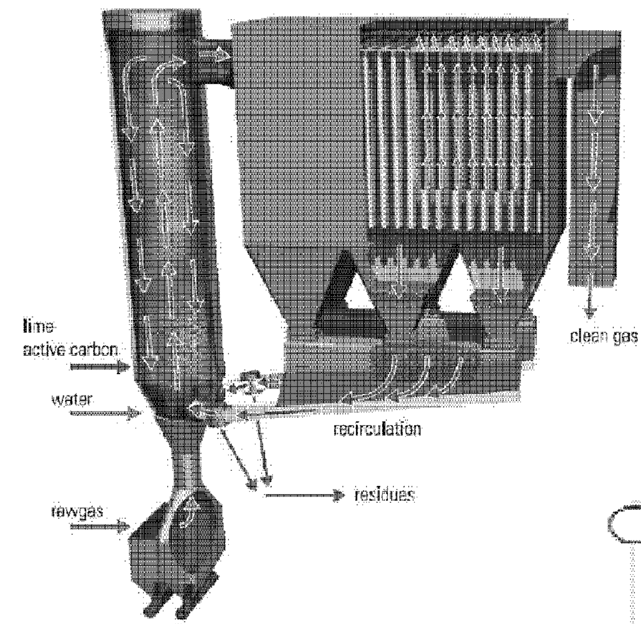
Circulating Dry Scrubber (CDS) vs Novel Innovative Desulfurization (NID) General Comparison

Black & Veatch

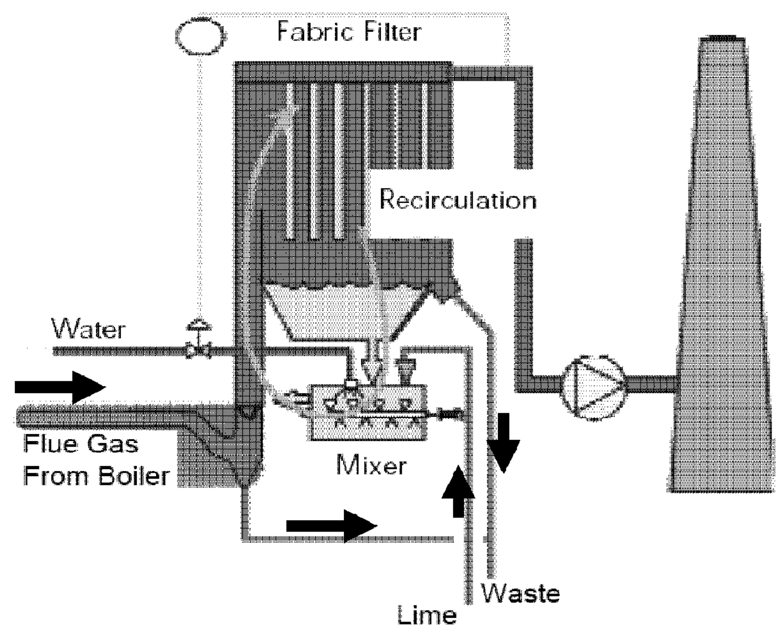
October 19, 2010

A Closer look at two dry FGD systems

Circulating Dry Scrubber - CDS



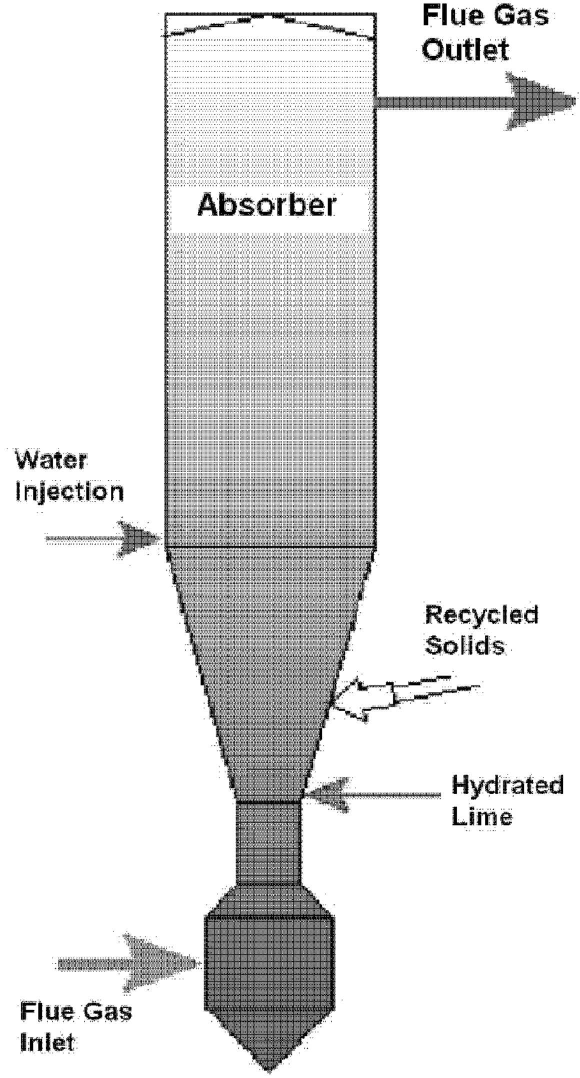
Novel Innovative Desulfurization - NID



Source: AE&E

Circulating Dry Scrubber (CDS)

- Dry free flowing powder of $Ca(OH)_2$ reagent fed into vessel
- Fluid bed of recycled ash/byproduct solids, and fresh reagent
- Water injected separately
- High solids recycle rate



Source: Allied Environmental

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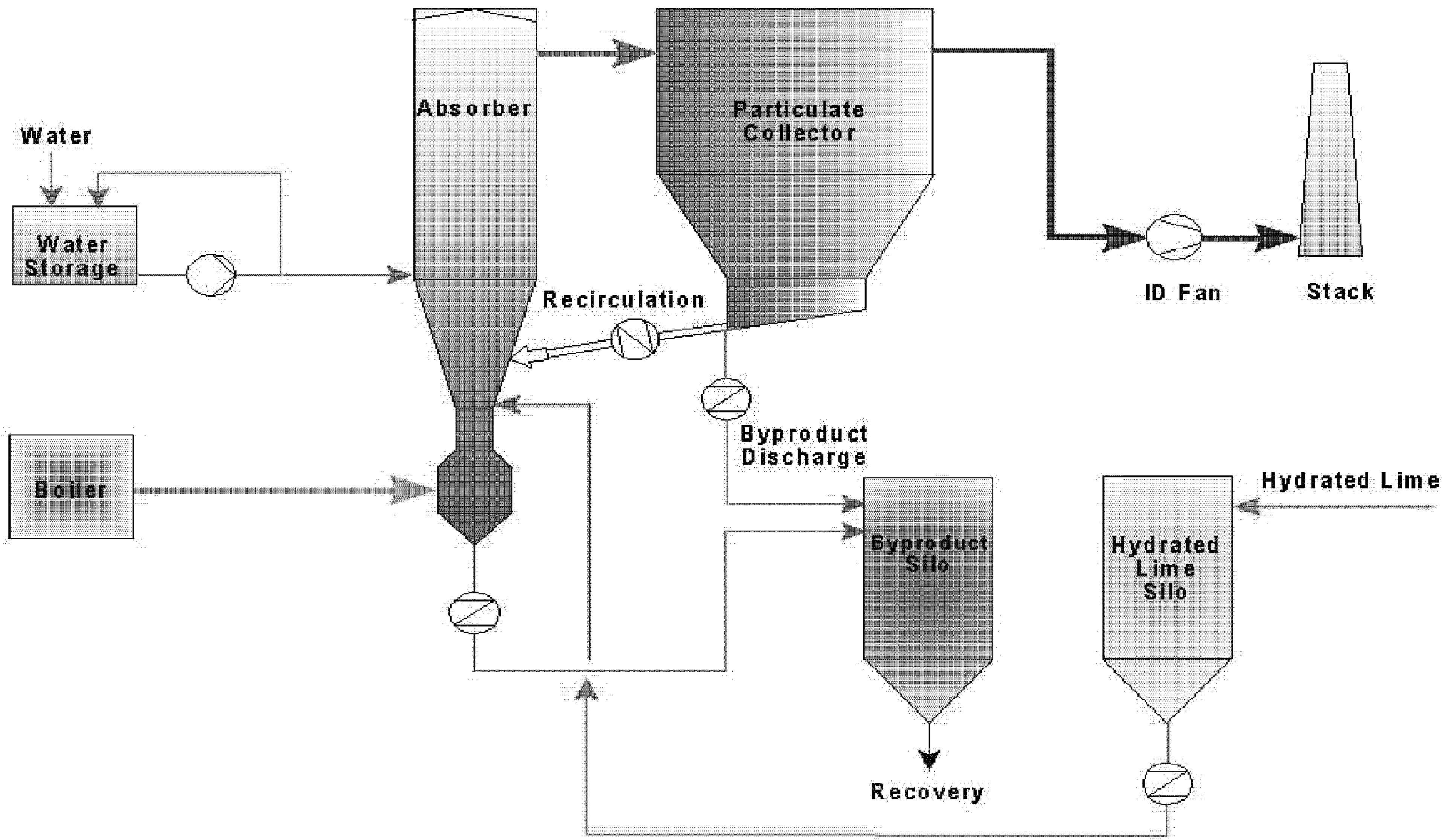
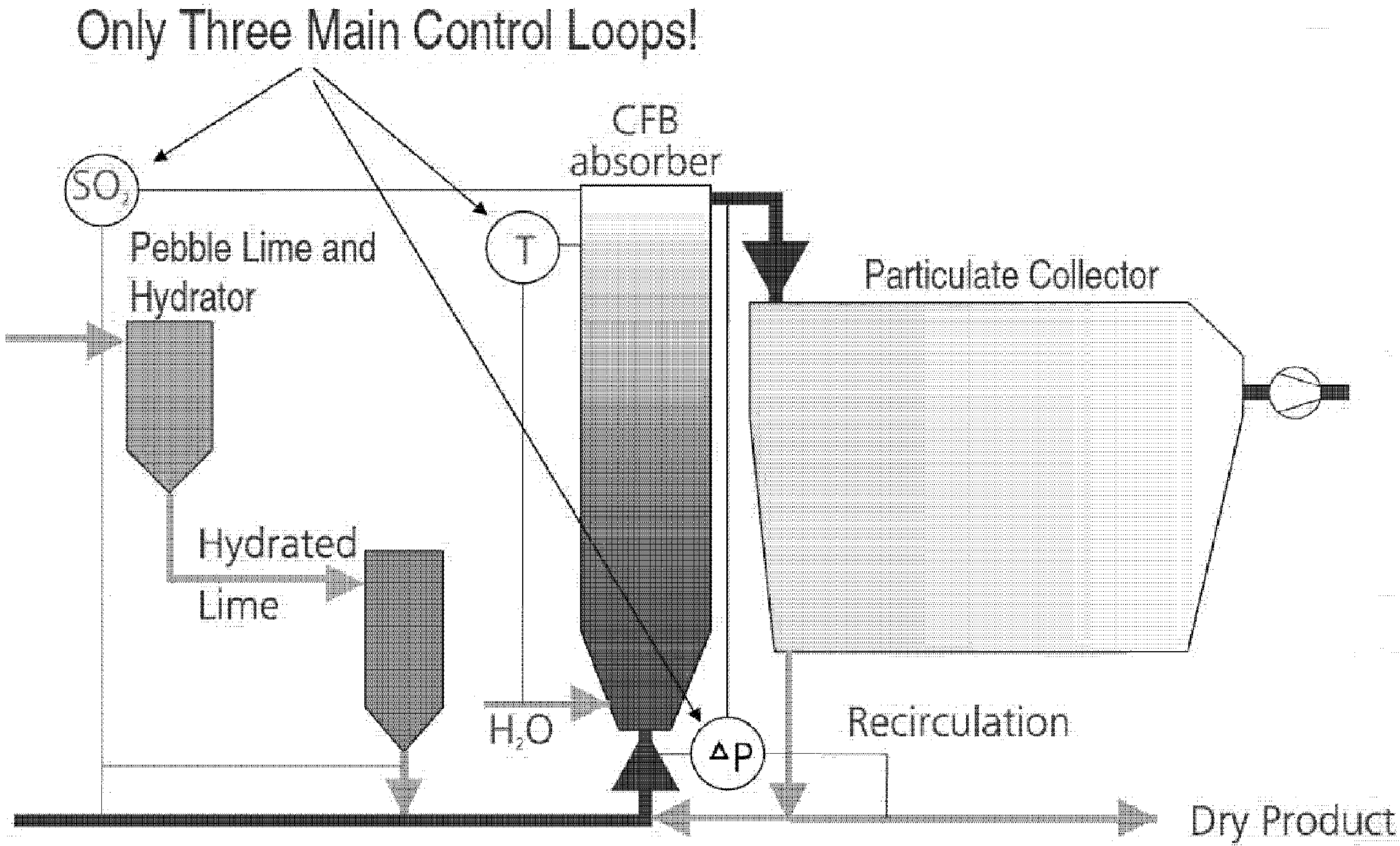
CDS Process Flow Diagram



Source: Allied Environmental

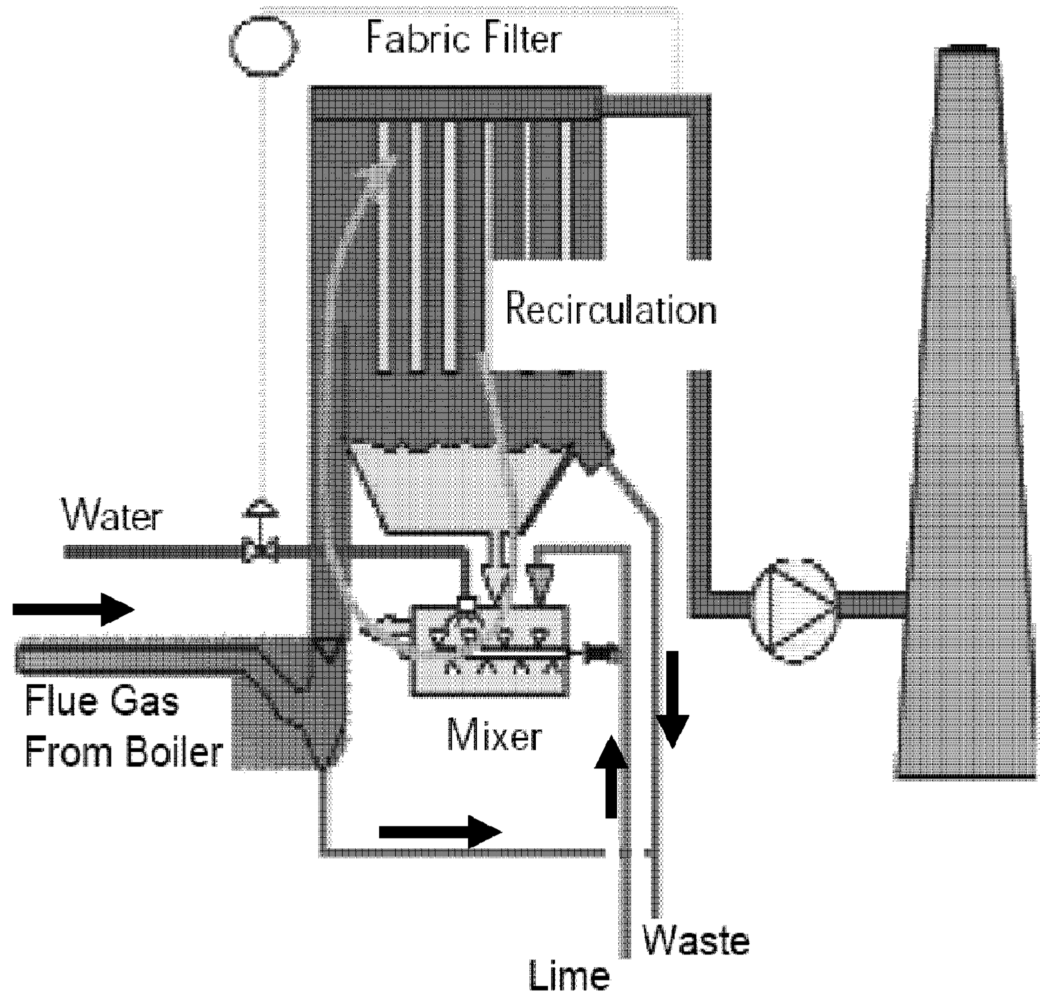
Process Control of CDS scrubber



Source: Allied Environmental

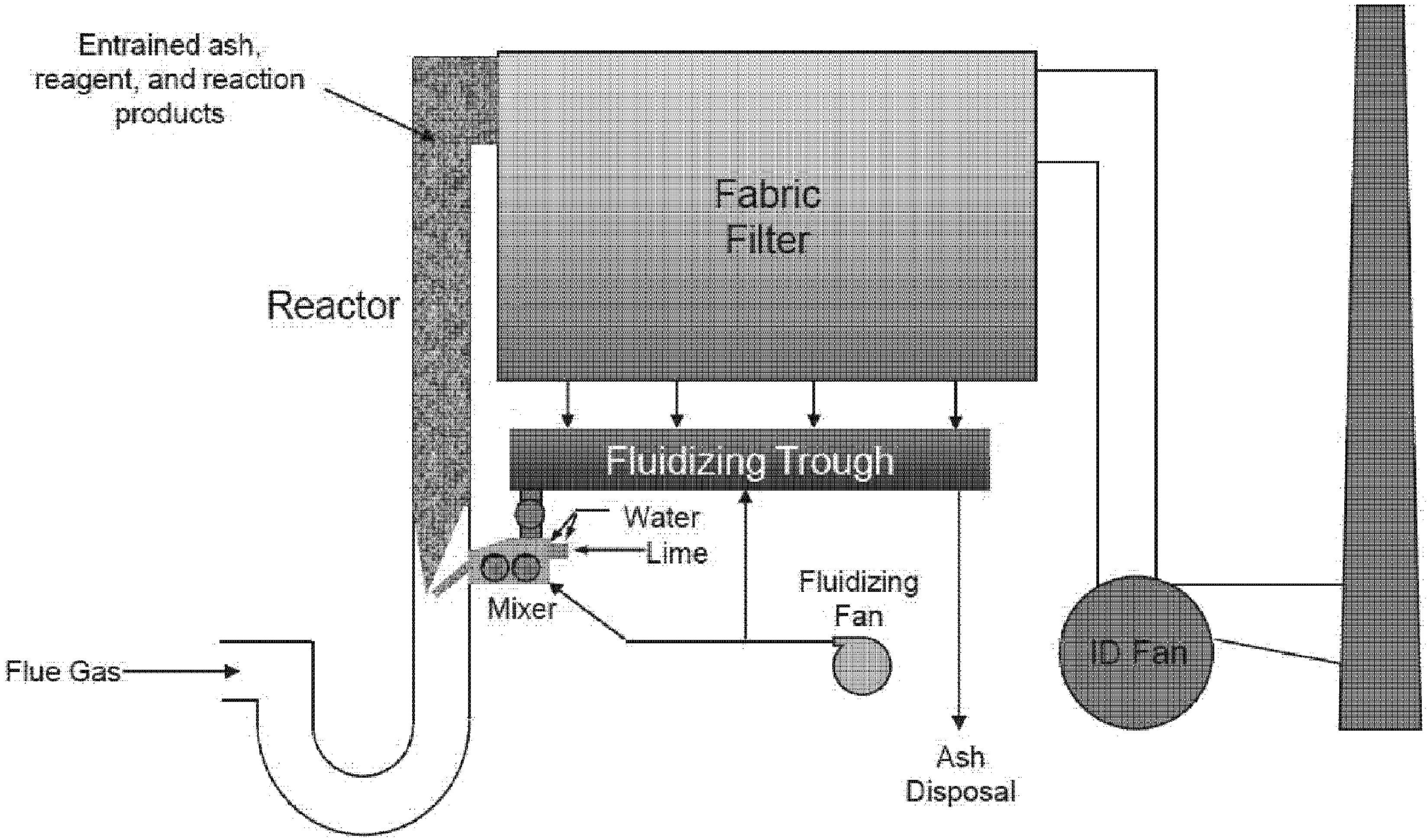
Novel Innovative Desulfurization (NID) Process

- Ash, byproduct, fresh lime and water recycled to the J-reactor
- Flue gas moves through J-reactor where major SO_2 capture takes place



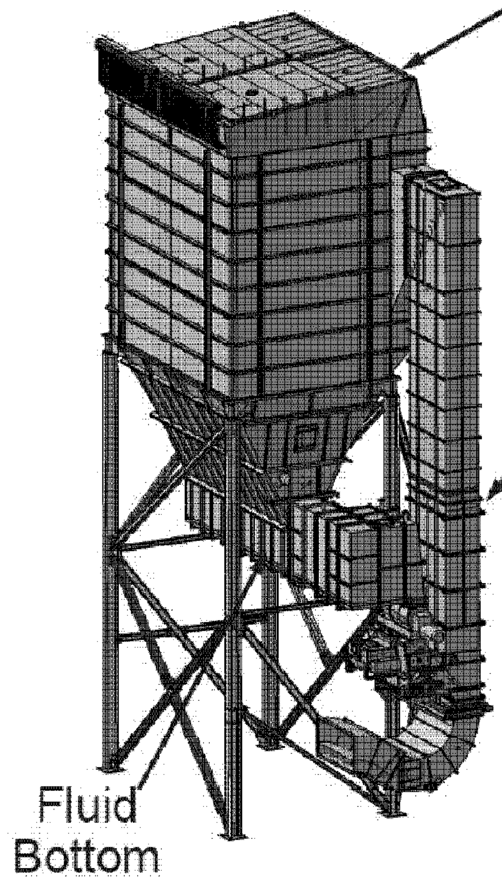
Source: Alstom

New Innovative Device (NID)

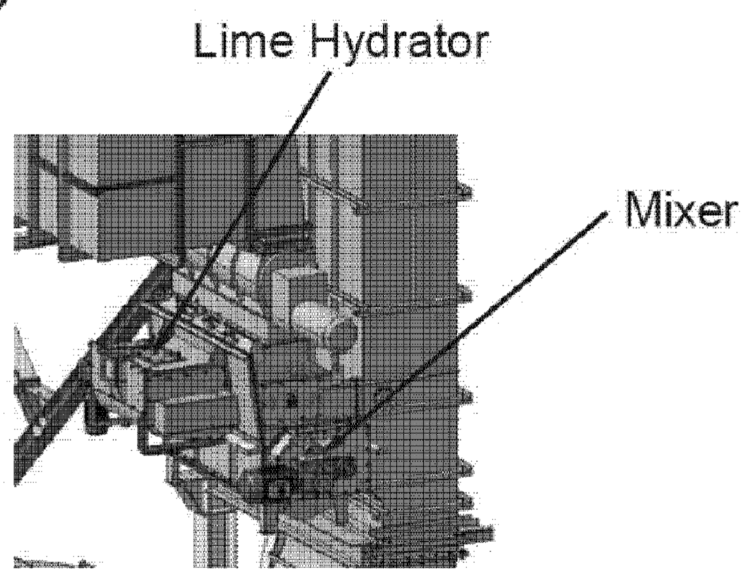


Source: Alstom

NID Components

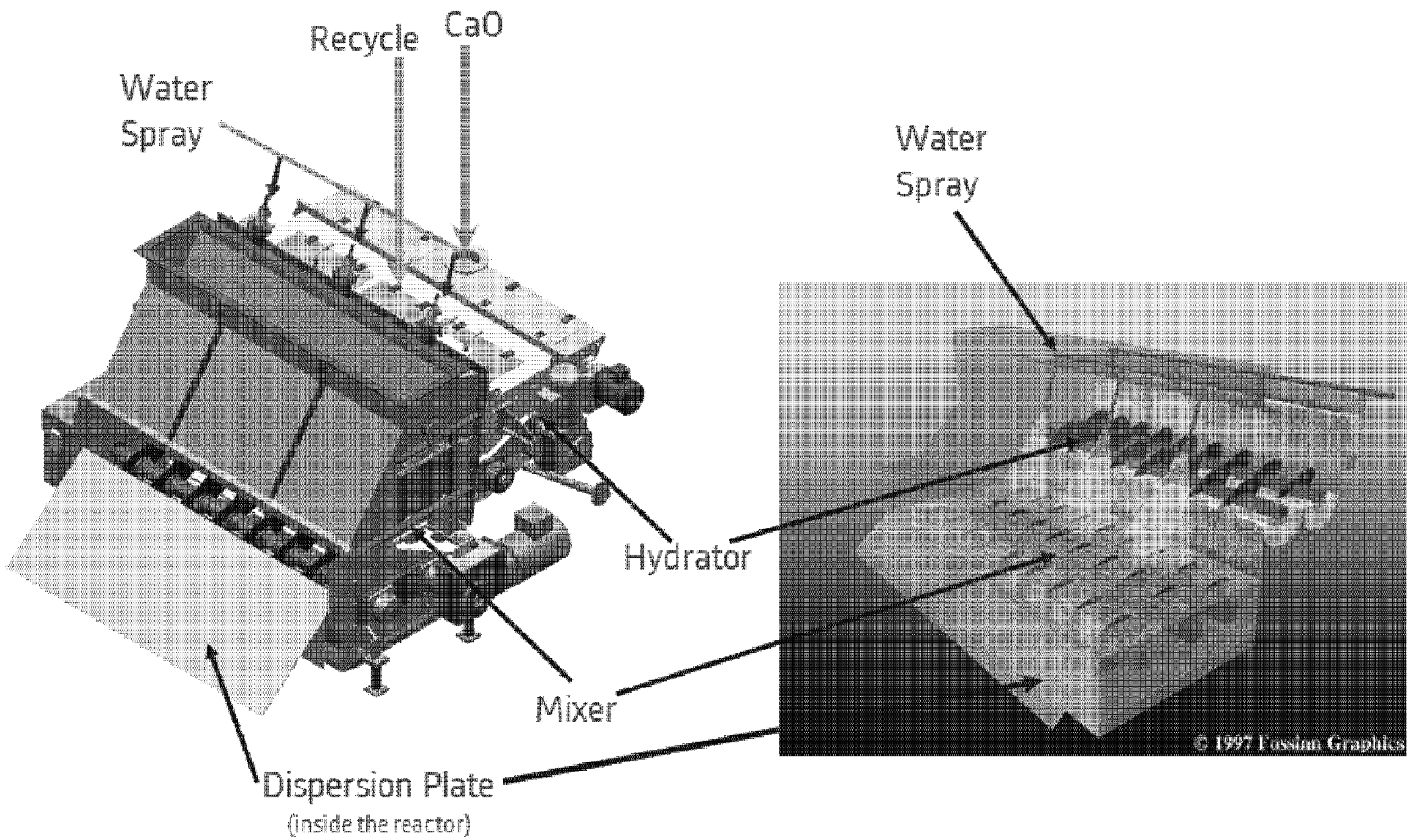


Key Components
- Fabric filter
- Reactor
- Mixer
- Hydrator
- Fluid bottom



Source: Alstom

NID Components



Source: Alstom

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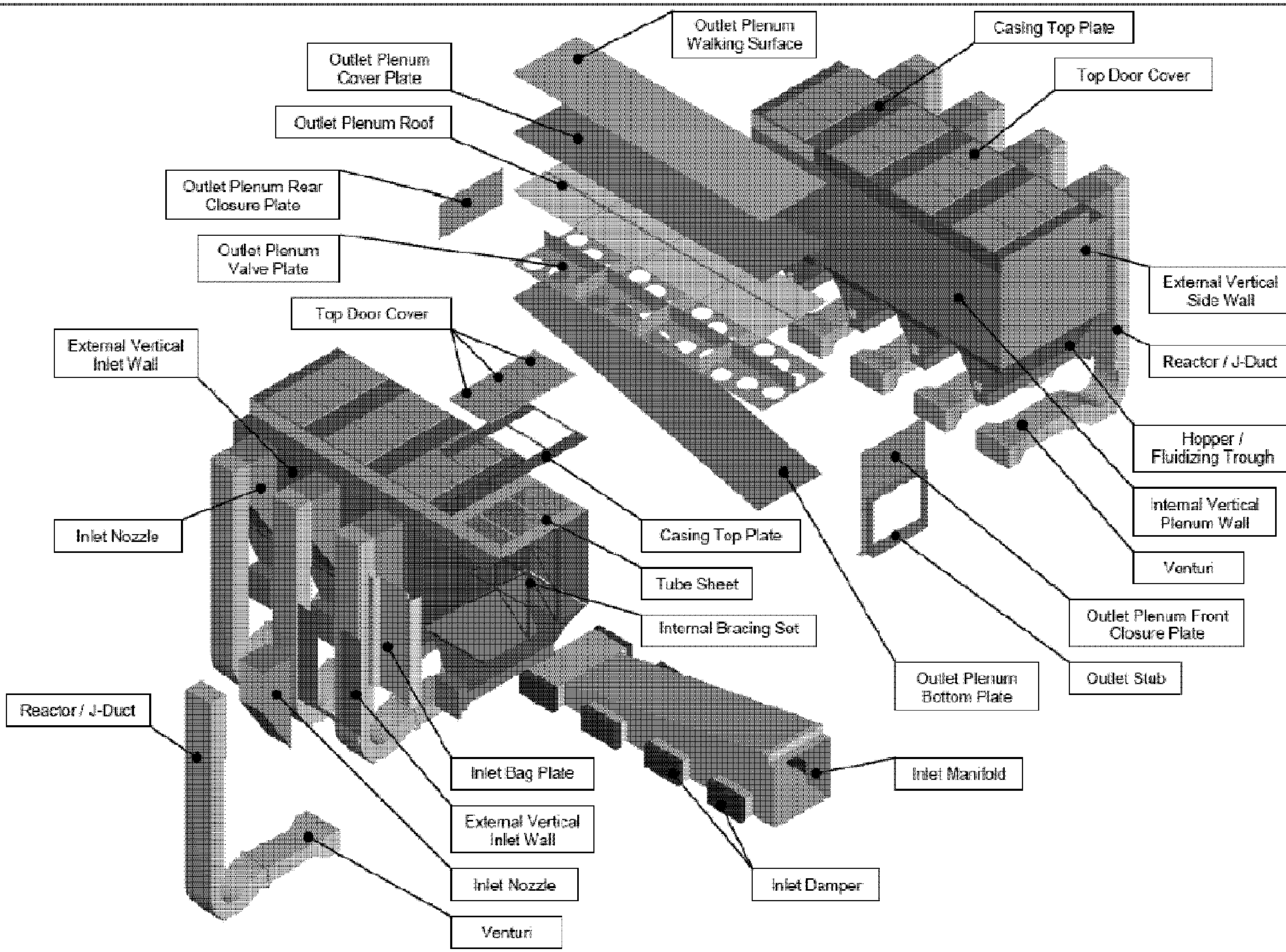
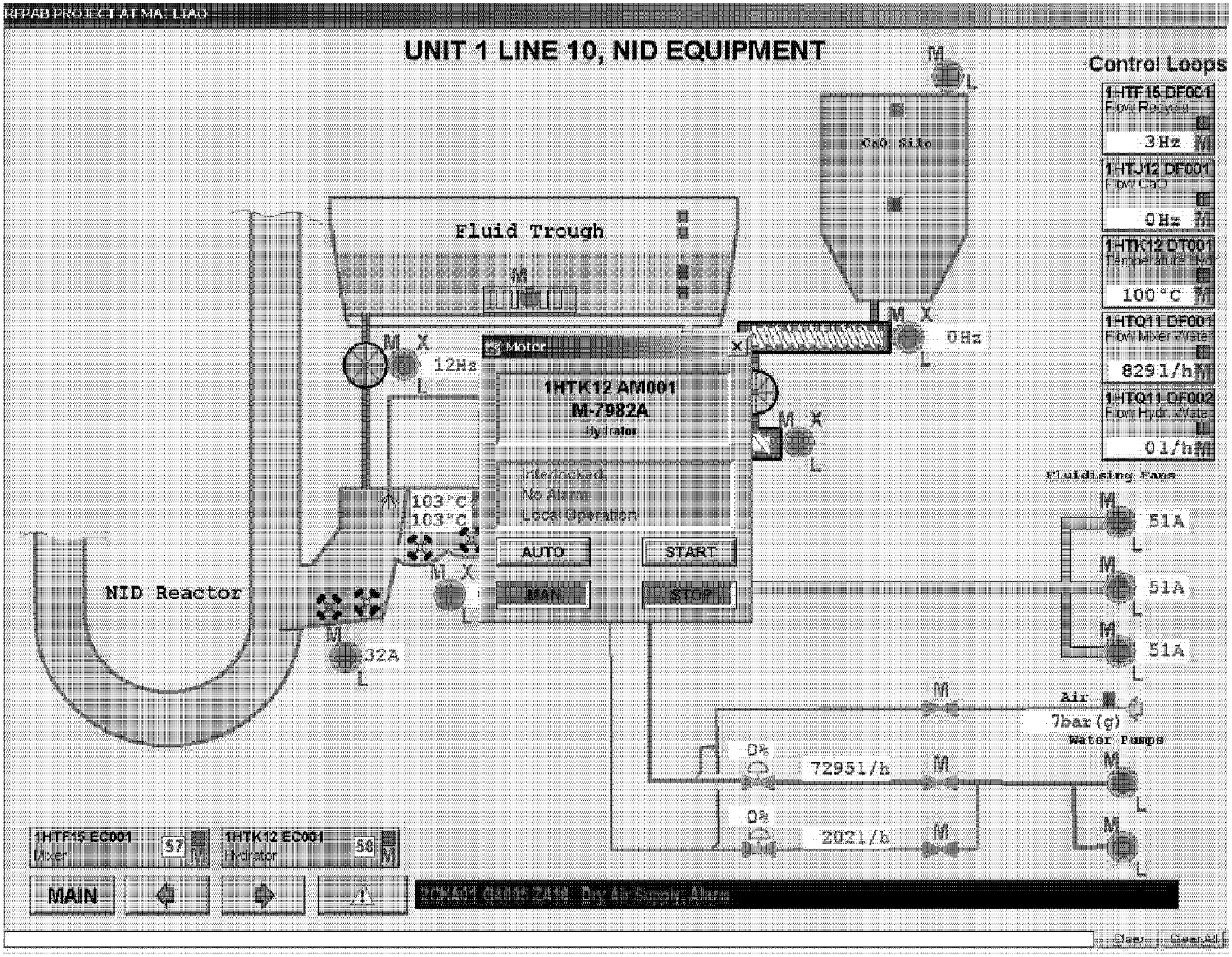
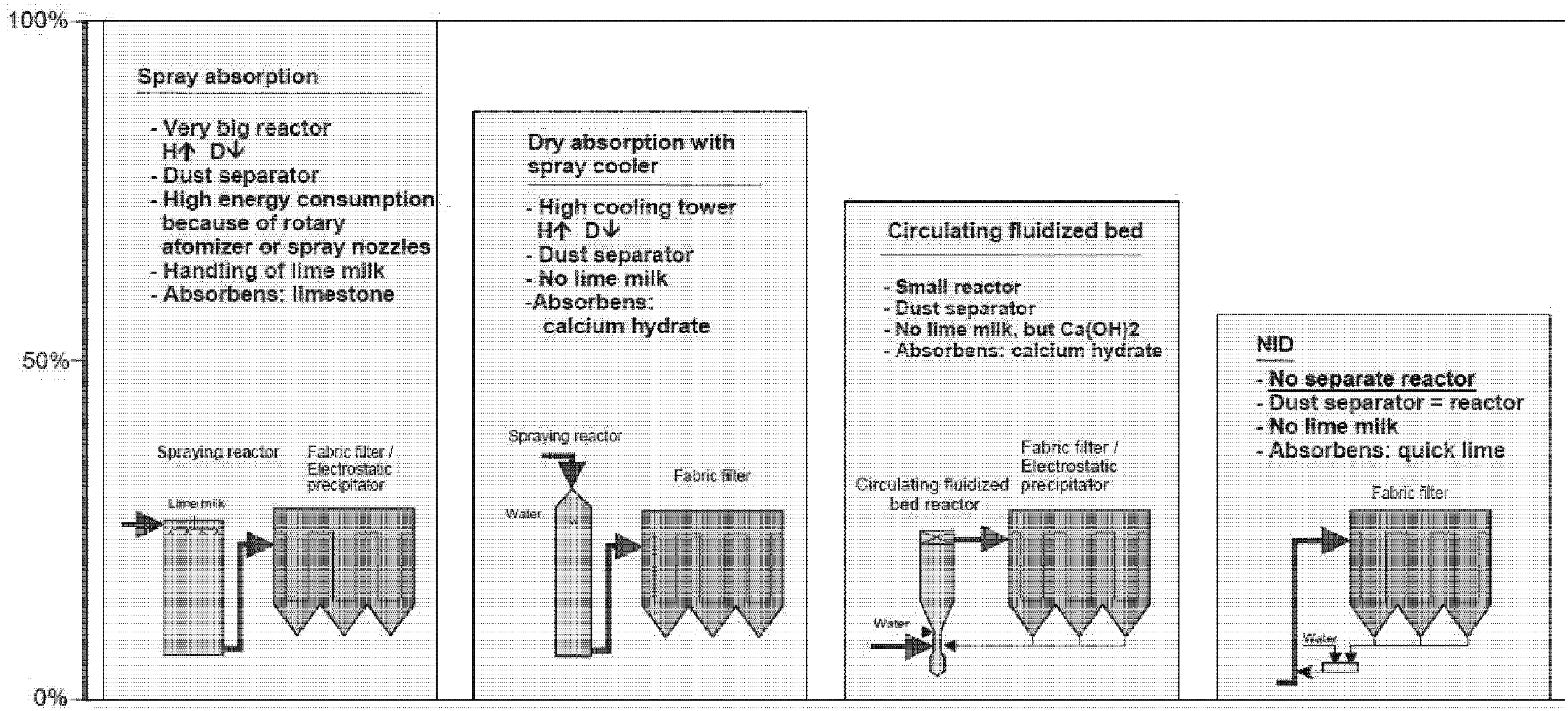
NID Components Schematic



NID Process Control



Footprint comparison



CDS / NID technology comparison

Factor	CDS	NID
Approach Temperature	30°F	25°F
Lime Consumption	SR of 1.7 – 1.85	SR of 2.0 – 2.25
Coal Sulfur Content	All	Low and Medium
Turndown	Recirculation fan for <50%	Excellent capabilities
Pluggage Potential	None	Potential at mixer-hydrator assembly

CDS / NID technology comparison

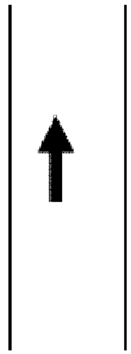
Factor	CDS	NID
Standard Lime Size	3/4” x 0”	1/8” x 0”
Plenum Design	Walk-in	Top Door
Footprint	Larger	Smaller
Pressure Drop	High	Less
Equipment Cost	Less	More

CDS / NID technology comparison

Factor	CDS	NID
Maintenance	Low	High
Corrosion potential	Low	High
Inlet Temperature Limitations	None	< 350 F
Auxiliary Power	High	Low
Water Requirements	Low	High

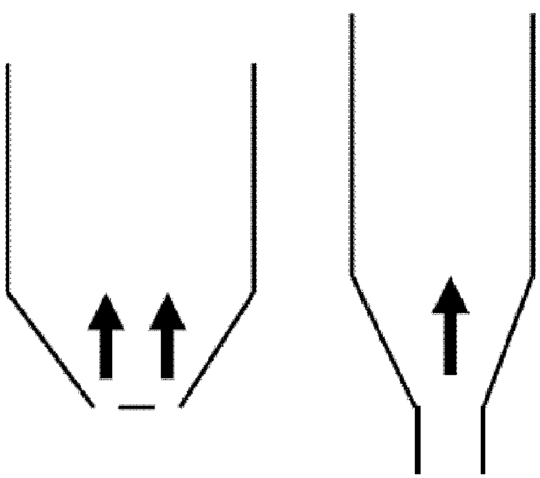
Flow Comparison

NID



- Same flow velocity in whole reactor.
- Same lifting force all the time
- Agglomerates are following the flow
- No water spraying inside reactor/flue gas

CDS

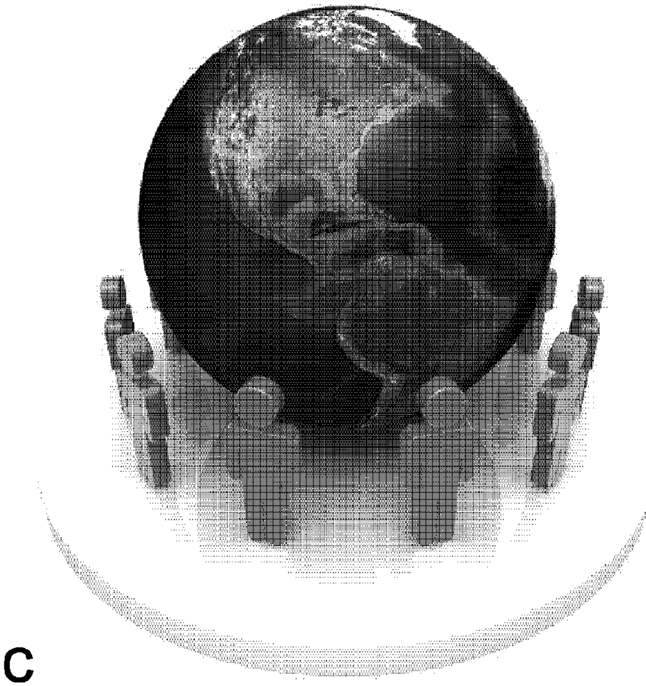


- Lower velocity in upper part of reactor, acceleration through venturi
- Lower lifting force in upper part
- Agglomerates are to a higher extend collected in the reactor and can't leave it
- Water addition inside reactor

NID has 4-8 week savings over CDS

Activity	NID 34-35 months	CDS 36 months
Engineering/ Procurement	12 months	12 months
Foundations	6 months	6 months
Erection	14-15 months (J-tubes shop fabricated in 3 pieces)	16 months (requires welding of reactor plates)
Tie-in Outage	1 month	1 month
Start-up	1 month	1 month

Vendors



NID system

- Alstom Power Inc

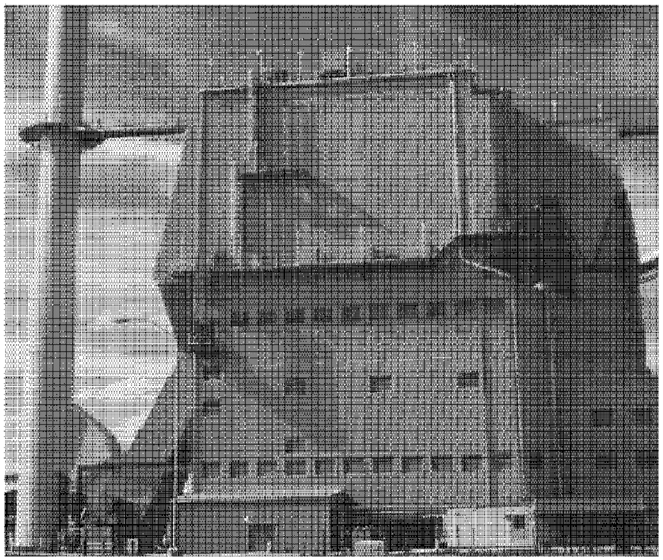
CDS system

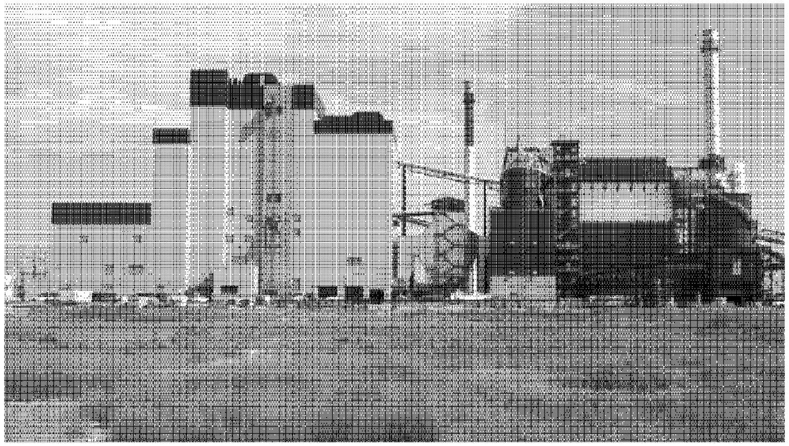
- Allied Environmental Inc
- Austrian Energy & Environmental Inc
- Babcock Power Environmental Inc
- Nooter Eriksen

Black & Veatch has recent experience with all of these vendors

B&V PC Boiler CDS/NID Experience

- First CDS scrubber in U.S.
  - Black Hills Power & Light – Wygen Station
  - Started up in 1995
  - 80 MW operating unit in Wyoming
- Currently installing CDS technology on 220 MW Whelan Energy Center #2
- NID on 5 x 5 MW industrial application in 1994





From: Hillman, Timothy M.
To: Saunders, Eileen
CC: Jackson, Audrey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mehta, Pratik D.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Goodlet, Roger F.; Ballard, Michael W; Hintz, Monty E.
Sent: 10/29/2010 12:38:35 PM
Subject: 168908.41.0803 101029 - Mill Creek U4 Alternative AQC Arrangement Sketches for Nov 1st Conference Call (Revised)
Attachments: Mill Creek U3-U4 NID A.pdf; Mill Creek U3-U4 NID B.pdf; Mill Creek U3-U4 PJFF A.pdf; Mill Creek U3-U4 PJFF B.pdf

Eileen,

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Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

From: Hillman, Timothy M.
Sent: Wednesday, October 27, 2010 2:20 PM
To: 'Saunders, Eileen'
Cc: Jackson, Audrey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mehta, Pratik D.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Goodlet, Roger F.; Ballard, Michael W; Hintz, Monty E.
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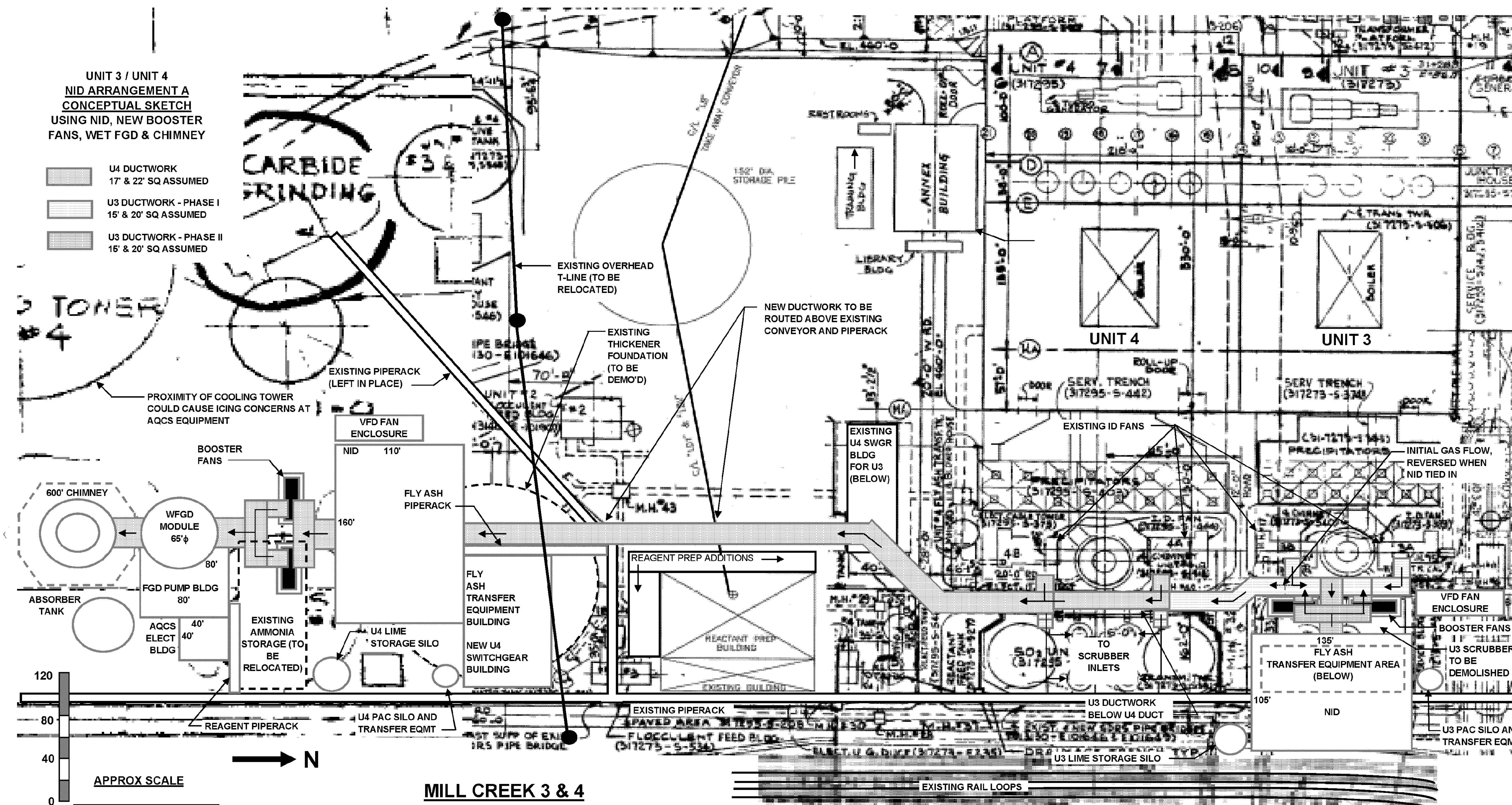
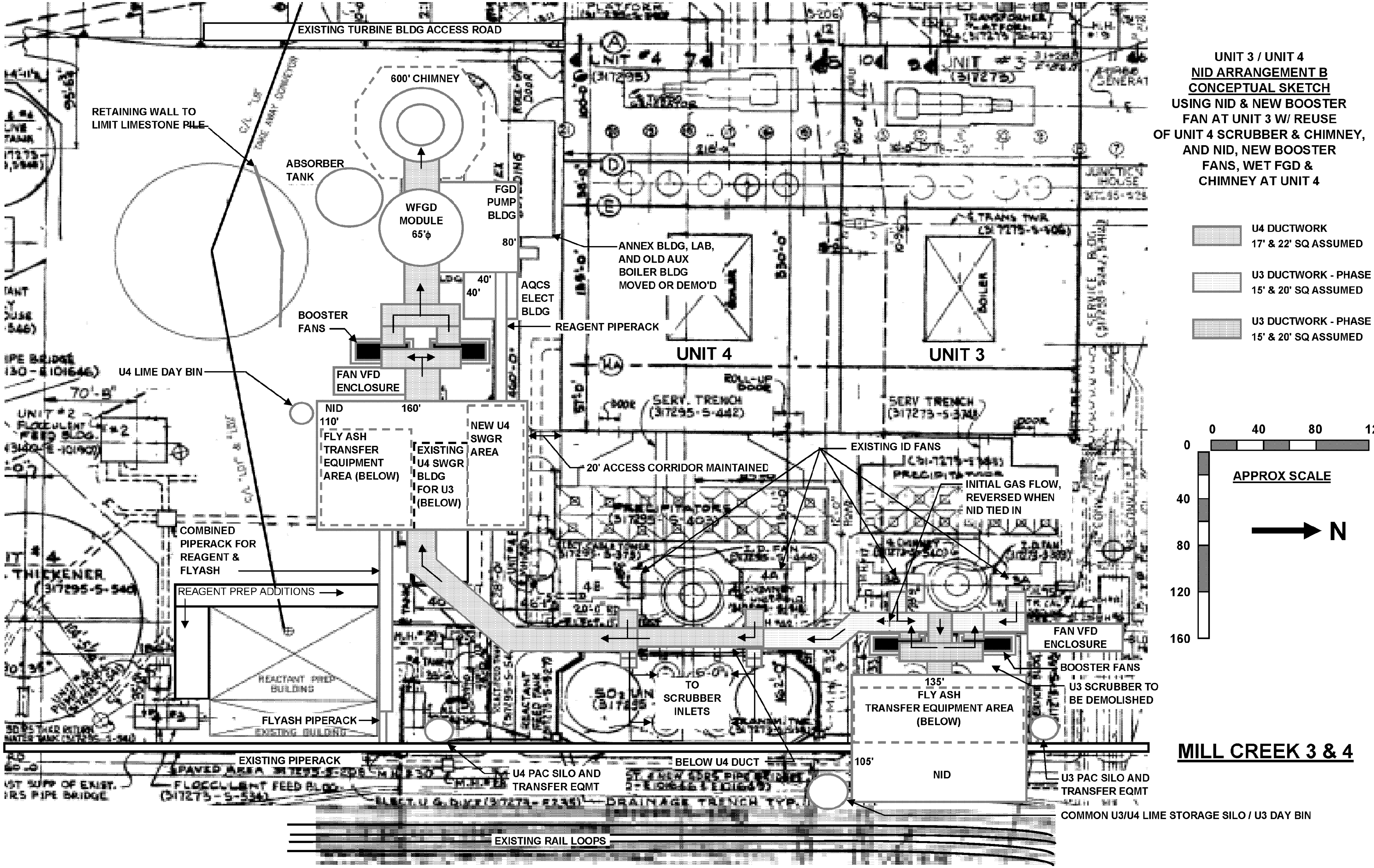
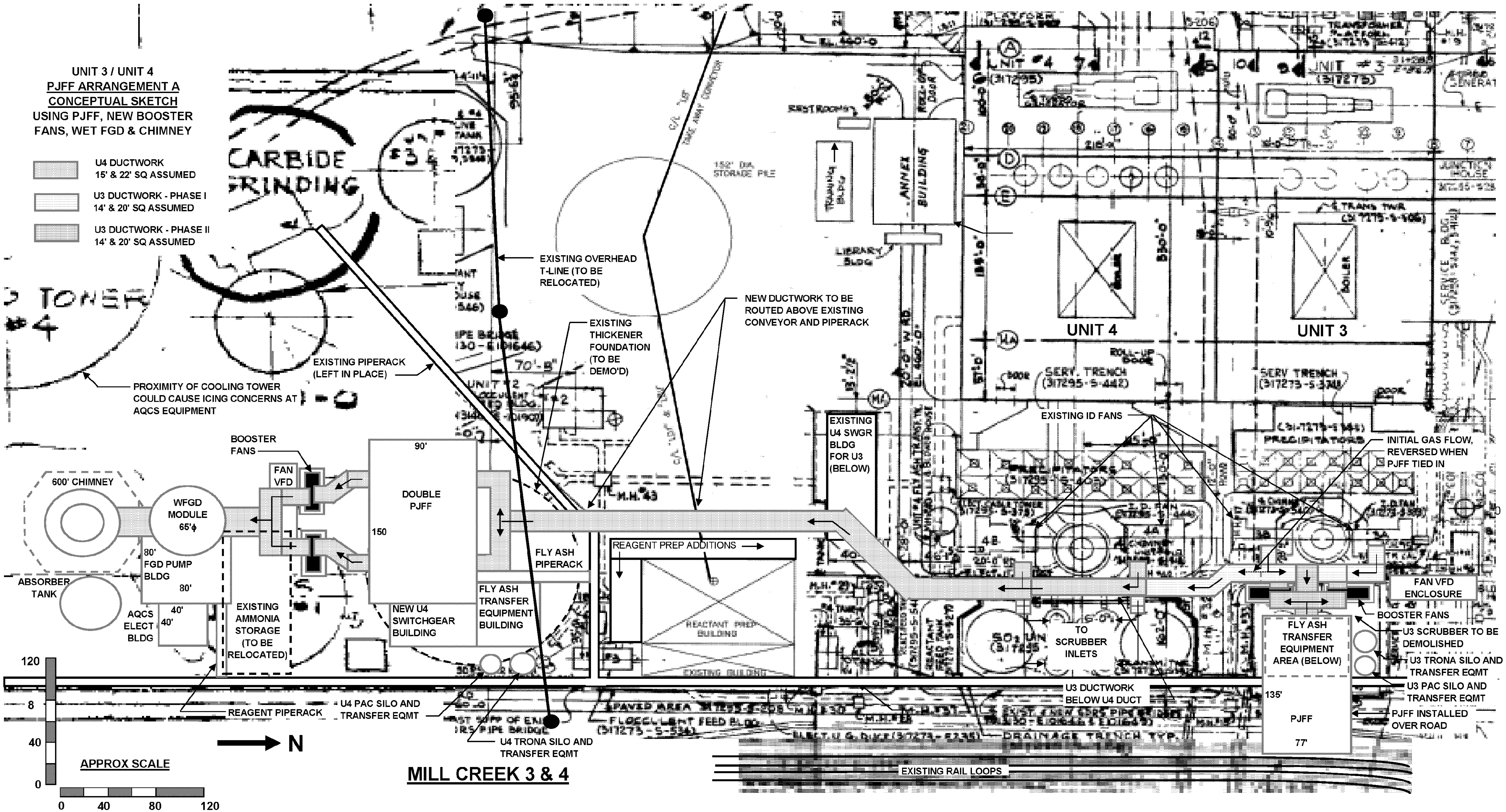
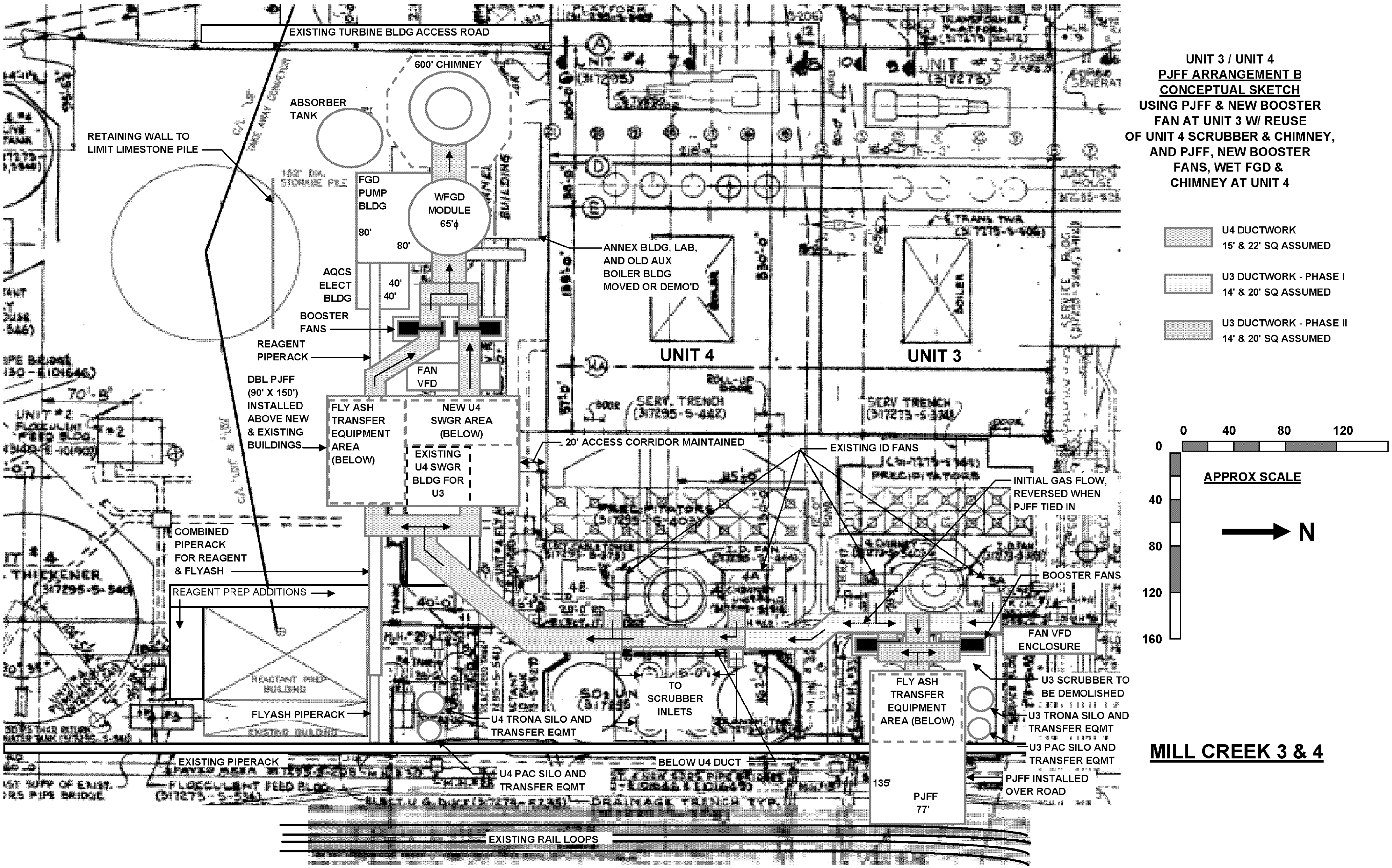

UNIT 3 / UNIT 4
NID ARRANGEMENT A
CONCEPTUAL SKETCH
USING NID, NEW BOOSTER FANS, WET FGD & CHIMNEY
U4 DUCTWORK 17' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I 15' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II 15' & 20' SQ ASSUMED
EXISTING OVERHEAD T-LINE (TO BE RELOCATED)
NEW DUCTWORK TO BE ROUTED ABOVE EXISTING CONVEYOR AND PIPERACK
EXISTING THICKENER FOUNDATION (TO BE DEMO'D)
EXISTING PIPERACK (LEFT IN PLACE)
PROXIMITY OF COOLING TOWER COULD CAUSE ICING CONCERNS AT AQCS EQUIPMENT
VFD FAN ENCLOSURE
BOOSTER FANS
NID
110'
160'
FLY ASH PIPERACK
600' CHIMNEY
WFGD MODULE 65'ϕ
80'
FGD PUMP BLDG 80'
ABSORBER TANK
AQCS ELECT BLDG
40'
EXISTING AMMONIA STORAGE (TO BE RELOCATED)
U4 LIME STORAGE SILO
FLY ASH TRANSFER EQUIPMENT BUILDING
NEW U4 SWITCHGEAR BUILDING
REAGENT PREP ADDITIONS
EXISTING U4 SWGR BLDG FOR U3 (BELOW)
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN NID TIED IN
UNIT 4
UNIT 3
TO SCRUBBER INLETS
VFD FAN ENCLOSURE
BOOSTER FANS
U3 SCRUBBER TO BE DEMOLISHED
135'
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
105'
NID
U3 PAC SILO AND TRANSFER EQMT
U3 LIME STORAGE SILO
U3 DUCTWORK BELOW U4 DUCT
EXISTING PIPERACK
REAGENT PIPERACK
U4 PAC SILO AND TRANSFER EQMT
EXISTING RAIL LOOPS
CARBIDE GRINDING
ANNEX BUILDING
LIBRARY BLDG
PRECIPITATORS
REACTANT PREP BUILDING
SERV. TRENCH
APPROX SCALE
0
40
80
120
N
MILL CREEK 3 & 4


UNIT 3 / UNIT 4
NID ARRANGEMENT B
CONCEPTUAL SKETCH
USING NID & NEW BOOSTER FAN AT UNIT 3 W/ REUSE OF UNIT 4 SCRUBBER & CHIMNEY, AND NID, NEW BOOSTER FANS, WET FGD & CHIMNEY AT UNIT 4
U4 DUCTWORK
17' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I
15' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II
15' & 20' SQ ASSUMED
APPROX SCALE
N
MILL CREEK 3 & 4
EXISTING TURBINE BLDG ACCESS ROAD
600' CHIMNEY
RETAINING WALL TO LIMIT LIMESTONE PILE
ABSORBER TANK
WFGD MODULE 65'ϕ
FGD PUMP BLDG
80'
40'
40'
AQCS ELECT BLDG
ANNEX BLDG, LAB, AND OLD AUX BOILER BLDG MOVED OR DEMO'D
BOOSTER FANS
REAGENT PIPERACK
UNIT 4
UNIT 3
U4 LIME DAY BIN
FAN VFD ENCLOSURE
NID
110'
160'
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
EXISTING U4 SWGR BLDG FOR U3 (BELOW)
NEW U4 SWGR AREA
20' ACCESS CORRIDOR MAINTAINED
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN NID TIED IN
COMBINED PIPERACK FOR REAGENT & FLYASH
REAGENT PREP ADDITIONS
FLYASH PIPERACK
TO SCRUBBER INLETS
FAN VFD ENCLOSURE
BOOSTER FANS
U3 SCRUBBER TO BE DEMOLISHED
135'
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
105'
NID
EXISTING PIPERACK
BELOW U4 DUCT
U4 PAC SILO AND TRANSFER EQMT
U3 PAC SILO AND TRANSFER EQMT
COMMON U3/U4 LIME STORAGE SILO / U3 DAY BIN
EXISTING RAIL LOOPS


UNIT 3 / UNIT 4
PJFF ARRANGEMENT A
CONCEPTUAL SKETCH
USING PJFF, NEW BOOSTER FANS, WET FGD & CHIMNEY
U4 DUCTWORK 15' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I 14' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II 14' & 20' SQ ASSUMED
EXISTING OVERHEAD T-LINE (TO BE RELOCATED)
NEW DUCTWORK TO BE ROUTED ABOVE EXISTING CONVEYOR AND PIPERACK
EXISTING THICKENER FOUNDATION (TO BE DEMO'D)
EXISTING PIPERACK (LEFT IN PLACE)
PROXIMITY OF COOLING TOWER COULD CAUSE ICING CONCERNS AT AQCS EQUIPMENT
BOOSTER FANS
FAN VFD
600' CHIMNEY
WFGD MODULE 65'ϕ
DOUBLE PJFF
90'
150
80' FGD PUMP BLDG 80'
ABSORBER TANK
AQCS ELECT BLDG
40'
40'
EXISTING AMMONIA STORAGE (TO BE RELOCATED)
NEW U4 SWITCHGEAR BUILDING
FLY ASH TRANSFER EQUIPMENT BUILDING
FLY ASH PIPERACK
REAGENT PREP ADDITIONS
EXISTING U4 SWGR BLDG FOR U3 (BELOW)
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN PJFF TIED IN
UNIT 4
UNIT 3
FAN VFD ENCLOSURE
BOOSTER FANS
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
U3 SCRUBBER TO BE DEMOLISHED
U3 TRONA SILO AND TRANSFER EQMT
U3 PAC SILO AND TRANSFER EQMT
PJFF INSTALLED OVER ROAD
135'
PJFF
77'
TO SCRUBBER INLETS
U3 DUCTWORK BELOW U4 DUCT
REAGENT PIPERACK
U4 PAC SILO AND TRANSFER EQMT
U4 TRONA SILO AND TRANSFER EQMT
EXISTING RAIL LOOPS
CARBIDE GRINDING
TOWER #4
ANNEX BUILDING
TRAINING BLDG
LIBRARY BLDG
REACTANT PREP BUILDING
EXISTING BUILDING
152' DIA. STORAGE PILE
SERV. TRENCH
PRECIPITATORS
SERVICE BLDG
JUNCTION HOUSE
PAVED AREA
FLOCCULENT FEED BLDG
DRAINAGE TRENCH TYP.
N
120
80
40
0
APPROX SCALE
0 40 80 120
MILL CREEK 3 & 4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FAN AT UNIT 3 W/ REUSE
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0 40 80 120
APPROX SCALE
40
80
120
160
N
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600' CHIMNEY
ABSORBER
TANK
RETAINING WALL TO
LIMIT LIMESTONE PILE
FGD
PUMP
BLDG
80'
80'
WFGD
MODULE
65'ϕ
AQCS
ELECT
BLDG
40'
40'
BOOSTER
FANS
REAGENT
PIPERACK
DBL PJFF
(90' X 150')
INSTALLED
ABOVE NEW
& EXISTING
BUILDINGS
FAN
VFD
FLY ASH
TRANSFER
EQUIPMENT
AREA
(BELOW)
NEW U4
SWGR AREA
(BELOW)
EXISTING
U4 SWGR
BLDG FOR
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ANNEX BLDG, LAB,
AND OLD AUX
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MOVED OR DEMO'D
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U3 PAC SILO AND
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BELOW U4 DUCT
U4 PAC SILO AND
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PJFF INSTALLED
OVER ROAD
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PJFF
77'
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From:	Saunders, Eileen
To:	Straight, Scott
CC:	HillmanTM@bv.com
Sent:	10/29/2010 1:03:22 PM
Subject:	FW: 168908.41.0803 101029 - Mill Creek U4 Alternative AQC Arrangement Sketches for Nov 1st Conference Call (Revised)
Attachments:	Mill Creek U3-U4 NID A.pdf; Mill Creek U3-U4 NID B.pdf; Mill Creek U3-U4 PJFF A.pdf; Mill Creek U3-U4 PJFF B.pdf

Scott,

Here are updated sketches to use when we talk to B&V Monday at 2 pm.

Thanks,

Eileen

From: Hillman, Timothy M. [mailto:HillmanTM@bv.com]
Sent: Friday, October 29, 2010 12:39 PM
To: Saunders, Eileen
Cc: Jackson, Audrey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mehta, Pratik D.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Goodlet, Roger F.; Ballard, Michael W; Hintz, Monty E.
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Importance: High

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nothy M.
October 27, 2010 2:20 PM
een'
ey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mehta, Pratik D.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Goodlet, Roger F.; Ballard, Michael W; Hintz, Monty E.
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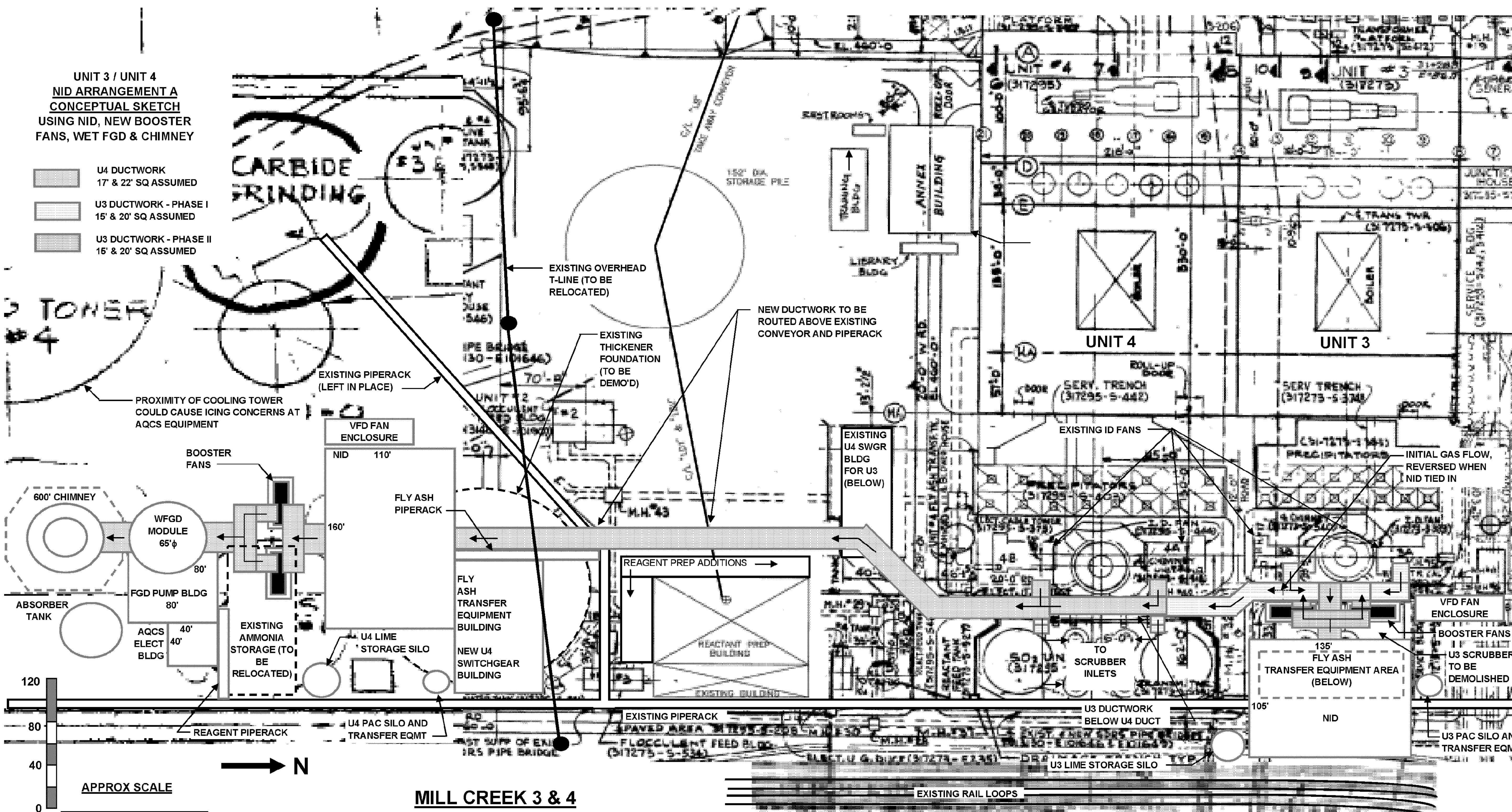
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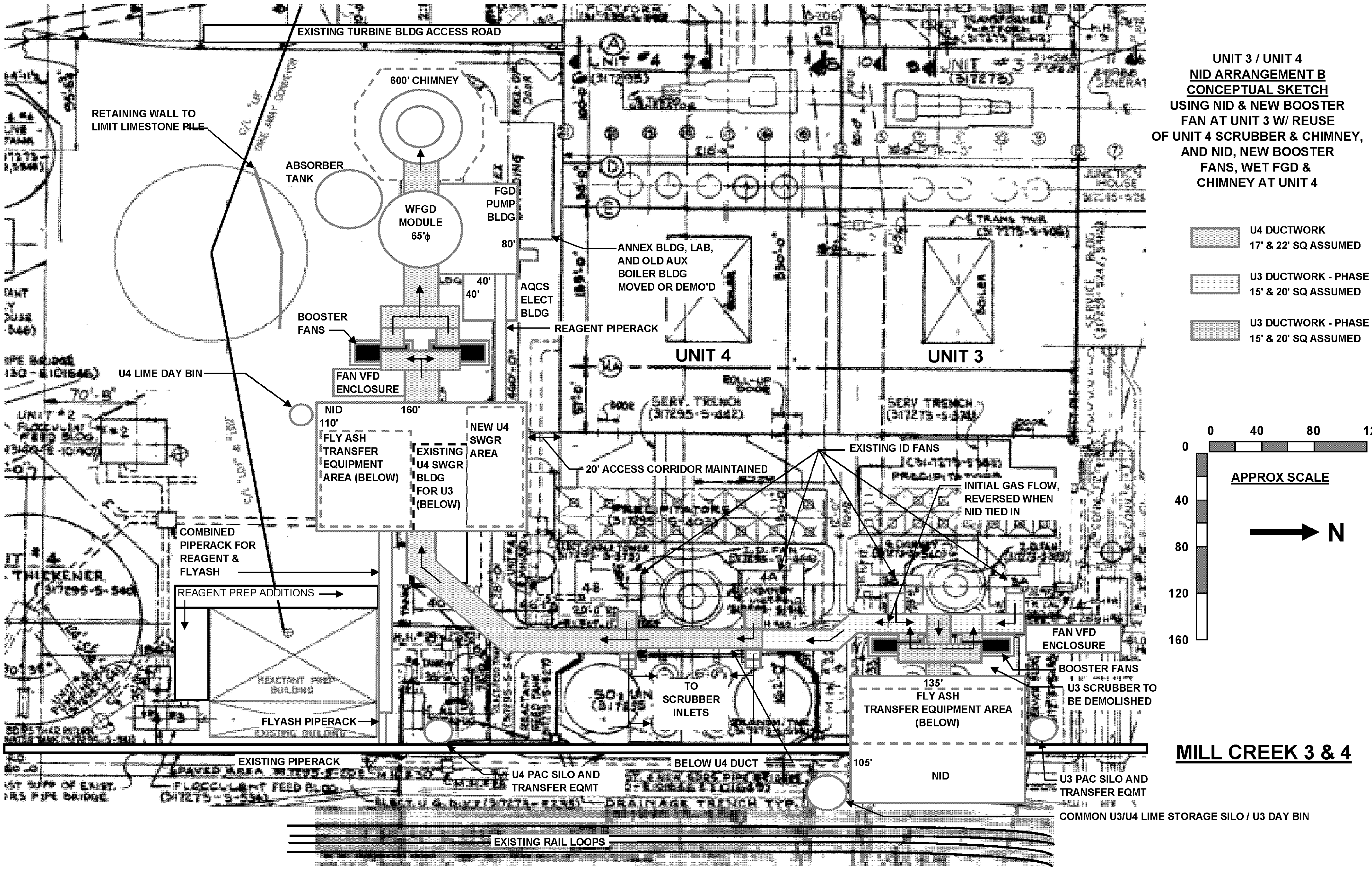
U3 SCRUBBER TO BE DEMOLISHED
135'
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
105'
EXISTING PIPERACK
U3 DUCTWORK BELOW U4 DUCT
REAGENT PIPERACK
U4 PAC SILO AND TRANSFER EQMT
U3 LIME STORAGE SILO
U3 PAC SILO AND TRANSFER EQMT
EXISTING RAIL LOOPS
N
APPROX SCALE
0
40
80
120
MILL CREEK 3 & 4
CARBIDE GRINDING
UNIT #4
UNIT #3
ANNEX BUILDING
LIBRARY BLDG
REACTANT PREP BUILDING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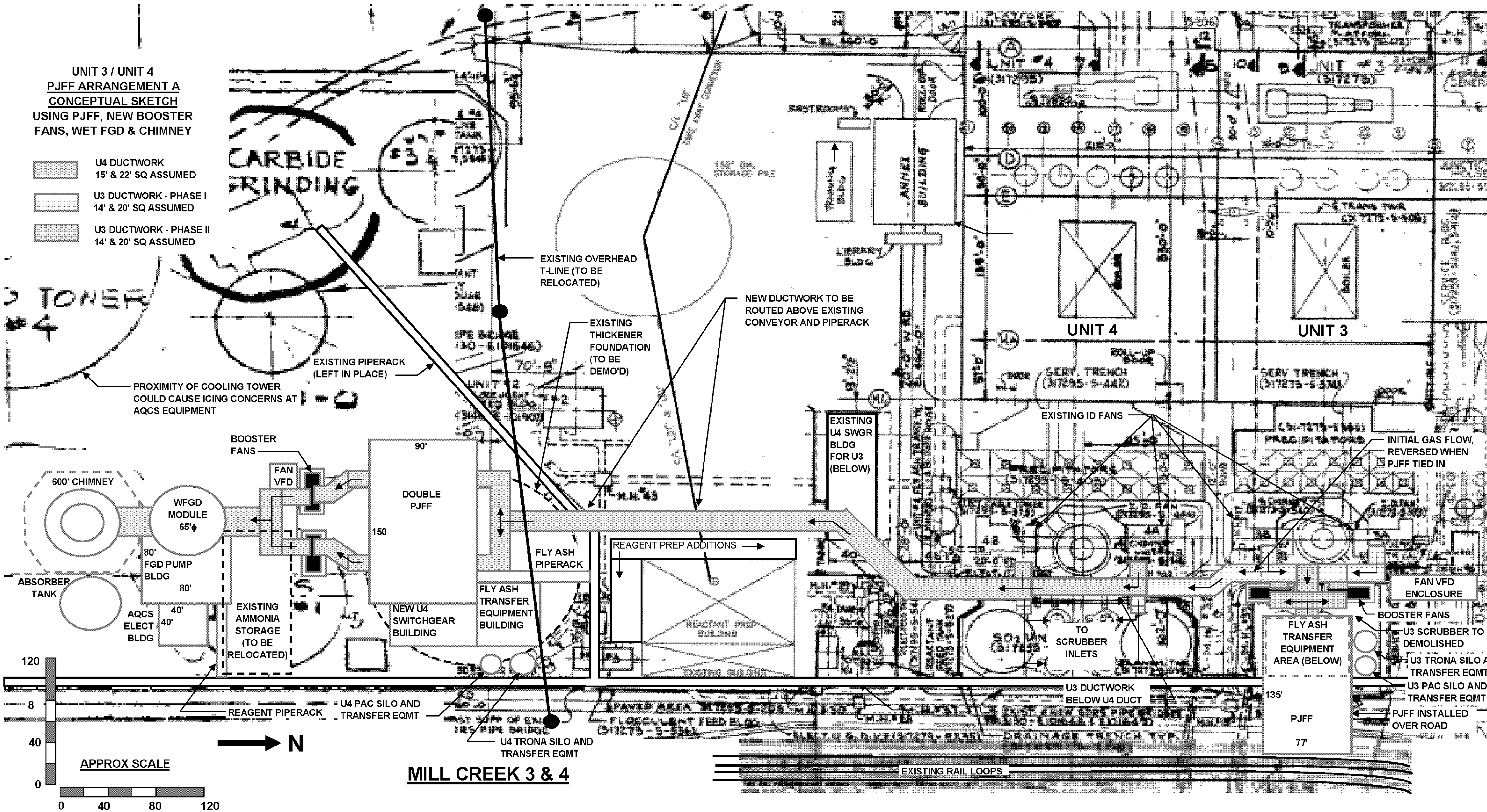
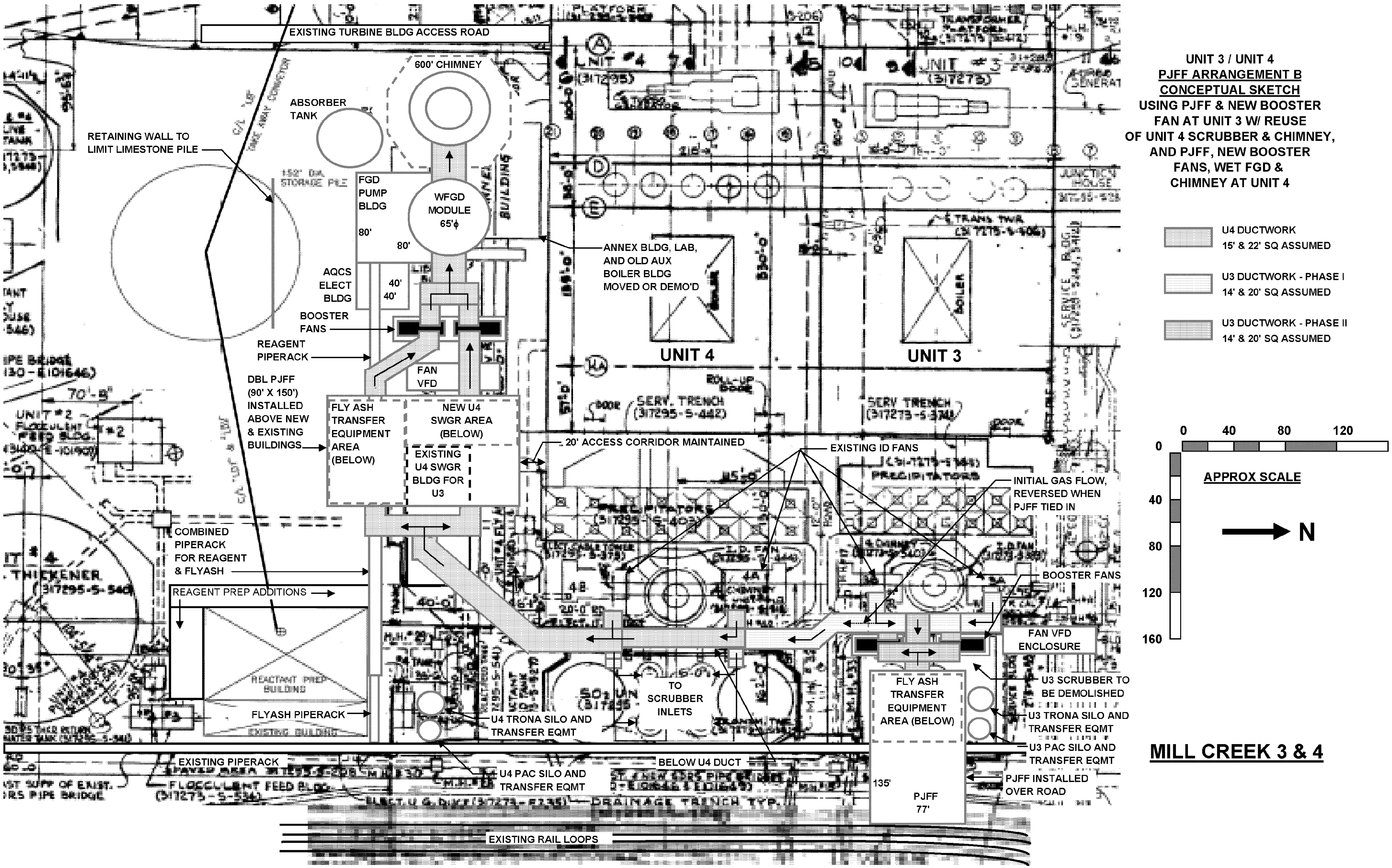
U3 DUCTWORK - PHASE I 15' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II 15' & 20' SQ ASSUMED
APPROX SCALE
0 40 80 120
0 40 80 120 160
N
EXISTING TURBINE BLDG ACCESS ROAD
600' CHIMNEY
RETAINING WALL TO LIMIT LIMESTONE PILE
ABSORBER TANK
WFGD MODULE 65'φ
FGD PUMP BLDG
80'
40'
40'
AQCS ELECT BLDG
ANNEX BLDG, LAB, AND OLD AUX BOILER BLDG MOVED OR DEMO'D
BOOSTER FANS
REAGENT PIPERACK
UNIT 4
UNIT 3
U4 LIME DAY BIN
FAN VFD ENCLOSURE
NID
110'
160'
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
EXISTING U4 SWGR BLDG FOR U3 (BELOW)
NEW U4 SWGR AREA
20' ACCESS CORRIDOR MAINTAINED
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN NID TIED IN
COMBINED PIPERACK FOR REAGENT & FLYASH
REAGENT PREP ADDITIONS
FLYASH PIPERACK
TO SCRUBBER INLETS
FAN VFD ENCLOSURE
BOOSTER FANS
U3 SCRUBBER TO BE DEMOLISHED
135'
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
105'
NID
EXISTING PIPERACK
BELOW U4 DUCT
U4 PAC SILO AND TRANSFER EQMT
U3 PAC SILO AND TRANSFER EQMT
COMMON U3/U4 LIME STORAGE SILO / U3 DAY BIN
EXISTING RAIL LOOPS
MILL CREEK 3 & 4


UNIT 3 / UNIT 4
PJFF ARRANGEMENT A
CONCEPTUAL SKETCH
USING PJFF, NEW BOOSTER FANS, WET FGD & CHIMNEY
U4 DUCTWORK 15' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I 14' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II 14' & 20' SQ ASSUMED
EXISTING OVERHEAD T-LINE (TO BE RELOCATED)
NEW DUCTWORK TO BE ROUTED ABOVE EXISTING CONVEYOR AND PIPERACK
EXISTING THICKENER FOUNDATION (TO BE DEMO'D)
EXISTING PIPERACK (LEFT IN PLACE)
PROXIMITY OF COOLING TOWER COULD CAUSE ICING CONCERNS AT AQCS EQUIPMENT
UNIT 4
UNIT 3
EXISTING U4 SWGR BLDG FOR U3 (BELOW)
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN PJFF TIED IN
BOOSTER FANS
FAN VFD
600' CHIMNEY
WFGD MODULE 65'ϕ
DOUBLE PJFF
90'
150
FLY ASH PIPERACK
REAGENT PREP ADDITIONS
80'
FGD PUMP BLDG
80'
ABSORBER TANK
AQCS ELECT BLDG
40'
40'
EXISTING AMMONIA STORAGE (TO BE RELOCATED)
NEW U4 SWITCHGEAR BUILDING
FLY ASH TRANSFER EQUIPMENT BUILDING
TO SCRUBBER INLETS
FAN VFD ENCLOSURE
BOOSTER FANS
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
U3 SCRUBBER TO BE DEMOLISHED
U3 TRONA SILO AND TRANSFER EQMT
U3 PAC SILO AND TRANSFER EQMT
U3 DUCTWORK BELOW U4 DUCT
135'
PJFF
77'
PJFF INSTALLED OVER ROAD
REAGENT PIPERACK
U4 PAC SILO AND TRANSFER EQMT
U4 TRONA SILO AND TRANSFER EQMT
EXISTING RAIL LOOPS
N
APPROX SCALE
0
40
80
120
MILL CREEK 3 & 4


UNIT 3 / UNIT 4
PJFF ARRANGEMENT B
CONCEPTUAL SKETCH
USING PJFF & NEW BOOSTER
FAN AT UNIT 3 W/ REUSE
OF UNIT 4 SCRUBBER & CHIMNEY,
AND PJFF, NEW BOOSTER
FANS, WET FGD &
CHIMNEY AT UNIT 4
U4 DUCTWORK
15' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I
14' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II
14' & 20' SQ ASSUMED
0 40 80 120
0 40 80 120 160
APPROX SCALE
N
MILL CREEK 3 & 4
EXISTING TURBINE BLDG ACCESS ROAD
600' CHIMNEY
ABSORBER TANK
RETAINING WALL TO LIMIT LIMESTONE PILE
FGD PUMP BLDG
80'
80'
WFGD MODULE 65'ϕ
AQCS ELECT BLDG
40'
40'
BOOSTER FANS
REAGENT PIPERACK
DBL PJFF (90' X 150') INSTALLED ABOVE NEW & EXISTING BUILDINGS
FAN VFD
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
NEW U4 SWGR AREA (BELOW)
EXISTING U4 SWGR BLDG FOR U3
ANNEX BLDG, LAB, AND OLD AUX BOILER BLDG MOVED OR DEMO'D
UNIT 4
UNIT 3
20' ACCESS CORRIDOR MAINTAINED
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN PJFF TIED IN
BOOSTER FANS
FAN VFD ENCLOSURE
COMBINED PIPERACK FOR REAGENT & FLYASH
REAGENT PREP ADDITIONS
FLYASH PIPERACK
U4 TRONA SILO AND TRANSFER EQMT
TO SCRUBBER INLETS
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
U3 SCRUBBER TO BE DEMOLISHED
U3 TRONA SILO AND TRANSFER EQMT
U3 PAC SILO AND TRANSFER EQMT
EXISTING PIPERACK
BELOW U4 DUCT
U4 PAC SILO AND TRANSFER EQMT
135'
PJFF 77'
PJFF INSTALLED OVER ROAD
EXISTING RAIL LOOPS

From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	168908 E.ON-AQC; Jackson, Audrey; Crabtree, Jonathan D.; Mahabaleshwarkar, Anand; Wehrly, M. R.; Hintz, Monty E.; Goodlet, Roger F.; Betz, Alex; Lucas, Kyle J.; Smith, Dave; Mehta, Pratik D.; Greenwell, Sarah
Sent:	12/20/2010 12:25:39 PM
Subject:	168908.28.3000 101220 - Action Item List
Attachments:	168908 LG&E AND KU ACTION ITEM LIST.xls

Eileen,

Attached is the action item list for our weekly Monday conference call.

Regards,

TIM HILLMAN | Project Manager, Energy
Black & Veatch Corporation | 11401 Lamar Ave., Overland Park, KS 66211
+ 1 913-458-7928 P |HillmanTM@BV.com
Building a World of Difference.®

	A	B	C	D	E	F	G	H	J	K	L	M
1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		DATE ADDED	ORIG DUE DA	RR DUE DA	COMPL DAT
2		DOC/MTNG	DATE				CO.	INITIAL				
3		**GENERAL**				n--	A					
4	27	Conf Call 10102	10/25/10	Prepare letter spec for Fabric Filter workshop.	41.0806	n--	B&V	AM/RL	10/19/10	TBD		
5		**MILL CREEK**				Mill Creek	A					
6	46	Conf Call 10120	12/7/10	Develop high level cost comparison between the installa	14.1000	Mill Creek	B&V	TH	12/13/10	TBD		
7	32	Email 41.0803 1	11/5/10	Provide comments and direction on Mill Creek Validation	41.0803	Mill Creek	LG&E/KU	ES	11/08/10	11/16/10	12/13/10	
8		**GHENT**				Ghent	A					
9	56	Ghent Val Mtg M	12/7/10	Provide a qualitative comparison between unit sorbent in	14.1000	Ghent	B&V	AM	12/13/10	12/17/10	12/22/10	
10	51	Ghent Val Mtg M	12/7/10	Provide suggestions to balance/bias the flows downstrea	14.1000	Ghent	B&V	MW	12/13/10	01/07/11		
11	52	Ghent Val Mtg M	12/7/10	Include demolition costs in the project cost estimate as s	14.1000	Ghent	B&V	RF	12/13/10	st estimate)		
12	54	Ghent Val Mtg M	12/7/10	Review and provide comments on the Ghent Validation	14.1000	Ghent	LG&E/KU	Ghent Tea	12/13/10	12/14/10	12/20/10	
13	58	Email 14.1000 1	12/10/10	Provide comments on Ghent Validation Meeting Minutes	14.1000	Ghent	LG&E/KU	ES	12/13/10	12/17/10	12/20/10	
14	47	Ghent Val Mtg M	12/7/10	Review requirements for fire protection on PJFFs.	14.1000	Ghent	LG&E/KU	ES	12/13/10	12/30/10		
15	49	Ghent Val Mtg M	12/7/10	Inform professionals involved in the Ghent ash handling	14.1000	Ghent	LG&E/KU	ES□MW	12/13/10	12/17/10	12/20/10	
16		**E.W. BROWN**				Brown	A					
17	41	Brown KO Mtg M	11/15/10	Review U3 SCR arrgmnts & comment on potential PJFF	14.1000	Brown	B&V	TH/ MH	11/16/10	12/10/10	12/22/10	
18	38	Brown KO Mtg M	11/15/10	Prepare Unit 1 and 2 sketches with and without SCR	14.1000	Brown	B&V	TH	11/15/10	01/10/11		
19	59	Email 22.1000 1	12/14/10	Incorporate LG&E/KU comments to Brown PDM and iss	22.1000	Brown	B&V	MW/JC	12/16/10	01/17/11		
20	42	Email 14.1000 1	11/16/10	Provide LG&E/KU comments on Brown Kick Off Meetin	14.1000	Brown	LG&E/KU	ES	11/16/10	11/22/10	12/20/10	
21	44	Conf Call 10112	11/22/10	Establish date for Brown Validation meeting.	41.0803	Brown	LG&E/KU	ES	11/22/10	11/29/10	12/20/10	
22	60											
23	61											
24	62											

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1	STATUS	NOTES			Fv G^ K^		
2							
3							
4	In Progress	Develop letter spec and send to Eileen for review (12/13)					
5							
6	In Progress	B&V has contacted Alstom & received initial response (12/15)					
7	Complete??	No comments on report. Direction given for U3, U4a&b, and see AI #46 for U1&U2 (12/13).					
8							
9	Open						
10	Open						
11	Open						
12	Open						
13	Open						
14	Open						
15	Open						
16							
17	In Progress	Received additional drawings 12/10 which require more review.					
18	In Progress						
19	Open	Pending tables of information in Info Request.					
20	In Progress	Eileen has no comments. Sent to team for comments. (12/13)					
21	Open	Potentially to be scheduled for the week of January 17th. Need to ask Jeff Fraley(11/29)					
22							
23							
24							

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1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		)ATE ADDE	IG DUE DA	RR DUE D/	OMPL DAT	STATUS
2		DOC/MTNG	DATE				CO.	INITIAL					
3	40	--	11/8/10	Incorporate LG&E and KU comments to Ghent PDM an	22.1000	Ghent	B&V	MW/JC	11/15/10	11/30/10	12/20/10	12/17/10	Complete
4	55	Ghent Val Mtg I	12/7/10	Provide reference/experience list for plants who inject tr	14.1000	Ghent	B&V	AM	12/13/10	12/17/10		12/16/10	Complete
5	48	Ghent Val Mtg I	12/7/10	Provide technical information on PJFF to LG&E/KU for r	14.1000	Ghent	B&V	AM	12/13/10	TBD		12/16/10	Complete
6	57	Ghent Val Mtg I	12/7/10	Jeff Joyce from LG&E/KU will investigate what the plant	14.1000	Ghent	LG&E/KU	JJ	12/13/10	12/13/10		12/16/10	Complete
7	45	Email 22.1000	######	Provide comments on Brown Project Design Memorand	22.1000	Brown	LG&E/KU	ES	11/29/10	12/03/10	12/10/10	12/14/10	Complete
8	43	Email 14.1000	######	Provide LG&E/KU comments on Mill Creek validation pr	14.1000	Mill Creek	LG&E/KU	ES	11/16/10	11/22/10	12/13/10	12/13/10	Complete
9	50	Ghent Val Mtg I	12/7/10	Confirm if there will be any issues or concerns if the exi	14.1000	Ghent	LG&E/KU	ES	12/13/10	12/17/10		12/13/10	Complete
10	53	Ghent Val Mtg I	12/7/10	LG&E/KU to schedule visit PJFF at Trimble County Unit	14.1000	Ghent	LG&E/KU	ES	12/13/10	12/17/10		12/13/10	Removed
11	35	--	11/8/10	Incorporate LG&E and KU comments to Mill Creek PDM	22.1000	Mill Creek	B&V	MW/JC	11/08/10	11/16/10	11/29/10	11/29/10	Complete
12	34	--	11/8/10	Prepare and issue draft of Project Design Memorandum	22.1000	Brown	B&V	TH	11/08/10	11/25/10		11/24/10	Complete
13	36	Brown KO Mtg	######	Provide a list of "sacred ground" areas at Brown.	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/23/10	Complete
14	39	Brown KO Mtg	######	Identify a contact person for data collection	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/22/10	Complete
15	33	--	11/8/10	Prepare Data Request for Brown Station.	41.0100	Brown	B&V	TH	11/08/10	11/18/10		11/19/10	Complete
16	37	Brown KO Mtg	######	Provide drawings of the Unit 3 SO3 mitigation project	14.1000	Brown	LG&E/KU	ES	11/15/10	11/19/10		11/11/10	Complete
17	25	Email 22.1000	######	Provide LG&E and KU comments on Ghent Project Des	22.1000	Ghent	LG&E/KU	ES	10/21/10	10/28/10		11/08/10	Complete
18	23	Conf Call 1010	######	Provide draft of Mill Creek Validation Report for LG&E/K	41.0803	Mill Creek	B&V	TH/MW	10/19/10	11/05/10		11/05/10	Complete
19	29	--	######	Provide Brown Kickoff presentation .	14.1000	Brown	B&V	TH	10/29/10	11/05/10		11/03/10	Complete
20	24	Conf Call 1010	######	Prepare differences between SCR and SNCR for Browr	14.1000	Brown	B&V	AM/RL	10/19/10	11/09/10		11/03/10	Complete
21	28	--	######	Provide Mill Creek Validation presentation.	41.0803	Mill Creek	B&V	TH	10/29/10	11/05/10		11/03/10	Complete
22	31	Email 14.1000	######	Provide comments on Brown Kickoff meeting agenda	14.1000	Brown	LG&E/KU	ES	10/27/10	11/02/10		11/01/10	Complete
23	30	Email 14.1000	######	Provide comments on Mill Creek Validation meeting age	14.1000	Mill Creek	LG&E/KU	ES	10/27/10	11/02/10		11/01/10	Complete
24	26	--	######	Provide sketches of Unit 4 AQC equipment in the thicke	41.0402	Mill Creek	B&V	MH	10/25/10	10/27/10	10/27/10	11/01/10	Complete

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1	NOTES									
2										
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6	Conference Call with Jeff on 12/16.									
7	Comments received and question on section 1.10 answered (12/14)									
8	No comments.									
9	Gary Revlett and Env. Team say they do not have any concerns.									
10	Eileen said she will track this item on her own and to remove from the Project AI List									
11										
12	PDM issued for In-House Review (11/18)									
13	Added to Info Request Priority 1									
14										
15										
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18										
19										
20	To be included in Brown KO presentation. Also include fabric filter discussion. (10/25)									
21	Final sent on 11/5									
22										
23	Confirmed LG&E and KU team is available for the afternoon on 11/9									
24										

	A	B	C	D	E	F	G	H	J	K	L	M	N
25	22	Email 14.1000	######	Provide LG&E/KU comments on Ghent Site Visit meeti	14.1000	Ghent	LG&E/KU	ES	10/15/10	10/19/10		10/22/10	Complete
26	11	KO & MC Site \	9/20/10	Evaluate pros and cons of NID system for November teo	14.1000	n--	B&V	AM/□RL	09/21/10	Nov. 2010		10/21/10	Complete
27	21	Ghent Site Visit	######	Prepare Ghent Information Request.	41.0100	Ghent	B&V	TH	10/11/10	10/15/10		10/18/10	Complete
28	15	KO & MC Site \	9/20/10	Review B&V electrical study conducted in the 1990s	14.1000	Mill Creek	B&V	JB	09/21/10	09/24/10	TBD	10/18/10	Complete
29	18	Email 41.0100	9/29/10	Choose the coal fuel design basis for Mill Creek, Ghent,	41.0100	n--	LG&E/KU	ES	09/30/10	10/06/10		10/18/10	Complete
30	4	KO & MC Site \	9/20/10	Use B&V file system to set up LG&E/KU document stor	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/18/10	Complete
31	12	KO & MC Site \	9/20/10	Schedule vendors for evaluation of existing scrubbers	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/18/10	Complete
32	1	KO & MC Site \	9/20/10	Determine location for Mill Creek Task 6 Technology Se	14.1000	Mill Creek	LG&E/KU	ES	09/21/10	10/15/10		10/12/10	Complete
33	20	Email 22.1000	10/5/10	Provide comments on the Mill Creek Project Design Me	22.1000	Mill Creek	LG&E/KU	ES	10/11/10	10/12/10		10/12/10	Complete
34	13	KO & MC Site \	9/20/10	Provide structural steel study assessments	14.1000	n--	LG&E/KU	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
35	14	KO & MC Site \	9/20/10	Provide minimum access dimension box	14.1000	n--	LG&E/KU	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
36	7	KO & MC Site \	9/20/10	Determine personnel assignments for document review	14.1000	n--	LG&E/KU	ES	09/21/10	TBD		10/04/10	Complete
37	19	Re: Email 41.01	9/30/10	B&V to provide schedule/deadlines for Mill Creek inform	41.0100	Mill Creek	B&V	TH	09/30/10	10/06/10		10/04/10	Complete
38	6	KO & MC Site \	9/20/10	Create IBackup FTP site for large file transfer	14.1000	--	B&V	KL	09/21/10	09/24/10		09/29/10	Complete
39	10	KO & MC Site \	9/20/10	Prepare data inventory and information request	14.1000	Mill Creek	B&V	MW/□JC	09/21/10	09/24/10		09/29/10	Complete
40	5	KO & MC Site \	9/20/10	Provide engineering cost estimate at end of each month	14.1000	n--	B&V	TH	09/21/10	09/30/10		09/28/10	Complete
41	2	KO & MC Site \	9/20/10	Determine dates for Ghent kick-off meeting	14.1000	Ghent	LG&E/KU	ES	09/21/10	09/23/10		09/27/10	Complete
42	16	KO & MC Site \	9/20/10	Evaluate the possibility of accelerating the installation of	14.1000	Mill Creek	LG&E/KU	ES &□TH	09/21/10	TBD		09/27/10	Complete
43	17	Email 14.1000	9/20/10	Provide LG&E/KU comments on Kick Off Meeting and M	14.1000	--	LG&E/KU	ES	09/21/10	09/24/10		09/24/10	Complete
44	3	KO & MC Site \	9/20/10	Provide DVD copy of Phase I Report	14.1000	--	B&V	TH	09/21/10	09/24/10		09/22/10	Complete
45	9	KO & MC Site \	9/20/10	Update PIM with Eileen's Ghent contact information	14.1000	--	B&V	MW	09/21/10	09/24/10		09/21/10	Complete
46	8	KO & MC Site \	9/20/10	Determine if a Monday, 2 pm EST project conference ca	14.1000	--	B&V	TH/□MW	09/21/10	09/23/10		09/21/10	Complete
47													
48													

	O	P	Q	R	S	T	U	V	W	X
25	Eileen has no comments (10/18). Waiting for comments from LG&E/KU members.									
26	Will send powerpoint presentation in the next couple of days (10/18).									
27										
28	B&V could not locate study. Added to Data Request. Will review when LG&E/KU provides study.									
29	Use future coal. (10/11) Chlorine needs to be corrected (10/18)									
30	Audrey is working on it (10/11). It is set up. Eileen to review (10/18).									
31	To be scheduled week of 10/25. B&V requested to be included in debriefing w/ each vendor.									
32	MC Technology selection meeting to be held in Louisville on 11/9 with Brown KO mtg on 11/10&11.									
33	Eileen's comments provided on 10/12. Sent to Alex for further comments.									
34	CD received 9/27. Units 1, 2, and 4 on CD. Unit 3 still needed. Email request sent on 9/28.									
35	CD received 9/27. Access Dimension not included. Email request sent 9/28.									
36	MC - Alex Betz and a couple others at plant. Process in place (10/4)									
37										
38										
39										
40	Sent 9/28.									
41	Scheduled for October 6&7									
42	B&V email addressed the acceleration of the SCR install for MC 1 & 2 (9/17). LG&E/KU replied no change in direction at this time (9/27).									
43	Final issued on 9/24									
44	Set received on 9/22									
45										
46	Scheduled									
47										
48										

	A	B	C	D	E	F	G	H	J	K	L	M	N
7120													
7121													
7122	58												

	O	P	Q	R	S	T	U	V	W	X
7120										
7121										
7122										

	A	B	C	D
1	LG&E/KU	LG&E and KU		
2	AB	Alex Betz - Mill Creek		
3	DS	Dave Smith - Ghent		
4	ES	Eileen Saunders		
5	GB	Greg Black		
6	GR	Gary Revlett		
7	JJ	Jeff Joyce - Ghent		
8				
9				
10				
11				
12				
13				
14				
15				
16				
17	BV	Black & Veatch (B&V)		
18	TH	Tim Hillman		
19	KL	Kyle Lucas		
20	AM	Anand Mahabaleshwarker		
21	MK	Mike King		
22	RL	Rick Lausman		
23	MW	M.R. Wehrly		
24	MH	Monty Hintz		
25	JB	Jim Bayless		
26	JC	Jonathan Crabtree		
27	RF	Ron Fields		

From: Saunders, Eileen
To: Inman, David
Sent: 11/1/2010 9:10:45 AM
Subject: FW: 168908.41.0803 101029 - Mill Creek U4 Alternative AQC Arrangement Sketches for Nov 1st Conference Call (Revised)
Attachments: Mill Creek U3-U4 NID A.pdf; Mill Creek U3-U4 NID B.pdf; Mill Creek U3-U4 PJFF A.pdf; Mill Creek U3-U4 PJFF B.pdf

David,

Here are the sketches needed for our conference call at 1 pm. Please remind Scott of the call and let him know that I will be calling in from Mill Creek unless he feels I need to come to the BOC. Please let me know if he wants me to come to his office.

Thanks,

Eileen

From: Hillman, Timothy M. [mailto:HillmanTM@bv.com]
Sent: Friday, October 29, 2010 12:39 PM
To: Saunders, Eileen
Cc: Jackson, Audrey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mehta, Pratik D.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Goodlet, Roger F.; Ballard, Michael W; Hintz, Monty E.
Subject: 168908.41.0803 101029 - Mill Creek U4 Alternative AQC Arrangement Sketches for Nov 1st Conference Call (Revised)
Importance: High

Eileen,

As part of our validation work, we have made some refinements to the Mill Creek U4 arrangement sketches that I sent you on Wednesday. Please consider the attached revised sketches for our Monday conference call.

Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

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nothy M.
October 27, 2010 2:20 PM
een'
ey; 168908 E.ON-AQC; Wehrly, M. R.; Crabtree, Jonathan D.; Lucas, Kyle J.; Mehta, Pratik D.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Goodlet, Roger F.; Ballard, Michael W; Hintz, Monty E.
8.41.0803 101027 - Mill Creek U4 Alternative AQC Arrangement Sketches for Nov 1st Conference Call

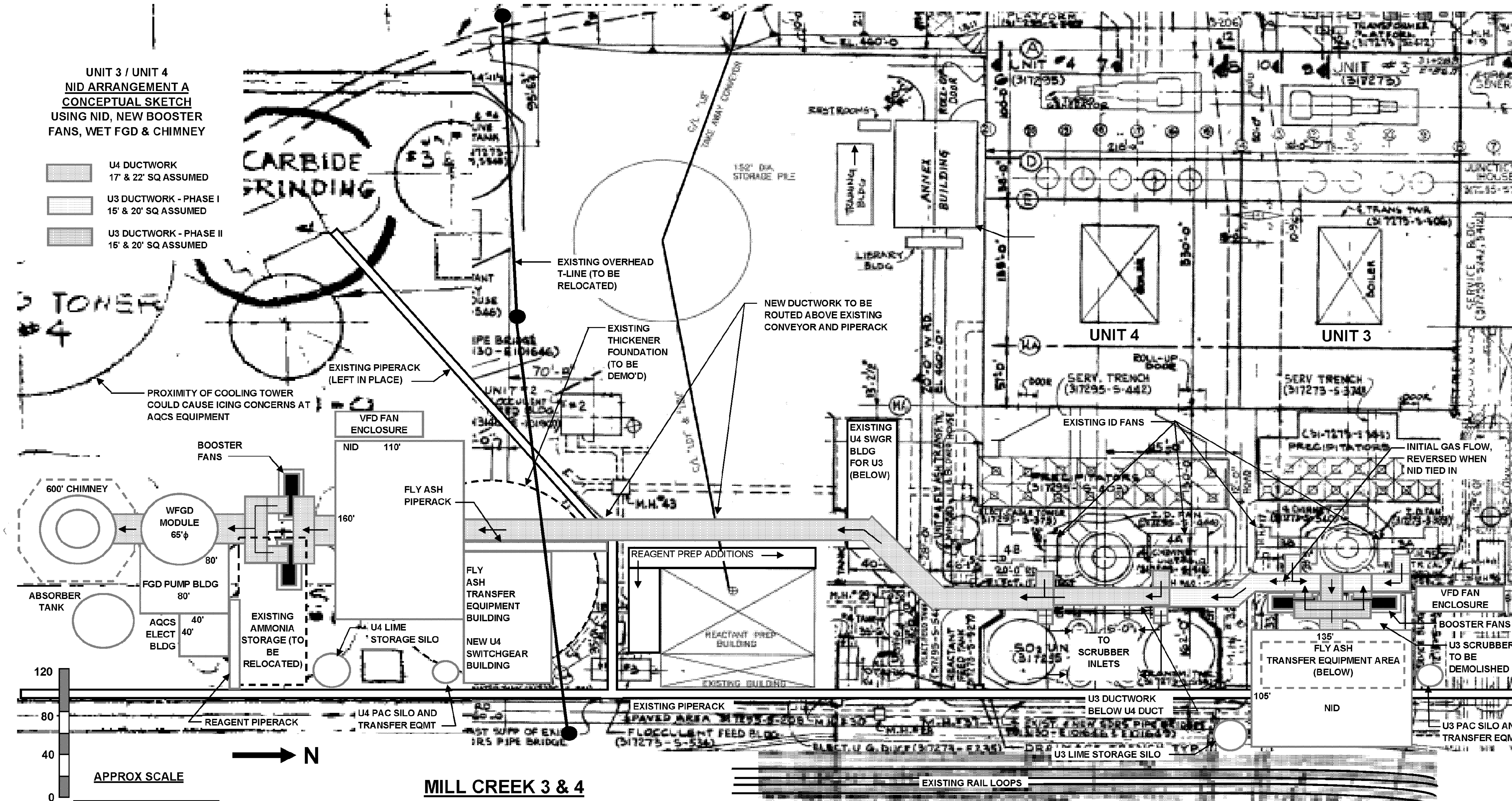
Eileen,

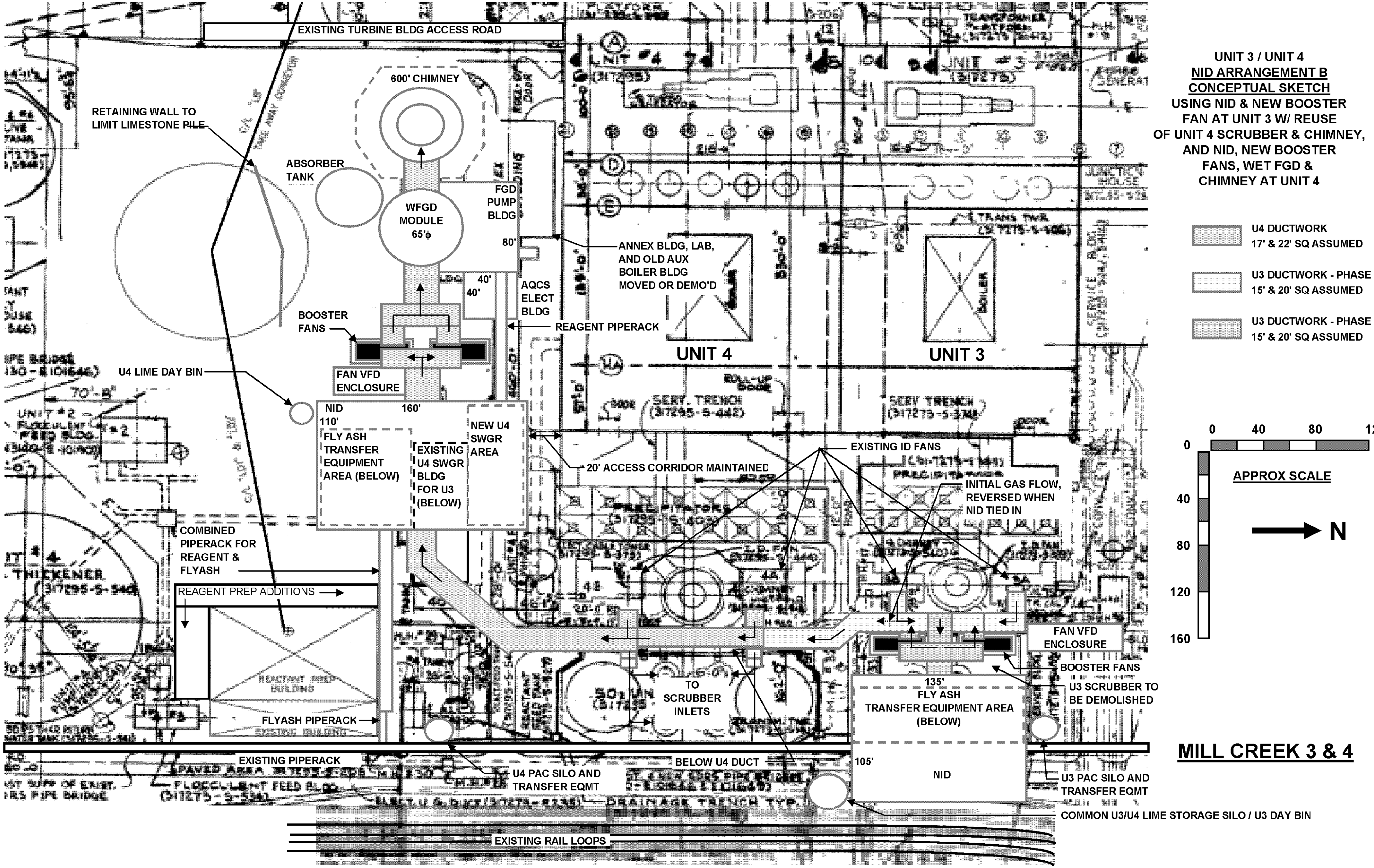
In preparation for our Nov 1st conference call, please find attached sketches of the potential Mill Creek U4 AQC arrangements. The sketches include both NID and PJFF versions of an east-west configuration along the south side of U4, and a north-south configuration in the old thickener area.

<< File: MC U3-U4 NID Sketch.pdf >> << File: MC U3-U4 NID Sketch Alt.pdf >> << File: MC U3-U4 PJFF Sketch.pdf >> << File: MC U3-U4 PJFF Sketch Alt.pdf >>
Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services

Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**


UNIT 3 / UNIT 4
NID ARRANGEMENT A
CONCEPTUAL SKETCH
USING NID, NEW BOOSTER FANS, WET FGD & CHIMNEY
U4 DUCTWORK 17' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I 15' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II 15' & 20' SQ ASSUMED
EXISTING OVERHEAD T-LINE (TO BE RELOCATED)
NEW DUCTWORK TO BE ROUTED ABOVE EXISTING CONVEYOR AND PIPERACK
EXISTING THICKENER FOUNDATION (TO BE DEMO'D)
EXISTING PIPERACK (LEFT IN PLACE)
PROXIMITY OF COOLING TOWER COULD CAUSE ICING CONCERNS AT AQCS EQUIPMENT
VFD FAN ENCLOSURE
BOOSTER FANS
600' CHIMNEY
WFGD MODULE 65'ϕ
NID
110'
160'
FLY ASH PIPERACK
FLY ASH TRANSFER EQUIPMENT BUILDING
NEW U4 SWITCHGEAR BUILDING
REAGENT PREP ADDITIONS
EXISTING U4 SWGR BLDG FOR U3 (BELOW)
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN NID TIED IN
UNIT 4
UNIT 3
FGD PUMP BLDG
80'
ABSORBER TANK
AQCS ELECT BLDG
40'
EXISTING AMMONIA STORAGE (TO BE RELOCATED)
U4 LIME STORAGE SILO
TO SCRUBBER INLETS
135'
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
105'
VFD FAN ENCLOSURE
BOOSTER FANS
U3 SCRUBBER TO BE DEMOLISHED
U3 PAC SILO AND TRANSFER EQMT
REAGENT PIPERACK
U4 PAC SILO AND TRANSFER EQMT
EXISTING PIPERACK
U3 DUCTWORK BELOW U4 DUCT
U3 LIME STORAGE SILO
EXISTING RAIL LOOPS
CARBIDE GRINDING
COOLING TOWER #4
ANNEX BUILDING
LIBRARY BLDG
TRAINING BLDG
REACTANT PREP BUILDING
PRECIPITATORS
SERV. TRENCH
SERVICE BLDG
JUNCTION HOUSE
152' DIA. STORAGE PILE
N
APPROX SCALE
0
40
80
120
MILL CREEK 3 & 4



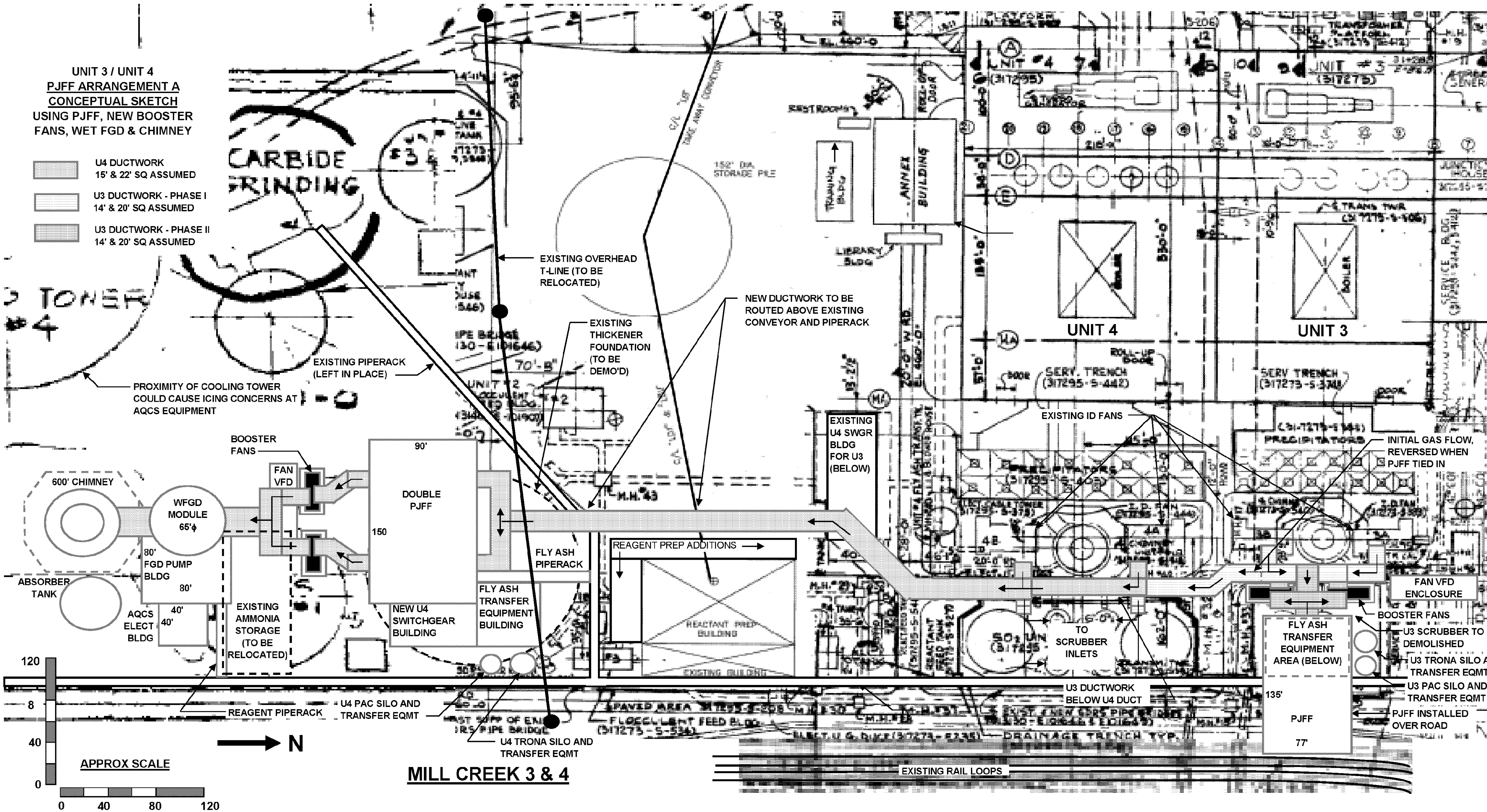
UNIT 3 / UNIT 4
NID ARRANGEMENT B
CONCEPTUAL SKETCH
USING NID & NEW BOOSTER FAN AT UNIT 3 W/ REUSE OF UNIT 4 SCRUBBER & CHIMNEY, AND NID, NEW BOOSTER FANS, WET FGD & CHIMNEY AT UNIT 4

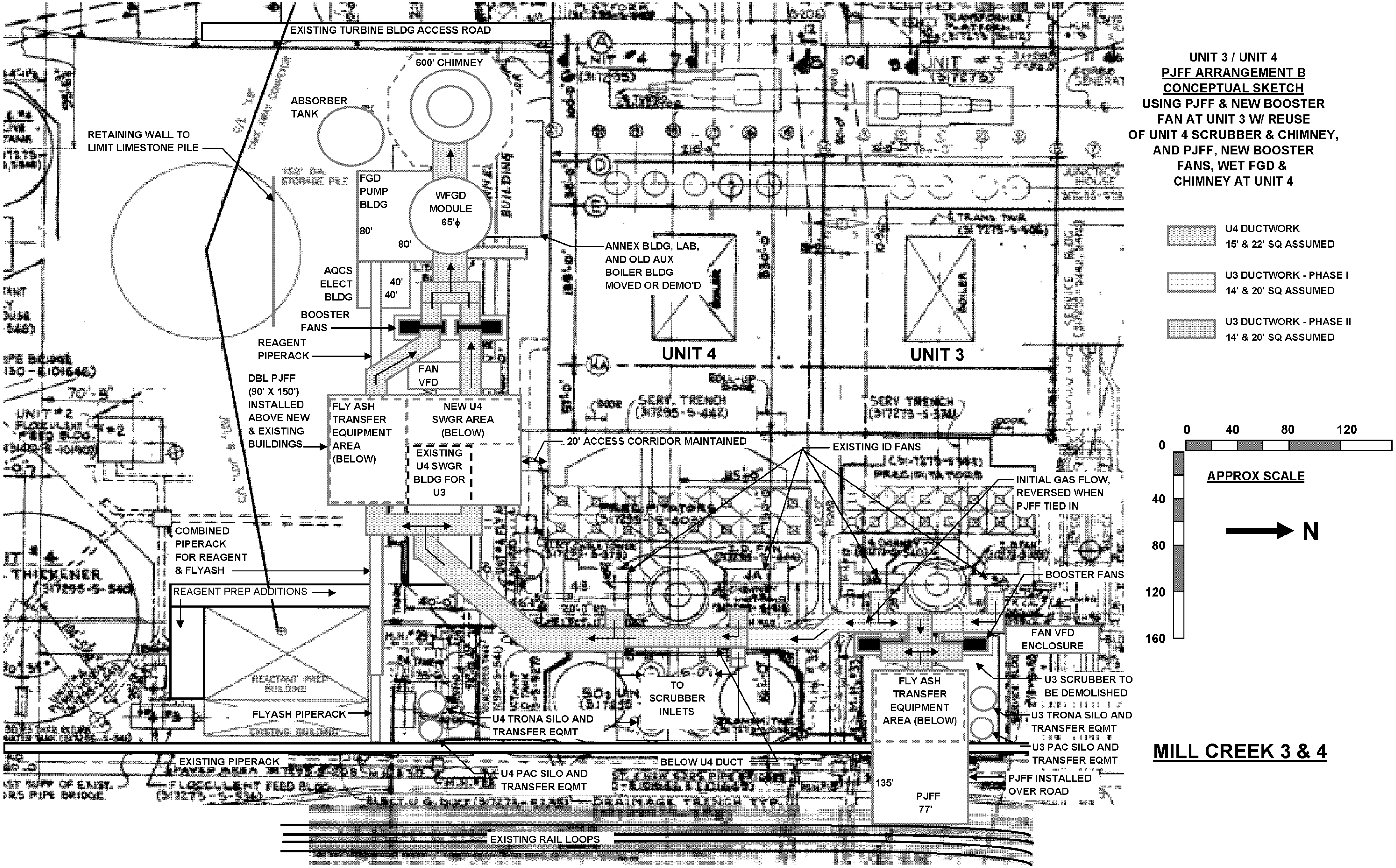
U4 DUCTWORK 17' & 22' SQ ASSUMED

U3 DUCTWORK - PHASE I 15' & 20' SQ ASSUMED

U3 DUCTWORK - PHASE II 15' & 20' SQ ASSUMED

MILL CREEK 3 & 4


UNIT 3 / UNIT 4
PJFF ARRANGEMENT A
CONCEPTUAL SKETCH
USING PJFF, NEW BOOSTER FANS, WET FGD & CHIMNEY
U4 DUCTWORK 15' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I 14' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II 14' & 20' SQ ASSUMED
EXISTING OVERHEAD T-LINE (TO BE RELOCATED)
NEW DUCTWORK TO BE ROUTED ABOVE EXISTING CONVEYOR AND PIPERACK
EXISTING THICKENER FOUNDATION (TO BE DEMO'D)
EXISTING PIPERACK (LEFT IN PLACE)
PROXIMITY OF COOLING TOWER COULD CAUSE ICING CONCERNS AT AQCS EQUIPMENT
BOOSTER FANS
FAN VFD
600' CHIMNEY
WFGD MODULE 65'ϕ
DOUBLE PJFF
90'
150
FGD PUMP BLDG
80'
ABSORBER TANK
AQCS ELECT BLDG
40'
EXISTING AMMONIA STORAGE (TO BE RELOCATED)
NEW U4 SWITCHGEAR BUILDING
FLY ASH TRANSFER EQUIPMENT BUILDING
FLY ASH PIPERACK
REAGENT PREP ADDITIONS
EXISTING U4 SWGR BLDG FOR U3 (BELOW)
UNIT 4
UNIT 3
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN PJFF TIED IN
FAN VFD ENCLOSURE
BOOSTER FANS
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
U3 SCRUBBER TO BE DEMOLISHED
U3 TRONA SILO AND TRANSFER EQMT
U3 PAC SILO AND TRANSFER EQMT
PJFF INSTALLED OVER ROAD
135'
PJFF
77'
TO SCRUBBER INLETS
U3 DUCTWORK BELOW U4 DUCT
EXISTING RAIL LOOPS
REAGENT PIPERACK
U4 PAC SILO AND TRANSFER EQMT
U4 TRONA SILO AND TRANSFER EQMT
N
APPROX SCALE
120
80
40
0
MILL CREEK 3 & 4


EXISTING TURBINE BLDG ACCESS ROAD
600' CHIMNEY
ABSORBER TANK
RETAINING WALL TO LIMIT LIMESTONE PILE
FGD PUMP BLDG
80'
80'
WFGD MODULE 65'ϕ
ANNEX BLDG, LAB, AND OLD AUX BOILER BLDG MOVED OR DEMO'D
AQCS ELECT BLDG
40'
40'
BOOSTER FANS
REAGENT PIPERACK
DBL PJFF (90' X 150') INSTALLED ABOVE NEW & EXISTING BUILDINGS
FAN VFD
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
NEW U4 SWGR AREA (BELOW)
EXISTING U4 SWGR BLDG FOR U3
20' ACCESS CORRIDOR MAINTAINED
EXISTING ID FANS
INITIAL GAS FLOW, REVERSED WHEN PJFF TIED IN
UNIT 4
UNIT 3
COMBINED PIPERACK FOR REAGENT & FLYASH
REAGENT PREP ADDITIONS
BOOSTER FANS
FAN VFD ENCLOSURE
TO SCRUBBER INLETS
FLY ASH TRANSFER EQUIPMENT AREA (BELOW)
U3 SCRUBBER TO BE DEMOLISHED
U3 TRONA SILO AND TRANSFER EQMT
U3 PAC SILO AND TRANSFER EQMT
FLYASH PIPERACK
U4 TRONA SILO AND TRANSFER EQMT
EXISTING PIPERACK
BELOW U4 DUCT
U4 PAC SILO AND TRANSFER EQMT
135'
PJFF 77'
PJFF INSTALLED OVER ROAD
EXISTING RAIL LOOPS
UNIT 3 / UNIT 4
PJFF ARRANGEMENT B
CONCEPTUAL SKETCH
USING PJFF & NEW BOOSTER FAN AT UNIT 3 W/ REUSE OF UNIT 4 SCRUBBER & CHIMNEY, AND PJFF, NEW BOOSTER FANS, WET FGD & CHIMNEY AT UNIT 4
U4 DUCTWORK 15' & 22' SQ ASSUMED
U3 DUCTWORK - PHASE I 14' & 20' SQ ASSUMED
U3 DUCTWORK - PHASE II 14' & 20' SQ ASSUMED
0
40
80
120
160
APPROX SCALE
N
MILL CREEK 3 & 4

From: Saunders, Eileen
To: Kirkland, Mike; Buckner, Mike; Didelot, Joe; Betz, Alex
CC: Craigmyle, Kenny; Moehrke, William
Sent: 11/1/2010 9:13:52 AM
Subject: FW: 168908.14.1000 100924 Mill Creek - Final Kickoff and Site Visit Meeting Minutes
Attachments: Mill Creek Kickoff and Site Walkdown Meeting Minutes - Final with Attachments.pdf

All,

I know I sent you the initial meeting minutes but I don't think I forwarded the final version to you. Please feel free to issue this information to others who attended our meeting.

Thank you,

Eileen

From: Hillman, Timothy M. [mailto:HillmanTM@bv.com]
Sent: Friday, September 24, 2010 2:17 PM
To: Saunders, Eileen
Cc: 168908 E.ON-AQC; Wehrly, M. R.; Lucas, Kyle J.; Jackson, Audrey; Hillman, Timothy M.
Subject: 168908.14.1000 100924 Mill Creek - Final Kickoff and Site Visit Meeting Minutes

Eileen,

Please find attached the final Mill Creek Kickoff meeting minutes incorporating E.ON's comments.
Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

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nothy M.
ɔtember 20, 2010 4:09 PM
ɜen'
-AQC; Crabtree, Jonathan D.; Wehrly, M. R.; Lausman, Rick L.; Mahabaleshwarkar, Anand; Hintz, Monty E.; Lucas, Kyle J.
8.14.1000 100920 Mill Creek - Draft Kickoff and Site Visit Meeting Minutes

Eileen,

Please find attached draft meeting minutes from last week's kickoff and Mill Creek site visit. Please provide E.ON's comments back to me by Friday, 9/24.

<< File: Mill Creek Kickoff and Site Walkdown Meeting Minutes with Attachments - Draft.pdf >>
Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

BLACK & VEATCH CORPORATION
CONFERENCE MEMORANDUM

E.ON US	B&V Project 168908
Phase II: Air Quality Control Study	B&V File 14.1000
Project Kick-off and Mill Creek Site Visit	September 24, 2010

A project administrative kick-off meeting and Mill Creek site visit and walk down were held September 14-16th for the Phase II: Air Quality Control Study Project. The administrative kick-off meeting was held at E.ON's Broadway Office Complex in Louisville, while the site visit and walk down were held at the Mill Creek Generating Station.

Recorded by: Tim Hillman

Attending:

Administrative Kick-off Meeting, September 14th.

Eileen Saunders	E.ON
Mike Mooney	E.ON
Mike King	B&V
Tim Hillman	B&V
M.R. Wehrly	B&V
Kyle Lucas	B&V

Mill Creek Kick-off Meeting, September 15th.

Eileen Saunders	E.ON
Mike Mooney	E.ON
Bill Moehrke	E.ON
Kenny Craigmyle	E.ON
Kevin Siers	E.ON
Michael Stevens	E.ON
Jim Nichols	E.ON
Gary Revlett	E.ON
Joe Didelot	E.ON
Scott Straight	E.ON
Mike Kirkland	LG&E
Mike Buckner	LG&E
Alex Betz	LG&E
Tim Hillman	B&V
M.R. Wehrly	B&V
Anand Mahabaleshwarkar	B&V
Kyle Lucas	B&V
Rick Lausman	B&V
Monty Hintz	B&V

The purpose of the meetings was to 1) provide an administrative kick-off of the project, 2) present the project scope and purpose of the project to Mill Creek personnel, and 3) provide for a site visit and walk down of the Mill Creek facility. The above attendance roster reflects those attending the administrative kick-off meeting in Louisville and the initial kick-off meeting at Mill Creek. The meeting agenda and attendance sign-up sheets are attached herein for reference.

MEETING DISCUSSION

Day 1, September 14, 2010

As noted in the agenda, the meetings began at 1 pm on September 14th, with an administrative meeting in the Broadway Office Complex and an initial escorted site walk down at Mill Creek with part of the B&V team. The following is an account of the administrative kick-off meeting.

1. The meeting began with introductions and distribution of the agenda.
2. B&V distributed a copy of the project scope of work contained in the contract and provided a summary of each task along with the associated deliverable.
   - It was noted that a Project Design Memorandum (Task 5) would be developed for each facility.
   - E.ON commented that the Fabric Filter Vendor Workshop scope of work may not start until after the Ghent project has been kicked-off, but likely before the Brown kick-off.
3. B&V reviewed the major milestone schedule contained in the scope of work.
   - The possibility of holding the Mill Creek Task 6, AQC Technology Selection Meeting during the second week of November in B&V offices in Kansas City was discussed. E.ON to review and make recommendation. [Action Item #1]
   - E.ON to determine dates for Ghent kick-off meeting. The milestone schedule tentatively has this schedule for the week of October 4th. [Action Item #2]
4. E.ON requested B&V provide a DVD of the Phase I report. [Action Item #3]
5. B&V distributed a draft copy of the Project Instruction Memorandum (PIM). The communication contacts and project filing system were discussed in some detail.
   - E.ON will investigate setting up a document storage file system to mimic the Documentum system proposed by B&V in the PIM. [Action item #4]
   - B&V to copy Eileen on all correspondence with the plants.
   - Copy Audrey.Jackson@eon-us.com for copy to E.ON file mailbox.
   - B&V will establish and iBackup FTP site to facilitate large file transfer. [Action item #6]
   - E.ON will determine personnel assignments for document review. [Action Item #7]
6. B&V distributed a template of a standard monthly report. E.ON approved of the basic format and data of the monthly report template.
   - In addition to the Summary of Engineering Costs contained in the standard monthly report, E.ON requested a financial engineering cost estimate at the end of each month. Copy Mike Rooney on monthly reports. [Action Item #5]
   - Monthly reports will typically be sent during the second week of the following month.
7. E.ON requested to use the same weekly telephone conference date of Monday, 2 pm EST. B&V will check for conflicts and advise. [Action item #8]

8. B&V distributed an example action item list used during the Phase I work. It was agreed to use the same format for Phase II. The action item list will be divided by facility.
9. E.ON prefers to provide document review comments in a table log format.
10. E.ON is purchasing a trailer for the Mill Creek site that may offer some additional project meeting space.
11. Eileen Saunders provided an alternate contact number for her at Ghent (502-347-4023). B&V to update PIM with contact information. [Action Item #9]
12. B&V distributed a draft data request and inventory of data/information already in B&V's possession. E.ON asked B&V to carefully scrutinize the information request so as to not request information we may already have. B&V to finalize the initial data request and inventory list and submit it to E.ON as soon as possible. [Action item #10]
13. The administrative kick-off meeting concluded at approximately 4:30 pm.

Day 2, September 15, 2010

The second day of kick-off meetings began at 9 am at Mill Creek.

14. Eileen began the meeting with introductions and a brief summary of the project scope.
15. Gary Revlett provided a presentation of the main regulatory drivers influencing the coal-fired fleet. These drivers include the new NOx and SO2 NAAQS standards, Utility MACT for hazardous air pollutants, and the proposed Clean Air Transport Rule (CATR). Gary explained that these current and pending regulations are the drivers for the Phase II work. Gary provided an updated table that can be used as the initial design basis titled "Estimated Limits & Compliance Dates for Future New Air Requirement Mill Creek Station".
16. Scott Straight addressed the meeting stating that the current company strategy does not have E.ON self-compliant (as a fleet) with NOx credits until 2016. E.ON would like to be self-compliant by 2013-2014. Scott asked the group to evaluate the possibility of accelerating the installation of SCRs on Mill Creek Units 1 and 2. This is also being considered at Ghent. (Note: Over the course of the next two days, this scenario was given consideration. A separate email correspondence addressing this issue was prepared and sent to E.ON on September 17, 2010, a copy of which is attached herein.) [Action Item #16]
17. B&V provided a presentation summary of the results of the August 5th and 6th Mill Creek AQC Screen Workshop. The presentation summarized the workshop purpose and attendees, an overview of the current plant basis, AQC technologies and options considered, and recommendations of the workshop. A copy of the workshop presentation summary slides is attached here in for reference.
    - E.ON requested B&V review the pros and cons of the NID system as part of the technology validation task. Action item #11]
18. E.ON advised that Alex Betz would be the Mill Creek plant contact for information requests.
19. E.ON will be contacting Hitachi, BPI, Foster Wheeler, and Alstom, and/or others to evaluate the status of the existing scrubbers and determine the extent they can be

refurbished. E.ON is to lead this effort with support from B&V as requested. [Action item #12] Results of the evaluation will be provided to B&V

20. If the new Unit 4 WFGD and stack requires the relocation of the ammonia storage area, it may be possible to consolidate it with the ammonia storage requirements for the new Unit 1 and 2 SCRs.
21. It may be possible to reuse Unit 4's fans on Unit 3 should the existing fans become superfluous in the new Unit 4 arrangement. It then may be possible to reuse the Unit 3 fans on Unit 1 and/or unit 2.
22. E.ON confirmed there is no "sacred ground" around the existing units, areas reserved for other uses and unavailable for use in the AQCS upgrade. B&V requested if any balance-of-plant upgrades are currently under consideration that should be taken into account in the AQCS work, beyond the plans for an additional ball mill at the limestone prep building.
23. Following lunch, E.ON and B&V personnel continue site walk down activities, concluding at approximately 5:30 pm. Some observations from this walk down are identified below.
    - Unit 4 fabric filter likely to be required to be installed above the Unit 4 scrubber electrical building.
    - Unit 3 would be tied into the current Unit 4 scrubber after the new Unit 4 FGD is built. The old Unit 3 scrubber would be torn down to allow new AQC equipment to be potentially located in that area.
    - Unit 3 and 4 structural steel was generally in good shape for lower areas that could be inspected. Higher areas of Unit 3 & 4 could not be assessed due to the large flue gas leaks in the duct that limited access for personal safety reasons.
    - Duct configuration will be complicated, but appears possible, and will depend on the specific fan arrangement and if new ID fans or booster fans will be used.

Day 3, September 16, 2010

The third and final day of meetings began at 9 am at Mill Creek.

24. B&V summarized the major findings of the walk downs for Eileen and began preparing white board sketches of the preliminary AQC control configurations discussed over the last two days in preparation for a site de-briefing scheduled for the early afternoon.
25. After a break in the morning rain, an additional walk down of Units 1 and 2 was conducted before lunch to review the structural integrity of the Unit 1 and Unit 2 steel for additional AQC equipment.
26. At 1:15 pm, B&V presented de-briefing of the site walk down findings and preliminary AQC control configurations. Two sketches were prepared for the meeting. One illustrated the preliminary AQC configuration options for Units 3 and 4, while the second sketch addressed Units 1 and 2 and the possibility of accelerating the SCR schedule. Pictures of the two white board sketches are attached here in for reference.
    - As a result of the workshop discussions, the potential for locating the Unit 4 fabric filter/NIDs unit and new scrubber, plus a new chimney, to the south of Unit 4 was

considered. The original location for the new scrubber and chimney considered was in the area of the demolished thickener south of the limestone prep building. This location, however, involved crossing the limestone conveyor with relatively high ductwork, plus moving both an overhead Unit 3 and Unit 4 345kV T-line and the ammonia tanks and electrical building to provide necessary working space for new construction.

- Alternately, it was determined that there is likely sufficient space for the new Unit 4 AQCS train directly south of Unit 4, running more or less straight east to west with the new chimney located opposite of the Unit 4 turbine building. This arrangement, if it fits, has the advantage of relatively short ductwork runs, no impact to the overhead T-line, and no impact to the existing ammonia tank farm. It would, however, require relocation of the existing annex building and lab, plus limit construction access to one side of the train. B&V will continue evaluation of this arrangement as first choice for Unit 4, with the thickener area location used as a fall-back alternate.
- Should either of the above arrangements fit, it appeared that it would be advantageous to upgrade the existing Unit 4 scrubber in place and reuse it for Unit 3. The flue gas from Unit 3 would be rerouted to the Unit 4 scrubber in the short term (Phase I) and the Unit 3 scrubber demo'd. A new Unit 3 fabric filter/NIDs unit could be built in its place and tied into the Unit 3 ductwork as Phase II of a two phase construction sequence at Unit 3.
- Both Unit 1 and Unit 2 offer significant challenges in the addition of an SCR as an immediate modification (refer to Sep 17th email, attached herein for reference). The existing ESP at both units is located within a few feet of the boiler structure, leaving insufficient room to route ductwork to a new SCR overhead of the ESP. The ESP would have to be demolished or extensively modified before the SCR could be constructed, resulting in either an extended outage while the ESP is moved or reconstructed or the installation of a separate new ESP in another location prior to installation of the SCR. In addition, area available for new structures for either Units 1 or 2 is very limited, by the narrow alleyway between Units 1 and 3 for Unit 1 and by the new RO facility north of the powerblock at Unit 2. No obvious arrangement for the AQCS upgrades at Units 1 and 2 were immediately noted, and additional investigation will be required.

27. B&V commented on the poor condition of the structural steel at the existing scrubbers, especially at Units 1 and 2. Relatively isolated examples of steel corrosion, most likely due to exposure to flue gas, were noted in the superstructures at the Unit 3 and 4 scrubbers. However, severe corrosion and loss of structural mass was noted in a significant number of areas at Units 1 and 2. The most severe damage noted was in lighter components, such as platform and grating, but instances of chemical attack on the major structural steel members were also noted on Units 1 and 2. E.ON agreed to provide the results of recent studies assessing the structural steel. [Action Item #13]
28. New AQC will likely restrict vehicle and maintenance access in some areas of the facility. E.ON agreed to provide the minimum access dimensions for use in the analysis. [Action Item #14]
29. E.ON noted that the existing Unit 4 AQCS (ESP and scrubber) were powered by the Unit 4 aux power supply. Should the Unit 4 scrubber be reused for Unit 3, an alternate source of aux power for the refurbished equipment must be included. Otherwise, an outage on Unit 4 would result in the loss of AQCS for Unit 3.

30. E.ON noted that no aux power supply greater than 4160V is currently available in the immediate plant area. However, there are spare cubicles which might be able to be modified to accept feeder breakers as potential sources of medium voltage power for new loads such as fans in the AQCS upgrade. E.ON also noted that B&V Ann Arbor completed a short circuit study for the plant in the 1990's. B&V to review this study. [Action item #15]

31. The meeting concluded at approximately 3 pm.

ACTION ITEMS

#	Description	Responsible	Due Date
1	Determine location for Mill Creek Task 6 Technology Selection meeting during 2nd wk of November	E.ON	10/15/10
2	Determine dates for Ghent kick-off meeting	E.ON	9/23/10
3	Provide DVD copy of Phase I Report	B&V	9/24/10
4	Use B&V file system to set up E.ON document storage	E.ON	TBD
5	Provide engineering cost estimate at end of each month and copy Mike Rooney on monthly reports	B&V	End of Month
6	Create IBackup FTP site for large file transfer	B&V	9/24/10
7	Determine personnel assignments for document review	E.ON	TBD
8	Determine if a Monday, 2 pm EST project conference call time will work for B&V project team	B&V	9/23/10
9	Update PIM with Eileen's Ghent contact information	B&V	9/24/10
10	Prepare data inventory and information request	B&V	9/24/10
11	Evaluate pros and cons of NID system for November technology validation presentation	B&V	Nov 2010
12	Schedule vendors for evaluation of existing scrubbers	E.ON	TBD
13	Provide structural steel study assessments	E.ON	9/24/10
14	Provide minimum access dimension box	E.ON	9/24/10
15	Review B&V electrical study conducted in the 1990s	B&V	9/24/10
16	Evaluate the possibility of accelerating the installation of SCRs on Mill Creek Units 1 and 2	E.ON and B&V	TBD

ATTACHMENTS

- Agenda
- Attendance roster
- B&V email of September 17, 2010 addressing the acceleration of the SCR installation schedule for Mill Creek Units 1 and 2.
- August 5th and 6th Mill Creek AQC Workshop Summary Presentation.
- Pictures of the September 16, 2010 white board sketches from the de-brief meeting.

cc: All Attendees
File

AGENDA

Phase II Air Quality Control Study – Kickoff Meeting and Site Visit
E.ON - Mill Creek Station
September 14 - 16, 2010
Location: E.ON Broadway Office Complex and Mill Creek

Day 1, September 14th, Arrive 1 pm (Broadway Office Complex)

I. Introductions
II. Review Project Scope
III. Review Project Schedule
IV. Review Project Deliverables
V. Project Administration
    a. Communication
    b. File System
    c. Monthly Reports
    d. Weekly Conference Calls/Action Item List
    e. Invoicing
VI. Project Documentation
VII. Information Request

Day 1, September 14th, Arrive 1 pm (Mill Creek)

I. Arrive on Site and Introductions
II. Begin Initial Escorted Site Walk Down

Day 2, September 15th, Arrive 8 am (Mill Creek)

I. Introductions
II. Environmental Drivers Presentation (E.ON – Gary R.)
III. Aug 5-6th AQC Workshop Results Presentation (B&V – Rick L and Anand M.)
IV. Lunch (on site)
V. Continue Escorted Site Walk Down and Data Collection

Day 3, September 16th, Arrive 8 am (Mill Creek)

I. Continue Escorted Site Walk Down and Data Collection
II. Lunch (off site)
III. Site Debriefing Meeting
IV. Depart (no later than 4 pm)

Eon AQC Mill Creek 1pm - 4:30p. 9/14/10

Admin Kick-off Meeting

Kyle Lucas	913-458-9062	lucaskj@bv.com
M.R. WEHRLY	913-458-7131	wehrlymr.com
Mike Mooney	502-627-3671	mike.mooney@eon-us.com
Eileen Saunders	502-627-2431	eileen.saunders@eon-us.com
MIKE KING	313 618-8657	kingml@bv.com
Tim Hillman	913-458-7928	hillmantm@bv.com.

EON AQC Mill Creek Plant Kickoff 9/15/10
9am - 11:30

Kyle Lucas	B&V	913-458-9062 lucaskj@bv.com	Asst PM / EON MNG
Rick Lausman	B&V	913 458 7528 LAUSMANRL@BV.COM	AQC Eng
Mike Mooney	EON	mike.mooney@eon-us.com 502-627-3671	Budget Analyst
Bill Moehrke		william.moehrke@eon-us.com 502-627-6369	Project Coord.
Tim Hillman	B&V	913-458-7928 hillmantm@bv.com	B&V PM
Monty Hintz	B&V	913-458-2464 hintzme@bv.com	B&V civil/struct
M.R. Wehrly	B&V	913 458-7131 wehrlymr@bv.com	B&V Eng. Mgr.
Kevin Siers	EON-US	502-817-3545	Production Leader
Michael Stevens	EON-US	502-933-6518	Production Supv / Comp.
Jim Nichols	EON-US	502-933-6643	Prod Supv.
Mike Buckner	LG&E	502-933-6515	Production Manager
Mike Kirkland	LG&E	502-933-6565	General Manager
Kenny Craigmyle	EON	502-627-6366	Project Coordinator
Eileen Saunders	EON	502-627-2431	MGR, Major Capital Project
Gary Revlett	EON	502-627-4621	MGR, Environmental Affairs
Joe Didelot	EON	502-933-6559	MGR, MAINT. MC
Scott Straight	"	" 627-2701	Director - PE
Alex Betz	LG&E	502-933-6602	Mech. Eng., Mill Creek
Anand Mahabaleshwarkar	B&V	913 458 7736	AQC Section Lead

Hillman, Timothy M.

From: Hillman, Timothy M.
Sent: Friday, September 17, 2010 12:01 PM
To: 'Saunders, Eileen'
Cc: Lausman, Rick L.; Lucas, Kyle J.; Mahabaleshwarkar, Anand; Wehrly, M. R.; Hintz, Monty E.
Subject: 168908.14.1000 100917 Mill Creek - Acceleration of MC 1 and 2 SCR Installation

Eileen,

Anand and the rest of the team combined notes in this email to present both a high level and somewhat detailed summary of the issues surrounding Scott's inquiry about accelerating the installation schedule of SCRs at Mill Creek Units 1 and 2. Hopefully this will assist you in the pending management decision process.

Thanks for all you planning and organization this week. I thought the meetings and site walk downs were very helpful and meaningful.

Tim.

Summary

The most direct path of accelerating the installation of SCRs on Units 1 and 2 would be to construct the new SCRs with the existing ESPs in place. Unfortunately, this is hampered by the close proximity of the existing dry ESPs to the boilers. As a result, there is no room to route ductwork to and from the new SCRs. Therefore, any acceleration of Unit 1 and 2's new SCR schedule would likely require the original Phase 1 approach of building a new ESP and/or PJFF/NID *first*, in order that the existing ESP could be demolished to make room for the new SCR and ductwork.

Details and Basis

Available SCR Options for MC 1 & 2:

Option 1. High-dust SCR located above the existing dry ESP
Option 2. High-dust SCR located at new location with new air heater placed directly under the new SCR reactor
Option 3. Tail-end, low-dust SCR located on new ground downstream of existing ESP, with flue gas reheat

Challenges Presented by the Economizer Outlet and the Close Proximity of the Existing Dry ESP:

- For SCR Options 1 and 2, the economizer outlet duct would need to be routed eastwards out of the boiler building through the east boiler building wall to flow the flue gas to the SCR reactor inlet, located either per Option 1 or 2. The arrangement of the existing dry ESP, located to the east and at approximately same elevation as the economizer outlet duct, along with its close proximity to the boiler building wall, are all preventing the routing of new SCR inlet duct towards the east direction. Similarly, due to presence of boiler support steel inside the boiler building, it is nearly impossible to route the ductwork out to either the north or south side.
- Also, for Option 1, the new SCR outlet duct needs to be connected back to the existing air heater, which is located directly underneath the economizer. This creates additional congestion in the same area and presents ductwork support challenges with the current boiler steel. On the other hand, for Option 2, it is possible to install a new air heater underneath the new SCR reactor at another location and connect the flue gas stream to the new dry ESP and/or PJFF/NID. However, the routing of the SCR inlet ductwork out of the boiler building for Option 2 still faces the same challenges as Option 1.
- The tail-end, low-dust SCR (Option 3) will increase the capital and O&M cost due to the need for flue gas reheating and another air heater to maintain the SCR operating temperature. Therefore, Option 3 is not considered feasible in this preliminary review.

Solutions to above challenges:

- For SCR Options 1 and 2, routing of the new SCR ductwork makes the demolition of the existing dry ESPs inevitable.

Therefore, in order to create room for a new SCR, a new dry ESP and/or PJFF/NID system will need to be installed first, while the units are online. Once the new dry ESP and/or PJFF/NID system is installed and operating, the existing dry ESP can be demolished to create room for the new SCR. The ID fan and or booster fan requirements can also be finalized based on the BOP challenges, including aux power availability.

- Option 3 is believed to be capital and O&M cost intensive, and is therefore not considered feasible in this preliminary review.

Regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

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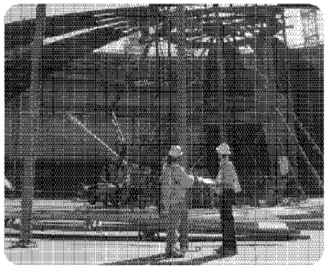
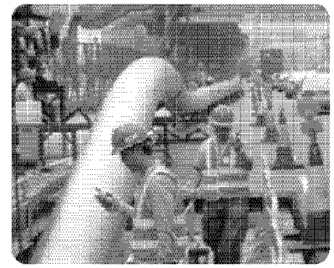
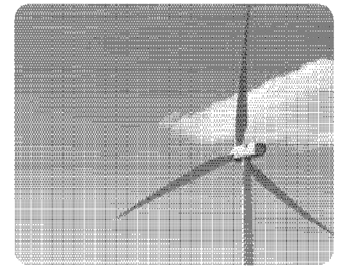


Alternative FGD Technology Workshop Review

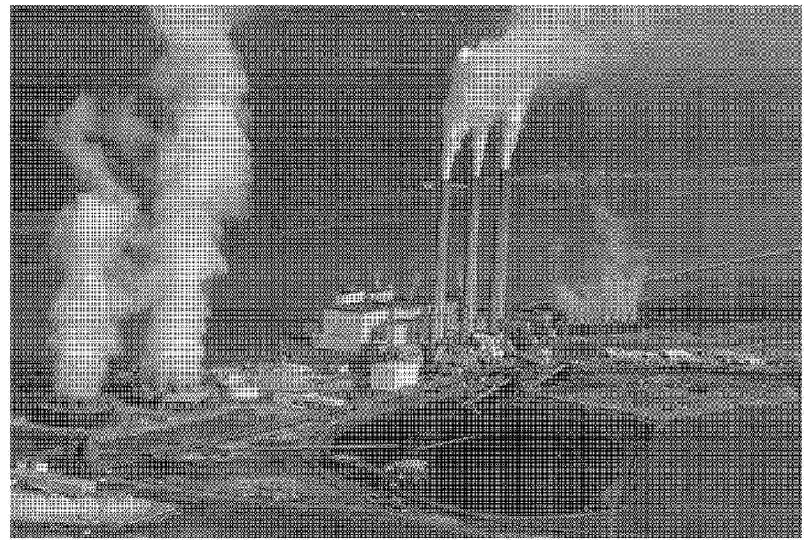
e·on | U.S.

Black & Veatch

September 2010

Agenda

- Drivers
- Overview workshop
- Current plant basis
- Technologies and options discussed
- Recommendations of workshop



Regulatory drivers – still uncertainty

Program Name	Regulated Pollutants	Forecasted Date for Compliance
BART	SAM (MC3 Only)	Within 6 months of final Title V
1-hour NAAQS for NO_x	NO_x	2015 -2017
1-hour NAAQS for SO_2	SO_2	2016
Clean Air Transport Rule	NO_x SO_2	Beginning in 2012 Phase in 2014
New EGU MACT	Mercury Acids (HCl) Metals (PM) Metals (AS) Organics (CO) Dioxin/Furan	Estimated January, 2015; with 1-yr extension - January, 2016

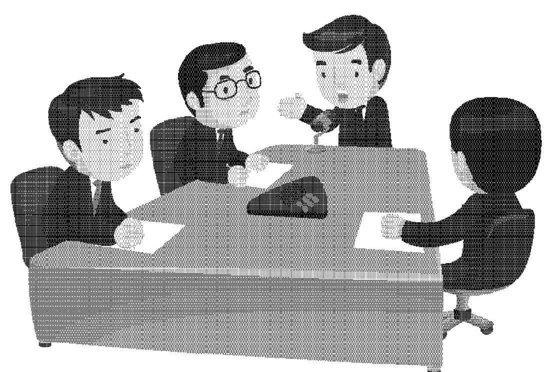
Workshop attendees

E.ON US

Scott Straight	Dir. Proj. Engineering
Phillip Imber	Sr. Chem. Engineer
Ronald Gregory	Mgr Major Projects
Gary Revlett	Mgr Air Section & Environmental Affairs
Mike Kirkland	Mill Creek Plant Manager

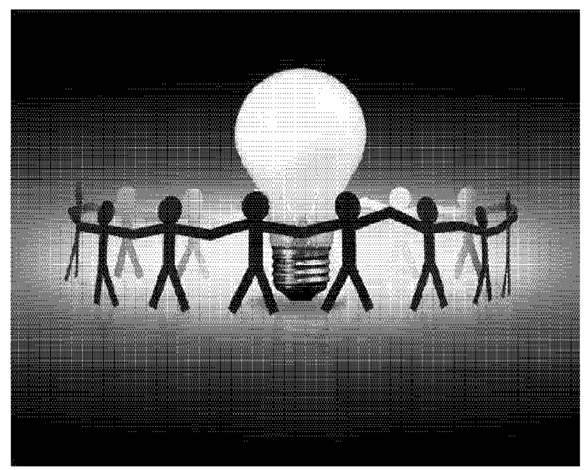
Black & Veatch

Tim Hillman	Project Manager
Mike Ballard	Construction
Anand Mahabaleshwarkar	AQCS
Rick Lausman	AQCS

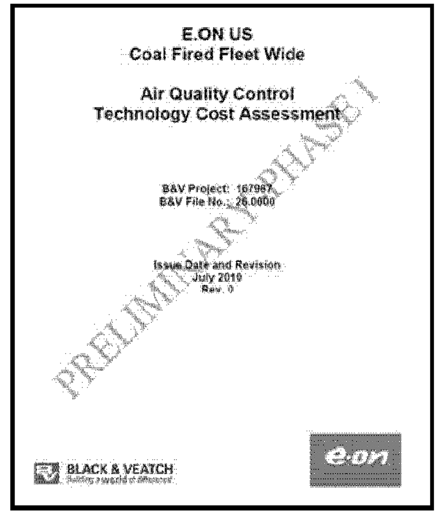


Workshop purpose

- Review Phase 1 B&V evaluation
- Review current plant constraints
- Brainstorm potential for lower cost yet effective alternatives



Phase 1 B&V evaluation


E.ON US
Coal Fired Fleet Wide

Air Quality Control
Technology Cost Assessment

B&V Project: 167967
B&V File No.: 26.0000

Issue Date and Revision
July 2010
Rev. 0

PRELIMINARY PHASE 1

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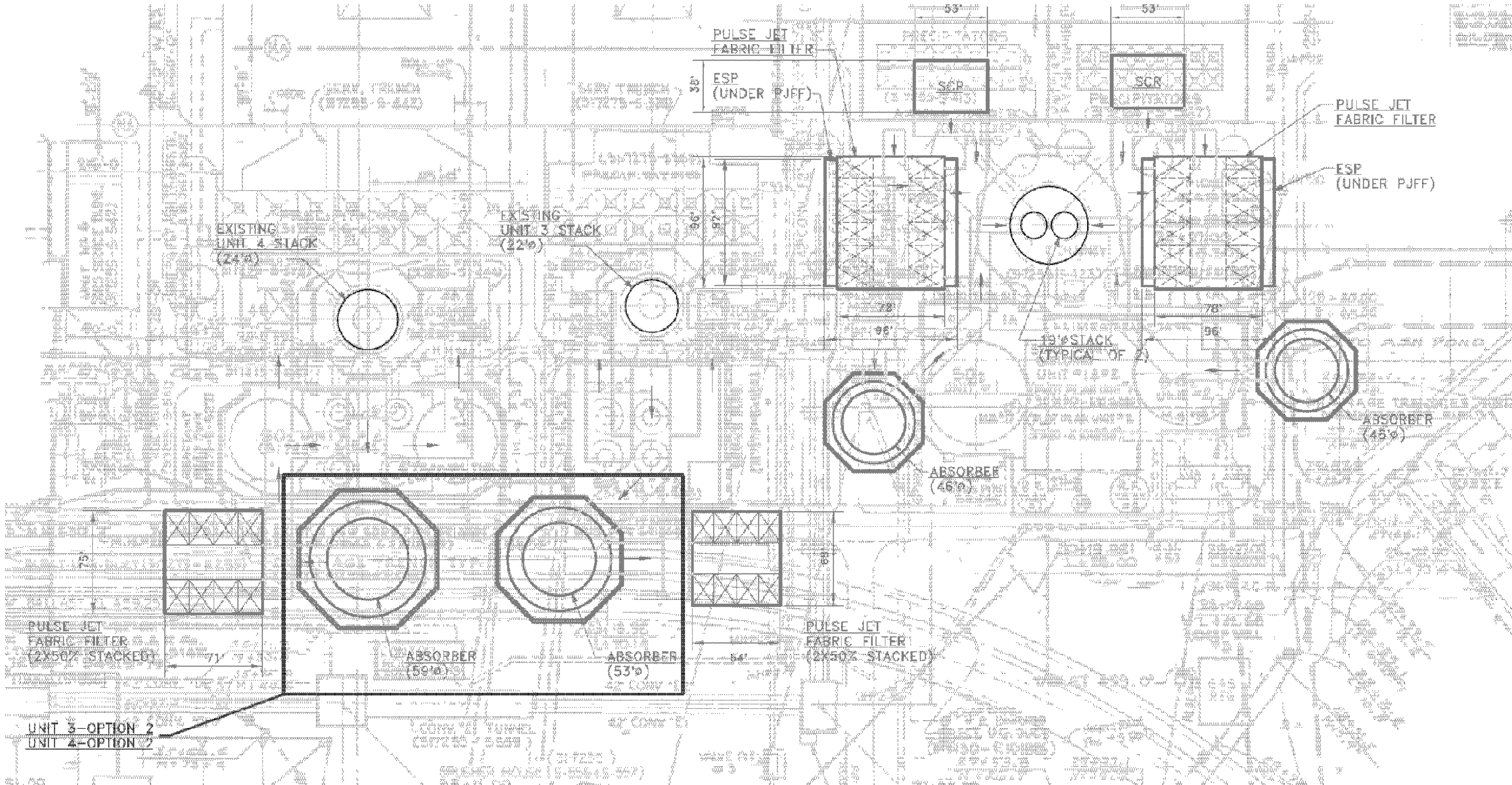
- Fleet wide review
- Screen technologies
- Conceptual design
- Limited time constraints
- New wet FGD and fabric filters for each Mill Creek unit

Mill Creek phase 1 potential layout - example



Current conditions and future targets

Unit	MW	Current Emissions lb/MBtu	Current Removal %	Future Removal %
1	330	0.48	92	96
2	330	0.48	92	96
3	425	0.36	86	96
4	525	0.12	92	98
Plant	1610	0.36		
Plant	Targets	0.25 lb/MBtu		96%

Uncontrolled SO2 Emissions 6.2 lb/MBtu

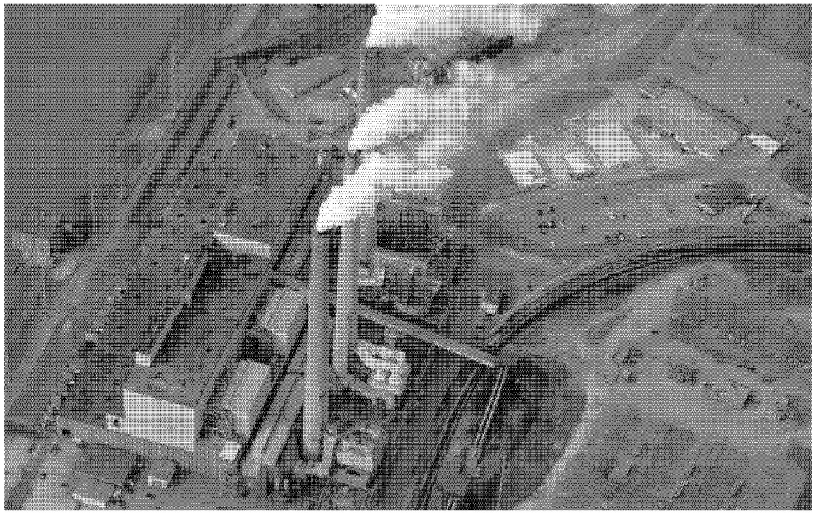
HAPS Issues

- E.ON.US emissions tests are just being finished
- Hg controls are expected for MC units
- Acid gases are likely acceptable
- Uncertainty if plant-wide averaging for Hg will be available
- Speciated metal emissions are also low at MC units

Hg

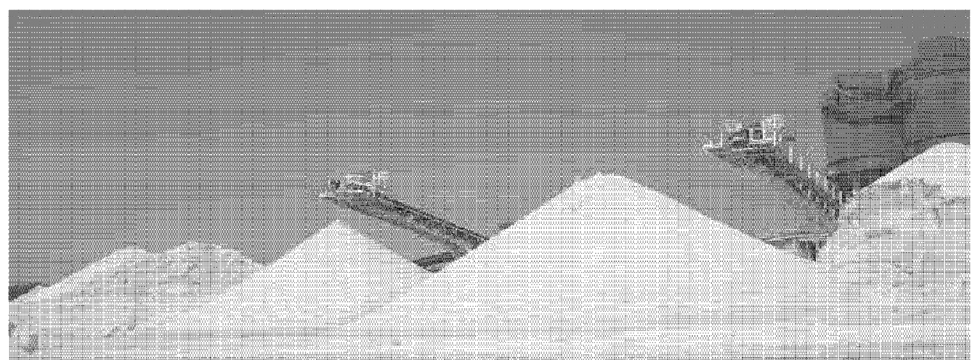
Site specific criteria

- Existing wet FGD
- Condition of FGD and structural steel
- Dewatering system and material handling in place
- Limestone grinding issues
- High sulfur fuel
- Fly ash sale requirement
- Mercury control
- Available space
- …….Other ……..



Byproduct Issues

- Mill Creek needs to be able to sell ash due to landfill limitations
- Water emission issues and future limitations may be an issue
- Wastewater stream is currently going to ash ponds



Current FGD conditions

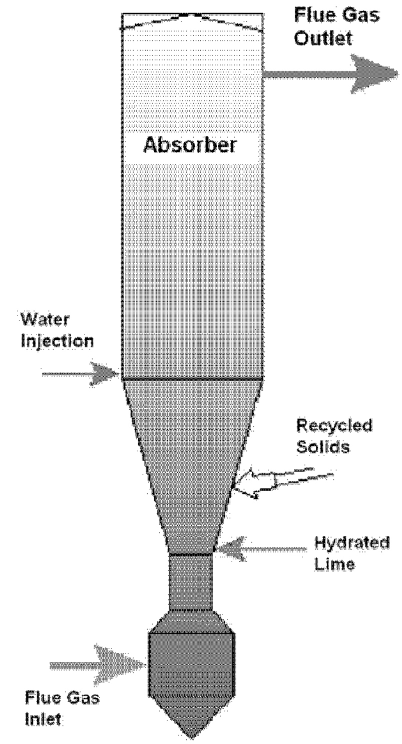
- All scrubbers are basically in a constant rebuilding mode
- Scrubbers are good for another 20 years structurally speaking
- MC1 and MC2 had trays added in 2002 which are now wearing thin
- Top of modules need to be placed
- MC1 and MC2 all duct work has been replaced that wasn't replaced during the wet stack conversion
- Pumps conditions are acceptable with some on MC 1 and MC2 previously replaced

Current FGD conditions - continued

- MC3 and MC4 FGD had trays added in 2000
- MC4 top of modules and duct work needs to be replaced
- MC4 contact trays need replacement
- MC3 scrubber structure is good, although mixing is poor
- MC3 has underground reaction tanks and recycle pumps which cause maintenance and reliability issues.

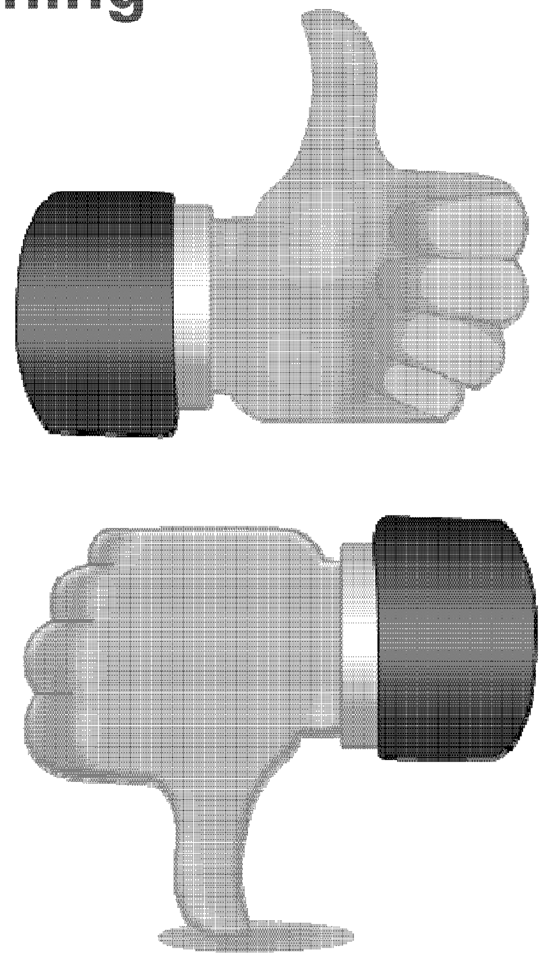
Technology review

- Semi-dry FGD
  - Provides acid gas control (SO_3)
  - Limits waste water production
  - High sulfur fuel is an issue
  - Reagent costs
  - Different technologies provide different advantages - NIDS vs CDS



Factors for upgrading or abandoning existing FGD

- Expected life of unit
- Improvement level required
- Condition of existing FGD
- Space considerations
- Cost comparison to new FGD
- Technical or physical limitations
- Orphaned components



Preliminary workshop results

- Build a new WFGD for MC4
- Upgrade MC4's existing WFGD and use it for MC3
- Upgrade MC1 and MC2's existing WFGDs
- Add fabric filters to all four units
- Add PAC for Hg control
- Add duct injection systems for SO_3 control.
- As an alternative to the fabric filter, add NID system

Workshop results

Planned Future

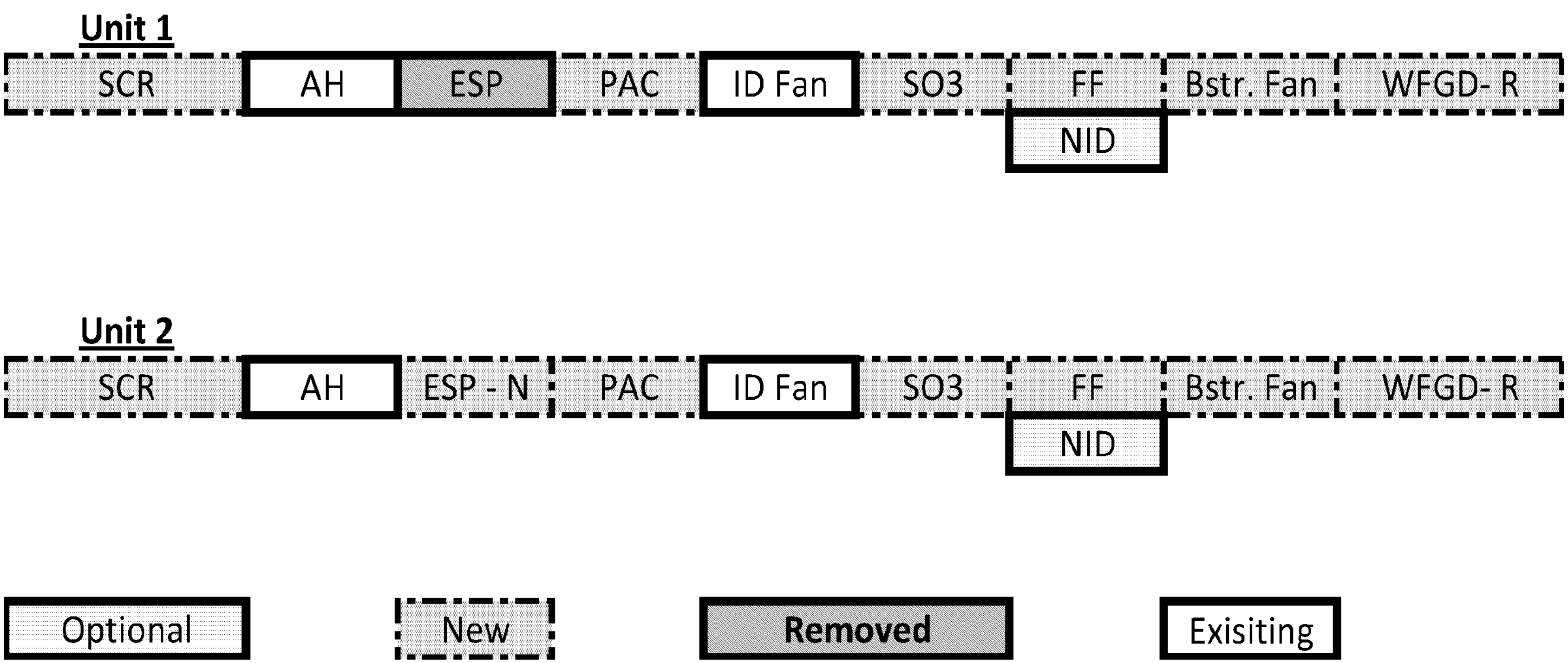
Unit No.	Technology	Schedule Priority
1	FGD upgrade	1
2	FGD upgrade	4
3	Unit 4 FGD with modification	3
4	New FGD	2

Workshop results

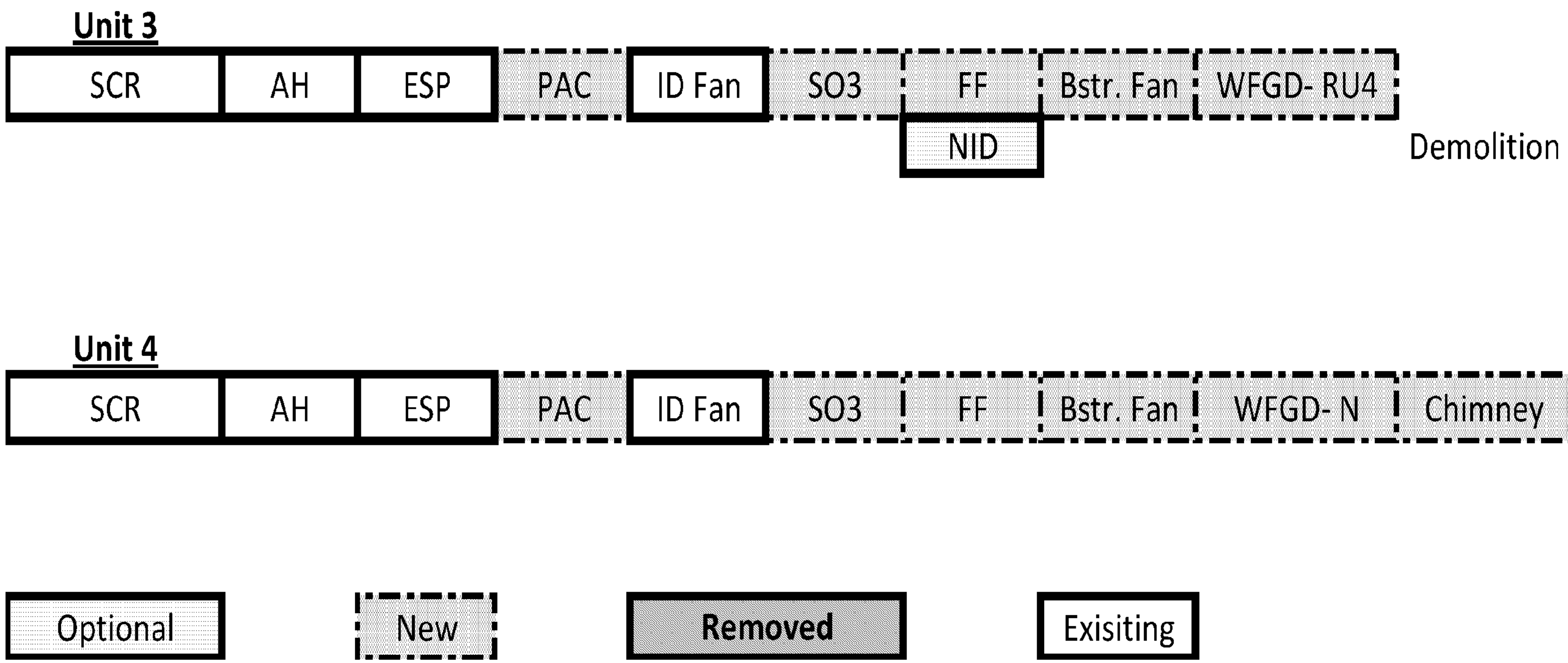
Preliminary Schedule

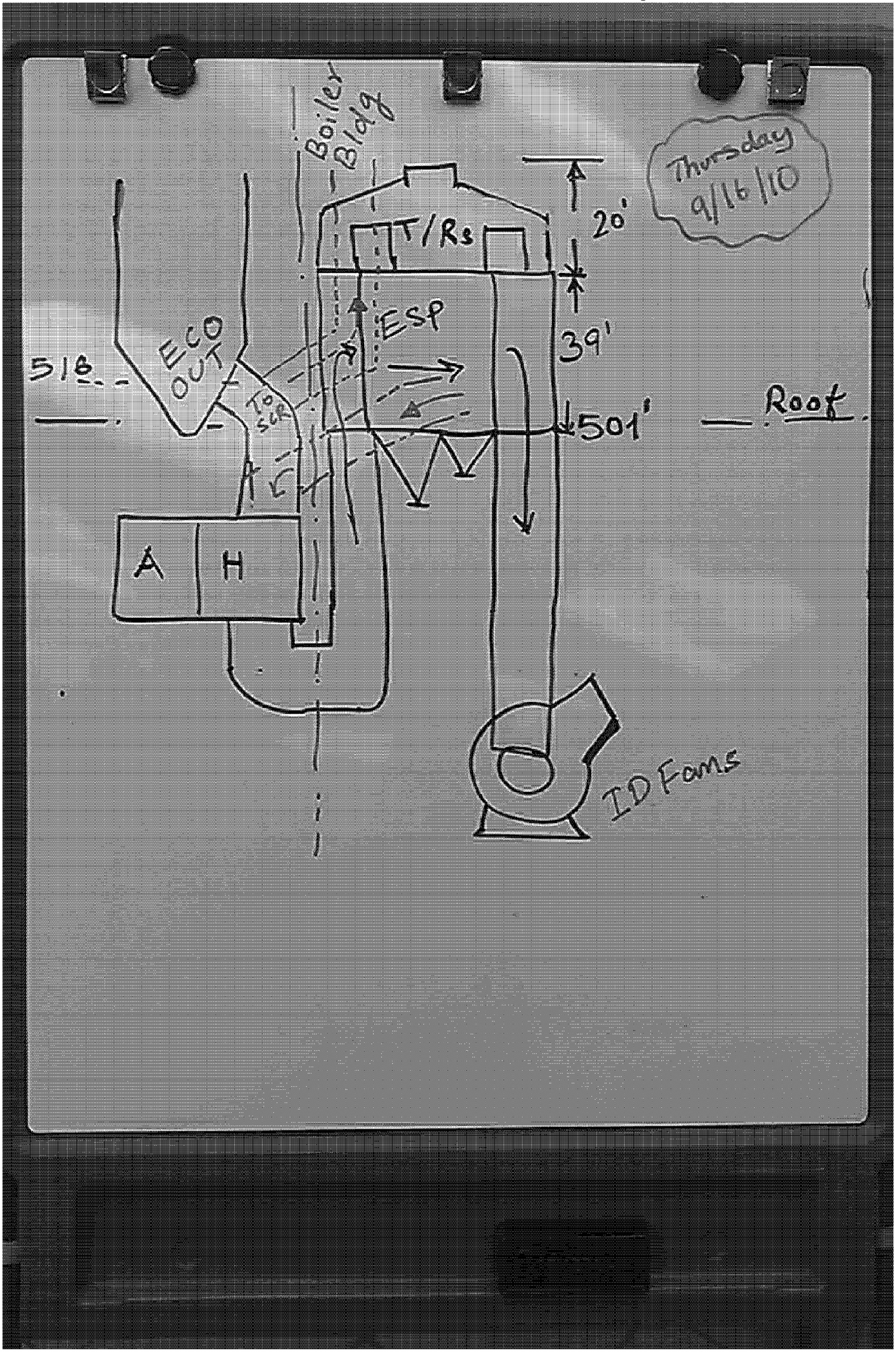
Unit	FGD	FF	SCR	Fans	Chimney	FF Location
1	2012	2014	2016	2014	Existing	In road
2	2013 or 4th - 2013	2013	2015	2013	Existing	To open area north
3	1st Qtr 2014	Apr 2015		2015	Existing	Road with fans in Unit 3 FGD area
4	4th - 2013	4th - 2013	Relocate NH3	2013	Likely New	South side of plant

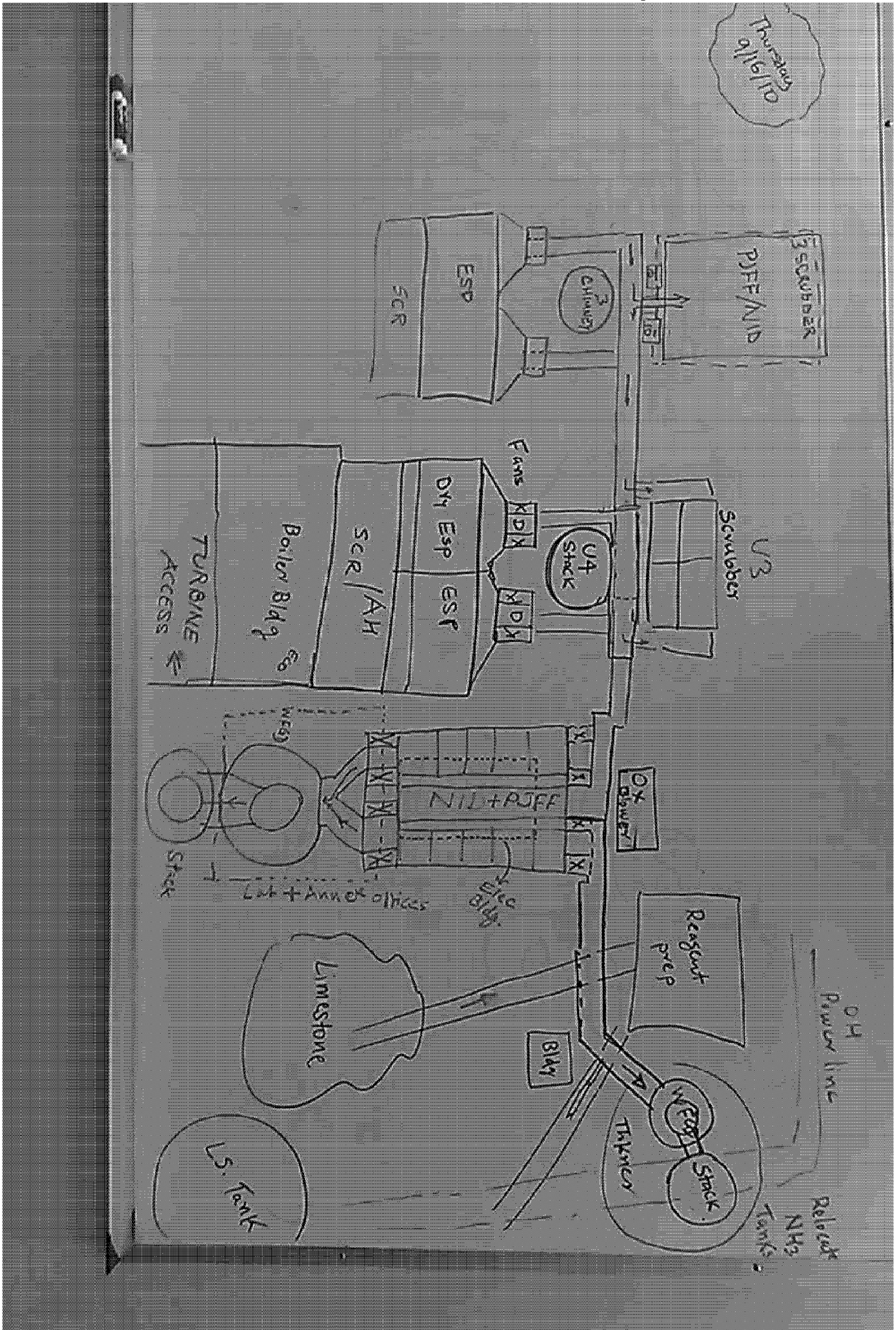
Proposed equipment lineups- Unit 1 & 2



Proposed equipment lineups- Unit 3 & 4




Boiler Bldg
Thursday 9/16/10
T/Rs
20'
ESP
39'
ECO OUT
518
To SCR
Roof
501'
A
H
ID Fans


Thursday 9/16/10
3 scrubber
ESP
SCR
3 chimney
Fans
Dry ESP
ESP
SCR/AH
Boiler Bldg
TURBINE ACCESS
U4 Stack
U3 Scrubber
NID+PJFF
Ox blower
Stack
Lab + Annex offices
Elec Bldg.
Reagent prep
Limestone
Bldg
OH Power line
WFGD
Stack
L.S. Tank
Relocate NH3 Tanks

From:	Saunders, Eileen
To:	Inman, David
Sent:	11/1/2010 9:14:26 AM
Subject:	FW: 168908.14.1000 100924 Mill Creek - Final Kickoff and Site Visit Meeting Minutes
Attachments:	Mill Creek Kickoff and Site Walkdown Meeting Minutes - Final with Attachments.pdf

David,

You may want to make a color copy of this document as well to give to Scott.

Thanks,

Eileen

From: Hillman, Timothy M. [mailto:HillmanTM@bv.com]
Sent: Friday, September 24, 2010 2:17 PM
To: Saunders, Eileen
Cc: 168908 E.ON-AQC; Wehrly, M. R.; Lucas, Kyle J.; Jackson, Audrey; Hillman, Timothy M.
Subject: 168908.14.1000 100924 Mill Creek - Final Kickoff and Site Visit Meeting Minutes

Eileen,

Please find attached the final Mill Creek Kickoff meeting minutes incorporating E.ON's comments.
Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

nothy M.
ptember 20, 2010 4:09 PM
een'
-AQC; Crabtree, Jonathan D.; Wehrly, M. R.; Lausman, Rick L.; Mahabaleshwarkar, Anand; Hintz, Monty E.; Lucas, Kyle J.
8.14.1000 100920 Mill Creek - Draft Kickoff and Site Visit Meeting Minutes

Eileen,

Please find attached draft meeting minutes from last week's kickoff and Mill Creek site visit. Please provide E.ON's comments back to me by Friday, 9/24.

<< File: Mill Creek Kickoff and Site Walkdown Meeting Minutes with Attachments - Draft.pdf >>
Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

BLACK & VEATCH CORPORATION
CONFERENCE MEMORANDUM

E.ON US	B&V Project 168908
Phase II: Air Quality Control Study	B&V File 14.1000
Project Kick-off and Mill Creek Site Visit	September 24, 2010

A project administrative kick-off meeting and Mill Creek site visit and walk down were held September 14-16th for the Phase II: Air Quality Control Study Project. The administrative kick-off meeting was held at E.ON's Broadway Office Complex in Louisville, while the site visit and walk down were held at the Mill Creek Generating Station.

Recorded by: Tim Hillman

Attending:

Administrative Kick-off Meeting, September 14th.

Eileen Saunders	E.ON
Mike Mooney	E.ON
Mike King	B&V
Tim Hillman	B&V
M.R. Wehrly	B&V
Kyle Lucas	B&V

Mill Creek Kick-off Meeting, September 15th.

Eileen Saunders	E.ON
Mike Mooney	E.ON
Bill Moehrke	E.ON
Kenny Craigmyle	E.ON
Kevin Siers	E.ON
Michael Stevens	E.ON
Jim Nichols	E.ON
Gary Revlett	E.ON
Joe Didelot	E.ON
Scott Straight	E.ON
Mike Kirkland	LG&E
Mike Buckner	LG&E
Alex Betz	LG&E
Tim Hillman	B&V
M.R. Wehrly	B&V
Anand Mahabaleshwarkar	B&V
Kyle Lucas	B&V
Rick Lausman	B&V
Monty Hintz	B&V

The purpose of the meetings was to 1) provide an administrative kick-off of the project, 2) present the project scope and purpose of the project to Mill Creek personnel, and 3) provide for a site visit and walk down of the Mill Creek facility. The above attendance roster reflects those attending the administrative kick-off meeting in Louisville and the initial kick-off meeting at Mill Creek. The meeting agenda and attendance sign-up sheets are attached herein for reference.

MEETING DISCUSSION

Day 1, September 14, 2010

As noted in the agenda, the meetings began at 1 pm on September 14th, with an administrative meeting in the Broadway Office Complex and an initial escorted site walk down at Mill Creek with part of the B&V team. The following is an account of the administrative kick-off meeting.

1. The meeting began with introductions and distribution of the agenda.
2. B&V distributed a copy of the project scope of work contained in the contract and provided a summary of each task along with the associated deliverable.
    - It was noted that a Project Design Memorandum (Task 5) would be developed for each facility.
    - E.ON commented that the Fabric Filter Vendor Workshop scope of work may not start until after the Ghent project has been kicked-off, but likely before the Brown kick-off.
3. B&V reviewed the major milestone schedule contained in the scope of work.
    - The possibility of holding the Mill Creek Task 6, AQC Technology Selection Meeting during the second week of November in B&V offices in Kansas City was discussed. E.ON to review and make recommendation. [Action Item #1]
    - E.ON to determine dates for Ghent kick-off meeting. The milestone schedule tentatively has this schedule for the week of October 4th. [Action Item #2]
4. E.ON requested B&V provide a DVD of the Phase I report. [Action Item #3]
5. B&V distributed a draft copy of the Project Instruction Memorandum (PIM). The communication contacts and project filing system were discussed in some detail.
    - E.ON will investigate setting up a document storage file system to mimic the Documentum system proposed by B&V in the PIM. [Action item #4]
    - B&V to copy Eileen on all correspondence with the plants.
    - Copy Audrey.Jackson@eon-us.com for copy to E.ON file mailbox.
    - B&V will establish and iBackup FTP site to facilitate large file transfer. [Action item #6]
    - E.ON will determine personnel assignments for document review. [Action Item #7]
6. B&V distributed a template of a standard monthly report. E.ON approved of the basic format and data of the monthly report template.
    - In addition to the Summary of Engineering Costs contained in the standard monthly report, E.ON requested a financial engineering cost estimate at the end of each month. Copy Mike Rooney on monthly reports. [Action Item #5]
    - Monthly reports will typically be sent during the second week of the following month.
7. E.ON requested to use the same weekly telephone conference date of Monday, 2 pm EST. B&V will check for conflicts and advise. [Action item #8]

8. B&V distributed an example action item list used during the Phase I work. It was agreed to use the same format for Phase II. The action item list will be divided by facility.
9. E.ON prefers to provide document review comments in a table log format.
10. E.ON is purchasing a trailer for the Mill Creek site that may offer some additional project meeting space.
11. Eileen Saunders provided an alternate contact number for her at Ghent (502-347-4023). B&V to update PIM with contact information. [Action Item #9]
12. B&V distributed a draft data request and inventory of data/information already in B&V's possession. E.ON asked B&V to carefully scrutinize the information request so as to not request information we may already have. B&V to finalize the initial data request and inventory list and submit it to E.ON as soon as possible. [Action item #10]
13. The administrative kick-off meeting concluded at approximately 4:30 pm.

Day 2, September 15, 2010

The second day of kick-off meetings began at 9 am at Mill Creek.

14. Eileen began the meeting with introductions and a brief summary of the project scope.
15. Gary Revlett provided a presentation of the main regulatory drivers influencing the coal-fired fleet. These drivers include the new NOx and SO2 NAAQS standards, Utility MACT for hazardous air pollutants, and the proposed Clean Air Transport Rule (CATR). Gary explained that these current and pending regulations are the drivers for the Phase II work. Gary provided an updated table that can be used as the initial design basis titled "Estimated Limits & Compliance Dates for Future New Air Requirement Mill Creek Station".
16. Scott Straight addressed the meeting stating that the current company strategy does not have E.ON self-compliant (as a fleet) with NOx credits until 2016. E.ON would like to be self-compliant by 2013-2014. Scott asked the group to evaluate the possibility of accelerating the installation of SCRs on Mill Creek Units 1 and 2. This is also being considered at Ghent. (Note: Over the course of the next two days, this scenario was given consideration. A separate email correspondence addressing this issue was prepared and sent to E.ON on September 17, 2010, a copy of which is attached herein.) [Action Item #16]
17. B&V provided a presentation summary of the results of the August 5th and 6th Mill Creek AQC Screen Workshop. The presentation summarized the workshop purpose and attendees, an overview of the current plant basis, AQC technologies and options considered, and recommendations of the workshop. A copy of the workshop presentation summary slides is attached here in for reference.
    - E.ON requested B&V review the pros and cons of the NID system as part of the technology validation task. Action item #11]
18. E.ON advised that Alex Betz would be the Mill Creek plant contact for information requests.
19. E.ON will be contacting Hitachi, BPI, Foster Wheeler, and Alstom, and/or others to evaluate the status of the existing scrubbers and determine the extent they can be

refurbished. E.ON is to lead this effort with support from B&V as requested. [Action item #12] Results of the evaluation will be provided to B&V

20. If the new Unit 4 WFGD and stack requires the relocation of the ammonia storage area, it may be possible to consolidate it with the ammonia storage requirements for the new Unit 1 and 2 SCRs.
21. It may be possible to reuse Unit 4's fans on Unit 3 should the existing fans become superfluous in the new Unit 4 arrangement. It then may be possible to reuse the Unit 3 fans on Unit 1 and/or unit 2.
22. E.ON confirmed there is no "sacred ground" around the existing units, areas reserved for other uses and unavailable for use in the AQCS upgrade. B&V requested if any balance-of-plant upgrades are currently under consideration that should be taken into account in the AQCS work, beyond the plans for an additional ball mill at the limestone prep building.
23. Following lunch, E.ON and B&V personnel continue site walk down activities, concluding at approximately 5:30 pm. Some observations from this walk down are identified below.
    - Unit 4 fabric filter likely to be required to be installed above the Unit 4 scrubber electrical building.
    - Unit 3 would be tied into the current Unit 4 scrubber after the new Unit 4 FGD is built. The old Unit 3 scrubber would be torn down to allow new AQC equipment to be potentially located in that area.
    - Unit 3 and 4 structural steel was generally in good shape for lower areas that could be inspected. Higher areas of Unit 3 & 4 could not be assessed due to the large flue gas leaks in the duct that limited access for personal safety reasons.
    - Duct configuration will be complicated, but appears possible, and will depend on the specific fan arrangement and if new ID fans or booster fans will be used.

Day 3, September 16, 2010

The third and final day of meetings began at 9 am at Mill Creek.

24. B&V summarized the major findings of the walk downs for Eileen and began preparing white board sketches of the preliminary AQC control configurations discussed over the last two days in preparation for a site de-briefing scheduled for the early afternoon.
25. After a break in the morning rain, an additional walk down of Units 1 and 2 was conducted before lunch to review the structural integrity of the Unit 1 and Unit 2 steel for additional AQC equipment.
26. At 1:15 pm, B&V presented de-briefing of the site walk down findings and preliminary AQC control configurations. Two sketches were prepared for the meeting. One illustrated the preliminary AQC configuration options for Units 3 and 4, while the second sketch addressed Units 1 and 2 and the possibility of accelerating the SCR schedule. Pictures of the two white board sketches are attached here in for reference.
    - As a result of the workshop discussions, the potential for locating the Unit 4 fabric filter/NIDs unit and new scrubber, plus a new chimney, to the south of Unit 4 was

considered. The original location for the new scrubber and chimney considered was in the area of the demolished thickener south of the limestone prep building. This location, however, involved crossing the limestone conveyor with relatively high ductwork, plus moving both an overhead Unit 3 and Unit 4 345kV T-line and the ammonia tanks and electrical building to provide necessary working space for new construction.

- Alternately, it was determined that there is likely sufficient space for the new Unit 4 AQCS train directly south of Unit 4, running more or less straight east to west with the new chimney located opposite of the Unit 4 turbine building. This arrangement, if it fits, has the advantage of relatively short ductwork runs, no impact to the overhead T-line, and no impact to the existing ammonia tank farm. It would, however, require relocation of the existing annex building and lab, plus limit construction access to one side of the train. B&V will continue evaluation of this arrangement as first choice for Unit 4, with the thickener area location used as a fall-back alternate.
- Should either of the above arrangements fit, it appeared that it would be advantageous to upgrade the existing Unit 4 scrubber in place and reuse it for Unit 3. The flue gas from Unit 3 would be rerouted to the Unit 4 scrubber in the short term (Phase I) and the Unit 3 scrubber demo'd. A new Unit 3 fabric filter/NIDs unit could be built in its place and tied into the Unit 3 ductwork as Phase II of a two phase construction sequence at Unit 3.
- Both Unit 1 and Unit 2 offer significant challenges in the addition of an SCR as an immediate modification (refer to Sep 17th email, attached herein for reference). The existing ESP at both units is located within a few feet of the boiler structure, leaving insufficient room to route ductwork to a new SCR overhead of the ESP. The ESP would have to be demolished or extensively modified before the SCR could be constructed, resulting in either an extended outage while the ESP is moved or reconstructed or the installation of a separate new ESP in another location prior to installation of the SCR. In addition, area available for new structures for either Units 1 or 2 is very limited, by the narrow alleyway between Units 1 and 3 for Unit 1 and by the new RO facility north of the powerblock at Unit 2. No obvious arrangement for the AQCS upgrades at Units 1 and 2 were immediately noted, and additional investigation will be required.

27. B&V commented on the poor condition of the structural steel at the existing scrubbers, especially at Units 1 and 2. Relatively isolated examples of steel corrosion, most likely due to exposure to flue gas, were noted in the superstructures at the Unit 3 and 4 scrubbers. However, severe corrosion and loss of structural mass was noted in a significant number of areas at Units 1 and 2. The most severe damage noted was in lighter components, such as platform and grating, but instances of chemical attack on the major structural steel members were also noted on Units 1 and 2. E.ON agreed to provide the results of recent studies assessing the structural steel. [Action Item #13]
28. New AQC will likely restrict vehicle and maintenance access in some areas of the facility. E.ON agreed to provide the minimum access dimensions for use in the analysis. [Action Item #14]
29. E.ON noted that the existing Unit 4 AQCS (ESP and scrubber) were powered by the Unit 4 aux power supply. Should the Unit 4 scrubber be reused for Unit 3, an alternate source of aux power for the refurbished equipment must be included. Otherwise, an outage on Unit 4 would result in the loss of AQCS for Unit 3.

30. E.ON noted that no aux power supply greater than 4160V is currently available in the immediate plant area. However, there are spare cubicles which might be able to be modified to accept feeder breakers as potential sources of medium voltage power for new loads such as fans in the AQCS upgrade. E.ON also noted that B&V Ann Arbor completed a short circuit study for the plant in the 1990's. B&V to review this study. [Action item #15]

31. The meeting concluded at approximately 3 pm.

ACTION ITEMS

#	Description	Responsible	Due Date
1	Determine location for Mill Creek Task 6 Technology Selection meeting during 2nd wk of November	E.ON	10/15/10
2	Determine dates for Ghent kick-off meeting	E.ON	9/23/10
3	Provide DVD copy of Phase I Report	B&V	9/24/10
4	Use B&V file system to set up E.ON document storage	E.ON	TBD
5	Provide engineering cost estimate at end of each month and copy Mike Rooney on monthly reports	B&V	End of Month
6	Create IBackup FTP site for large file transfer	B&V	9/24/10
7	Determine personnel assignments for document review	E.ON	TBD
8	Determine if a Monday, 2 pm EST project conference call time will work for B&V project team	B&V	9/23/10
9	Update PIM with Eileen's Ghent contact information	B&V	9/24/10
10	Prepare data inventory and information request	B&V	9/24/10
11	Evaluate pros and cons of NID system for November technology validation presentation	B&V	Nov 2010
12	Schedule vendors for evaluation of existing scrubbers	E.ON	TBD
13	Provide structural steel study assessments	E.ON	9/24/10
14	Provide minimum access dimension box	E.ON	9/24/10
15	Review B&V electrical study conducted in the 1990s	B&V	9/24/10
16	Evaluate the possibility of accelerating the installation of SCRs on Mill Creek Units 1 and 2	E.ON and B&V	TBD

ATTACHMENTS

- Agenda
- Attendance roster
- B&V email of September 17, 2010 addressing the acceleration of the SCR installation schedule for Mill Creek Units 1 and 2.
- August 5th and 6th Mill Creek AQC Workshop Summary Presentation.
- Pictures of the September 16, 2010 white board sketches from the de-brief meeting.

cc: All Attendees
File

AGENDA

Phase II Air Quality Control Study – Kickoff Meeting and Site Visit

E.ON - Mill Creek Station

September 14 - 16, 2010

Location: E.ON Broadway Office Complex and Mill Creek

Day 1, September 14th, Arrive 1 pm (Broadway Office Complex)

I. Introductions

II. Review Project Scope

III. Review Project Schedule

IV. Review Project Deliverables

V. Project Administration

   a. Communication

   b. File System

   c. Monthly Reports

   d. Weekly Conference Calls/Action Item List

   e. Invoicing

VI. Project Documentation

VII. Information Request

Day 1, September 14th, Arrive 1 pm (Mill Creek)

I. Arrive on Site and Introductions

II. Begin Initial Escorted Site Walk Down

Day 2, September 15th, Arrive 8 am (Mill Creek)

I. Introductions

II. Environmental Drivers Presentation (E.ON – Gary R.)

III. Aug 5-6th AQC Workshop Results Presentation (B&V – Rick L and Anand M.)

IV. Lunch (on site)

V. Continue Escorted Site Walk Down and Data Collection

Day 3, September 16th, Arrive 8 am (Mill Creek)

I. Continue Escorted Site Walk Down and Data Collection

II. Lunch (off site)

III. Site Debriefing Meeting

IV. Depart (no later than 4 pm)

Eon AQC Mill Creek 1pm -4:30p. 9/14/10

Admin Kick-off Meeting

Kyle Lucas	913-458-9062	lucaskj@bv.com
M.R. WEHRLY	913-458-7131	wehrlymr.com
Mike Mooney	502-627-3671	mike.mooney@eon-us.com
Eileen Saunders	502-627-2431	eileen.saunders@eon-us.com
MIKE KING	313 618-8657	kingml@bv.com
Tim Hillman	913-458-7928	hillmantm@bv.com.

EON AQC Mill Creek Plant Kickoff 9/15/10
9am - 11:30

Kyle Lucas	B&V	913-458-9062 lucaskj@bv.com	Asst PM / EON MNG
Rick Lausman	B&V	913 458 7528 LAUSMANRL@BV.COM	AQC Eng
Mike Mooney	EON	mike.mooney@EON-US.com 502-627-3671	Budget Analyst
Bill Moehrke		william.moehrke@eon-us.com 502-627-6369	PROJECT COORD.
Tim Hillman	B+V	913-458-7928 hillmantm@bv.com	B+V PM
MONTY HINTZ	B&V	913-458-2464 hintzme@bv.com	B&V civil/struct
M.R. WEHRLY	B&V	913 458-7131 wehrlymr@bv.com	B&V ENG. MGR.
Kevin Siers	EON-US	502-817-3545	Production Leader
Michael Stevens	EON-US	502-933-6518	Production Supv / Comp.
Jim Nichols	EON-US	502-933-6643	Prod Supt.
Mike Buckner	LG&E	502-933-6515	Production Manager
Mike Kirkland	LG&E	502-933-6565	General Manager
KENNY CRAIGMYLE	EON	502-627-6366	PROJECT COORDINATOR
Eileen Saunders	EON	502-627-2431	MGR, Major Capital Project
Gary Revlett	EON	502-627-4621	MGR, Environmental Affairs
JOE DIDELOT	EON	502-933-6559	MGR, MAINT. MC
Scott Straight	"	" 627-2701	Director - PE
Alex Betz	LG&E	502-933-6602	Mech. Eng., Mill Creek
Anand Mahabaleshwarkar	B&V	913 4587736	AQC Section Lead

Hillman, Timothy M.

From: Hillman, Timothy M.
Sent: Friday, September 17, 2010 12:01 PM
To: 'Saunders, Eileen'
Cc: Lausman, Rick L.; Lucas, Kyle J.; Mahabaleshwarkar, Anand; Wehrly, M. R.; Hintz, Monty E.
Subject: 168908.14.1000 100917 Mill Creek - Acceleration of MC 1 and 2 SCR Installation

Eileen,

Anand and the rest of the team combined notes in this email to present both a high level and somewhat detailed summary of the issues surrounding Scott's inquiry about accelerating the installation schedule of SCRs at Mill Creek Units 1 and 2. Hopefully this will assist you in the pending management decision process.

Thanks for all you planning and organization this week. I thought the meetings and site walk downs were very helpful and meaningful.

Tim.

Summary

The most direct path of accelerating the installation of SCRs on Units 1 and 2 would be to construct the new SCRs with the existing ESPs in place. Unfortunately, this is hampered by the close proximity of the existing dry ESPs to the boilers. As a result, there is no room to route ductwork to and from the new SCRs. Therefore, any acceleration of Unit 1 and 2's new SCR schedule would likely require the original Phase 1 approach of building a new ESP and/or PJFF/NID *first*, in order that the existing ESP could be demolished to make room for the new SCR and ductwork.

Details and Basis

Available SCR Options for MC 1 & 2:
Option 1. High-dust SCR located above the existing dry ESP
Option 2. High-dust SCR located at new location with new air heater placed directly under the new SCR reactor
Option 3. Tail-end, low-dust SCR located on new ground downstream of existing ESP, with flue gas reheat

Challenges Presented by the Economizer Outlet and the Close Proximity of the Existing Dry ESP:

- For SCR Options 1 and 2, the economizer outlet duct would need to be routed eastwards out of the boiler building through the east boiler building wall to flow the flue gas to the SCR reactor inlet, located either per Option 1 or 2. The arrangement of the existing dry ESP, located to the east and at approximately same elevation as the economizer outlet duct, along with its close proximity to the boiler building wall, are all preventing the routing of new SCR inlet duct towards the east direction. Similarly, due to presence of boiler support steel inside the boiler building, it is nearly impossible to route the ductwork out to either the north or south side.
- Also, for Option 1, the new SCR outlet duct needs to be connected back to the existing air heater, which is located directly underneath the economizer. This creates additional congestion in the same area and presents ductwork support challenges with the current boiler steel. On the other hand, for Option 2, it is possible to install a new air heater underneath the new SCR reactor at another location and connect the flue gas stream to the new dry ESP and/or PJFF/NID. However, the routing of the SCR inlet ductwork out of the boiler building for Option 2 still faces the same challenges as Option 1.
- The tail-end, low-dust SCR (Option 3) will increase the capital and O&M cost due to the need for flue gas reheating and another air heater to maintain the SCR operating temperature. Therefore, Option 3 is not considered feasible in this preliminary review.

Solutions to above challenges:

- For SCR Options 1 and 2, routing of the new SCR ductwork makes the demolition of the existing dry ESPs inevitable.

Therefore, in order to create room for a new SCR, a new dry ESP and/or PJFF/NID system will need to be installed first, while the units are online. Once the new dry ESP and/or PJFF/NID system is installed and operating, the existing dry ESP can be demolished to create room for the new SCR. The ID fan and or booster fan requirements can also be finalized based on the BOP challenges, including aux power availability.

- Option 3 is believed to be capital and O&M cost intensive, and is therefore not considered feasible in this preliminary review.

Regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

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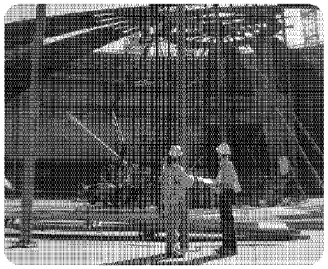

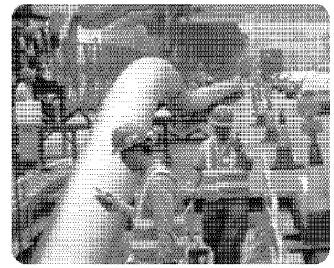
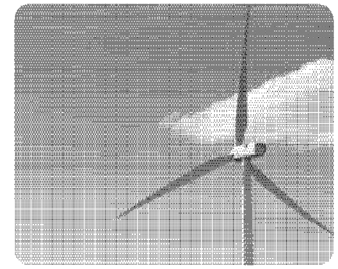

Alternative FGD Technology Workshop Review

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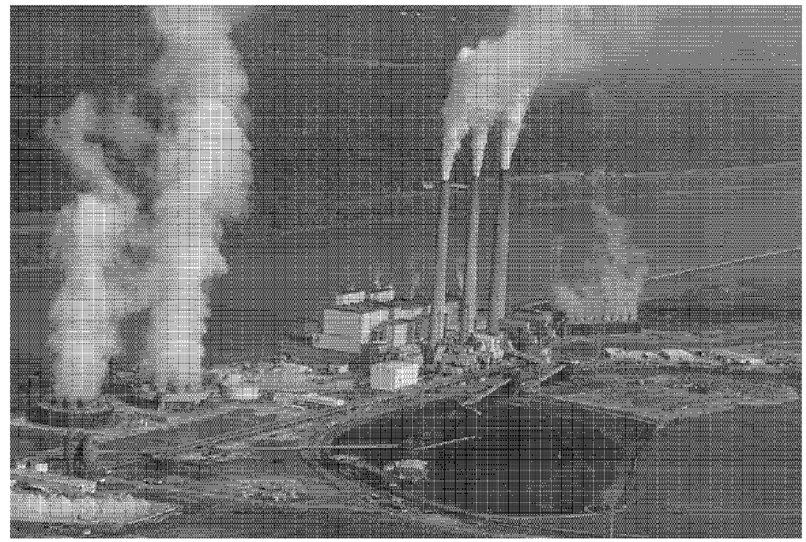
Black & Veatch

September 2010

Agenda

- Drivers
- Overview workshop
- Current plant basis
- Technologies and options discussed
- Recommendations of workshop



Regulatory drivers – still uncertainty

Program Name	Regulated Pollutants	Forecasted Date for Compliance
BART	SAM (MC3 Only)	Within 6 months of final Title V
1-hour NAAQS for NO_x	NO_x	2015 -2017
1-hour NAAQS for SO_2	SO_2	2016
Clean Air Transport Rule	NO_x SO_2	Beginning in 2012 Phase in 2014
New EGU MACT	Mercury Acids (HCl) Metals (PM) Metals (AS) Organics (CO) Dioxin/Furan	Estimated January, 2015; with 1-yr extension - January, 2016

Workshop attendees

E.ON US

Scott Straight	Dir. Proj. Engineering
Phillip Imber	Sr. Chem. Engineer
Ronald Gregory	Mgr Major Projects
Gary Revlett	Mgr Air Section & Environmental Affairs
Mike Kirkland	Mill Creek Plant Manager

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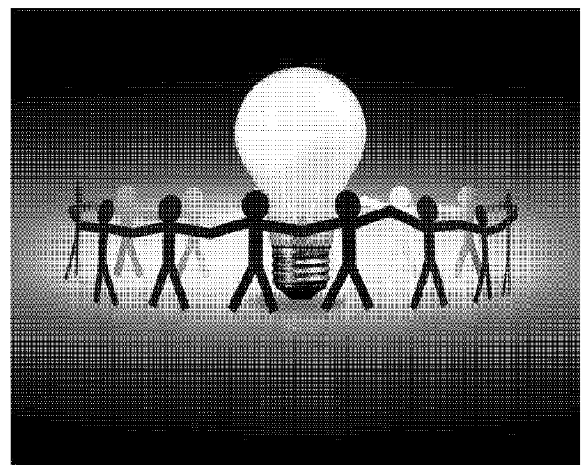
Tim Hillman	Project Manager
Mike Ballard	Construction
Anand Mahabaleshwarkar	AQCS
Rick Lausman	AQCS

Workshop purpose

- Review Phase 1 B&V evaluation
- Review current plant constraints
- Brainstorm potential for lower cost yet effective alternatives



Phase 1 B&V evaluation


E.ON US
Coal Fired Fleet Wide

Air Quality Control
Technology Cost Assessment

B&V Project: 167967
B&V File No.: 26.0000

Issue Date and Revision
July 2010
Rev. 0

PRELIMINARY PHASE 1

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- Fleet wide review
- Screen technologies
- Conceptual design
- Limited time constraints
- New wet FGD and fabric filters for each Mill Creek unit

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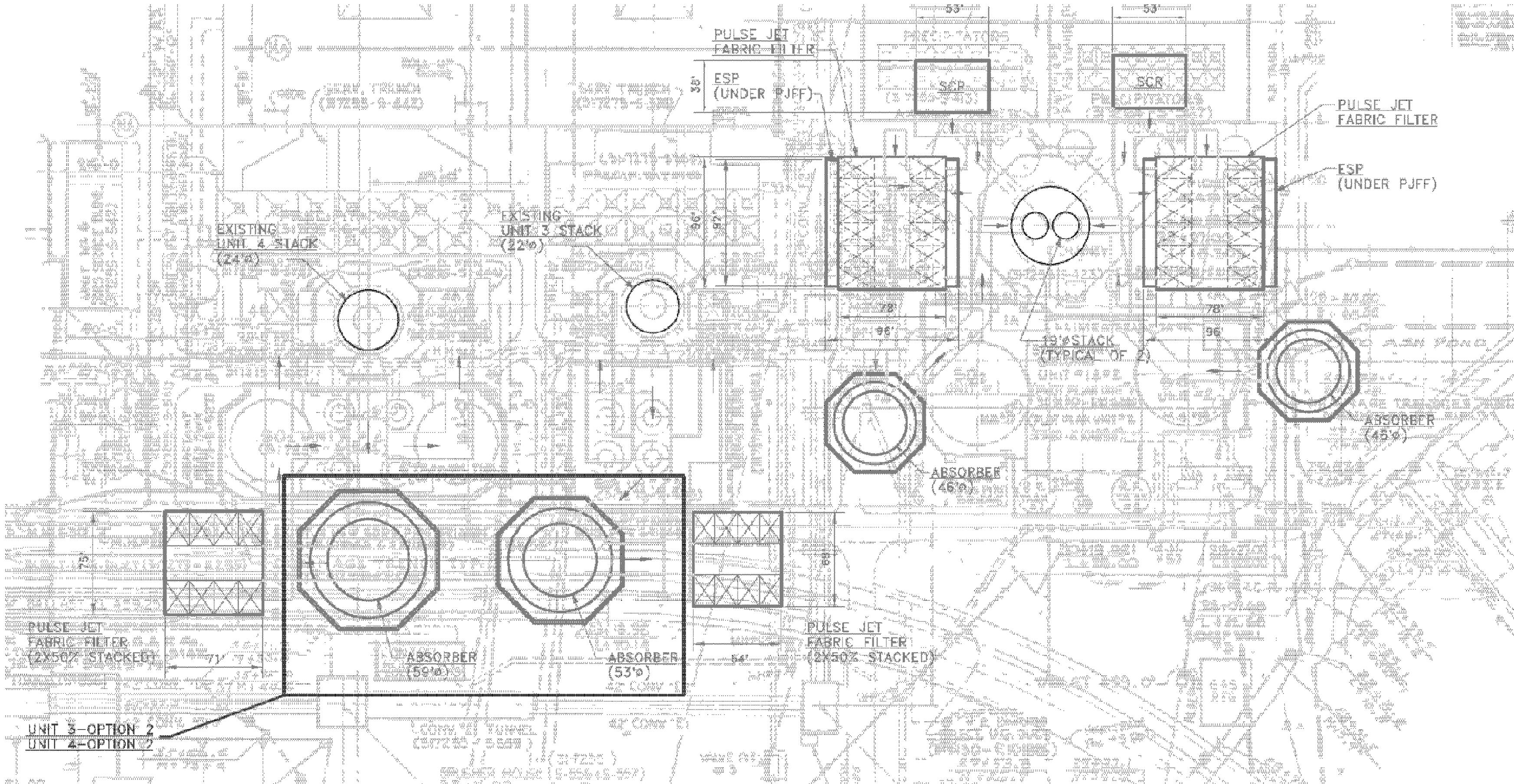
Mill Creek phase 1 potential layout - example



Current conditions and future targets

Unit	MW	Current Emissions lb/MBtu	Current Removal %	Future Removal %
1	330	0.48	92	96
2	330	0.48	92	96
3	425	0.36	86	96
4	525	0.12	92	98
Plant	1610	0.36		
Plant	Targets	0.25 lb/MBtu		96%

Uncontrolled SO2 Emissions 6.2 lb/MBtu

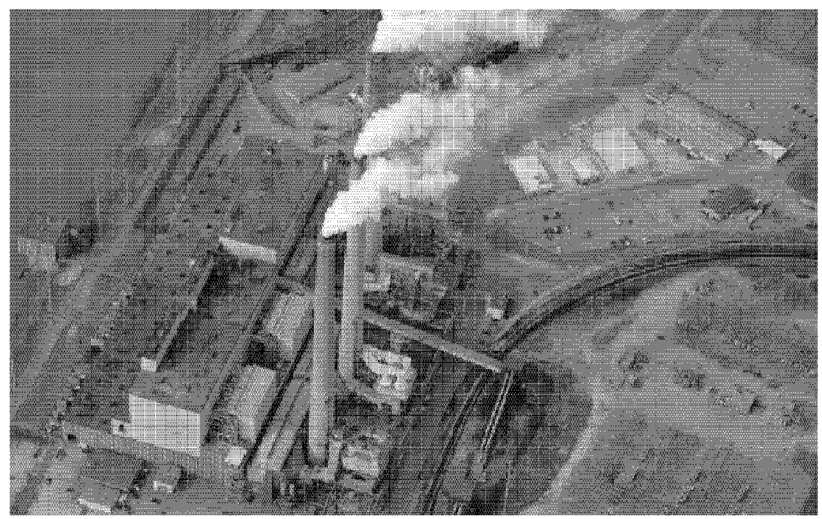
HAPS Issues

- E.ON.US emissions tests are just being finished
- Hg controls are expected for MC units
- Acid gases are likely acceptable
- Uncertainty if plant-wide averaging for Hg will be available
- Speciated metal emissions are also low at MC units

Hg

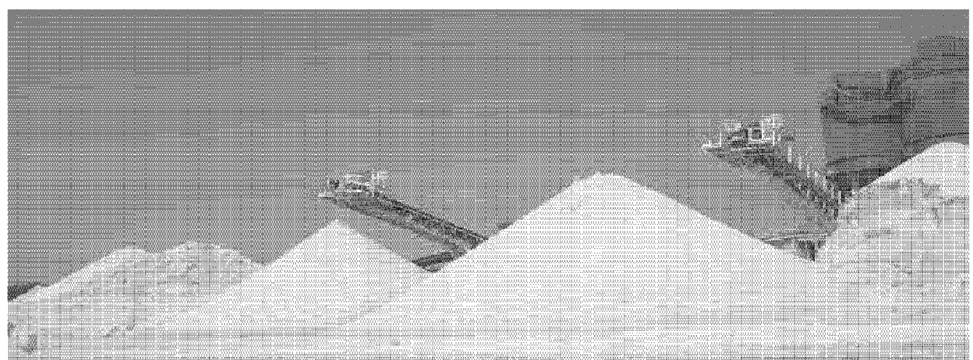
Site specific criteria

- Existing wet FGD
- Condition of FGD and structural steel
- Dewatering system and material handling in place
- Limestone grinding issues
- High sulfur fuel
- Fly ash sale requirement
- Mercury control
- Available space
- …….Other ……..



Byproduct Issues

- Mill Creek needs to be able to sell ash due to landfill limitations
- Water emission issues and future limitations may be an issue
- Wastewater stream is currently going to ash ponds



Current FGD conditions

- All scrubbers are basically in a constant rebuilding mode
- Scrubbers are good for another 20 years structurally speaking
- MC1 and MC2 had trays added in 2002 which are now wearing thin
- Top of modules need to be placed
- MC1 and MC2 all duct work has been replaced that wasn't replaced during the wet stack conversion
- Pumps conditions are acceptable with some on MC 1 and MC2 previously replaced

Current FGD conditions - continued

- MC3 and MC4 FGD had trays added in 2000
- MC4 top of modules and duct work needs to be replaced
- MC4 contact trays need replacement
- MC3 scrubber structure is good, although mixing is poor
- MC3 has underground reaction tanks and recycle pumps which cause maintenance and reliability issues.

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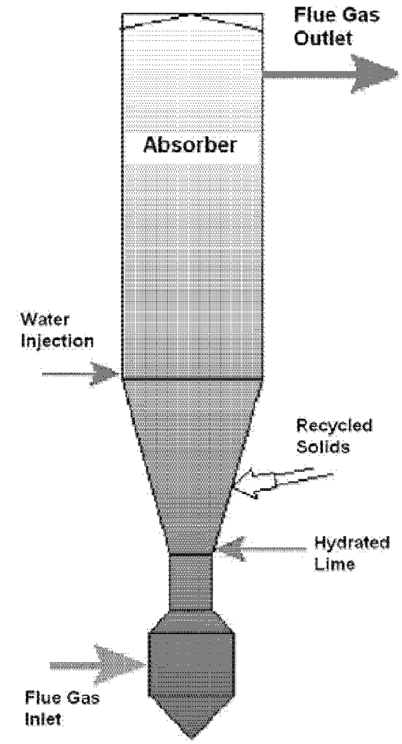
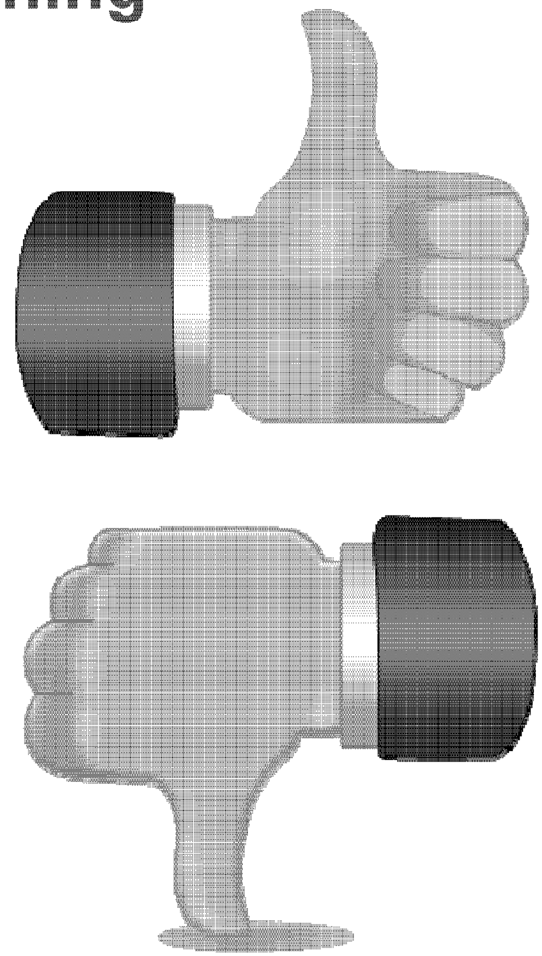
Technology review

- Semi-dry FGD
  - Provides acid gas control (SO_3)
  - Limits waste water production
  - High sulfur fuel is an issue
  - Reagent costs
  - Different technologies provide different advantages - NIDS vs CDS



Factors for upgrading or abandoning existing FGD

- Expected life of unit
- Improvement level required
- Condition of existing FGD
- Space considerations
- Cost comparison to new FGD
- Technical or physical limitations
- Orphaned components



Preliminary workshop results

- Build a new WFGD for MC4
- Upgrade MC4's existing WFGD and use it for MC3
- Upgrade MC1 and MC2's existing WFGDs
- Add fabric filters to all four units
- Add PAC for Hg control
- Add duct injection systems for SO_3 control.
- As an alternative to the fabric filter, add NID system

Workshop results

Planned Future

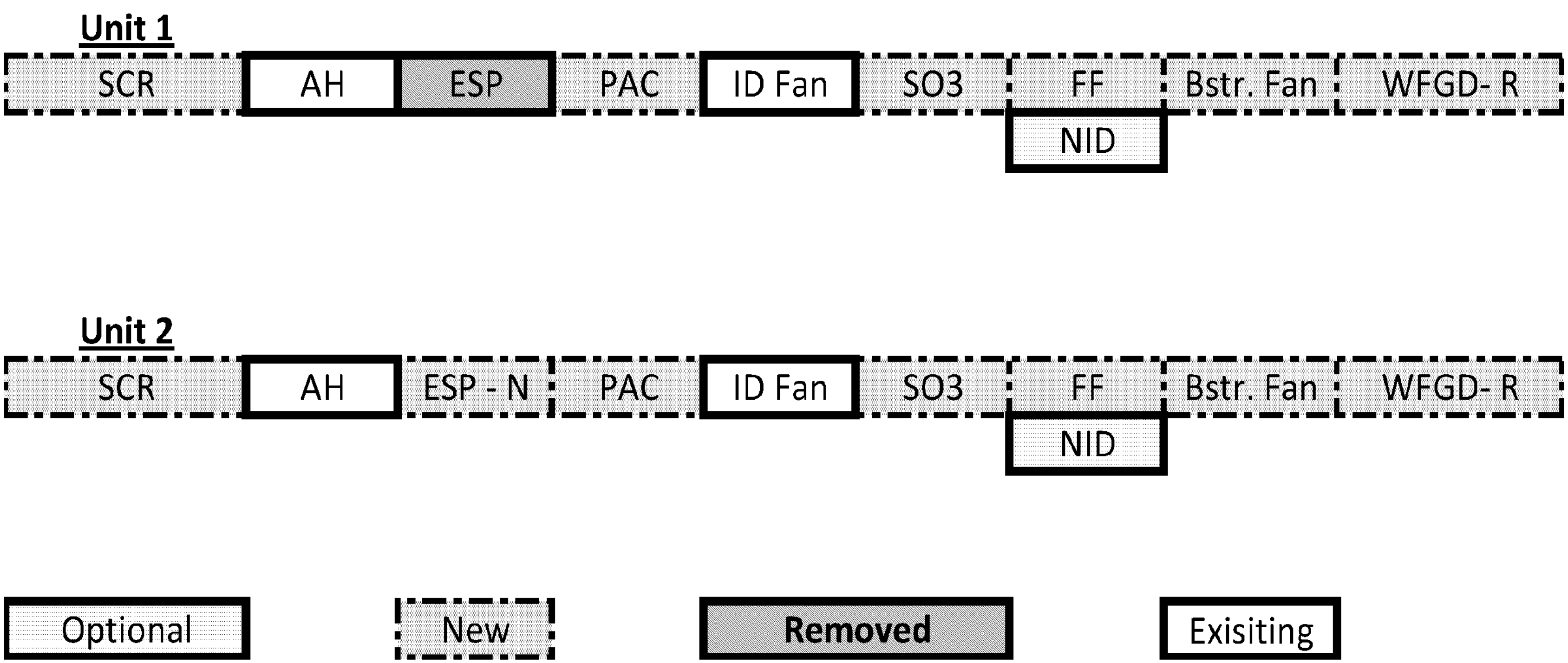
Unit No.	Technology	Schedule Priority
1	FGD upgrade	1
2	FGD upgrade	4
3	Unit 4 FGD with modification	3
4	New FGD	2

Workshop results

Preliminary Schedule

Unit	FGD	FF	SCR	Fans	Chimney	FF Location
1	2012	2014	2016	2014	Existing	In road
2	2013 or 4th - 2013	2013	2015	2013	Existing	To open area north
3	1st Qtr 2014	Apr 2015		2015	Existing	Road with fans in Unit 3 FGD area
4	4th - 2013	4th - 2013	Relocate NH3	2013	Likely New	South side of plant

Proposed equipment lineups- Unit 1 & 2



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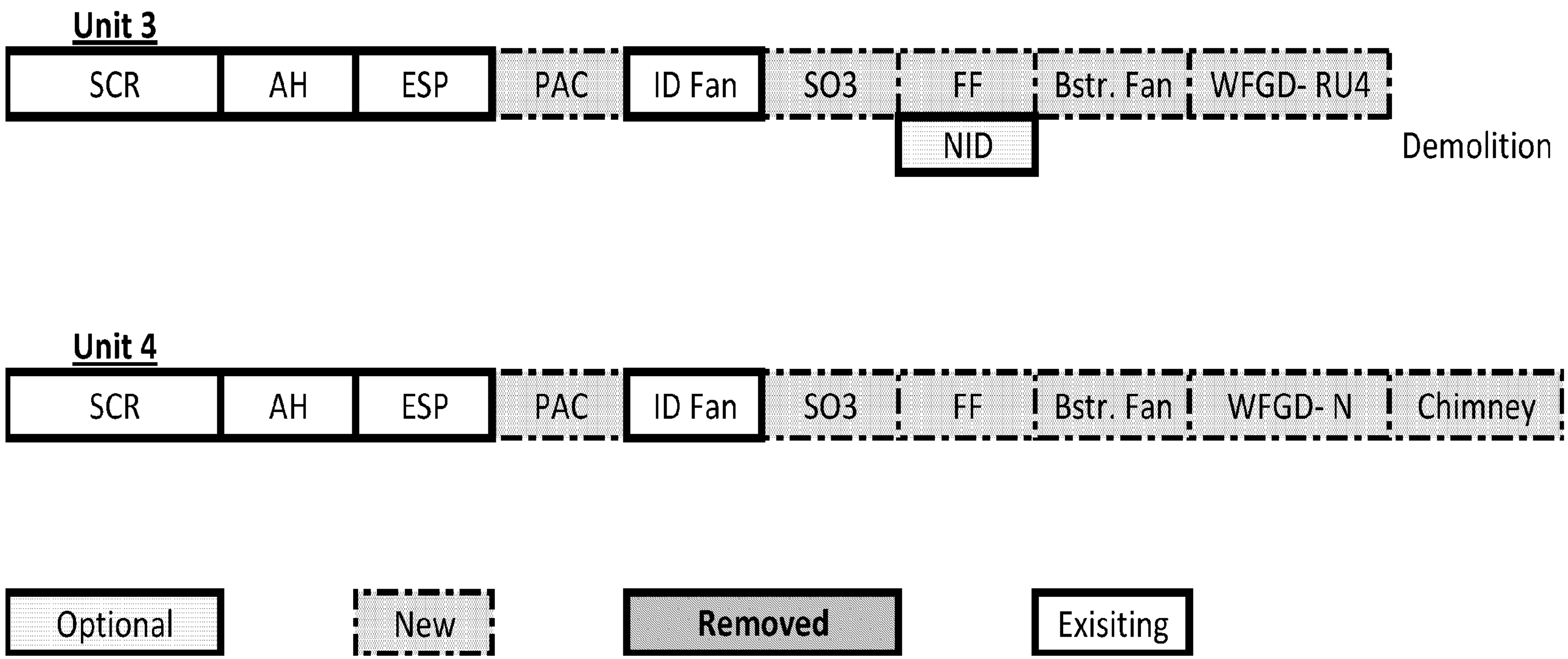
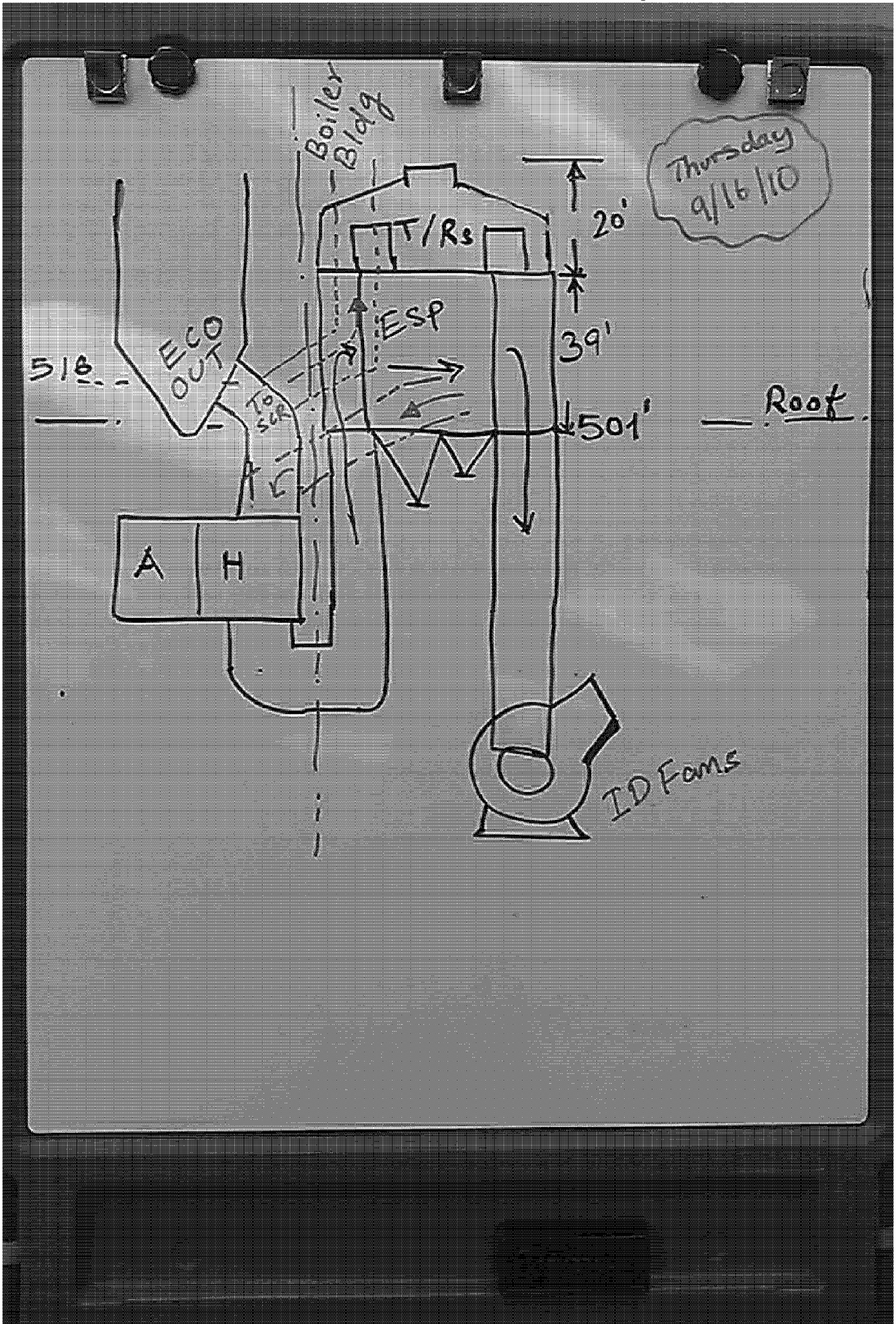
Proposed equipment lineups- Unit 3 & 4




Boiler Bldg
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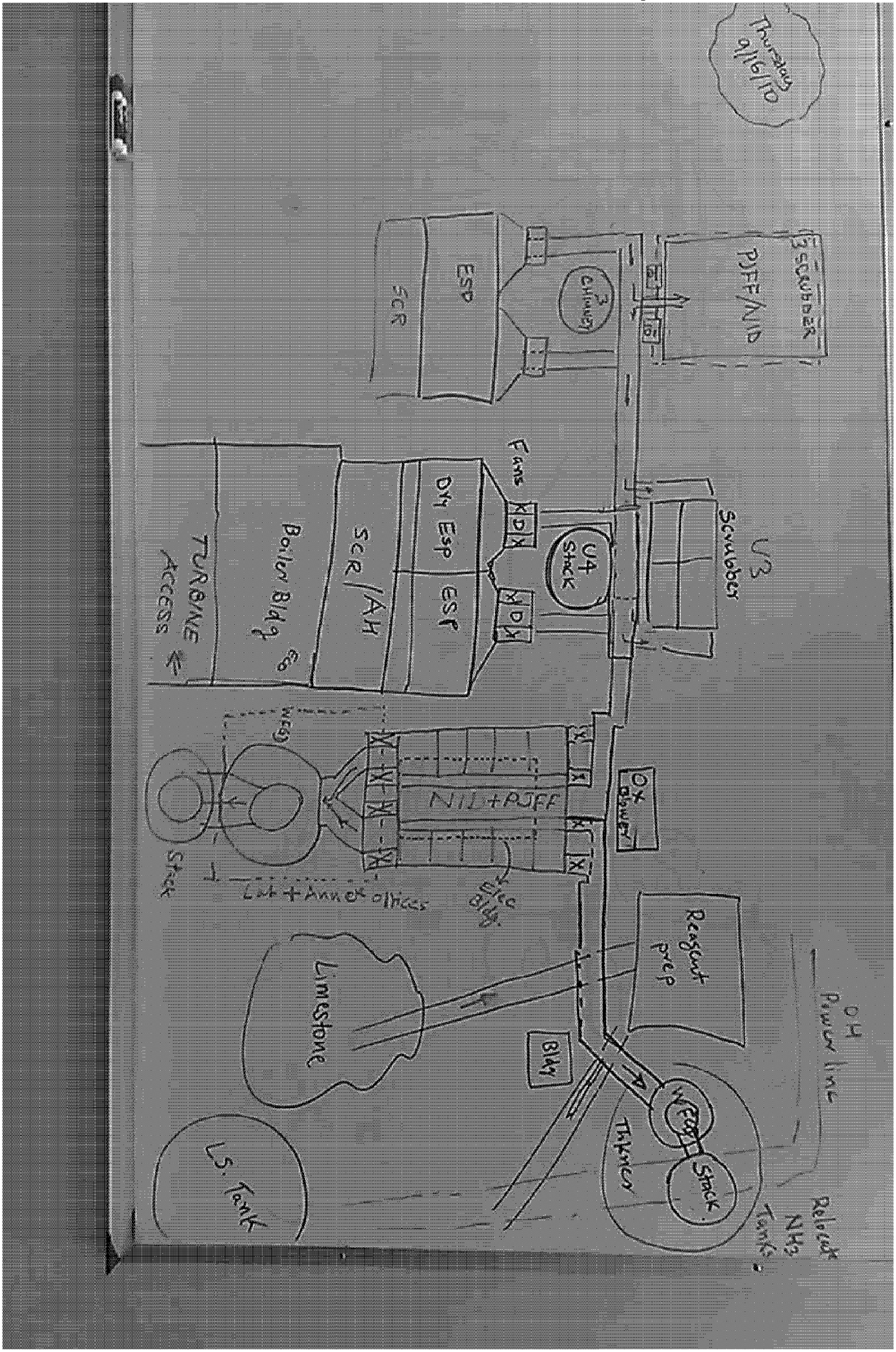
Thursday 9/16/10
3 Scrubber
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TURBINE ACCESS
U3 Scrubber
U4 Stack
OX blower
Stack
Lab + Annex offices
Elec Bldg
Reagent prep
Limestone
Bldg
U4 Power line
Relocate NH3 Tanks
Stack
Thickener
L.S. Tank

From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	168908 E.ON-AQC; Jackson, Audrey; Crabtree, Jonathan D.; Mahabaleshwarkar, Anand; Wehrly, M. R.; Lausman, Rick L.; Hintz, Monty E.; Goodlet, Roger F.; Betz, Alex; Lucas, Kyle J.; Smith, Dave; Mehta, Pratik D.
Sent:	11/1/2010 11:01:49 AM
Subject:	168908.28.3000 101101 - Action Item List
Attachments:	168908 EON ACTION ITEM LIST.xls

Eileen,

Attached is the updated action item list for our weekly Monday conference call following our Mill Creek U4 discussion.

Regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

	A	B	C	D	E	F	G	H	J	K	L	M
1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		DATE ADDEI	IG DUE DA	RR DUE DA	OMPL DAT
2		DOC/MTNG	DATE				CO.	INITIAL				
3		**GENERAL**				n--	A					
4	27	Conf Call 10102!	10/25/10	Prepare letter spec for Fabric Filter workshop.	41.0806	n--	B&V	AM/RL	10/19/10	TBD		
5		**MILL CREEK**				Mill Creek	A					
6	23	Conf Call 10101	10/18/10	Provide draft of Mill Creek Validation Report for E.ON re	41.0803	Mill Creek	B&V	TH/MW	10/19/10	11/05/10		
7	28	--	10/29/10	Provide Mill Creek Validation presentation.	41.0803	Mill Creek	B&V	TH	10/29/10	11/05/10		
8	30	Email 14.1000 1	10/27/10	Provide comments on Mill Creek Validation meeting age	14.1000	Mill Creek	E.ON	ES	10/27/10	11/02/10		
9		**GHENT**				Ghent	A					
10	25	Email 22.1000 1	10/21/10	Provide E.ON comments on Ghent Project Design Mem	22.1000	Ghent	E.ON	ES	10/21/10	10/28/10		
11		**E.W. BROWN**				Brown	A					
12	29	--	10/29/10	Provide Brown Kickoff presentation .	14.1000	Brown	B&V	TH	10/29/10	11/05/10		
13	24	Conf Call 10101	10/18/10	Prepare differences between SCR and SNCR for Browr	14.1000	Brown	B&V	AM/RL	10/19/10	11/09/10		
14	31	Email 14.1000 1	10/27/10	Provide comments on Brown Kickoff meeting agenda	14.1000	Brown	E.ON	ES	10/27/10	11/02/10		
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1	STATUS	NOTES				
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4	Open	Reminder to start this action in the future after further direction from E.ON (10/25)				
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6	In Progress					
7	In Progress					
8	Open					
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10	Open					
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12	In Progress					
13	Open	To be included in Brown KO presentation. Also include fabric filter discussion. (10/25)				
14	Open					
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1	ITEM #	SOURCE		DESCRIPTION	FILE NO.	FACILITY	RESPONSIBILITY		ATE ADDE	IG DUE DA	RR DUE DA	OMPL DAT	STATUS
2		DOC/MTNG	DATE				CO.	INITIAL					
3	9	KO & MC Site \	9/20/10	Update PIM with Eileen's Ghent contact information	14.1000	--	B&V	MW	09/21/10	09/24/10		09/21/10	Complete
4	8	KO & MC Site \	9/20/10	Determine if a Monday, 2 pm EST project conference ca	14.1000	--	B&V	TH/□MW	09/21/10	09/23/10		09/21/10	Complete
5	3	KO & MC Site \	9/20/10	Provide DVD copy of Phase I Report	14.1000	--	B&V	TH	09/21/10	09/24/10		09/22/10	Complete
6	17	Email 14.1000	9/20/10	Provide E.ON comments on Kick Off Meeting and Mill C	14.1000	--	E.ON	ES	09/21/10	09/24/10		09/24/10	Complete
7	2	KO & MC Site \	9/20/10	Determine dates for Ghent kick-off meeting	14.1000	Ghent	E.ON	ES	09/21/10	09/23/10		09/27/10	Complete
8	16	KO & MC Site \	9/20/10	Evaluate the possibility of accelerating the installation of	14.1000	Mill Creek	E.ON & B	ES &□TH	09/21/10	TBD		09/27/10	Complete
9	5	KO & MC Site \	9/20/10	Provide engineering cost estimate at end of each month	14.1000	n--	B&V	TH	09/21/10	09/30/10		09/28/10	Complete
10	6	KO & MC Site \	9/20/10	Create IBackup FTP site for large file transfer	14.1000	--	B&V	KL	09/21/10	09/24/10		09/29/10	Complete
11	10	KO & MC Site \	9/20/10	Prepare data inventory and information request	14.1000	Mill Creek	B&V	MW/□JC	09/21/10	09/24/10		09/29/10	Complete
12	13	KO & MC Site \	9/20/10	Provide structural steel study assessments	14.1000	n--	E.ON	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
13	14	KO & MC Site \	9/20/10	Provide minimum access dimension box	14.1000	n--	E.ON	ES	09/21/10	09/24/10	09/30/10	10/04/10	Complete
14	7	KO & MC Site \	9/20/10	Determine personnel assignments for document review	14.1000	n--	E.ON	ES	09/21/10	TBD		10/04/10	Complete
15	19	Re: Email 41.01	9/30/10	B&V to provide schedule/deadlines for Mill Creek inform	41.0100	Mill Creek	B&V	TH	09/30/10	10/06/10		10/04/10	Complete
16	1	KO & MC Site \	9/20/10	Determine location for Mill Creek Task 6 Technology Se	14.1000	Mill Creek	E.ON	ES	09/21/10	10/15/10		10/12/10	Complete
17	20	Email 22.1000	10/5/10	Provide comments on the Mill Creek Project Design Me	22.1000	Mill Creek	E.ON	ES	10/11/10	10/12/10		10/12/10	Complete
18	21	Ghent Site Visit	######	Prepare Ghent Information Request.	41.0100	Ghent	B&V	TH	10/11/10	10/15/10		10/18/10	Complete
19	15	KO & MC Site \	9/20/10	Review B&V electrical study conducted in the 1990s	14.1000	Mill Creek	B&V	JB	09/21/10	09/24/10	TBD	10/18/10	Complete
20	18	Email 41.0100	9/29/10	Choose the coal fuel design basis for Mill Creek, Ghent,	41.0100	n--	E.ON	ES	09/30/10	10/06/10		10/18/10	Complete
21	4	KO & MC Site \	9/20/10	Use B&V file system to set up E.ON document storage	14.1000	n--	E.ON	ES	09/21/10	TBD		10/18/10	Complete
22	12	KO & MC Site \	9/20/10	Schedule vendors for evaluation of existing scrubbers	14.1000	n--	E.ON	ES	09/21/10	TBD		10/18/10	Complete
23	11	KO & MC Site \	9/20/10	Evaluate pros and cons of NID system for November te	14.1000	n--	B&V	AM/□RL	09/21/10	Nov. 2010		10/21/10	Complete
24	22	Email 14.1000	######	Provide E.ON comments on Ghent Site Visit meeting m	14.1000	Ghent	E.ON	ES	10/15/10	10/19/10		10/22/10	Complete

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1	NOTES									
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4	Scheduled									
5	Set received on 9/22									
6	Final issued on 9/24									
7	Scheduled for October 6&7									
8	B&V email addressed the acceleration of the SCR install for MC 1 & 2 (9/17). E.ON replied no change in direction at this time (9/27).									
9	Sent 9/28.									
10										
11										
12	CD received 9/27. Units 1, 2, and 4 on CD. Unit 3 still needed. Email request sent on 9/28.									
13	CD received 9/27. Access Dimension not included. Email request sent 9/28.									
14	MC - Alex Betz and a couple others at plant. Process in place (10/4)									
15										
16	MC Technology selection meeting to be held in Louisville on 11/9 with Brown KO mtg on 11/10&11.									
17	Eileen's comments provided on 10/12. Sent to Alex for further comments.									
18										
19	B&V could not locate study. Added to Data Request. Will review when E.ON provides study.									
20	Use future coal. (10/11) Chlorine needs to be corrected (10/18)									
21	Audrey is working on it (10/11). It is set up. Eileen to review (10/18).									
22	To be scheduled week of 10/25. B&V requested to be included in debriefing w/ each vendor.									
23	Will send powerpoint presentation in the next couple of days (10/18).									
24	Eileen has no comments (10/18). Waiting for comments from E.ON members.									

	A	B	C	D	E	F	G	H	J	K	L	M	N
25	26	--	######	Provide sketches of Unit 4 AQC equipment in the thicke	41.0402	Mill Creek	B&V	MH	10/25/10	10/27/10	10/27/10		Complete
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1	E.ON	E.ON U.S. SERVICES INC. COMPANY			
2	AB	Alex Betz - Mill Creek			
3	DS	Dave Smith - Ghent			
4	ES	Eileen Saunders			
5	GB	Greg Black			
6	GR	Gary Revlett			
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17	BV	Black & Veatch (B&V)			
18	TH	Tim Hillman			
19	KL	Kyle Lucas			
20	AM	Anand Mahabaleshwarker			
21	MK	Mike King			
22	RL	Rick Lausman			
23	MW	M.R. Wehrly			
24	MH	Monty Hintz			
25	JB	Jim Bayless			
26	JC	Jonathan Crabtree			

From:	Saunders, Eileen
To:	Joyce, Jeff; Wright, Paul; Drake, Michael; Smith, Dave; Ayler, Danny; Bickers, Troy; Yocum, James; Scott, Randy
CC:	Straight, Scott; 'Hillman, Timothy M.'
Sent:	11/1/2010 2:41:30 PM
Subject:	FW: 168908.14.1000 101022 Ghent - Final Kickoff and Site Visit Meeting Minutes
Attachments:	Ghent Kickoff and Site Walkdown Meeting Minutes with Attachments - Final 102210.pdf

All,

Here are the final minutes from the discussion at Ghent.

Thanks,

Eileen

From: Hillman, Timothy M. [mailto:HillmanTM@bv.com]
Sent: Friday, October 22, 2010 2:43 PM
To: Saunders, Eileen
Cc: 168908 E.ON-AQC; Jackson, Audrey; Wehrly, M. R.; Lucas, Kyle J.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Hintz, Monty E.; Goodlet, Roger F.; Crabtree, Jonathan D.; Smith, Dave; Mehta, Pratik D.; Bayless, James W. III (Jim); Keltner, Erik J.; King, Michael L. (Mike)
Subject: 168908.14.1000 101022 Ghent - Final Kickoff and Site Visit Meeting Minutes

Eileen,

Please find attached the final Ghent Kickoff meeting minutes. This final version incorporates E.ON's comment below, and picks up a few additional comments/clarifications from B&V team members.

Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

From: Saunders, Eileen [mailto:Eileen.Saunders@eon-us.com]
Sent: Friday, October 22, 2010 6:36 AM
To: Hillman, Timothy M.
Cc: 168908 E.ON-AQC; Jackson, Audrey; Wehrly, M. R.; Lucas, Kyle J.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Hintz, Monty E.; Goodlet, Roger F.; Crabtree, Jonathan D.
Subject: RE: 168908.14.1000 101012 Ghent - Draft Kickoff and Site Visit Meeting Minutes

Tim,

The notes look fine with one exception: "James Yocun" should read "James Yocum".

Thanks,

Eileen

From: Hillman, Timothy M. [mailto:HillmanTM@bv.com]

Sent: Tuesday, October 12, 2010 1:53 PM
To: Saunders, Eileen
Cc: 168908 E.ON-AQC; Jackson, Audrey; Wehrly, M. R.; Lucas, Kyle J.; Mahabaleshwarkar, Anand; Lausman, Rick L.; Hintz, Monty E.; Goodlet, Roger F.; Crabtree, Jonathan D.
Subject: 168908.14.1000 101012 Ghent - Draft Kickoff and Site Visit Meeting Minutes

Eileen,

Please find attached draft meeting minutes from the Ghent kickoff. Please provide E.ON's comments by next Tuesday, 10/19.
Thanks,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

BLACK & VEATCH CORPORATION
CONFERENCE MEMORANDUM

E.ON US	B&V Project 168908
Phase II: Air Quality Control Study	B&V File 14.1000
Ghent Kick-off and Site Visit	October 22, 2010

A kick-off and site walk down meeting was held October 6-7th at the Ghent Generating Station for the Phase II: Air Quality Control Study Project.

Recorded by: Tim Hillman

Attending:

Ghent Kick-off Meeting, October 6th

Eileen Saunders	E.ON
Mike Mooney	E.ON
Gary Revlett	E.ON
James Yocum	KU
Randy Scott	LG&E - KU
Greg Jones	LG&E - KU
Jeff Joyce	KU
Danny Ayler	KU
Troy Bickers	KU
Paul Wright	KU
Mike Drake	KU
Dave Smith	KU
Tim Hillman	B&V
M.R. Wehrly	B&V
Anand Mahabaleshwarkar	B&V
Kyle Lucas	B&V
Rick Lausman	B&V
Monty Hintz	B&V
Roger Goodlet	B&V

The purpose of this meeting was to 1) present the project scope and Phase I study results to the Ghent facility personnel, and 2) provide for a site visit and walk down of the Ghent facility. The above attendance list reflects those attending the initial kick-off meeting at Ghent. (Agenda and Attendance Roster attached herein for reference).

MEETING DISCUSSION

Day 1, October 6, 2010

The kick-off meeting began at 9 am at Ghent.

1. Eileen began the meeting with introductions and a brief summary of the project scope. E.ON requested B&V to prepare a data request with priority dates similar to that developed for Mill Creek. (Action Item #1)
2. E.ON (Gary Revlett) provided a review of all the regulations and environmental controls that are driving the capital projects. (Presentation attached herein for reference).
    - NAAQS
    - Clean Air Transport Rule - CATR

- Electric Generating Unit Maximum Achievable Control Technology - EGU MACT

3. The change from annual average to a one (1) hour limit for NAAQS causes the biggest issues; even the diesel fired units may have issues on the site. The impact of one hour limits will be based on monitoring of stack emissions coupled with modeling done for the plume dispersion.
4. SO_2 should not be a problem for the Ghent units since the existing FGDs basically achieve +98% removal on the units and the modeling shows that they require 96% removal on a plant average.
5. Compliance dates are very short and the industry has commented that insufficient implementation time is included for CATR Phase 1 in 2012 and Phase 2 in 2014.
6. CATR is the driving force for Ghent for both SO_2 and $NO_{X.}$
7. Hg is an issue at Ghent. However, E.ON hopes that with the addition of an SCR on Unit 2, acceptable Hg control may be achieved without additional modifications.
8. E.ON provided an updated table that can be used as the initial Ghent design basis titled: Estimated Limits & Compliance Dates for Future New Air Requirements Ghent Station". (Attached herein for reference).
9. E.ON believes Ghent will likely meet the new NAAQS standards because of the existing scrubbers and SCRs.
10. CATR NOx and SO2 limits are aggressive because allowance modeling for the plant assumed a new SCR on Unit 2. Ghent SO2 allowances for SO2 in 2014 are higher for some reason than the 2012 allowances. This maybe an error in the CATR model.
11. B&V provided a presentation of the Ghent Phase I results and an overview of a PJFF. (Power Point Presentation attached herein for reference). The following general characteristics of a pulse jet fabric filter (PJFF) were discussed.

    - Pressure drop can be 6-8 inches through the PJFF. The increased system pressure drop will require increased ID fan capacity. Upgrade of the existing ID fans, the addition of booster fans, or new replacement ID fans will be required. E.ON emphasized that, if possible, the fans should be located downstream of the PJFF to minimize erosion and damage by dust loading.
    - PJFF bags are normally made of polyphenylene sulfide (PPS) materials, but materials such as fiberglass with a Teflon membrane have been used in specific applications. Temperature constraints on PPS bags are in the range of 380-400 ^{o}F continuous operation. Bags woven of fiberglass material can safely be subjected to 500 ^{o}F over the short term. The temperature limits require PJFFs to be installed downstream of the air heater.
    - PJFFs are compartmentalized with isolation between compartments to allow online maintenance of bags and compartment equipment.
    - The differences between PJFFs and reverse gas fabric filters were described and discussed.
    - Bag life for a PJFF is typically 3 years by guarantee. The PJFF is harder on the bags during cleaning than a reverse gas fabric filter due to the high, short-duration air pulse used.

- Dimensions of PJFF vary by manufacturer and are based on gas flow. A "typical" PJFF for a Ghent-sized unit would have an approximately 90 foot x140 foot footprint.
- An advantage of PJFF installation is that its performance is generally independent of the ash type and is based primarily on flue gas volume. A PJFF could allow burning of PRB coal in the future. This flexibility will be considered in the study.
- One question to be considered is whether Ghent needs to keep the hot-side ESPs, either for ash scavenging or because the existing SCRs are the low-dust type. B&V noted that a change in catalyst could convert the SCRs to operate in high-dust conditions if the possibility of lower catalyst life is acceptable.
- The area and facilities for dry ash conversion and ash handling need to be considered with this study. E.ON commented that B&V had previously completed an ash handling study and that the AQC study must be coordinated with the plans developed in the ash handling study.

12. B&V provided an overview of the Phase I study results. Two additional points were also noted and discussed.
    - B&V may consider designing the Unit 2 SCR as high-dust units from the onset, allowing deletion of the existing ESPs at Unit 2 if warranted by congestion and construction difficulties.
    - B&V asked if E.ON needs to sell fly ash. Saleable fly ash would require "scalping" of the fly ash upstream of PAC injection and require the retention and use of the existing ESPs. E.ON would like to sell fly ash on an opportunistic basis, but is not necessarily tied to the existing ESPs.
13. EON made the following general comments.
    - E.ON wants any new axial fans to be downstream of the PJFFs.
    - E.ON asked B&V to investigate a refined layout for Unit 3 PJFF that would reduce the ductwork runs indicated in the Phase I study.
    - The courtyard area between Units 2 and 3 can be used for siting new equipment. The various maintenance shops on the south side of the courtyard could be relocated. There is no "sacred ground" onsite that must be avoided in locating new facilities. However, retention or re-establishment of the ground level breezeway and the overhead skyway between Units 2 and 3 is desirable.
14. A plant walk down of Units 1-4 was conducted until approximately 3 pm.
15. After the walk down, B&V personnel convened in the Ghent conference room to review preliminary arrangement sketches and begin preparations for the debriefing meeting.
16. Day 1 activities adjourned at approximately 6 pm.

Day 2, October 7, 2010

The second day of meetings began at 8 am at Ghent.

17. B&V began Day 2 by preparing some initial sketch arrangements for Units 1-4 in preparation for a site de-briefing scheduled later in the afternoon.
18. At approximately 10 am, B&V resumed site walk downs, splitting into two groups to ground-verify some assumptions made in the initial arrangement sketches.

19. A site debriefing meeting was convened at 1 pm. The following are the general and unit specific discussions that ensued. (Initial arrangement sketches attached herein).

- General comments:
  - B&V believes it will likely not be feasible to reuse/upgrade the existing ID fans to avoid the addition of new booster or ID fans. Physical constraints on routing duct to and from the existing ID inlet fans is problematic. Locating the PJFFs to protect all of the existing ID fans is not practical in all cases, even for the axial fans at Units 3 and 4. The Unit 3 fans can be incorporated into the revised AQC system, but only in a location that may not be beneficial. B&V fan experts will review this, but new ID fans or booster fans are expected to be required for all units.
- Unit 1:
  - Sorbent injection will need to be relocated in the duct work to near the inlet of the PJFF. E.ON questioned whether the PJFF vendors would be willing to offer SO3 guarantees based on sorbent injection. B&V noted that if the vendor is awarded both sorbent injection and the PJFF as a single package he will likely offer some guarantees, but the specific level will have to be negotiated.
  - Concern was expressed with the elevated PJFF for Unit 1 being located close to the Unit 2 cooling tower. B&V will investigate and provide opinions on the overall affect of the new structures on cooling tower performance and level of icing that could result.
  - If the impact to performance warrants it, it was discussed that a couple cells could be added to the east end of the tower to increase the overall tower capacity or allow impacted cells to be taken out of service.
  - Alternate arrangements at Unit 1 appear very limited at this time. E.ON asked about relocating Unit 2's cooling tower to make more room for Unit 1 PJFF. The major issue with that approach is where to relocate the cooling tower. The potential of locating the new cooling tower towards the river or to the east of Unit 1's cooling tower was discussed. Any new construction towards the river, either relocating the Unit 2 cooling tower or the plant reagent piperack, would likely trigger permit concerns with the COE. Building a new tower in the "rock pile" area (formerly the limestone storage area east of the plant) was also discussed. Routing of the underground circulating water lines potentially would be a major issue.
- Unit 2
  - Because of the high level of congestion in the existing arrangement at Unit 2, plus the need to add a PJFF, B&V considered three alternatives for the SCR location at Unit 2. Two alternatives (Alternates 1 & 3) include split SCR's – two separate reactors, one for each ESP train, with the only difference between the alternatives being the location of the west side SCR.
  - Alternate 1 locates the west SCR in the area just west of the west ID fan and the east SCR above the tower support for the Unit 1 SCRs. The area west of the ID fans appears sufficiently open to allow construction of a tower support for the SCR. The advantage of this arrangement is the short runs of ductwork required, and the SCR reactor box location can be

reached by a crane set up in the area located immediately south of the abandoned Unit 2 chimney.

- Alternate 3 locates the west SCR along the west side of the Unit 2 boiler structure and the east SCR in the same location as Alternate 1. The approach suggested in the Phase 1 study of locating both split SCRs on the west side of the boiler structure would be problematic because of the difficulty of routing duct work from east side Unit 2 duct to the courtyard and back.
- Alternate 2 is similar to that used for the Unit 1 SCR, with a combined SCR located above the ESPs. However, the area beneath the SCRs in Alternate 2 is very congested, making foundation design and installation extremely difficult. Moreover, the lack of nearby open area adjacent to the SCR locations will limit crane access and greatly complicate constructability. Assuming sufficient free area is found to accommodate the necessary foundations, Alternate 1 is more favorable to construction and the most likely option.
- Low dust SCRs will be assumed for Unit 2 unless elimination of the existing ESPs is warranted for some other reason.
- E.ON has previous studies which propose locating the SCR modules in the courtyard on the west side of the Unit 2 boiler structure. E.ON offered to provide these studies to B&V. B&V will add these studies to the Ghent Information Request.
- The Unit 2 PJFF is assumed to be located north of the existing ESPs and ductwork. A short temporary bypass ductwork can be installed between the airheater outlet duct and the ductwork to the scrubber inlet. This would allow the large section of ductwork located north of the bypass to be demolished and the PJFF installed in its place while Unit 2 is on line. The completed PJFF would be tied into the system during an outage. The new booster or ID fans for Unit 2 (not shown on the arrangement sketches) would tentatively be located at the west (downstream) end of the new PJFF.

- Unit 3
  - The preliminary arrangement sketches show the PJFF location in the courtyard, requiring relocation of the maintenance shop. E.ON has some ideas where the shop could be relocated. As currently configured, new booster or ID fans could be added south of the PJFF without impacting the existing tanks south of the shop.
  - The skyway connecting Units 2 and 3 would need to be temporarily removed while the PJFF is installed. The skyway would then be modified to route around the south side of the PJFF and reconnect to Unit 3. It may also be possible to modify the skyway to provide access from the turbine buildings to the PJFF. To avoid re-routing of the significant amount of interconnecting pipe located in the ground level breezeway between units, the PJFF would be designed to span over this piping and allow the breezeway structure to remain in place, if practical.
- Unit 4

- The most likely location for the new PJFF is between the existing Unit 4 ESP area and the Unit 3 cooling tower as shown on the sketch. This location avoids the large 96" diameter circulating water pipelines, the water well, and most of the underground utilities in the area.
- The ID fans currently being installed at Unit 4 would be difficult to incorporate into the proposed ductwork configuration running between the existing ductwork tie in and the new PJFF and back, as shown on the arrangement sketches. A more favorable configuration may be accomplished by locating the new ID fans near the PJFF. The new fans would be sized to replace the current ID fans. New ID fans in this location would allow relatively easy connection directly to the ductwork at the FGD inlet.
- E.ON asked about wet fans to be located downstream of the scrubber, similar to those used in Europe. B&V explained some of the disadvantages, including materials of construction, maintenance and reliability.
- E.ON expressed general agreement with the arrangement as discussed for Unit 4. An alternate version of the Unit 4 arrangement sketch was developed to more closely depict the arrangement discussed.

- The debriefing meeting concluded at approximately 2:30.

20. Eileen identified Dave Smith as the Ghent information request point of contact. Dave's contact information is as follows: 502-627-4633 and dave.smith@eon-us.com.
21. B&V conducted a final walk down to ground-truth some of the comments obtained during the debriefing meeting and review the Unit 1 issues with relocating equipment to allow a more advantageous PJFF location to avoid cooling tower issues.
22. Plant personnel provided an electronic of an aerial view of the site.
23. B&V departed Ghent at approximately 4 pm.

ACTION ITEMS

#	Description	Responsible	Due Date
1	Prepare Ghent Information Request (complete 10/18/10)	TMH	10/15/10

ATTACHMENTS

- Agenda
- Attendance roster
- E.ON Environmental Drivers Presentation and Estimated Limits & Compliance Dates for Future New Air Requirements Ghent Station
- Phase I Results and PJFF PowerPoint Presentation
- Initial arrangement sketches presented during the de-brief meeting

cc: All Attendees
File

AGENDA

Phase II Air Quality Control Study – Kickoff Meeting and Site Visit
E.ON - Ghent
October 6 - 7, 2010
Location: Ghent Generating Station

Day 1, October 6th, B&V Arrives 8 am

I. Introductions (Starts at 9 am)
II. Project/Scope Description (E.ON – Eileen S)
III. Environmental Drivers Presentation (E.ON – Gary R)
IV. Phase I Study Results/PJFF Overview Presentation (B&V – Rick L and Anand M)
V. Lunch (on site)
VI. Begin Escorted Site Walk Down and Data Collection

Day 2, October 7th, B&V Arrives 8 am

I. Continue Escorted Site Walk Down and Data Collection
II. Lunch (on site)
III. Site Debriefing Meeting
IV. Additional Walk Down Time if Required
V. Depart (no later than 4 pm)

E.ON AQC GHENT PLANT KICKOFF 10/6/2010

9:00 A.M.

NAME	COMPANY/POSITION	TELE NO.	EMAIL
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JAMES YOCUM	KU	502-347-4157	JAMES.YOCUM LG+KU
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Greg Jones	"	347-4031	Greg.Jones " "
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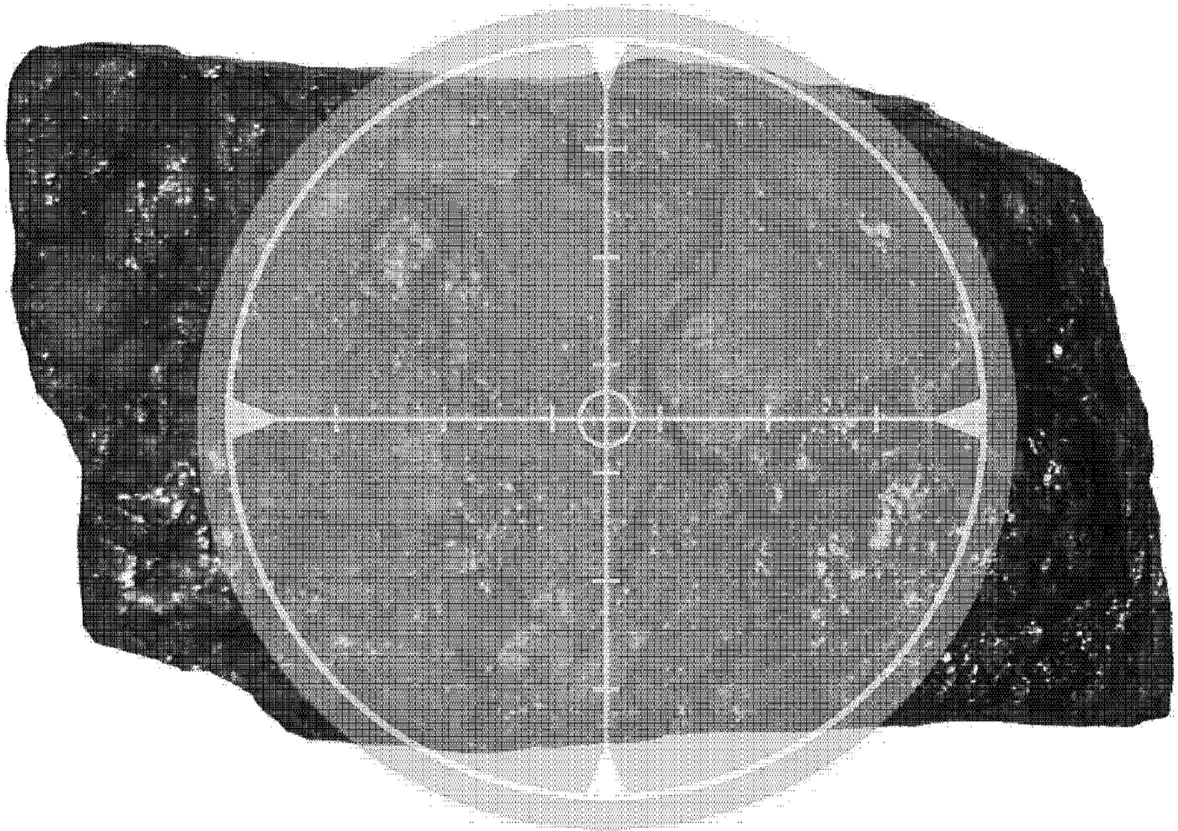
TROY BICKERS	Kentucky Utilities	502-347-4057	Troy.bickers@ " " "
Paul Wright	K.U.	502-347-4003	paul.wright@eon-us.com
Mike Drake	KU	502 347 4002	michael.drake@eon-us.com
Dave Smith	KU	(502)627-4633	dave.smith@eon-us.com

New EPA Air Regulations

Gary Revlett
Air Manager, Environmental Affairs

Coal (Still) in the Crosshairs



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Upcoming Air Related EPA Regulations

1. **Nitrogen Dioxide National Ambient Air Quality Standard: NO_x - NAAQS**
2. **Sulfur Dioxide National Ambient Air Quality Standard: SO_2 - NAAQS**
3. **Clean Air Interstate Rule (CAIR) Replacement: Clean Air Transport Rule (CATR)**
4. **Clean Air Mercury Rule (CAMR) Replacement: Electric Generating Unit Maximum Achievable Control Technology (EGU MACT)**

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New Nitrogen Dioxide National Ambient Air Quality Standard

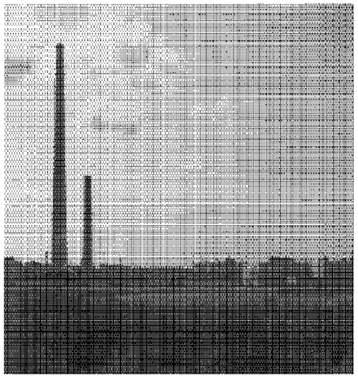
- New 1-hour NO_2 ambient air standard added to the current annual standard.
- The new ambient air standard is added to protect public health from short-term exposures.
- Sources with the greatest impact are power plants and major highways.
- Maximum impact due to short-duration adverse meteorological conditions.
- This new regulation is final and compliance is required by 2016.

Potential Company Impact(s):

- All coal-fired boilers will need tall stacks (> 400 ft.).

  OR

- Any coal-fired unit without a tall stack will need a SCR



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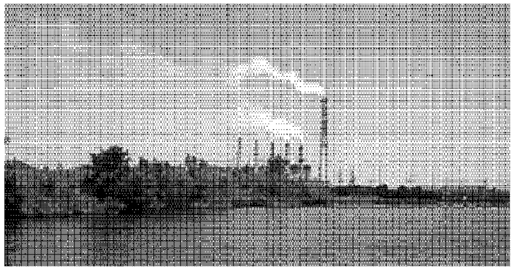
New Sulfur Dioxide National Ambient Air Quality Standard

- New 1-hour SO_2 ambient air standard added to the current 24-hour standard.
- The new ambient air standard is added to protect public health from short-term exposures.
- Sources with the greatest impact are coal-fired power plants.
- Maximum impact due to short-duration adverse meteorological conditions.
- This new regulation is final and compliance is required by end of 2016.

Potential Company Impact(s):

- All coal-fired boilers need tall stacks (> 400 ft.) and a FGD with greater than 96% removal efficiency.

  OR
- Switch to low sulfur fuels



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CAIR Replacement – Proposed Clean Air Transport Rule (CATR) for SO_2 and NO_x

- Replaces the CAIR cap-and-trade regulations which were vacated in 2008.
- The Acid Rain SO_2 cap-and-trade program will remain in place.
- 100% intrastate trading of SO_2 and NO_x allowances but limited interstate trading
- The new regulations were proposed in July, 2010 and will not be final until June, 2011.
- The proposed implementation dates of Phase 1 in 2012 and Phase 2 in 2014 are unrealistic.

Potential Company Impact(s):

- With less than 10% interstate trading allowed, utilities in Kentucky need to self comply.
- Will require a fleet-wide 20% reduction in NO_x emissions and more than 50% reduction in SO_2 emissions by 2014.

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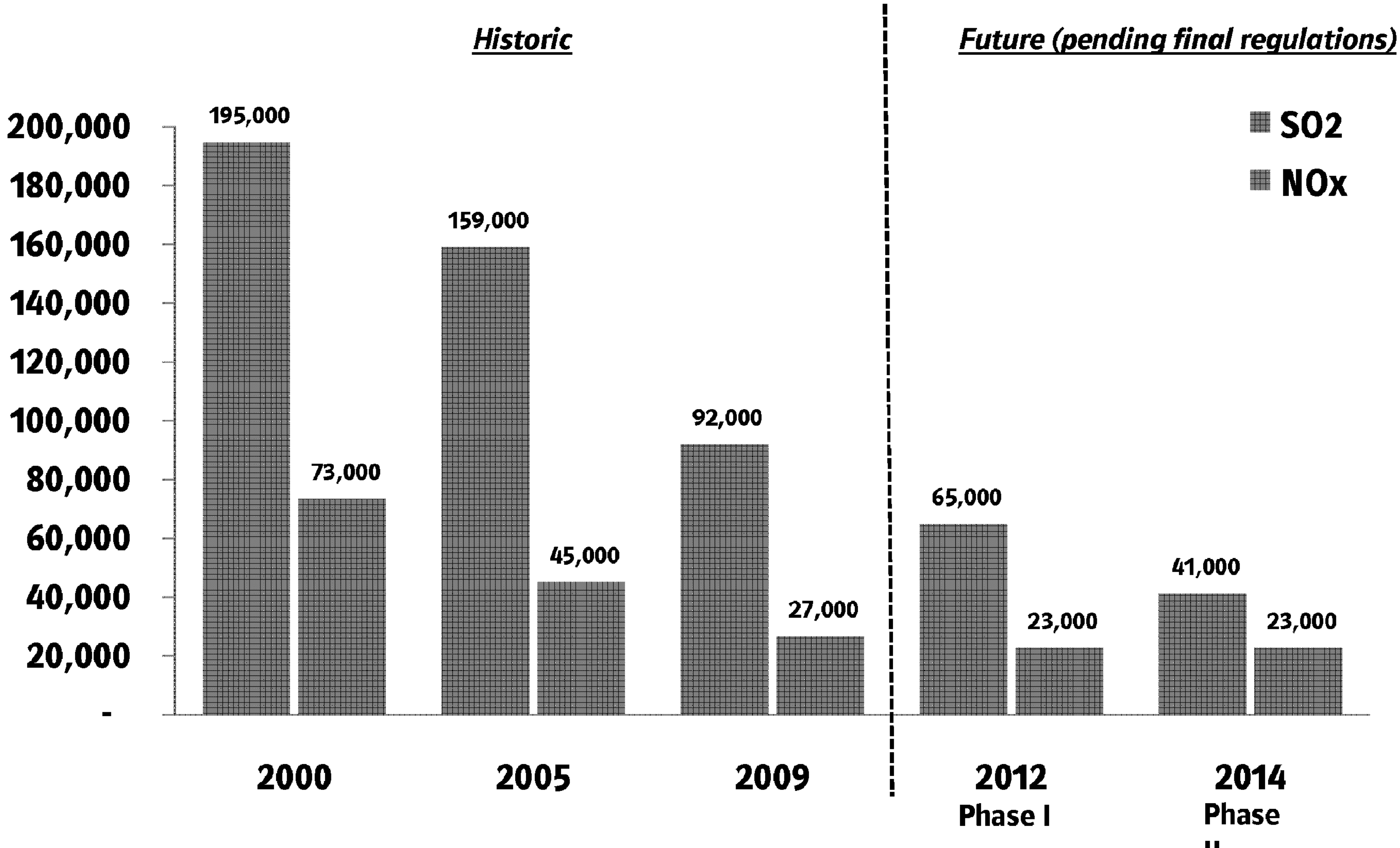
SO_2 and NO_x: Historic Emissions and CATR Allocations



KU and LG&E, 75% Trimble Co. coal

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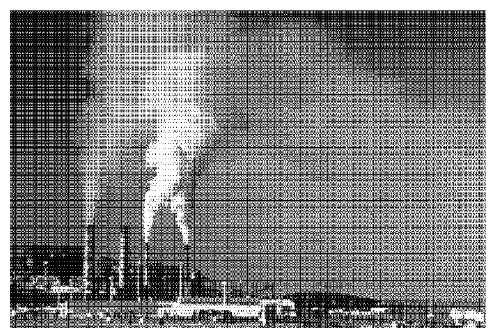
CAMR Replacement - Electric Utility Maximum Achievable Control Technology (MACT)

- **Currently the CAMR replacement has not yet been proposed by EPA.**
- **EPA plans to propose in the new rules in March 2011 and finalize in November 2011.**
- **New emissions limits for Hazardous Air Pollutants such as mercury, hydrogen chloride and hydrogen fluoride and other toxic metals.**
- **No trading of emissions or allowances, each plant must meet the pollutant specific emission limit.**
- **Expected compliance date will be 2015 with a possible 1-year extension.**

Potential Company Impact(s):

- **Most coal-fired units will need to add a baghouse with carbon and lime injection.**



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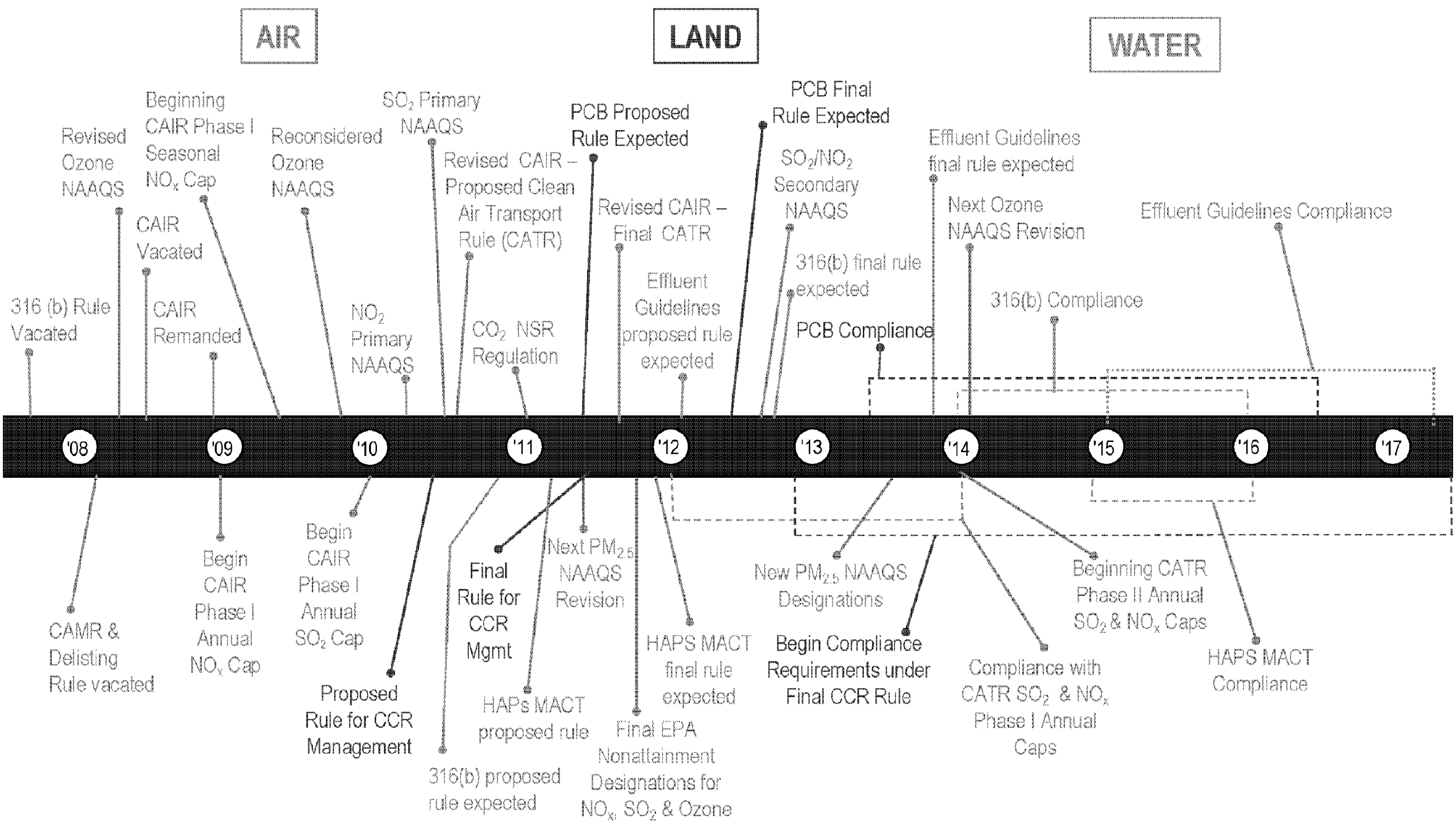

-- adapted from (EPA 2008) Updated August, 2010

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Summary

- Coal is still, and will continue to be, in the cross-hairs of the EPA.
- We will analyze every EPA proposal to determine the full magnitude of its impact, including the financial and operational implications.
- As with any proposed environmental regulation, we will continue to follow the developments and act accordingly to achieve full compliance once it takes effect.
- It will be necessary for continued coordination between departments and across the lines of business. There will be an increased effort to educate the public and key stakeholders.

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Estimated Limits & Compliance Dates For Future New Air Requirements

Ghent Station

Program Name	Regulated Pollutants: Pollutant	Limit	Units	Unit/Plant Averaging	Current Reg. Required Date	Forcasted Date for Compliance
SAM NSR NOV	H_2SO_4	2 - 10	ppm	Unit	To Be Determined	2012 - 2014
New 1-hour NAAQS for SO_2	SO_2	0.31 for plant avg.	lbs/mmBtu	Based on air quality modeling	June, 2017	June, 2016 to June, 2017
New 1-hour NAAQS for NO_x	NO_x	0.47 for plant avg.	lbs/mmBtu	Based on air quality modeling	January, 2017	No sooner than January, 2017
CATR	SO_2	0.186	lbs/mmBtu	Plant, but statewide trading	Beginning Phase I in 2012; Limits in Phase II during 2014	Beginning Phase I in 2013; Limits in Phase II during 2015
	NO_x	0.041	lbs/mmBtu			
New EGU MACT	Mercury	90% or 0.012	Removal lbs/GWH	Plant	January, 2015, with 1-yr extension - January, 2016	January, 2016, with 1-yr extension - January, 2017 Potential delay for commitment to shutdown older coal-fired units
	Acids (HCl)	0.002	lbs/mmBtu	Unit or Plant		
	Metals (PM) or Metals (As)	0.03 / 0.5×10^{-5}	lbs/mmBtu / lbs/mmBtu			
	Organics (CO)	0.10	lbs/mmBtu			
	Dioxin/Furan	15×10^{-18}	lbs/mmBtu			
$PM_{2.5}$ NAAQS	$PM_{2.5}$ or Condensable PM	To be determined based on modeling	lbs/hours	Plant	After 2017	After 2017

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Evaluation of CATR for Ghent Station

Plant	Unit	2009 Actual Emissions SO_2 (tons)	NO_x (tons)	mmBtu (year)	SO_2 Rate (lbs/mmBtu)	NO_x Rate (lbs/mmBtu)
Ghent	1	1,418.1	973.2	31,802,243	0.09	0.06
Ghent	2	5,044.3	2,664.9	24,783,886	0.41	0.22
Ghent	3	3,188.6	1,972.3	34,425,557	0.19	0.11
Ghent	4	1,220.5	802.8	28,668,181	0.09	0.06
Ghent	**Total**	**10,872**	**6,413**	**119,679,867**	**0.182**	**0.107**

Plant	Unit	CATR Allocation Tons			CATR Alterative lb/mmBtu			SO_2 2012 Heat Input	NO_x 2012 Heat Input
		SO_2 for 2012	SO_2 for 2014	NO_x in ≥ 2012	SO_2 for 2012	SO_2 for 2014	NO_x in ≥ 2012		
Ghent	1	2,221	3,653	794	0.139	0.214	0.050	31,854,467	31,477,413
Ghent	2	2,101	1,813	976	0.180	0.108	0.058	23,378,147	33,536,165
Ghent	3	3,578	3,363	483	0.199	0.203	0.030	35,919,897	32,698,639
Ghent	4	1,214	3,359	468	0.079	0.203	0.029	30,683,824	32,663,045
Ghent	**Total**	**9,114**	**12,188**	**2,721**	**0.155**	**0.186**	**0.041**	**121,836,336**	**130,375,262**

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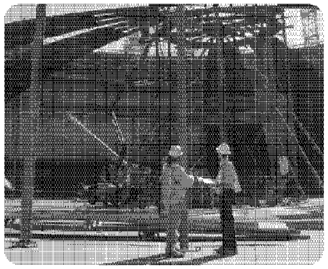

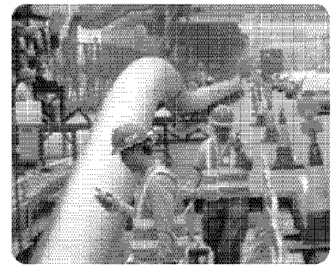
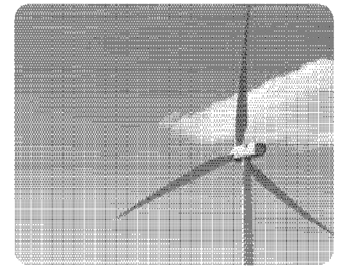

Phase II AQC Study
Ghent Station Kickoff

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October 2010

Agenda

- Regulatory drivers
- PJFF overview
- Overview of phase I results

Regulatory drivers – still uncertainty

Program Name	Regulated Pollutants	Forecasted Date for Compliance
PSD/NSR	SAM Ghent Units 1- 4	E.ON currently negotiating with EPA
1-hour NAAQS for NO_x	NO_x	2015 - 2017
1-hour NAAQS for SO_2	SO_2	2016
Clean Air Transport Rule	NO_x SO_2	Beginning in 2012 Phase in 2014
New EGU MACT	Mercury Acids (HCl) Metals (PM) Metals (AS) Organics (CO) Dioxin/Furan	Estimated January, 2015; with 1-yr extension - January, 2016

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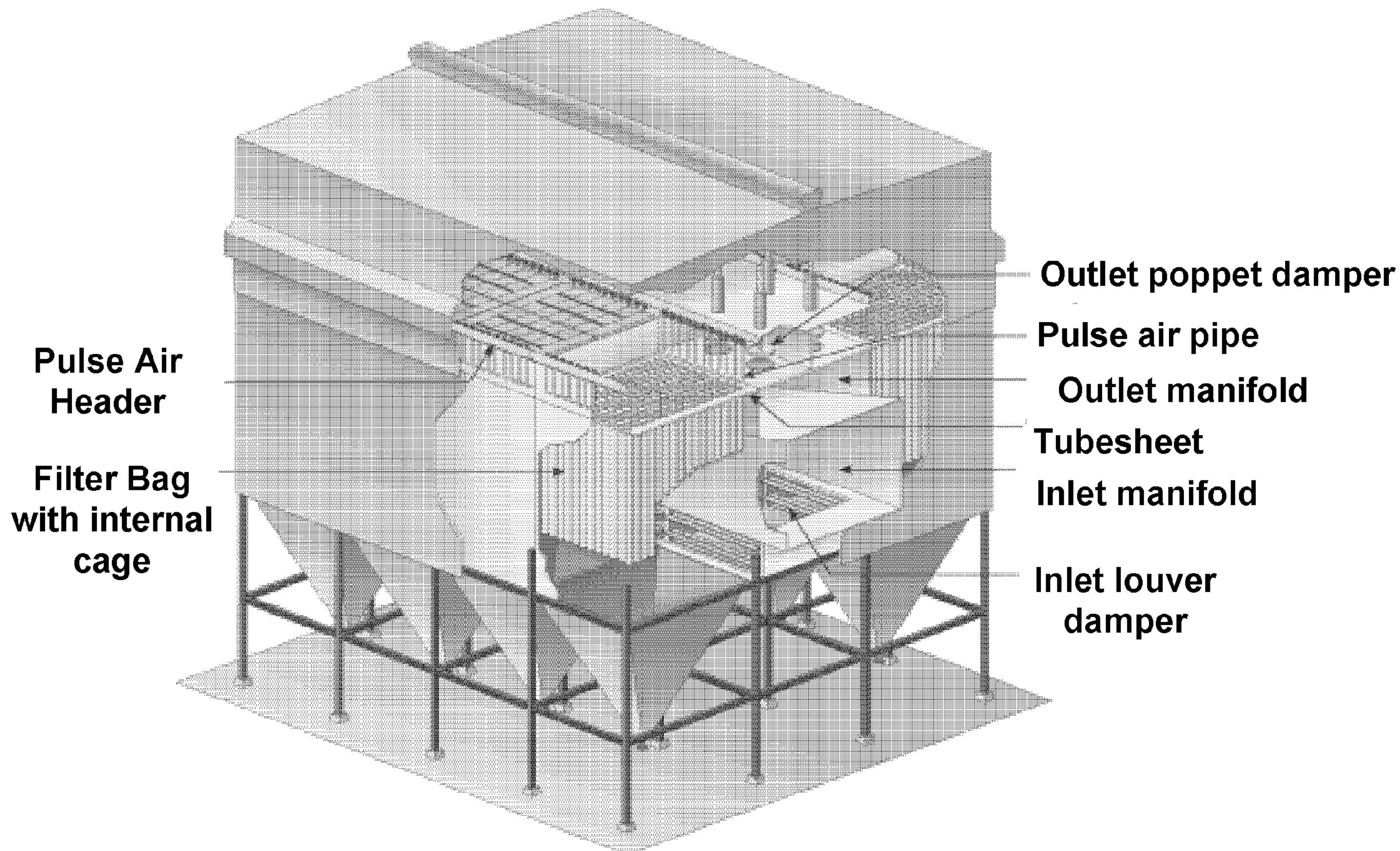
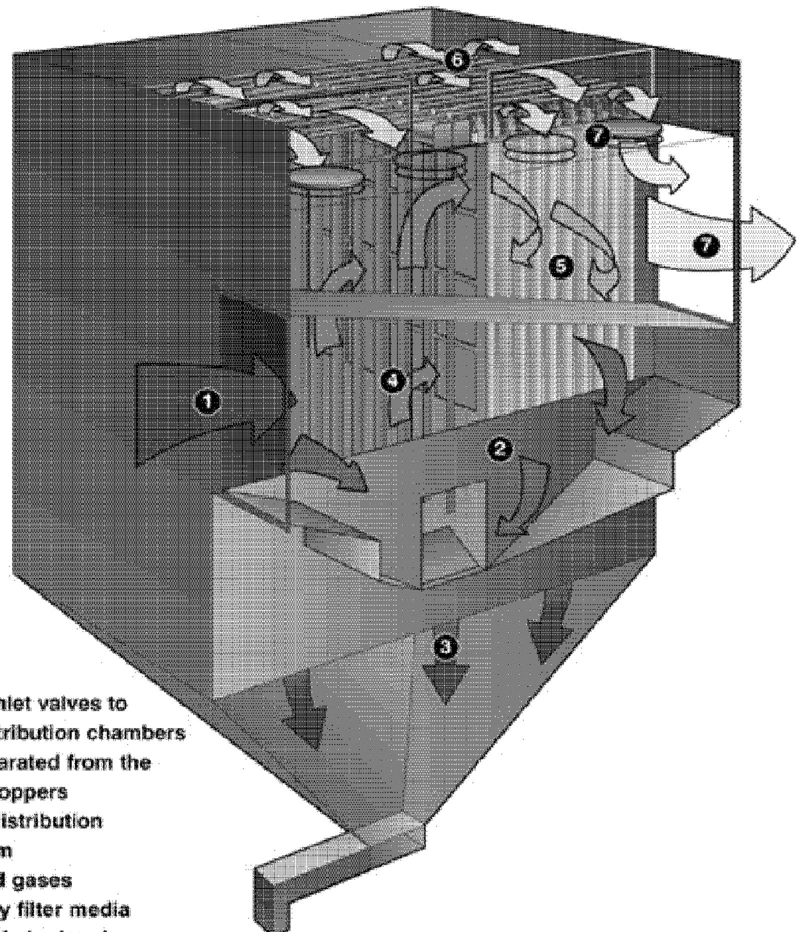
PJFF Overview

PJFF – overall layout



Courtesy: Babcock & Wilcox

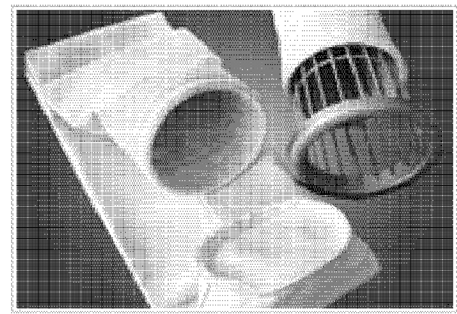
PJFF – flow diagram



❶ Process gas inlet
❷ Gas passes through inlet valves to pre-separator and distribution chambers
❸ Heavy particulate separated from the gas for collection in hoppers
❹ Gas passes through distribution system giving optimum dispersion of dust and gases
❺ Particulate removed by filter media
❻ Gas passes to cleaned air chamber
❼ Clean gases exit through outlet valves and cleaned air duct

PJFF advantages vs. DESP

- Fuel flexibility
- High efficiency especially on $PM_{2.5}$
- Performance is less susceptible to plant operating conditions
- Works well during startups
- Better control of hazardous air pollutants such as heavy metals (Ar, Ni, Pb, etc.)
- Allows reagent injection to work better (Hg or SO_3)



PJFF disadvantages vs. DESP

- Bags damaged by high temperatures
- High pressure drop
- Periodic bag replacement

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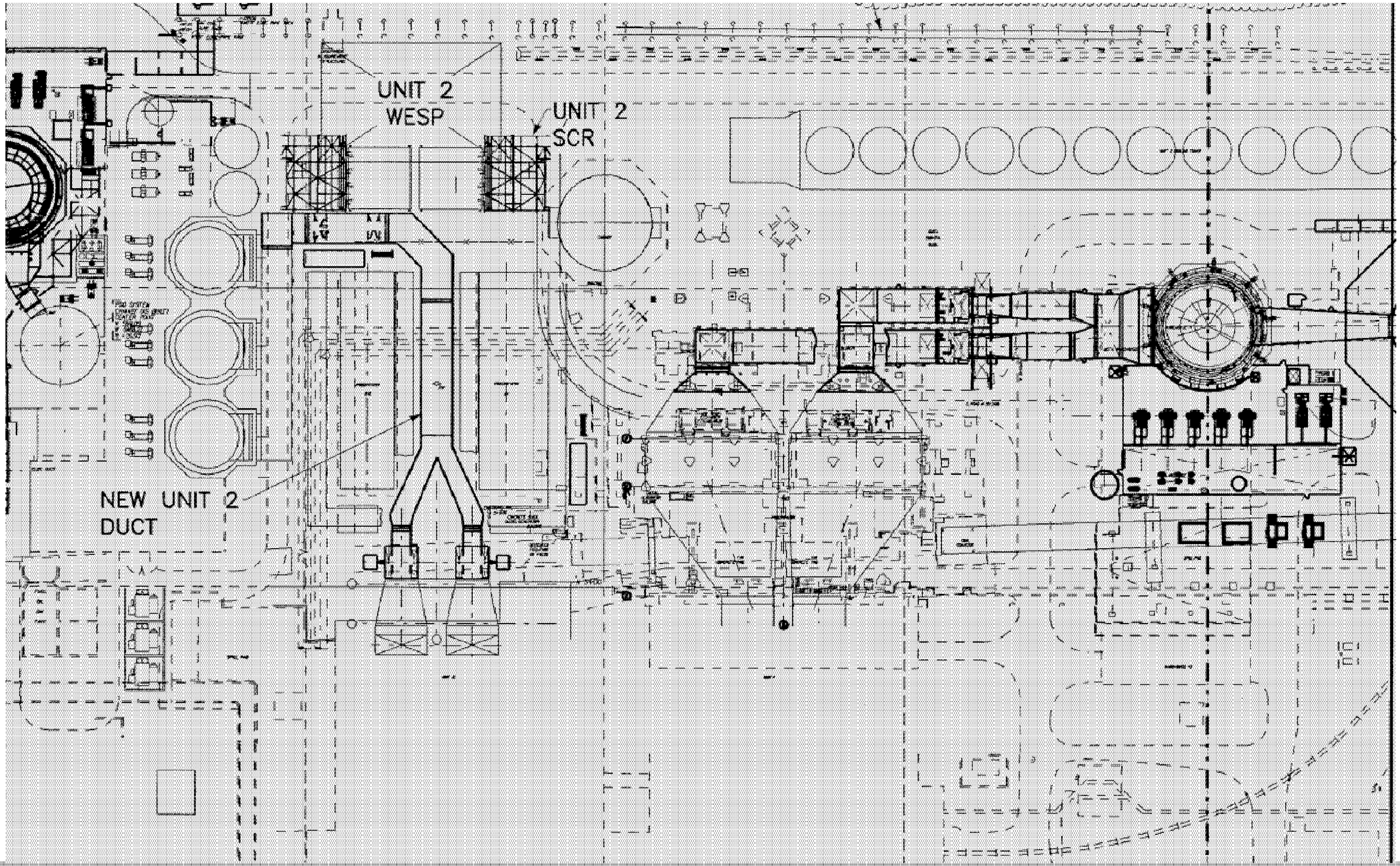
Overview of Phase I Results

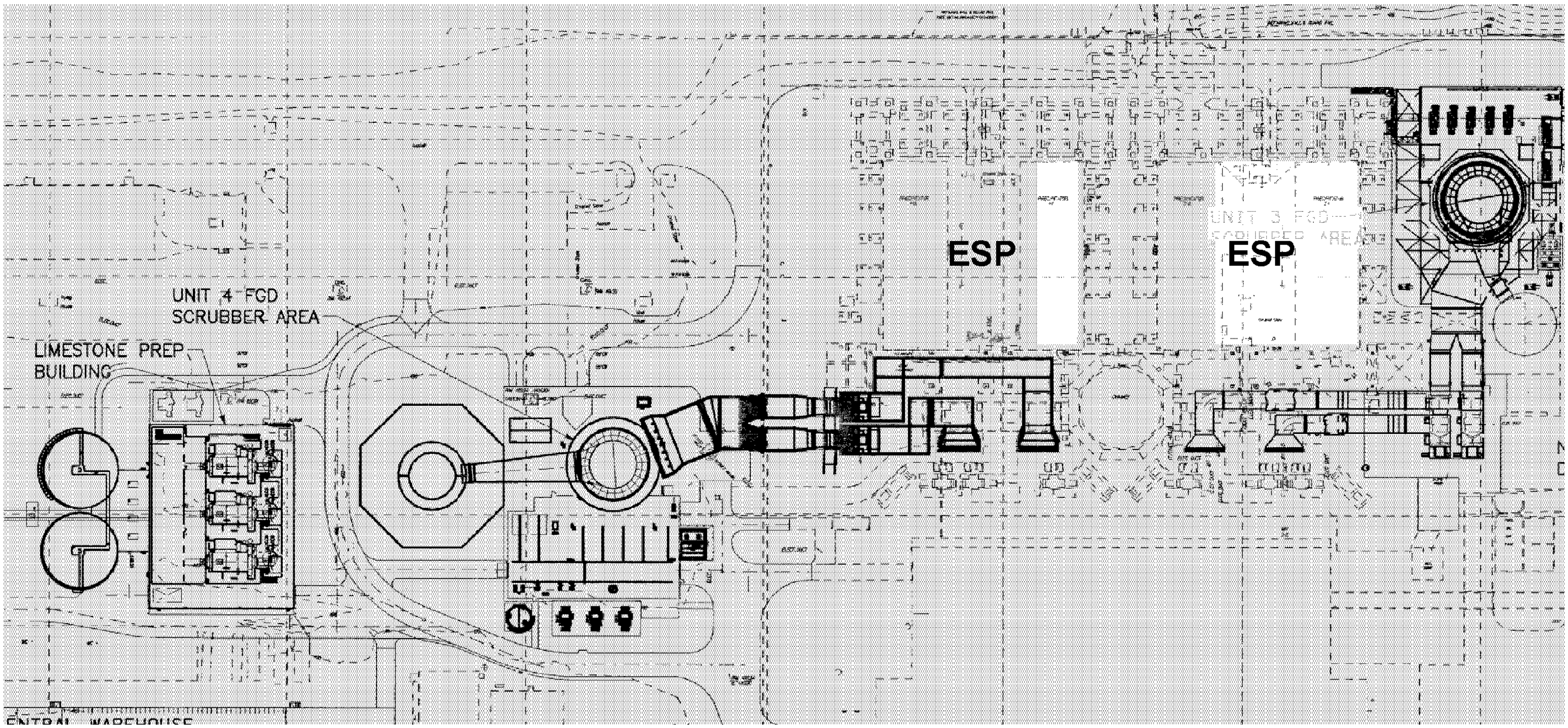
Phase I AQCS results for Ghent Station

- Ghent Unit 1
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection
- Ghent Unit 2
  - Selective Catalytic Reduction (SCR) System
  - Pulse Jet Fabric Filter (PJFF)
  - Lime / Trona Injection
  - Powdered Activated Carbon (PAC) Injection
- Ghent Unit 3
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection
- Ghent Unit 4
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection

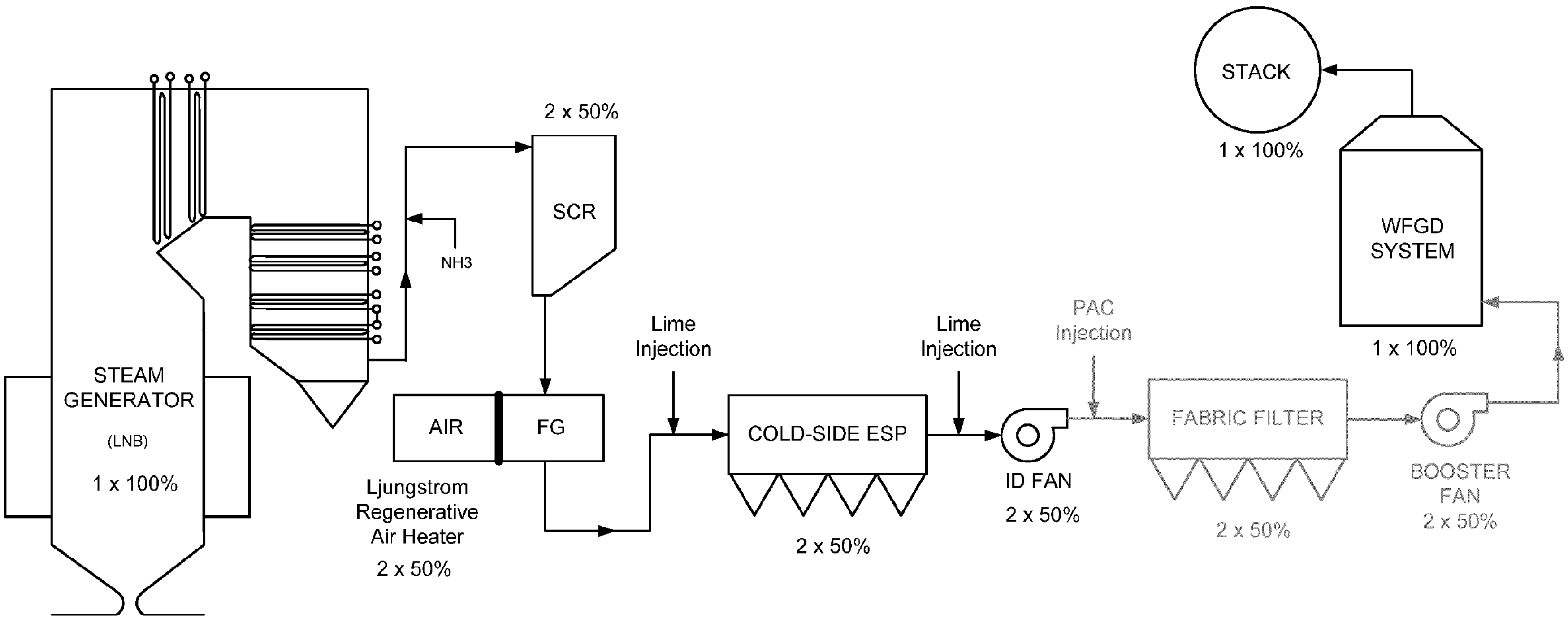
Ghent Unit 1 and Unit 2 space constraints



Ghent Unit 3 and Unit 4 space constraints



Ghent Unit 1 layout



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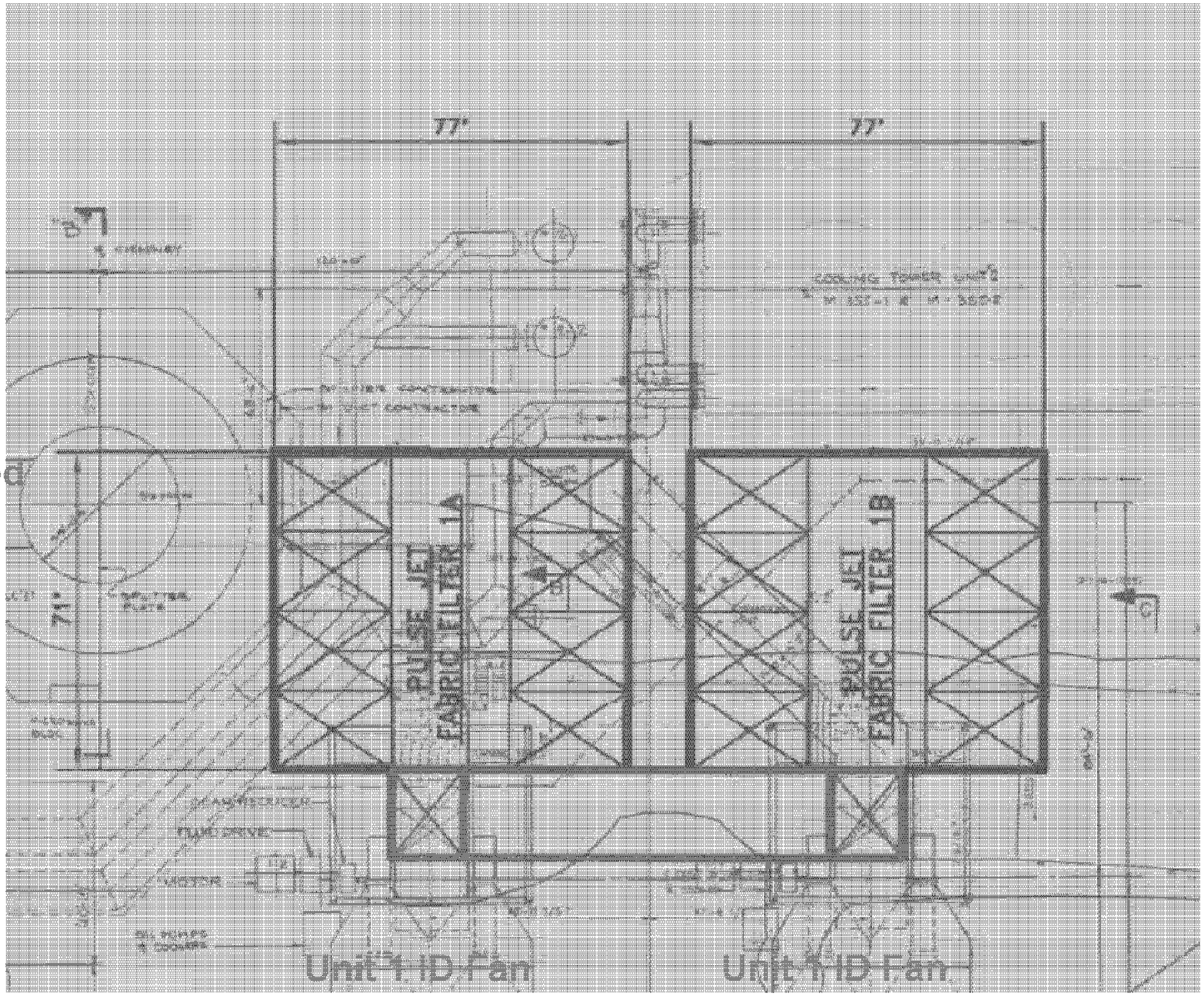
Ghent Unit 1 PJFF layout

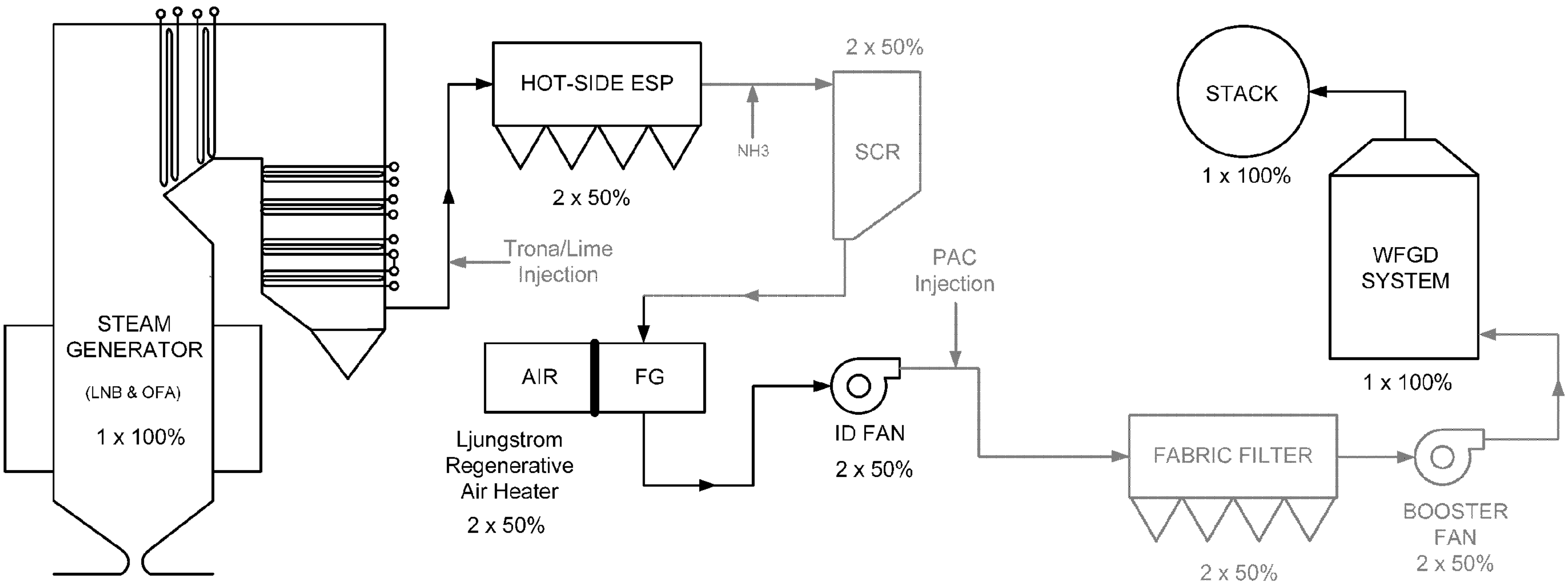
Unit 2 Abandoned Stack



Ghent Unit 1 PJFF challenges

- Elevated PJFF
- Real estate constraints
- Demolition and relocation of pipe racks
- Difficult crane access
- Restricted cooling tower access during project execution
- Lattice boom / crawler crane booms for final assembly

Ghent Unit 2 layout



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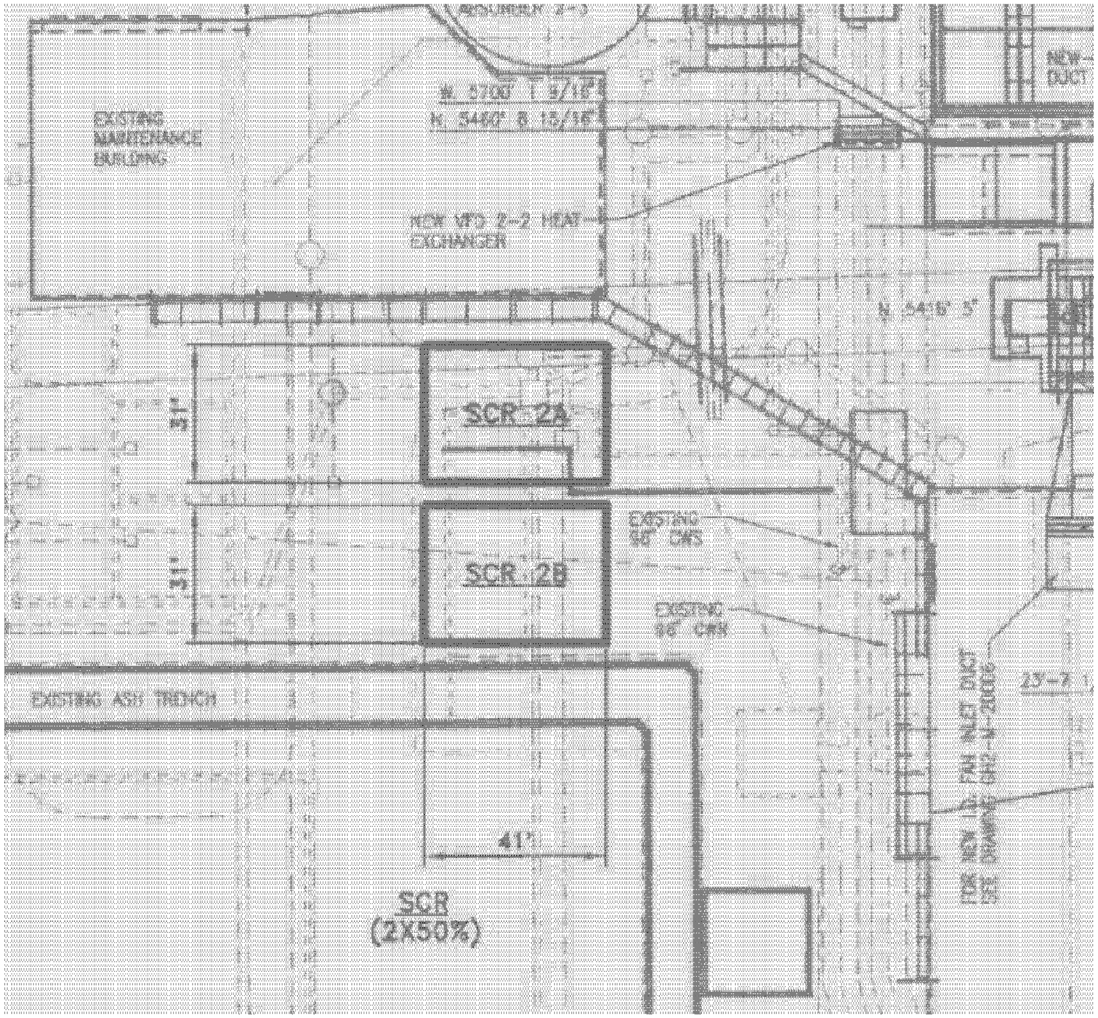
Ghent Unit 2 SCR layout



Unit 2 Boiler Building

Ghent Unit 2 SCR challenges

- Equipment lifting required over areas of high personnel traffic
- Demolition of overhead walkway between Unit 2 & Unit 3 boiler building
- Demolition and relocation of overhead power lines
- Tower crane for heavy equipment and final assembly of SCR
- Demolition and relocation of pipe-racks

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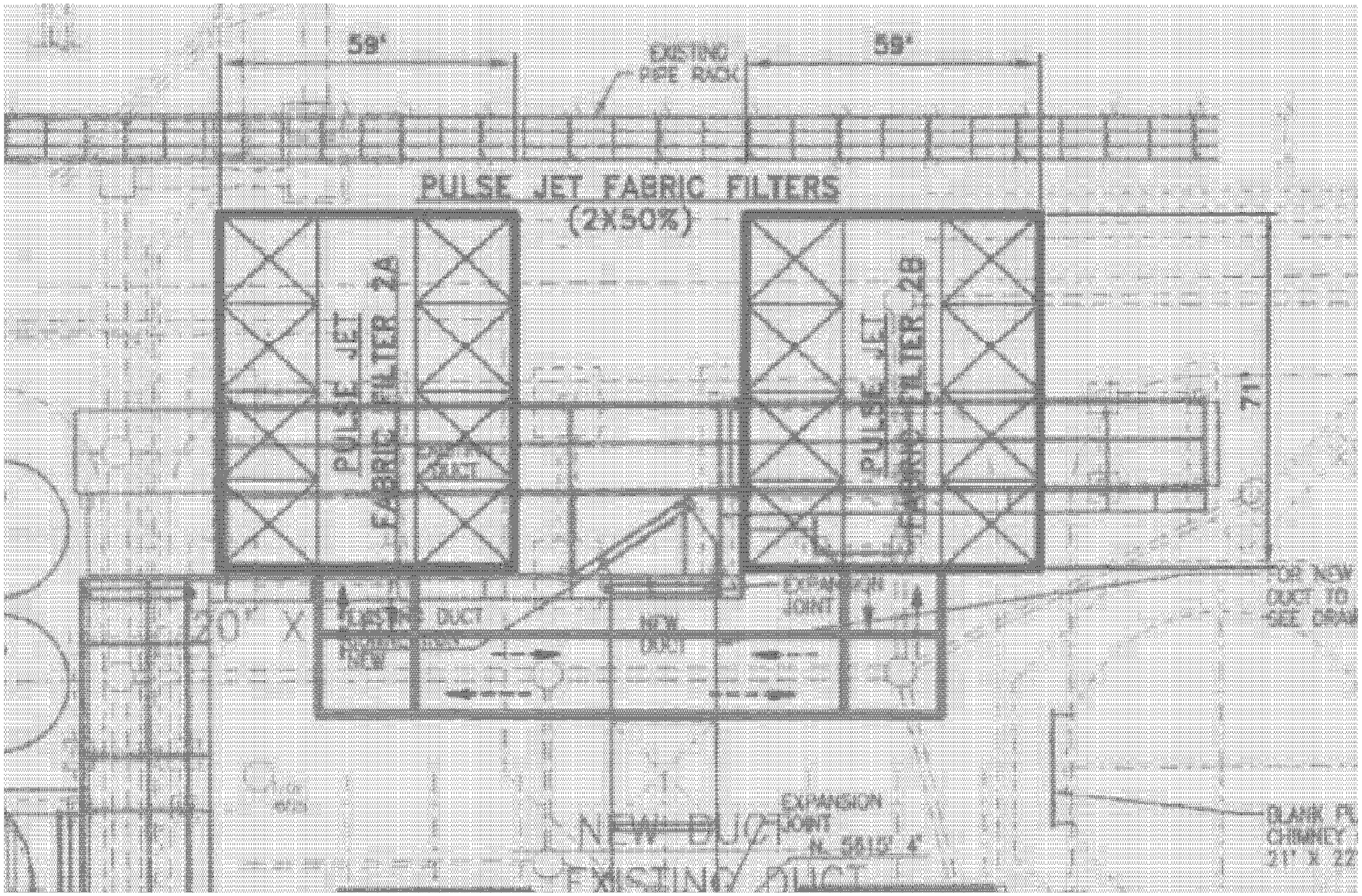
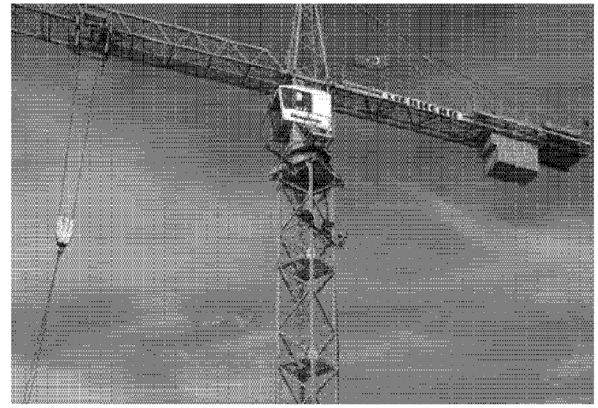
Ghent Unit 2 PJFF layout



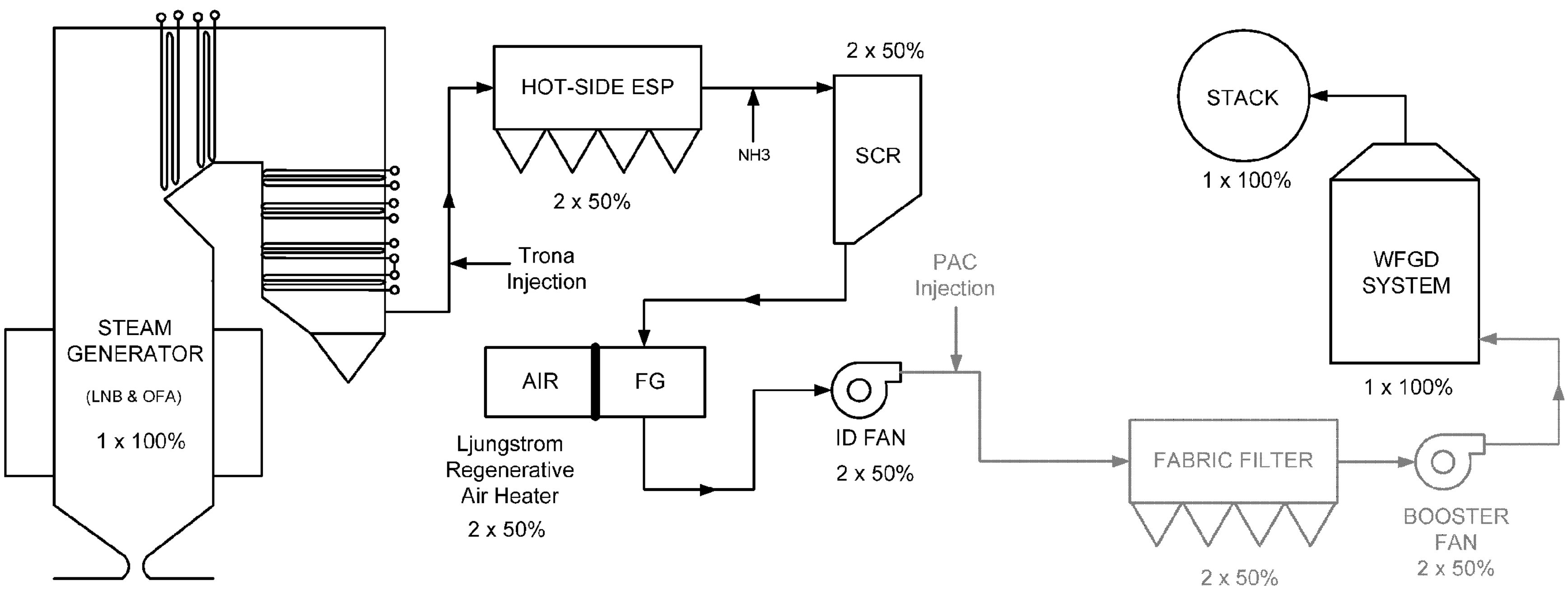
Unit 2 ID Fan
Outlet Ductwork

Ghent Unit 2 PJFF challenges



- Elevated PJFF
- Real estate constraints
- Difficult crane access
- Demolition and relocation of pipe racks
- Restricted cooling tower access during project execution
- Lattice boom / crawler crane booms for final assembly
- Bypass duct required

Ghent Unit 3 / Unit 4 layout



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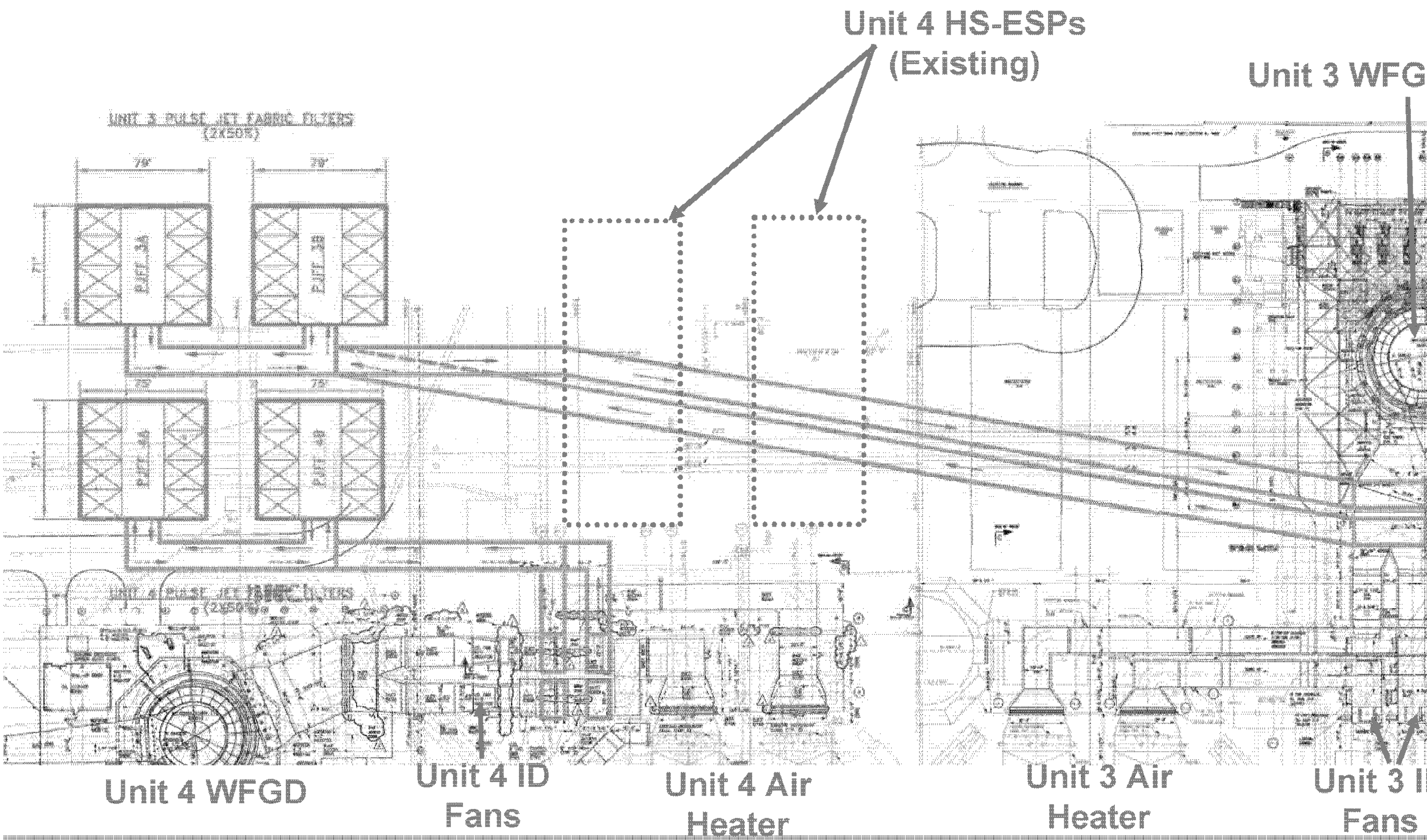
Ghent Unit 3 and Unit 4 PJFF layout



Ghent Unit 3 PJFF challenges

- Site constraints
- Long ductwork for Unit 3
- Restricted access around the footprint of Unit 3 ESP – tight space
- Difficult crane access for tie in of Unit 3 fabric filter inlet/outlet ductwork

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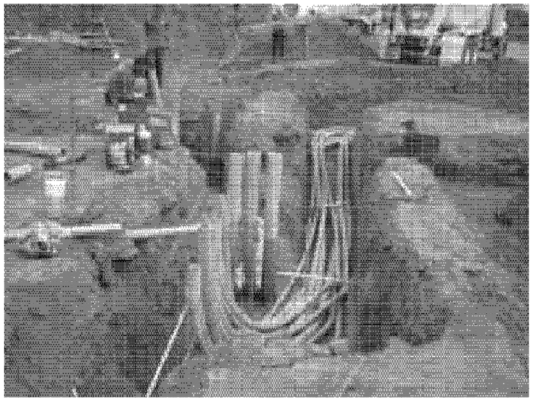
Ghent Unit 4 PJFF challenges

- Demolish and relocate underground utilities
  - Electrical manholes
  - Water wells
  - Storm sewer boxes and piping
  - Circulating cooling water piping

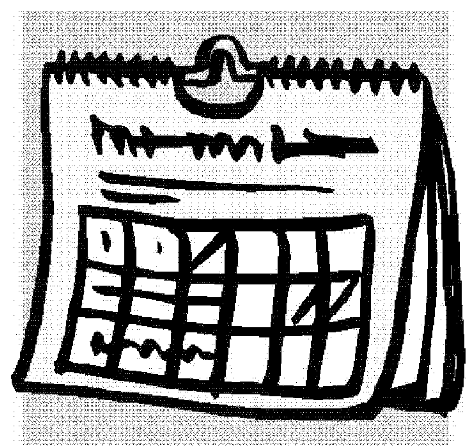


Typical PJFF schedule

- 32 to 36 months
  - Engineering & procurement – 16 months
  - Erect PJFF foundations – 6 months
  - Erect PJFF – 12 months
  - Tie-in outage – 1 month
  - Start-up – 1 month

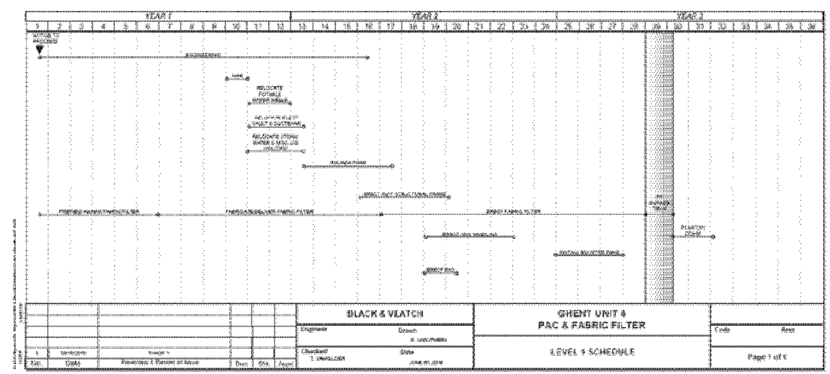
Typical SCR schedule

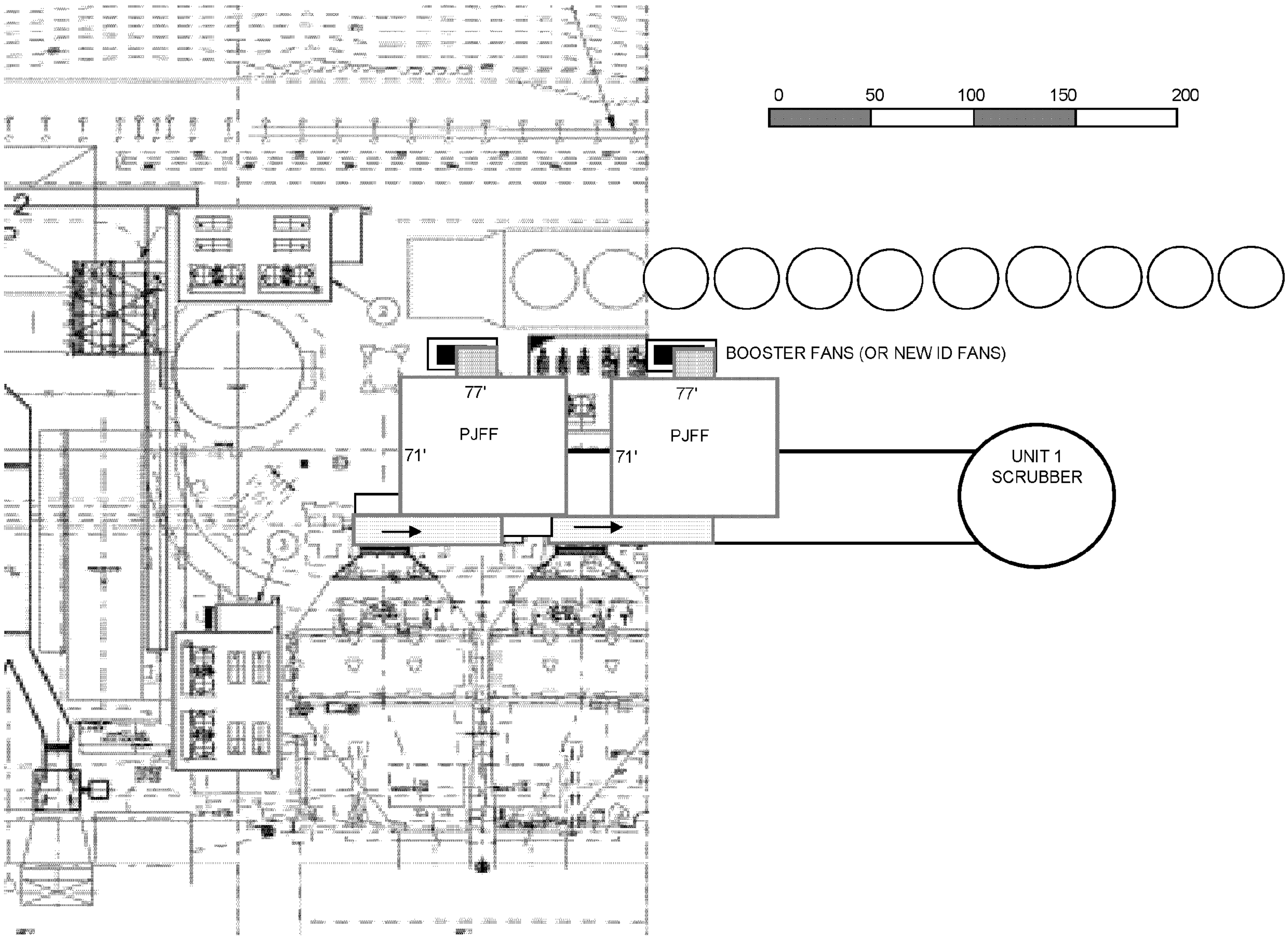
- 32 to 36 months
  - Engineering & procurement – 16 months
  - Erect SCR foundations – 4 months
  - Erect SCR support steel – 4 months
  - Erect SCR & ductwork – 8 months
  - Tie-in outage – 1 month
  - Start-up – 1 month

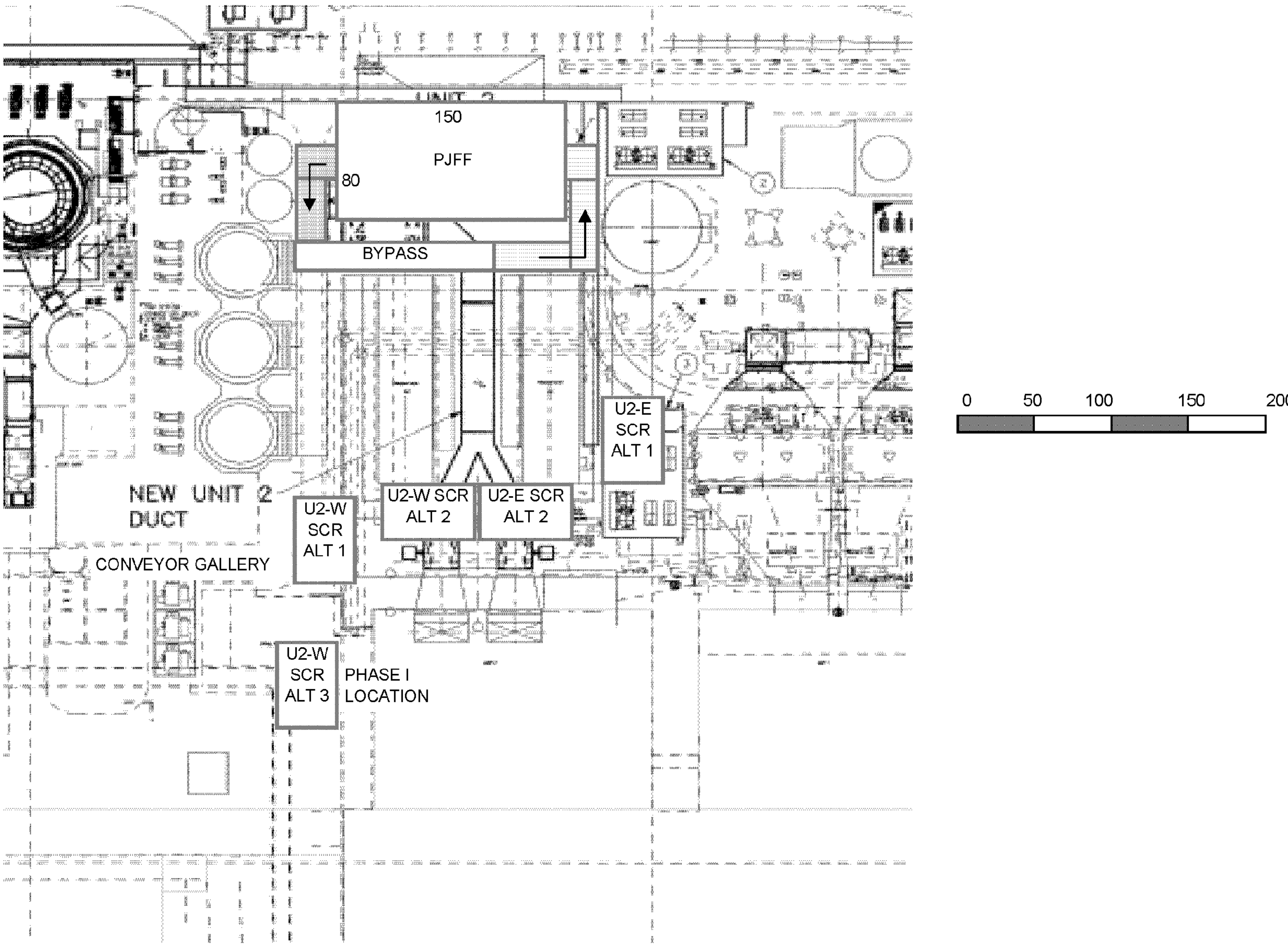


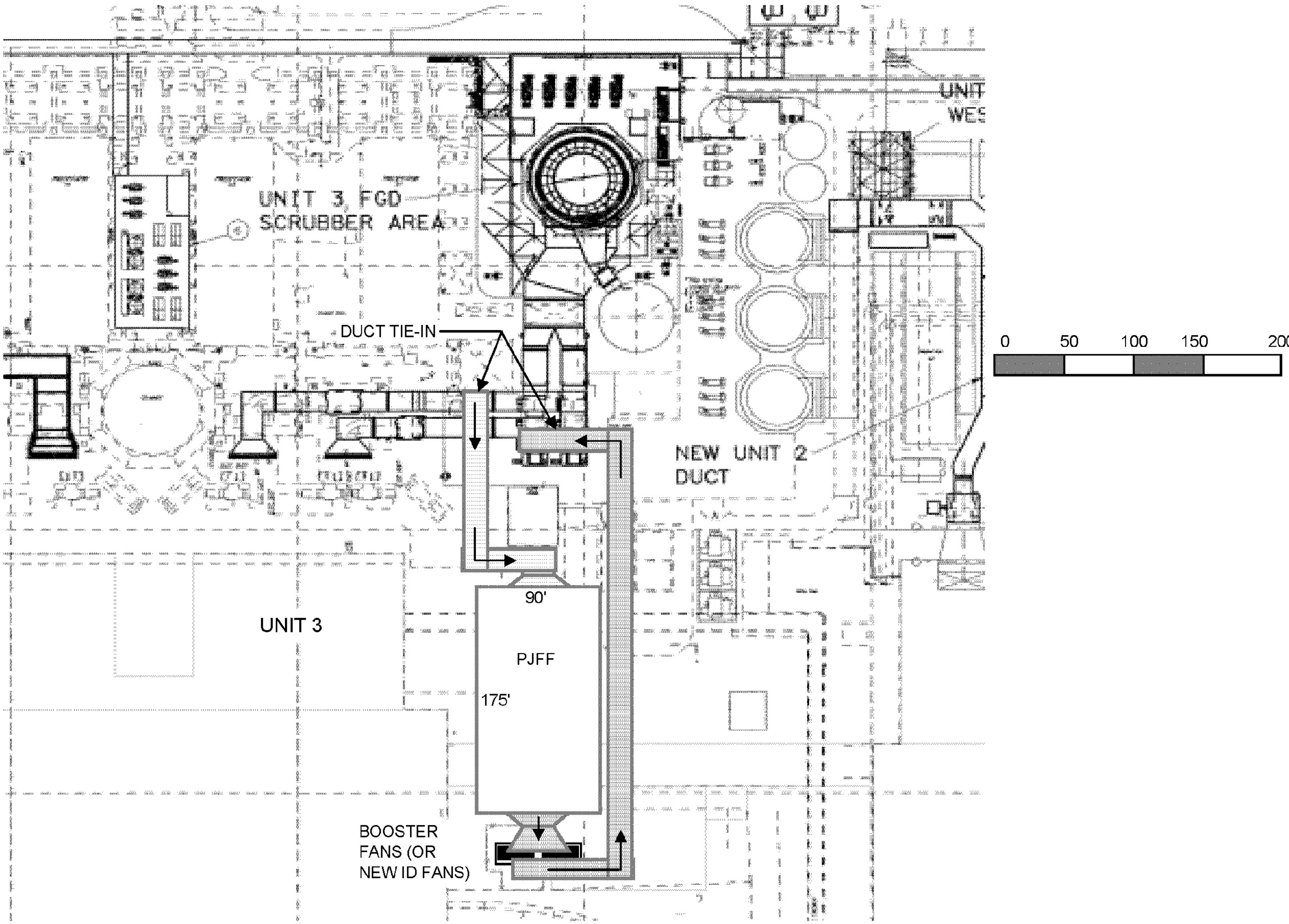
Phase I implementation schedule

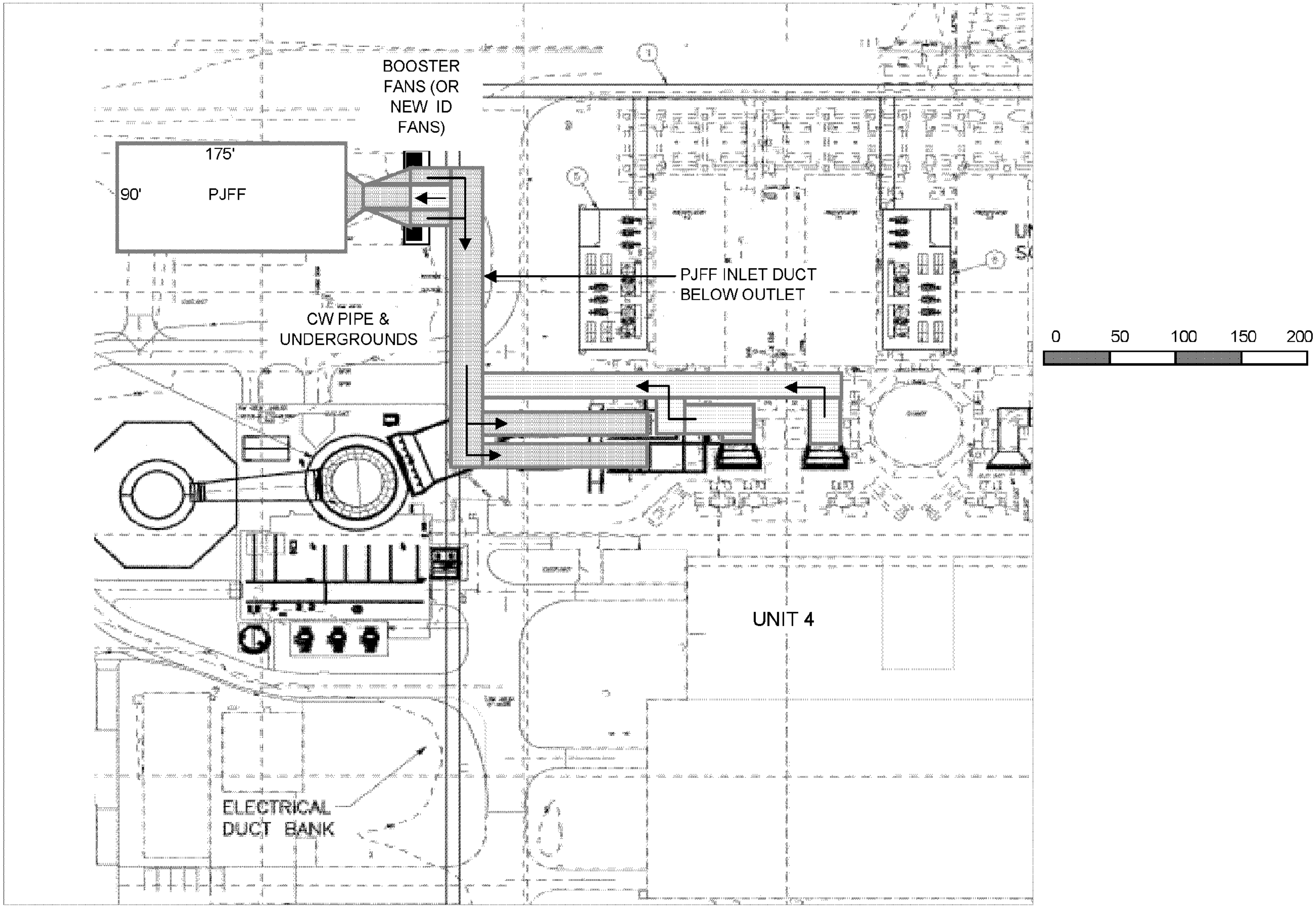
- Ghent Unit 1 PJFF – 36 months
- Ghent Unit 2 SCR & PJFF – 44 months
- Ghent Unit 3 PJFF – 32 months
- Ghent Unit 4 PJFF – 32 months

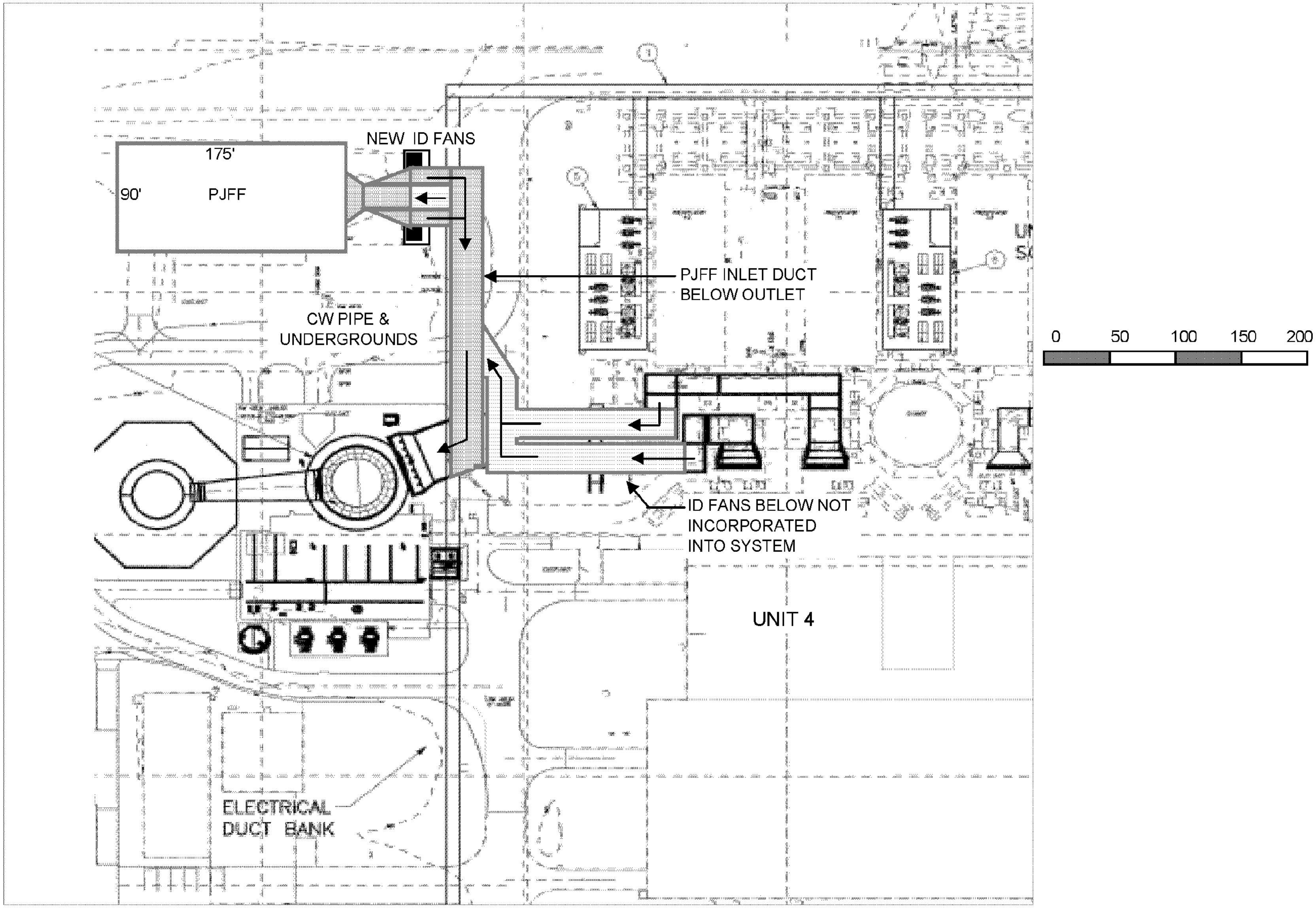



0
50
100
150
200
BOOSTER FANS (OR NEW ID FANS)
77'
PJFF
71'
77'
PJFF
71'
UNIT 1
SCRUBBER


150
PJFF
80
BYPASS
U2-E SCR ALT 1
NEW UNIT 2 DUCT
U2-W SCR ALT 1
U2-W SCR ALT 2
U2-E SCR ALT 2
CONVEYOR GALLERY
U2-W SCR ALT 3
PHASE I LOCATION
0
50
100
150
200


UNIT 3 FGD SCRUBBER AREA
DUCT TIE-IN
NEW UNIT 2 DUCT
0
50
100
150
200
90'
UNIT 3
PJFF
175'
BOOSTER FANS (OR NEW ID FANS)


BOOSTER FANS (OR NEW ID FANS)
175'
90'
PJFF
PJFF INLET DUCT BELOW OUTLET
CW PIPE & UNDERGROUNDS
0
50
100
150
200
UNIT 4
ELECTRICAL DUCT BANK


NEW ID FANS
175'
90'
PJFF
PJFF INLET DUCT
BELOW OUTLET
CW PIPE &
UNDERGROUNDS
ID FANS BELOW NOT
INCORPORATED
INTO SYSTEM
UNIT 4
ELECTRICAL
DUCT BANK
0
50
100
150
200

From:	Hillman, Timothy M.
To:	Saunders, Eileen
CC:	Lucas, Kyle J.; Wehrly, M. R.; Crabtree, Jonathan D.
Sent:	11/3/2010 10:32:28 AM
Subject:	Draft Mill Creek Validation and Brown Kickoff Presentations for Review.
Attachments:	Draft Brown kickoff Presentation 110310.pdf; Draft Mill Creek Validation Presentation 110310.pdf

Eileen,

Please find attached draft presentations for the Mill Creek validation and Brown kickoff meetings. I'm circulating them to you at the same time as my team for final review.

I believe you'll find the Brown kickoff presentation very similar to the previous ones. We've included slides on PJFF and SCR vs. SNCR as requested.
In the Mill Creek validation presentation, we have included the arrangement sketches for the different options and summarized the major pros and cons of each. These slides should facilitate additional discussions where more detail can be discussed on the attributes of each arrangement. Finally, we have a placeholder in the side deck for the 3-D models of the arrangement alternatives that we are currently working on. I think the 3-D models will be invaluable during are meeting, as a picture speaks a thousand words.

If you could provide a quick review of these and let us know your thoughts by the end of the day, then we will be in a position to finalize them and prepare copies for next week.

Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

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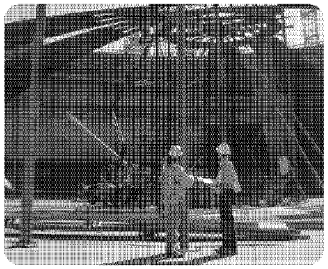

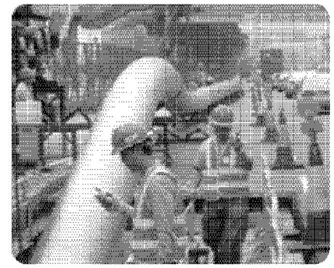
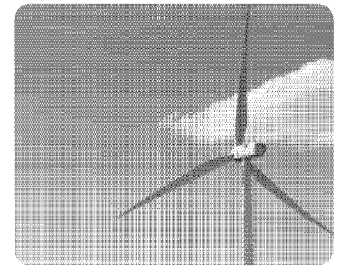

Phase II AQC Study
Brown Station Kickoff

LG&E KU

PPL companies

Black & Veatch

November 2010

Agenda

- Regulatory drivers
- PJFF overview
- SCR vs. SNCR
- Overview of phase I results

Regulatory drivers – still uncertainty

Program Name	Regulated Pollutants	Forecasted Date for Compliance
PSD/NSR	SAM Units 1-3	Draft Permit Limit for SCR Startup
1-hour NAAQS for NO_x	NO_x	January 2017
1-hour NAAQS for SO_2	SO_2	June 2017
Clean Air Transport Rule	NO_x SO_2	Beginning in 2012 Phase in 2014
New EGU MACT	Mercury Acids (HCl) Metals (PM) Metals (AS) Organics (CO) Dioxin/Furan	Estimated January, 2015; with 1-yr extension - January, 2016

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PJFF Overview

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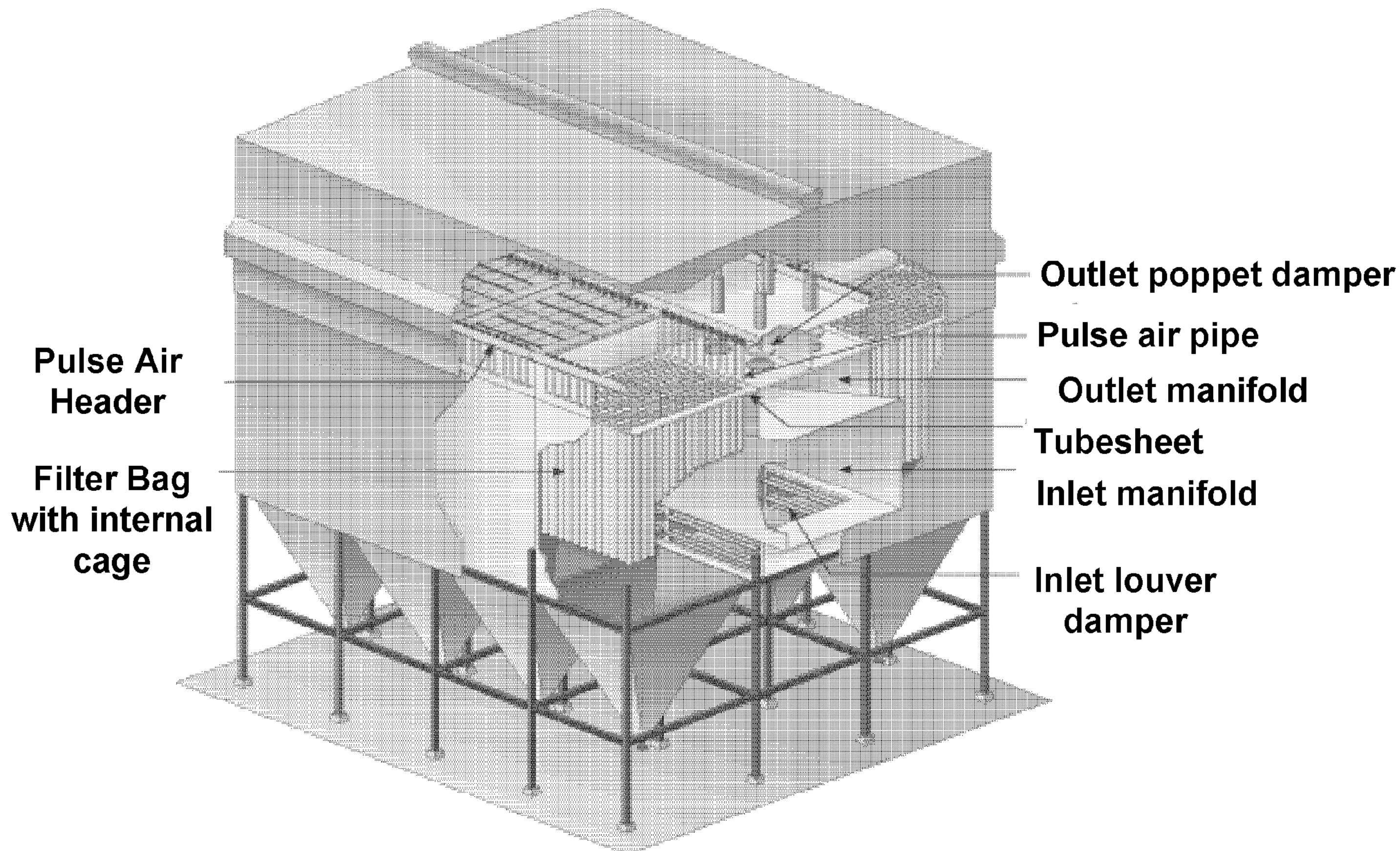
PJFF – overall layout



Courtesy: Babcock & Wilcox

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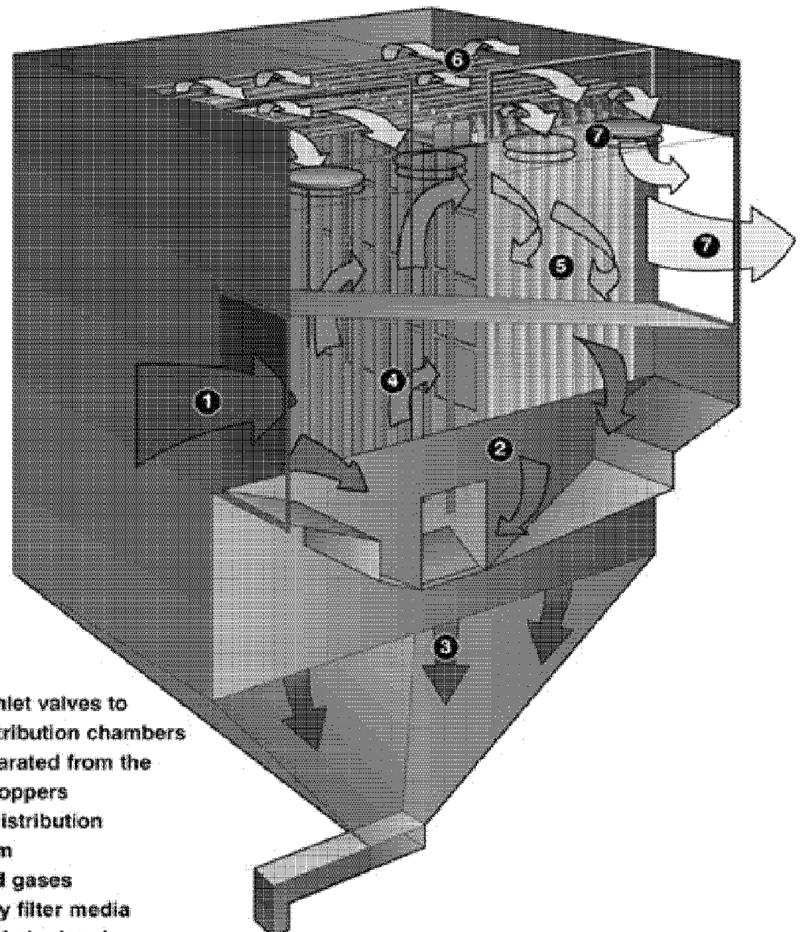
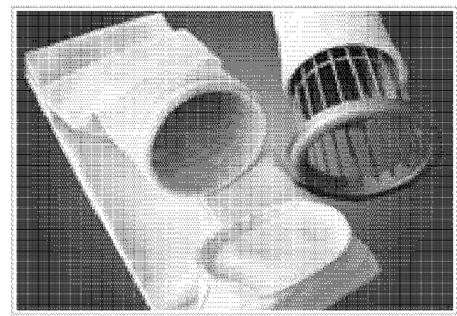
PJFF – flow diagram



1. Process gas inlet
2. Gas passes through inlet valves to pre-separator and distribution chambers
3. Heavy particulate separated from the gas for collection in hoppers
4. Gas passes through distribution system giving optimum dispersion of dust and gases
5. Particulate removed by filter media
6. Gas passes to cleaned air chamber
7. Clean gases exit through outlet valves and cleaned air duct

PJFF advantages vs. DESP

- Fuel flexibility
- High efficiency especially on $PM_{2.5}$
- Performance is less susceptible to plant operating conditions
- Works well during startups
- Better control of hazardous air pollutants such as heavy metals (Ar, Ni, Pb, etc.)
- Allows reagent injection to work better (Hg or SO_3)



PJFF disadvantages vs. DESP

- Bags damaged by high temperatures
- High pressure drop
- Periodic bag replacement

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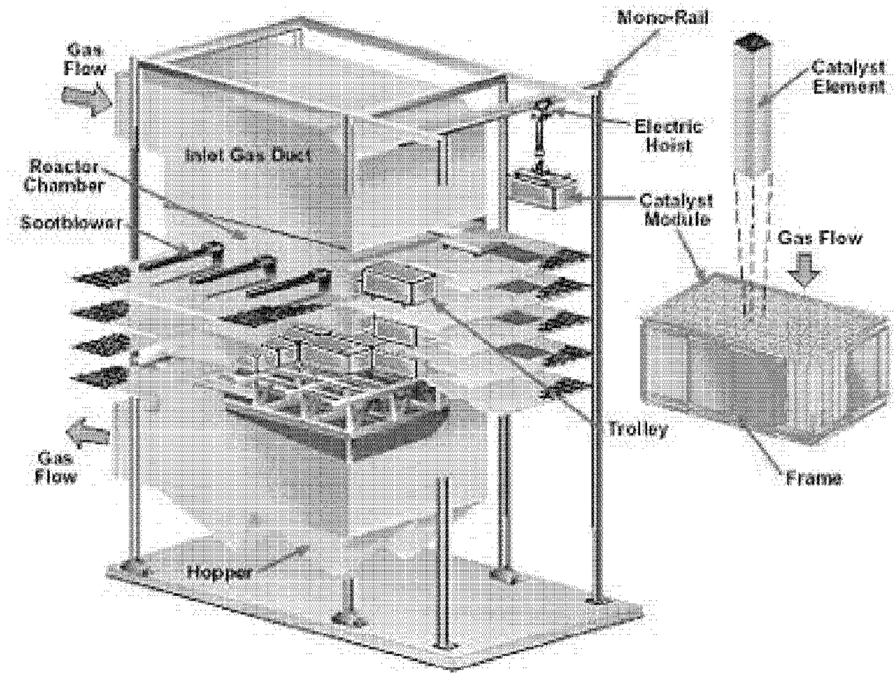
SCR vs. SNCR

SCR – overall layout



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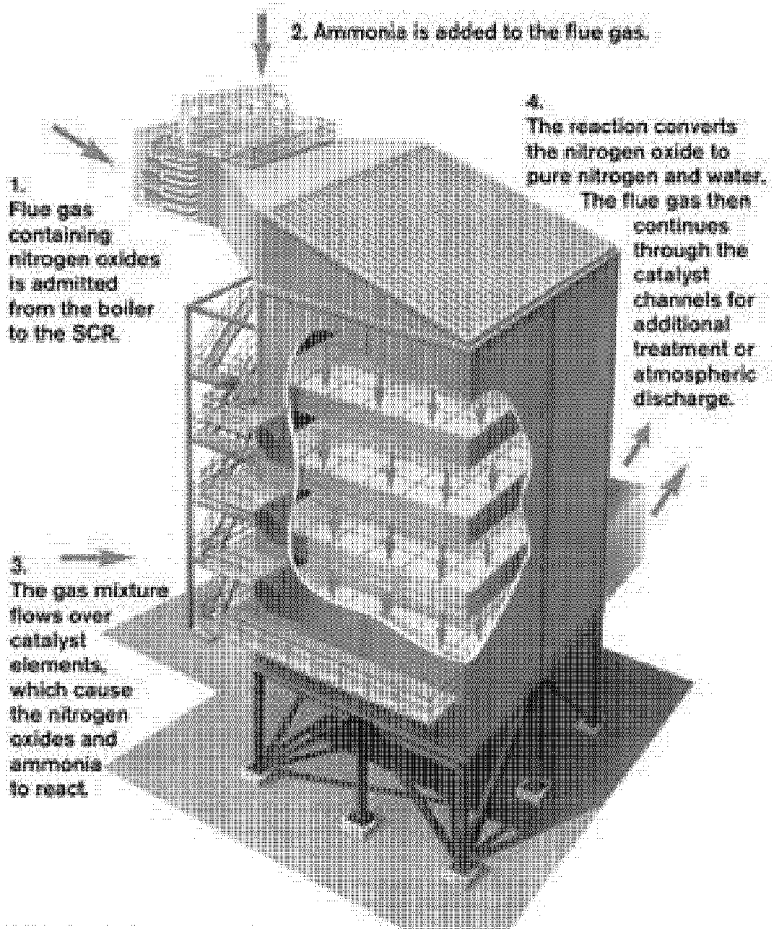
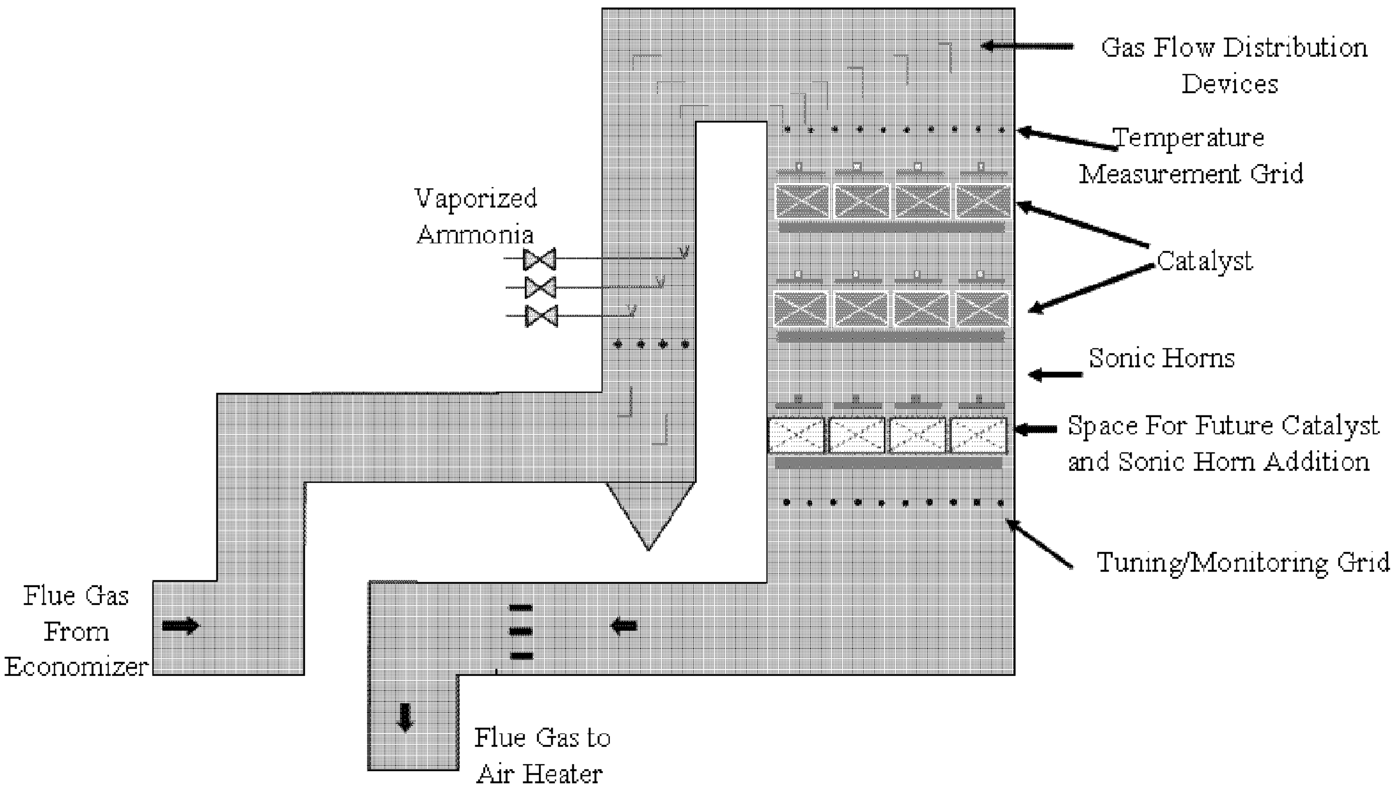
SCR – flow diagram

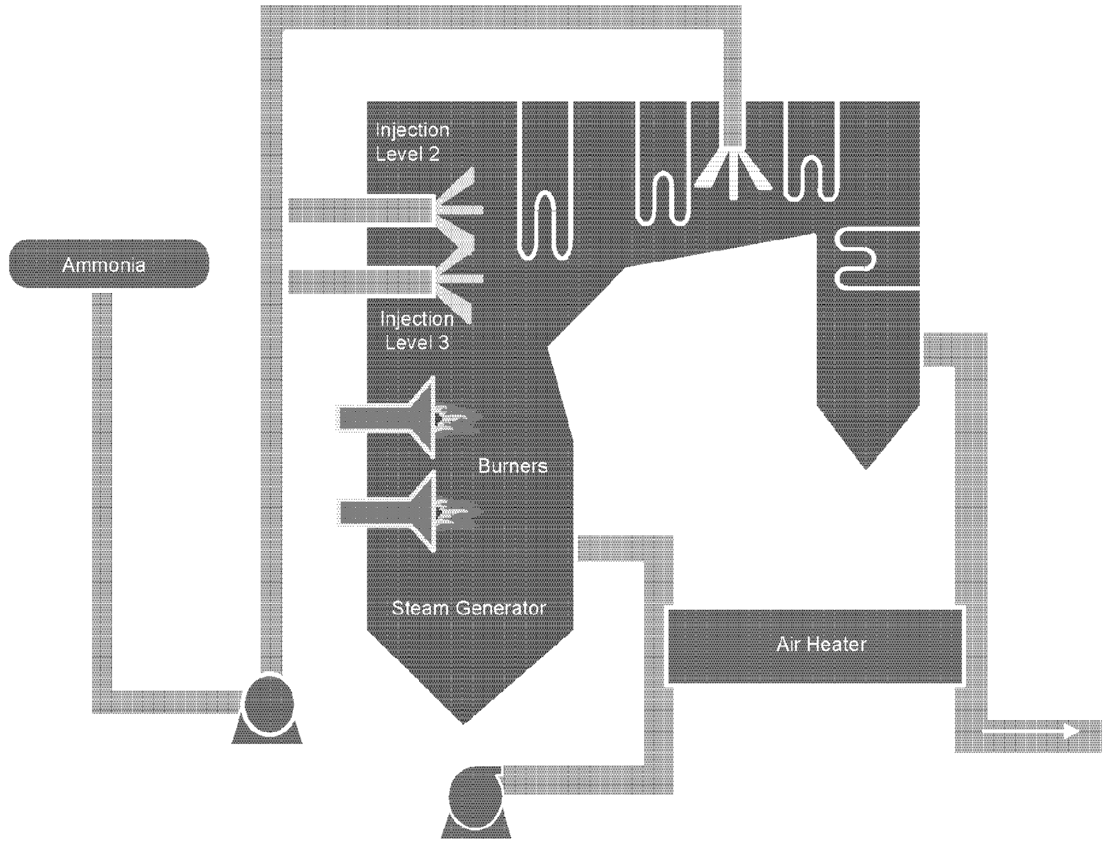


SCR – process



Gas Flow Distribution Devices
Temperature Measurement Grid
Vaporized Ammonia
Catalyst
Sonic Horns
Space For Future Catalyst and Sonic Horn Addition
Tuning/Monitoring Grid
Flue Gas From Economizer
Flue Gas to Air Heater

SNCR – overview



SNCR disadvantages

- High ammonia slip
- Large boilers complicate reagent injection
- High reagent usage
- Not as responsive to load changes

SCR disadvantages

- SCR catalyst oxidizes SO_2 to SO_3
- Requires catalyst
- Potential of plugging, erosion and poisoning of the catalyst
- Catalyst disposal and storage liability

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Overview of Phase I Results

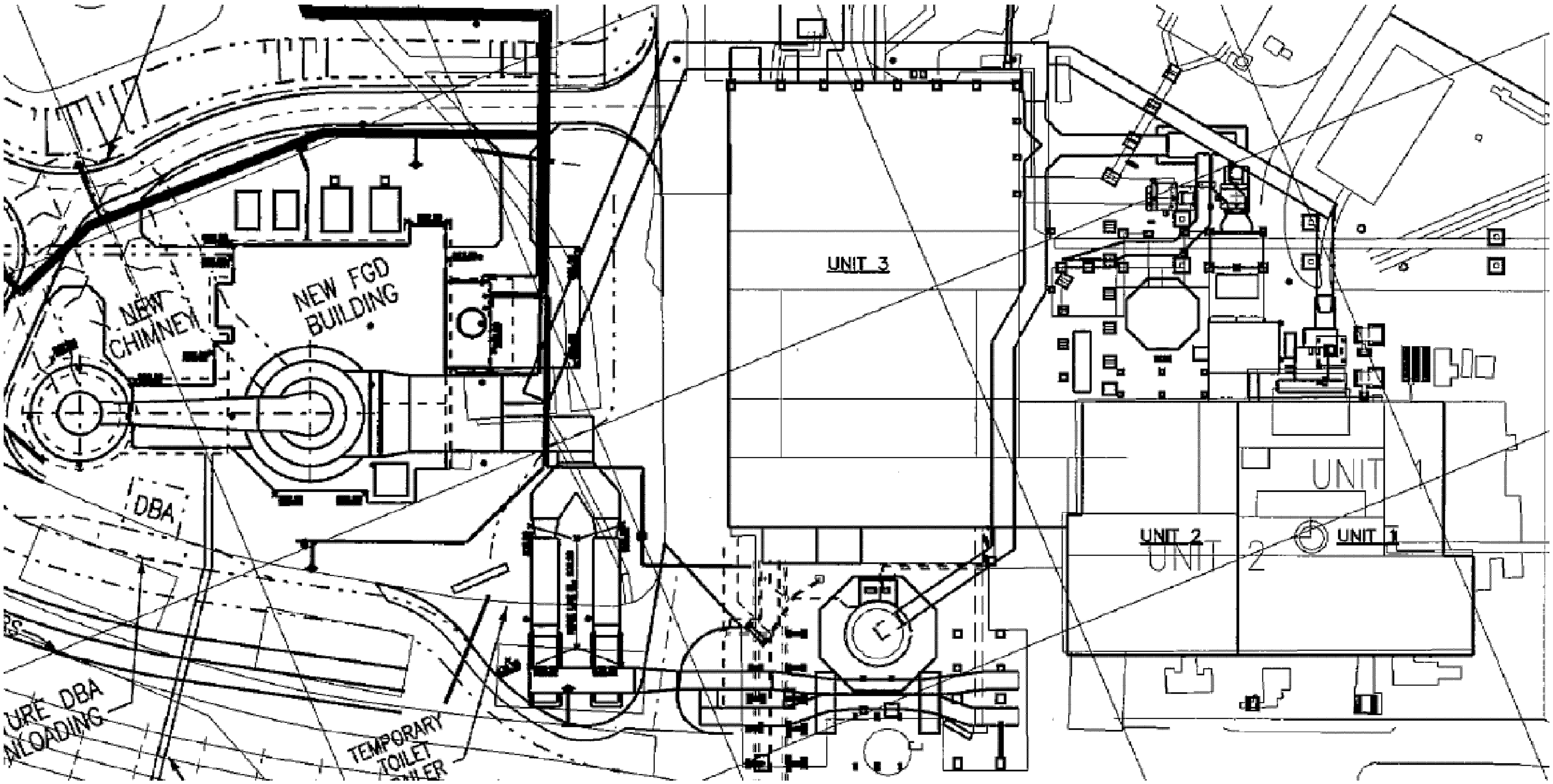
Phase I AQCS results for Brown Station

- Brown Unit 1
  - Upgrade Low NOx Burners (LNB)
  - Over-Fire Air (OFA)
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection
- Brown Unit 2
  - Selective Catalytic Reduction (SCR) System
  - Pulse Jet Fabric Filter (PJFF)
  - Sorbent Injection
  - Powdered Activated Carbon (PAC) Injection
- Brown Unit 3
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection

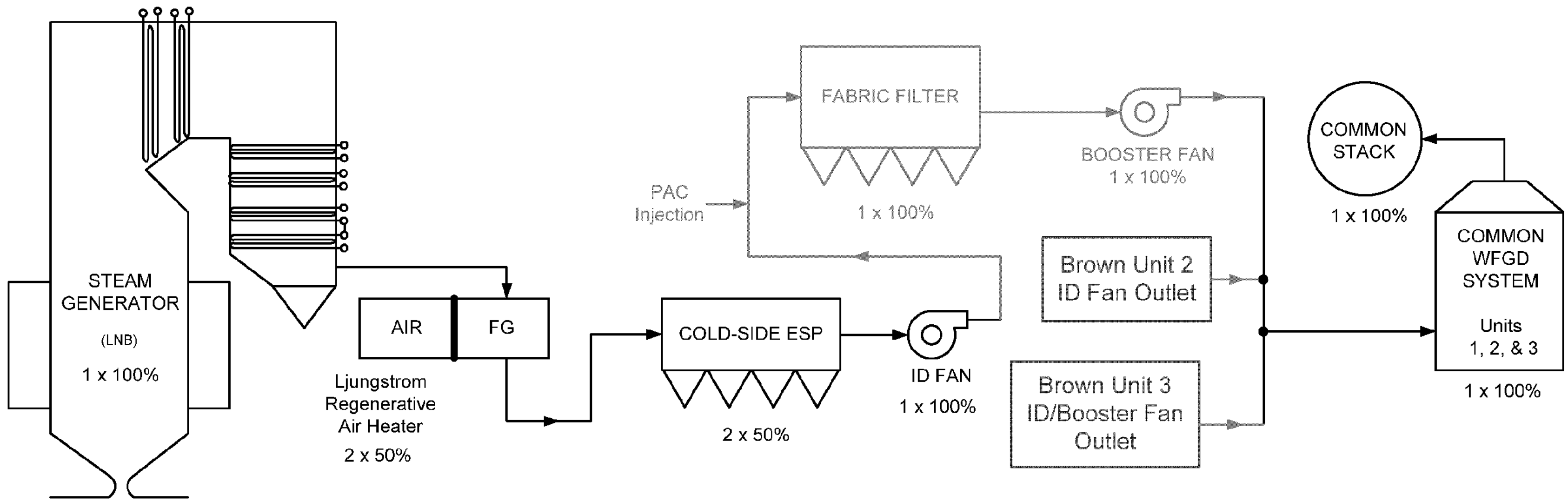
Phase I AQCS results for Brown Station (Options)

- Brown Units 1 & 2
  - Upgrade Low NOx Burners (LNB) for Unit 1
  - Over-Fire Air (OFA) for Unit 1
  - Selective Catalytic Reduction (SCR) for Unit 1
  - Selective Catalytic Reduction (SCR) for Unit 2
  - Common Units 1 and 2 Pulse Jet Fabric Filter (PJFF)
  - Sorbent Injection for Common Units 1 and 2 PJFF
  - Powdered Activated Carbon (PAC) Injection for Common Units 1 and 2 PJFF
- Brown Unit 3
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection

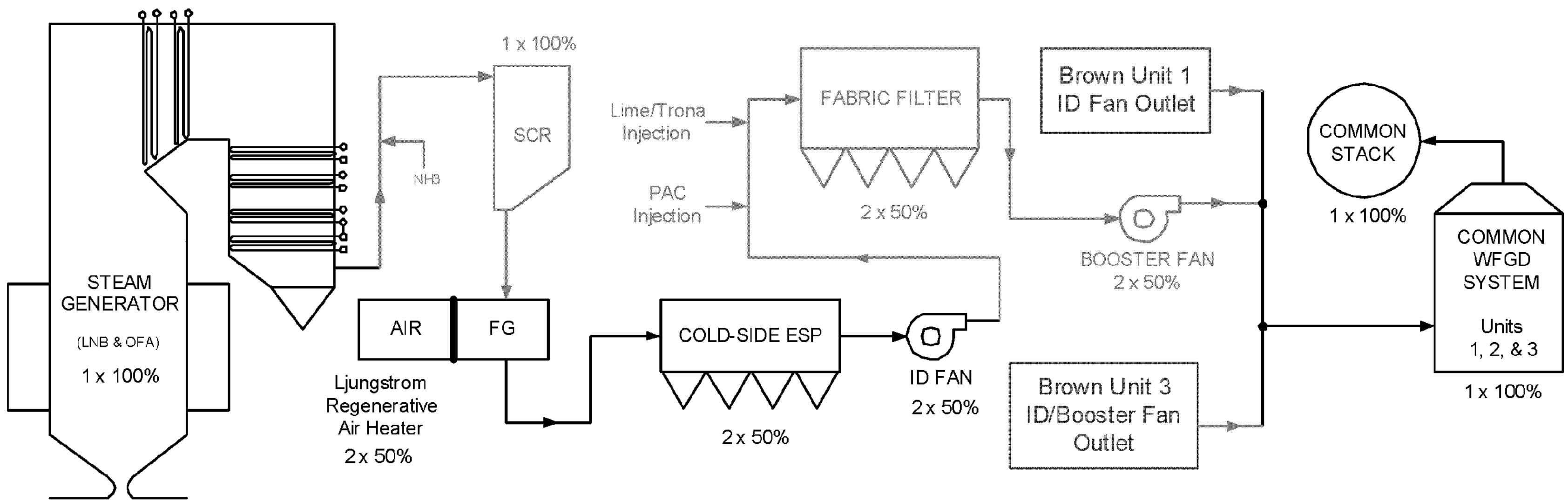
Existing Brown layout



Brown Unit 1 process flow diagram



Brown Unit 2 process flow diagram



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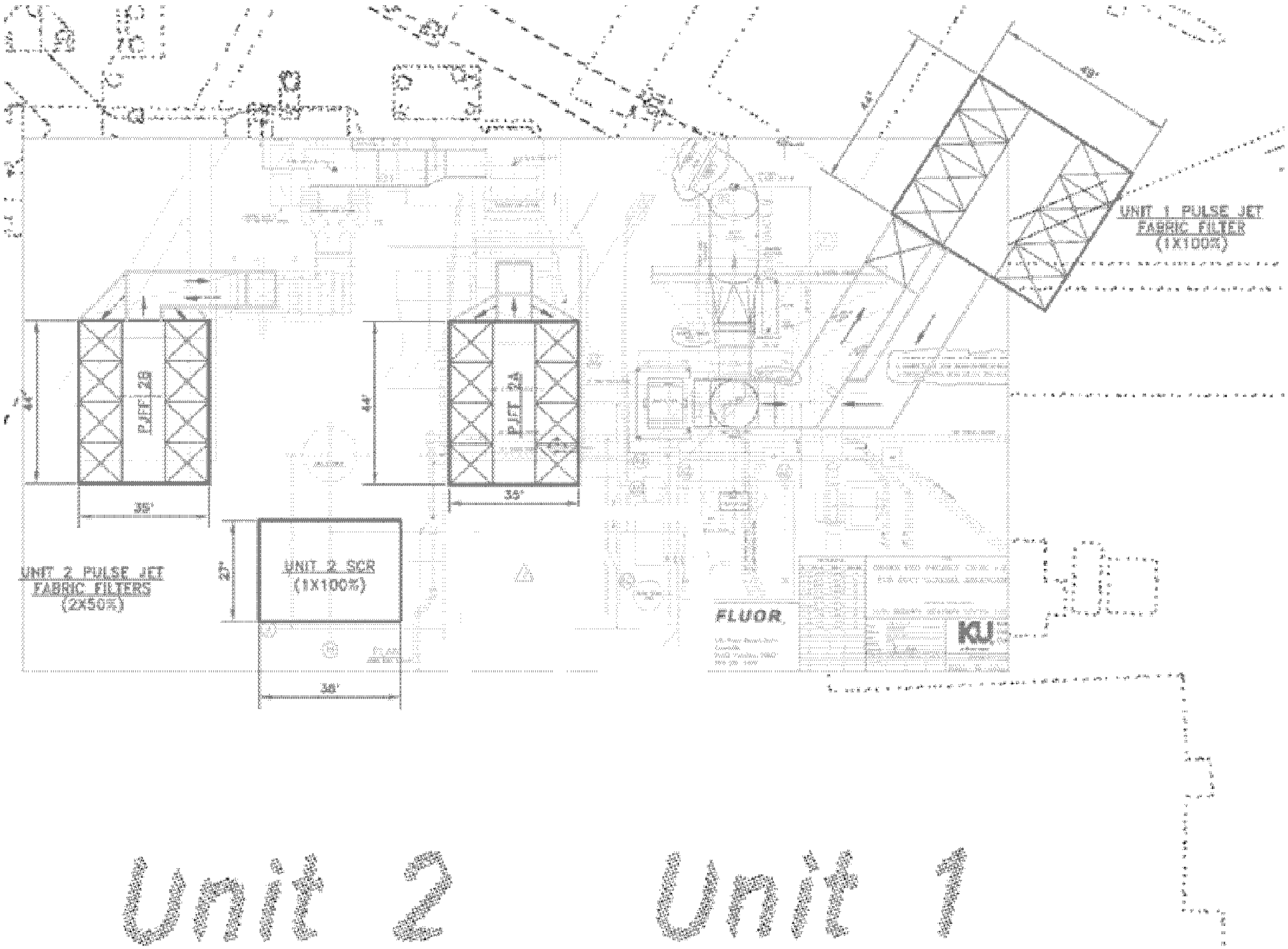
Brown Unit 1 and Unit 2 layout



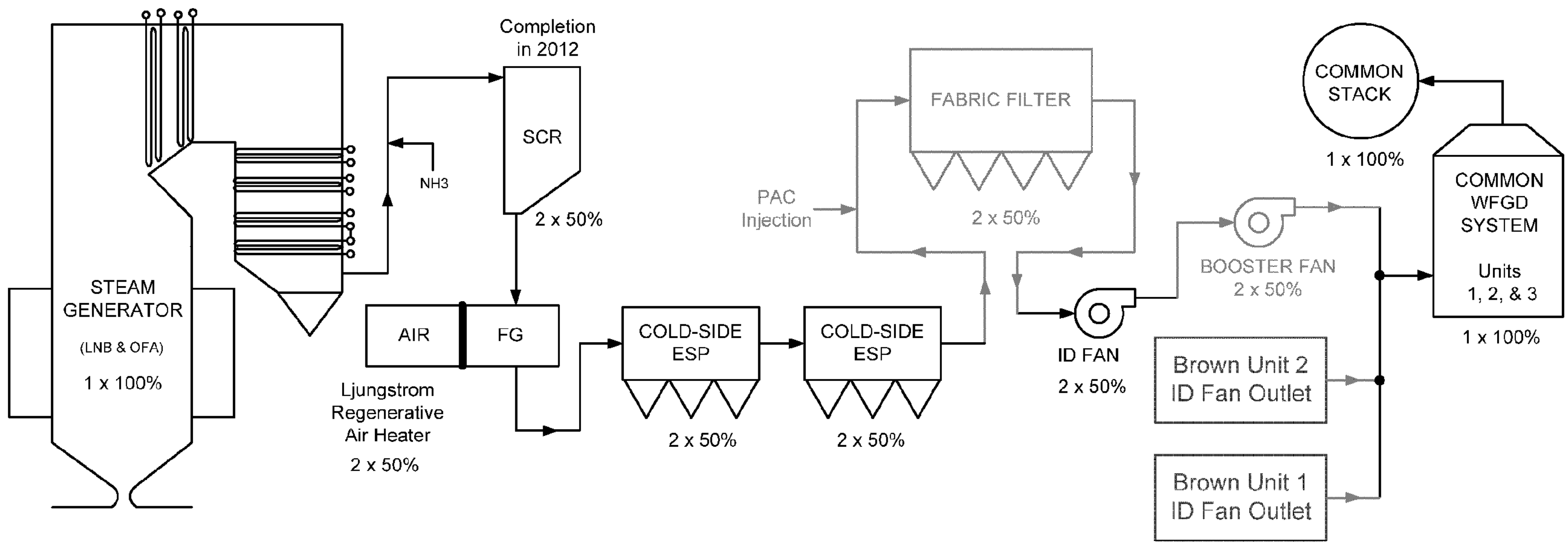
Brown Unit 2 SCR challenges

- Real estate constraints
- Difficult crane access
- Demolish existing mechanical dust collector
- Demolish abandoned Unit 2 stack
- Modify boiler building structural steel bracing and girts
- Demolish and relocate field fabricated tank located in base of abandoned Unit 2 chimney shell
- Demolish and relocate Unit 2 auxiliary transformer
- Pick and slide execution method to erect SCR

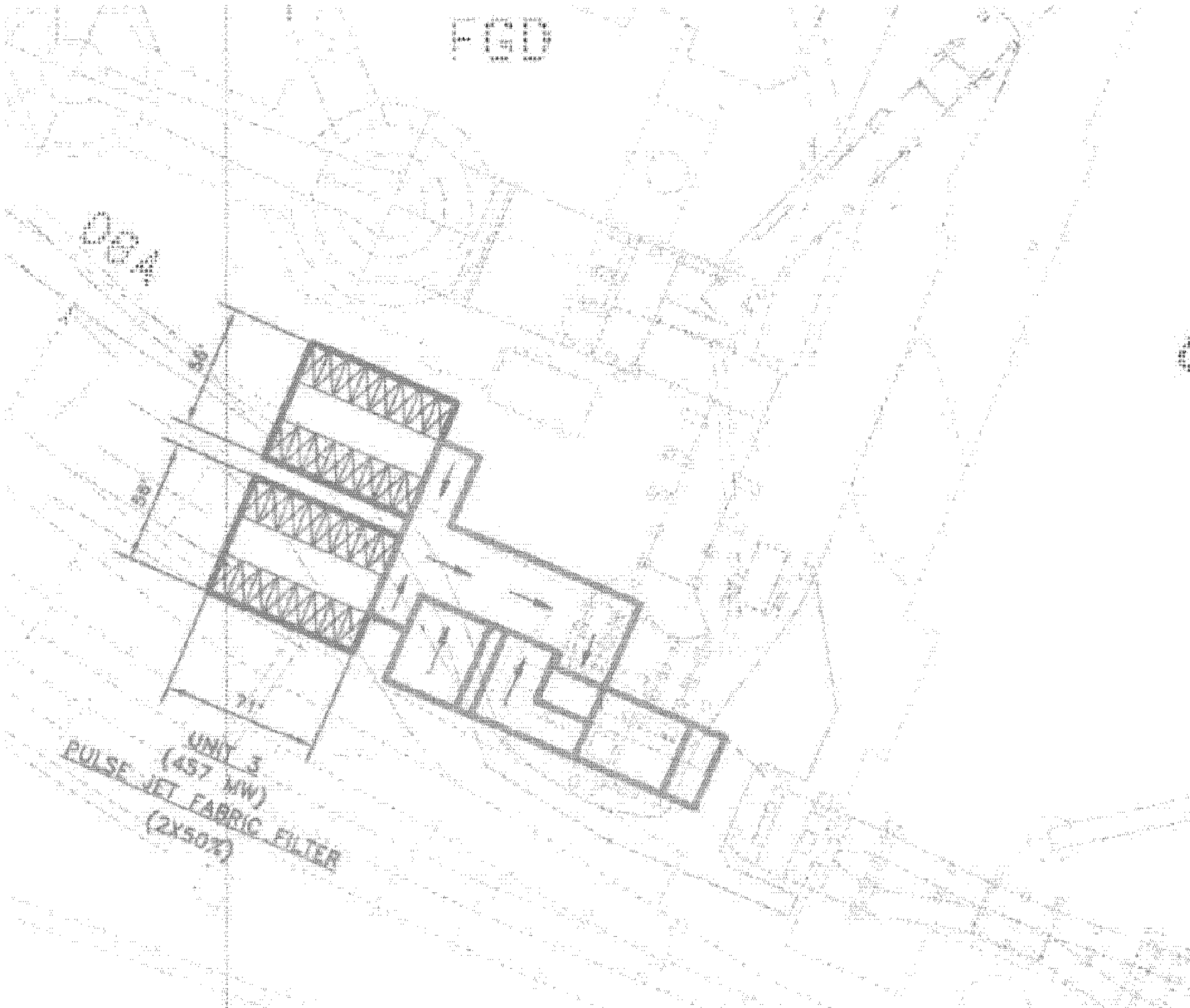
Brown Unit 2 PJFF challenges

- Elevated PJFF
- Real estate constraints
- Difficult crane access
- Pick and slide execution method to erect fabric filter modules
- Extensive underground investigation required prior to installing new foundations for structural steel support frame
- Heavy foundations required on outer ends
- Difficult to stage construction equipment near ID fans

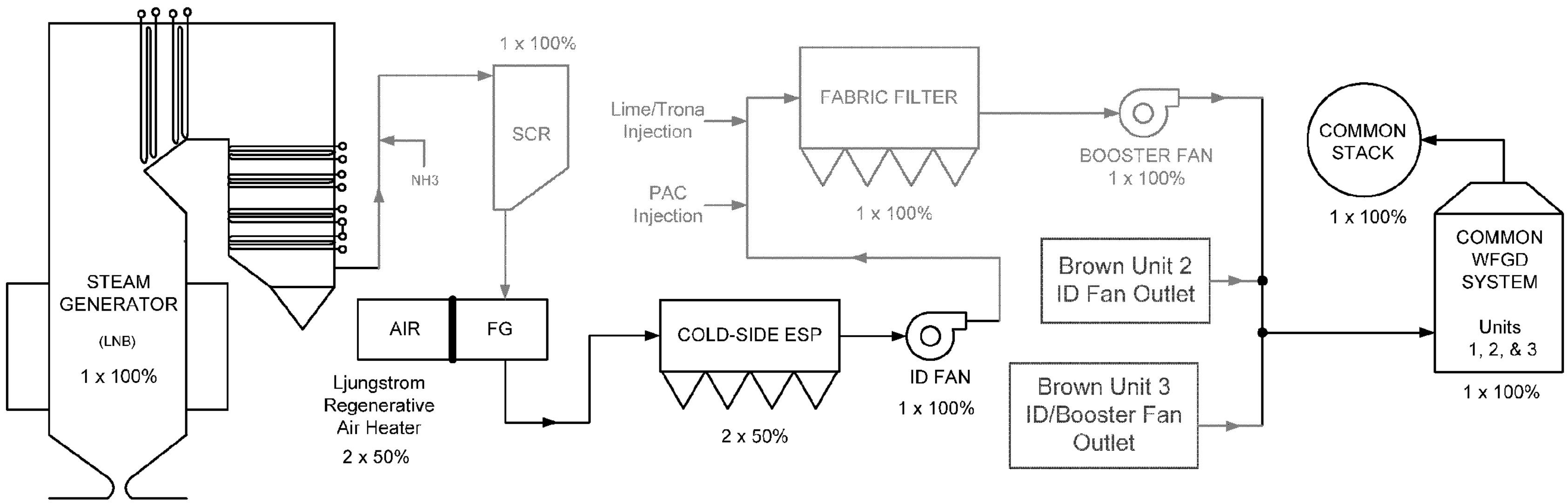
Brown Unit 3 process flow diagram



Brown Unit 3 layout



Brown Unit 1 process flow diagram (option)



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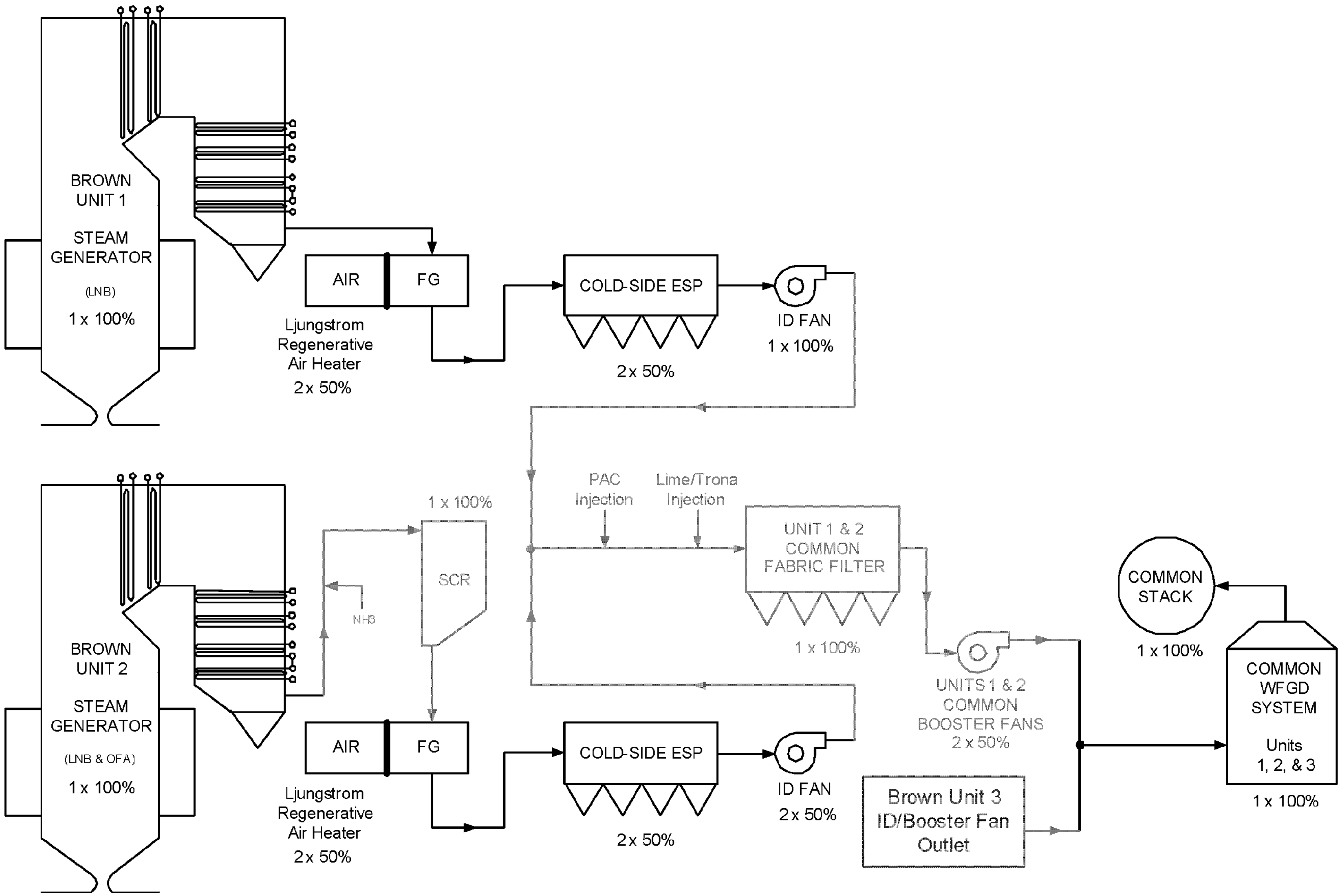
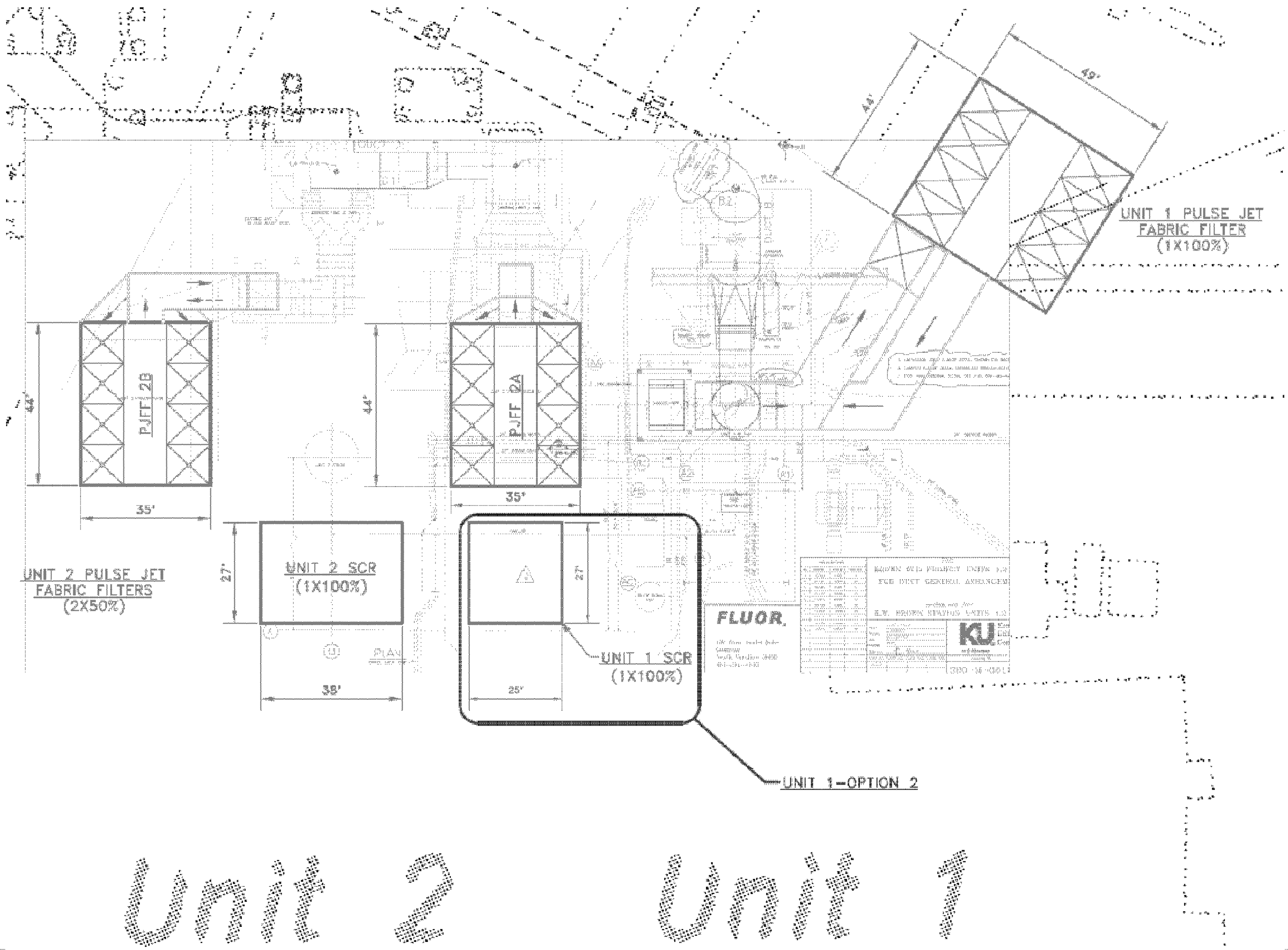
Brown Unit 1 and Unit 2 process flow diagram (option)



Brown Unit 1 and Unit 2 layout (option)



Brown Unit 1 SCR challenges (option)

- Real estate constraints
- Extensive relocation of existing plant components
- Rotation of secondary air heater duct
- Modify boiler building structural steel and bracing to accommodate ductwork
- Relocate switchgear in the boiler building

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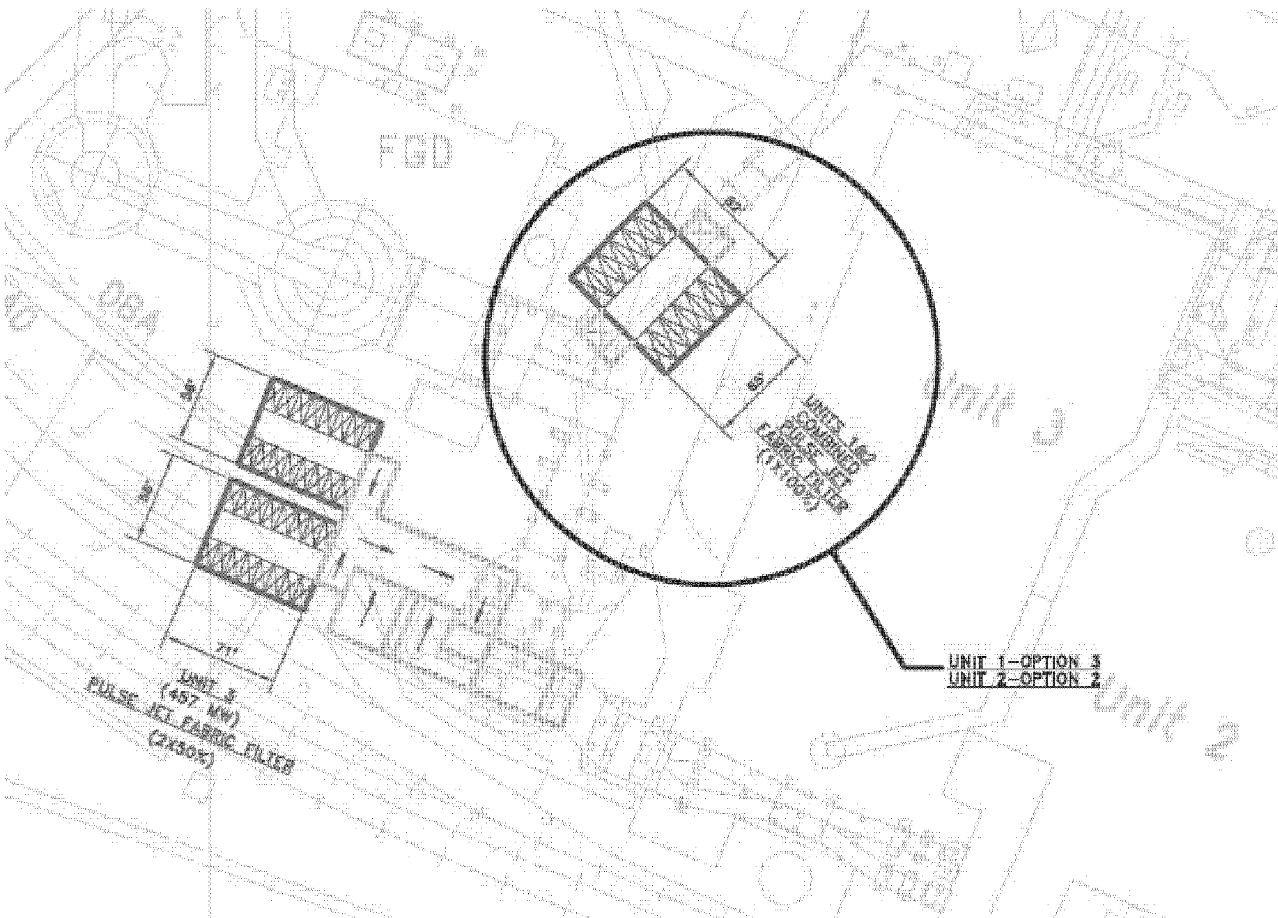
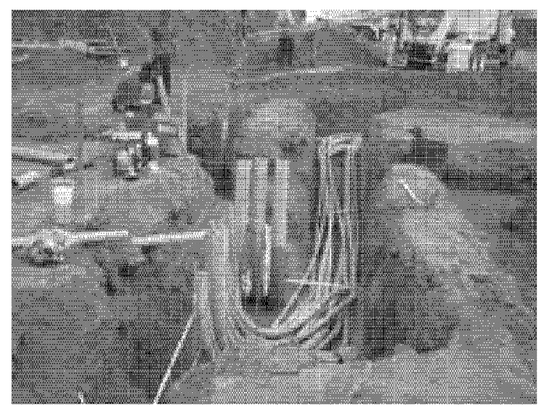
Brown Unit 1 and Unit 2 layout (option)



Brown Units 1 & 2 combined PJFF challenges (option)

- Elevated PJFF
- Demolish and relocate underground utilities
- Modify structural steel frame work
- Fabric filter built on standard frame above existing ductwork

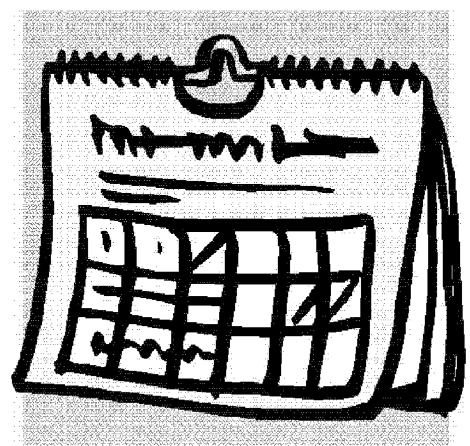


Typical PJFF schedule

- 30 to 36 months
  - Engineering & procurement – 12 -16 months
  - Erect PJFF foundations – 6 months
  - Erect PJFF – 10 -12 months
  - Tie-in outage – 1 month
  - Start-up – 1 month

Typical SCR schedule

- 32 to 36 months
  - Engineering & procurement – 16 months
  - Erect SCR foundations – 4 months
  - Erect SCR support steel – 4 months
  - Erect SCR & ductwork – 8 months
  - Tie-in outage – 1 month
  - Start-up – 1 month



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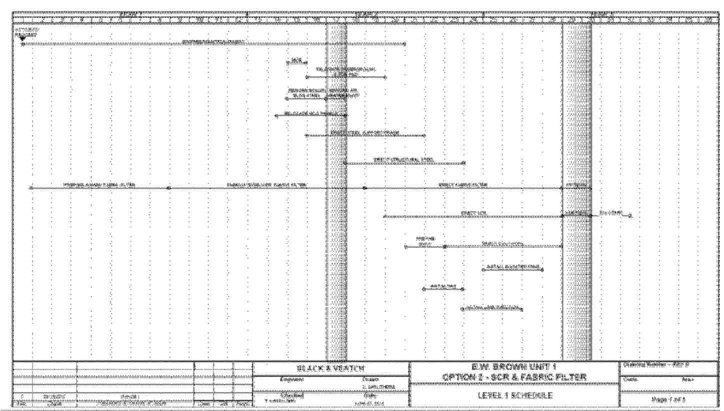
Phase I implementation schedule

- Brown Unit 1 PJFF – 32 months
- Brown Unit 2 SCR & PJFF – 34 months
- Brown Unit 3 PJFF – 30 months
- Option - Brown Unit 1 SCR – 32 months
- Option - Combined Brown Units 1 & 2 PJFF – 30 months



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Phase II AQC Study
Mill Creek Validation

LG&E KU

PPL companies

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November 2010

Agenda

- Units 1, 2, 3 and 4 AQC equipment train
- Unit AQC equipment conceptual layout
- NID vs PJFF comparison
- 3-D Model
- Summary / wrap-up and discussions

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AQC Equipment Train
Mill Creek Units 1, 2, 3 and 4

November 9, 2010

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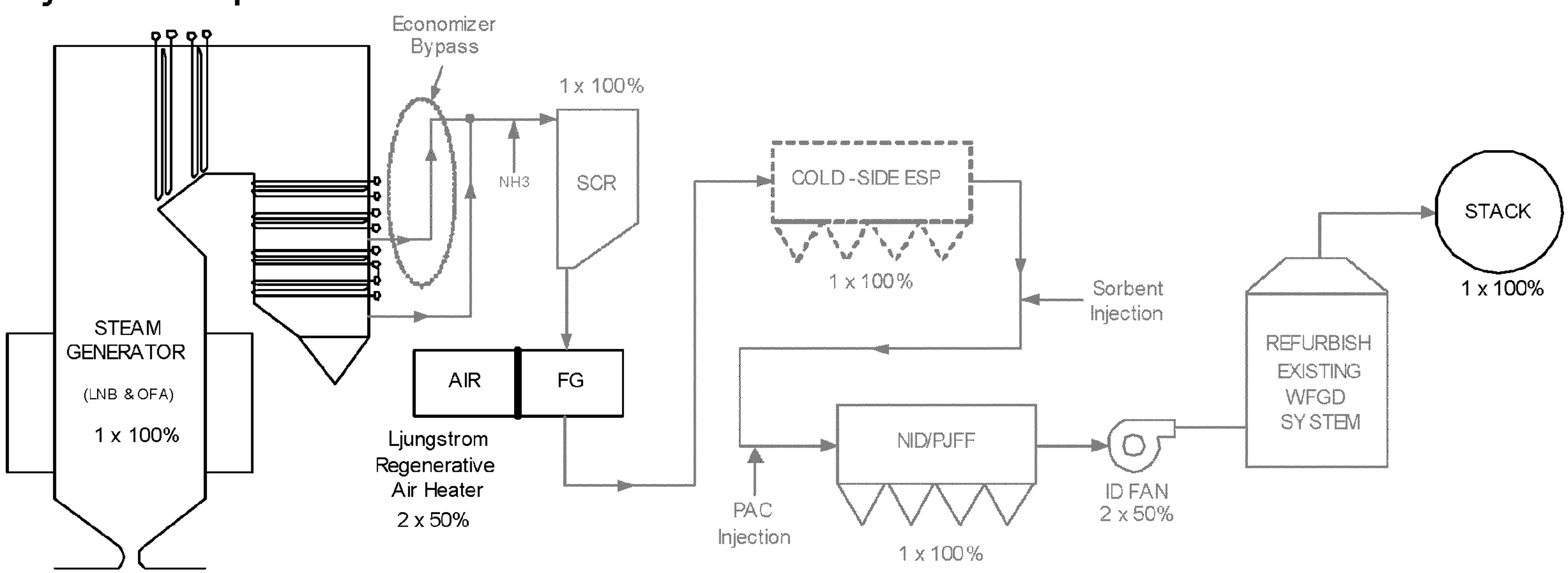
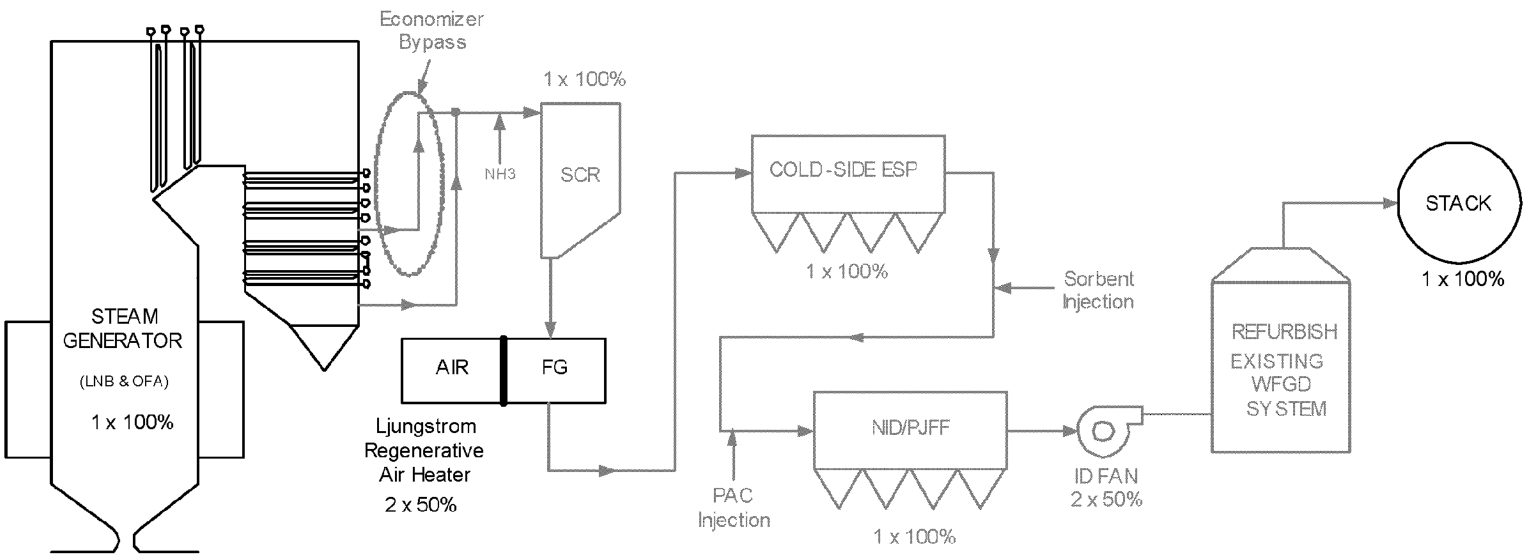
Mill Creek Unit 1 AQC process flow diagram

- Add new pre-filter CS-ESP (alternative)
- Add new ID fans
- Add new NID or PJFF/duct injection option
- Demolish existing CS-ESP
- Add new SCR at old CS-ESP
- Upgrade and refurbish existing WFGD system



Mill Creek Unit 2 AQC process flow diagram

- Add new CS-ESP (pre-filter)
- Add new ID fans
- Add new NID or PJFF/duct injection option
- Demolish existing CS-ESP
- Add new SCR at old CS-ESP
- Upgrade and refurbish existing WFGD system



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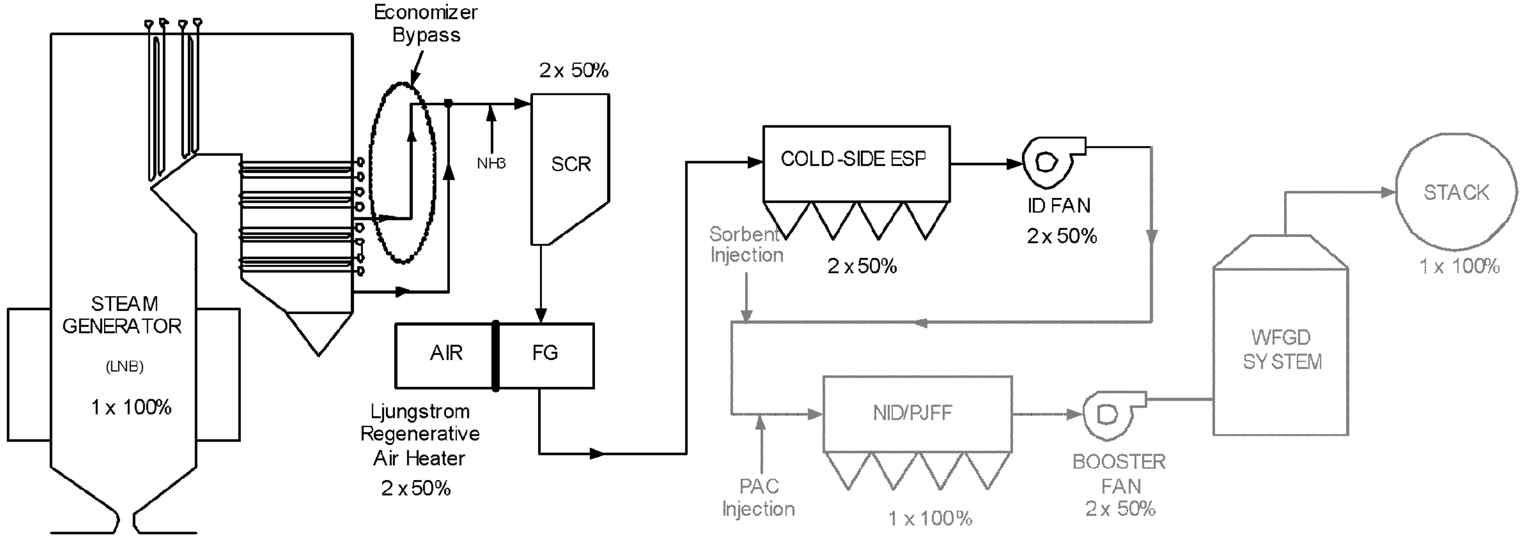
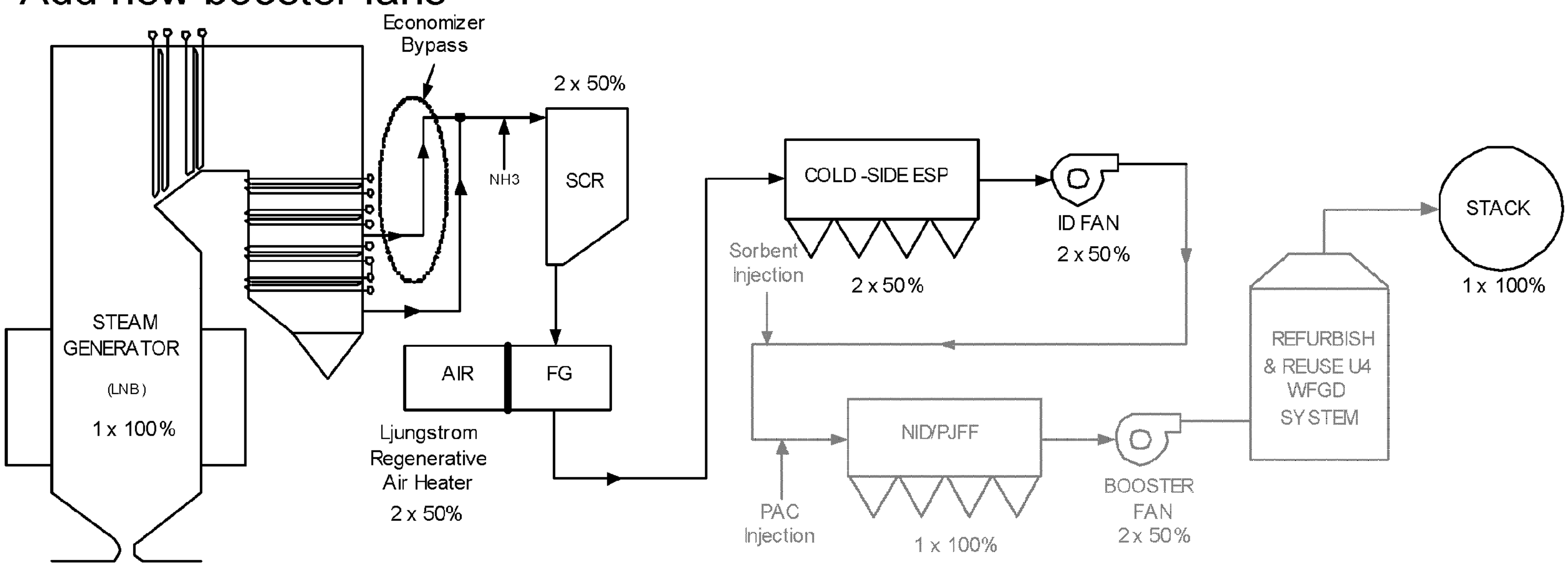
Mill Creek Unit 4 AQC process flow diagram

- Add new stack
- Add new NID or PJFF/duct injection option
- Add new booster fans
- Add new Unit 4 WFGD



Mill Creek Unit 3 AQC process flow diagram

- Upgrade and refurbish existing Unit 4 WFGD to re-use as unit 3 WFGD
- Reuse Unit 4 stack for Unit 3 (following Reuse of Unit 4 WFGD)
- Demolish existing Unit 3 WFGD
- Add new NID or PJFF/duct injection option
- Add new booster fans



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AQC Conceptual Sketches

AQC validation

- Validation report determined no fatal flows for the selected AQC equipment
- AQC equipment can meet identified emission targets
- Two or more arrangements possible for AQC equipment
- Pros and cons identified for each alternative

AQC conceptual sketches

- Unit 1 and Unit 2
  - 3 NID alternatives (A, B, and C)
  - 3 PJFF alternatives (A, B, and C)
- Unit 3 and Unit 4
  - 2 NID alternatives (A and B)
  - 2 PJFF alternatives (A and B)

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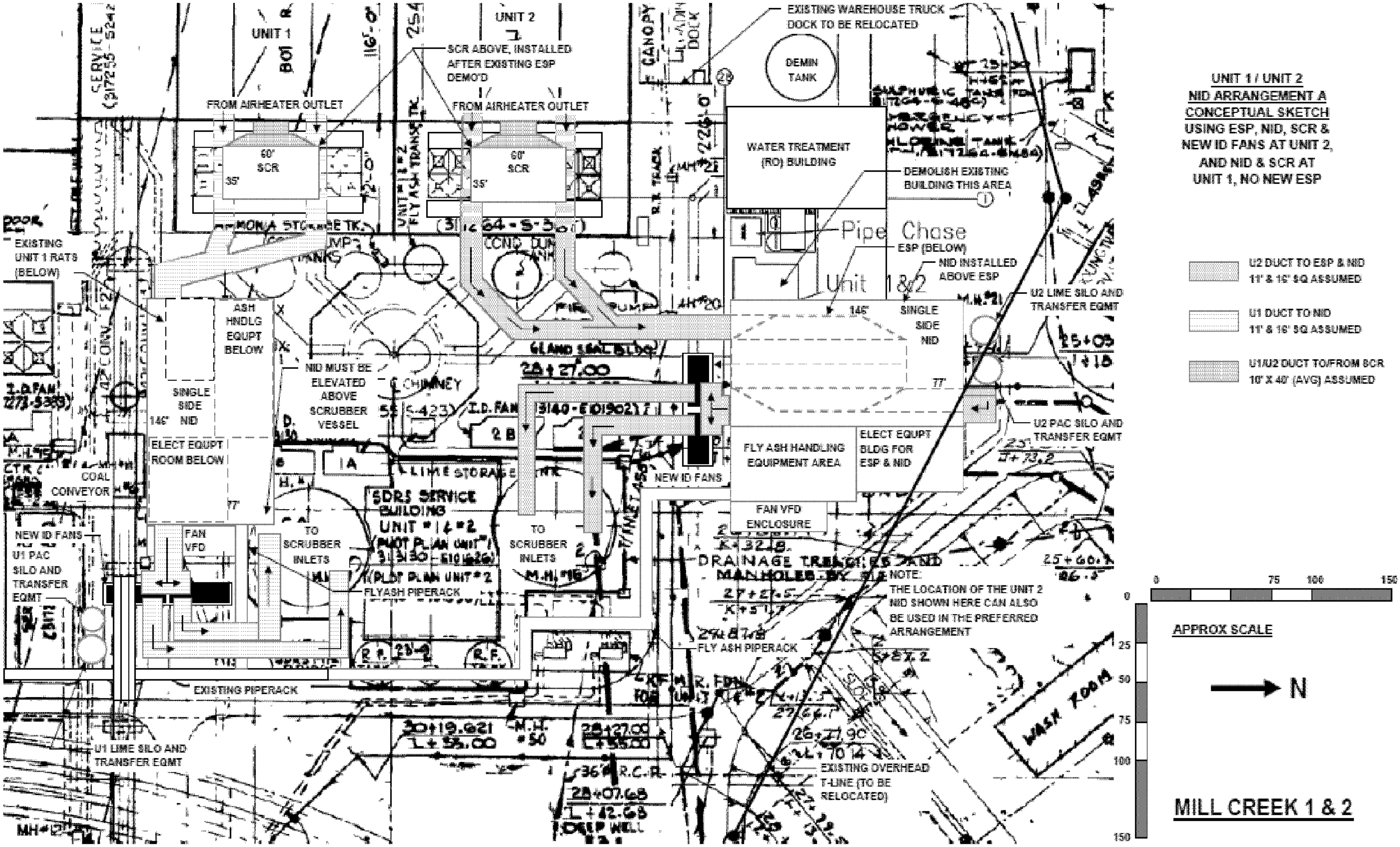
Mill Creek Unit 1 and Unit 2 (NID arrangement A)



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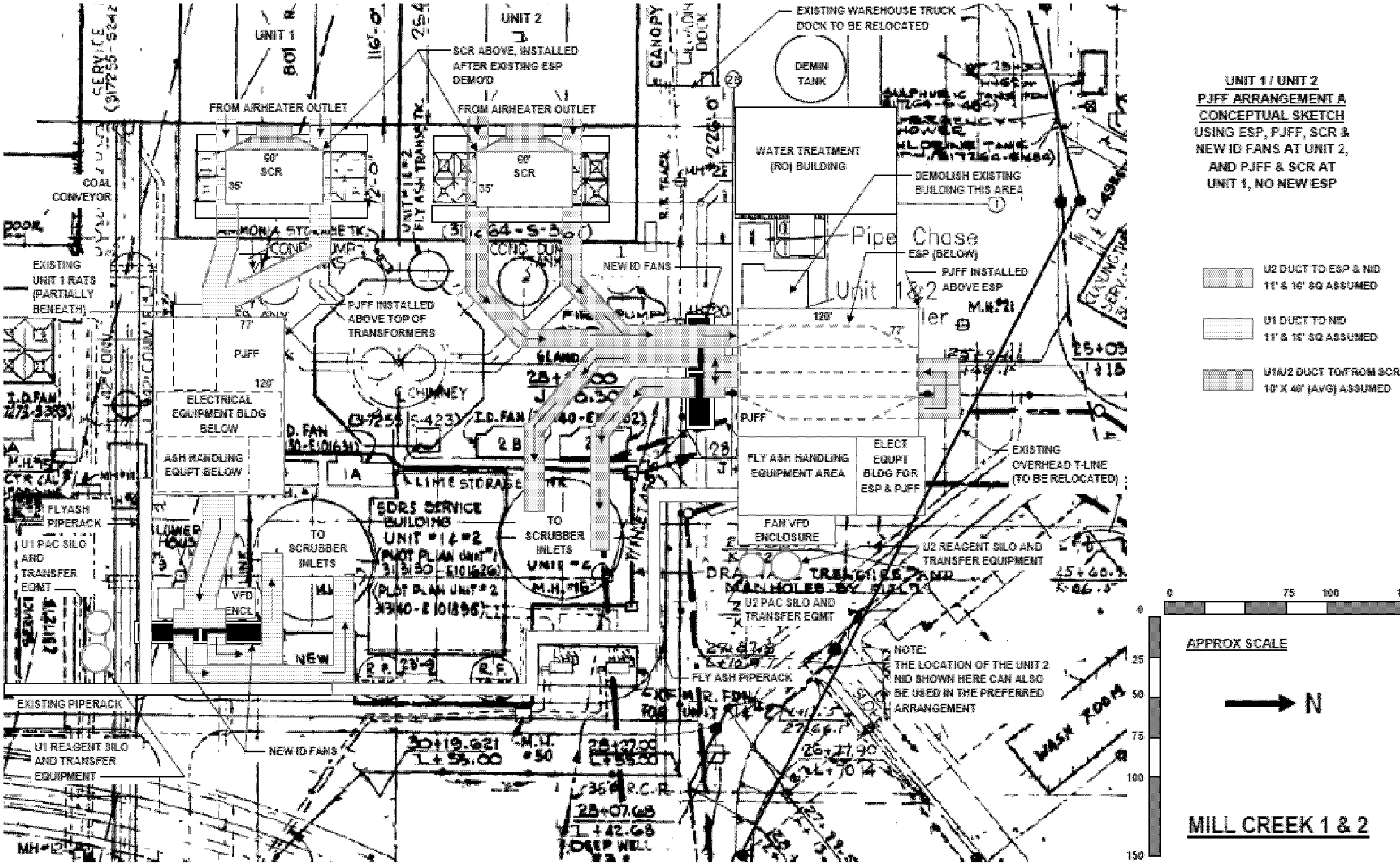
Mill Creek Unit 1 and Unit 2 (PJFF arrangement A)



Mill Creek Unit 1 and Unit 2 (arrangement A)

- Pros:
  - Optimized ductwork – less capital cost and pressure drop
  - Less ash drop out during low load
- Cons:
  - No pre-filter CS-ESP for Unit 1 only due to space constraints
  - Unit 1 requires ash land-filling capacity
  - Restricted access for Unit 1 SCR construction
  - Elevated structure required for NID or PJFF
  - Unit 1 and Unit 2 auxiliary boiler building requires demolition
  - Relocate overhead transmission lines north of Unit 2

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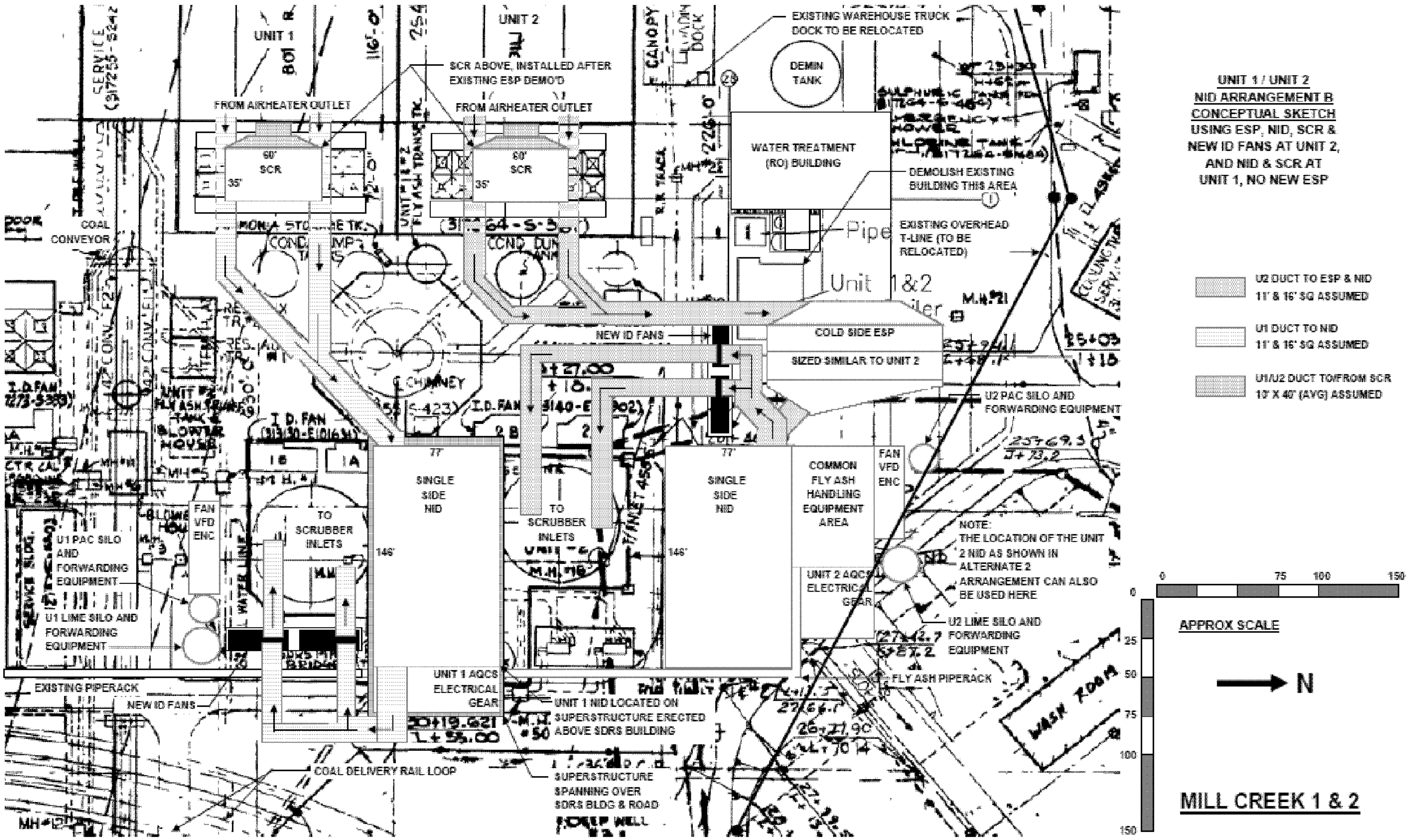
Mill Creek Unit 1 and Unit 2 (NID arrangement B)



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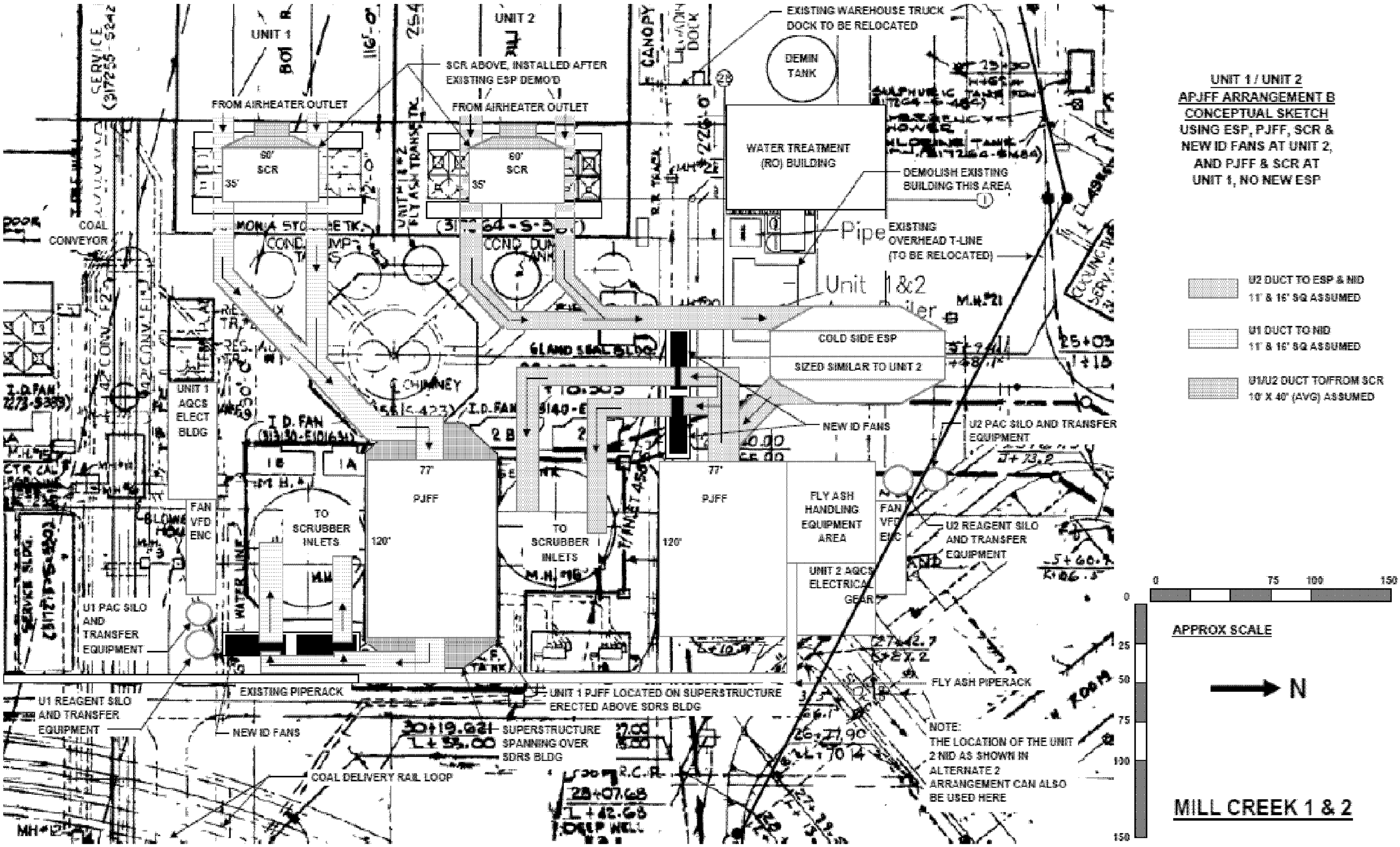
Mill Creek Unit 1 and Unit 2 (PJFF arrangement B)



November 9, 2010

Mill Creek Unit 1 and Unit 2 (arrangement B)

- Pros:
  - Optimized ductwork – less capital cost and pressure drop
  - Less ash drop out during low load
- Cons:
  - No pre-filter CS-ESP for Unit 1 – space constraints
  - Unit 1 requires ash land-filling capacity
  - Elevated structure required for NID or PJFF
  - Unit 1 and Unit 2 auxiliary boiler building requires demolition
  - Relocate overhead transmission lines north of Unit 2

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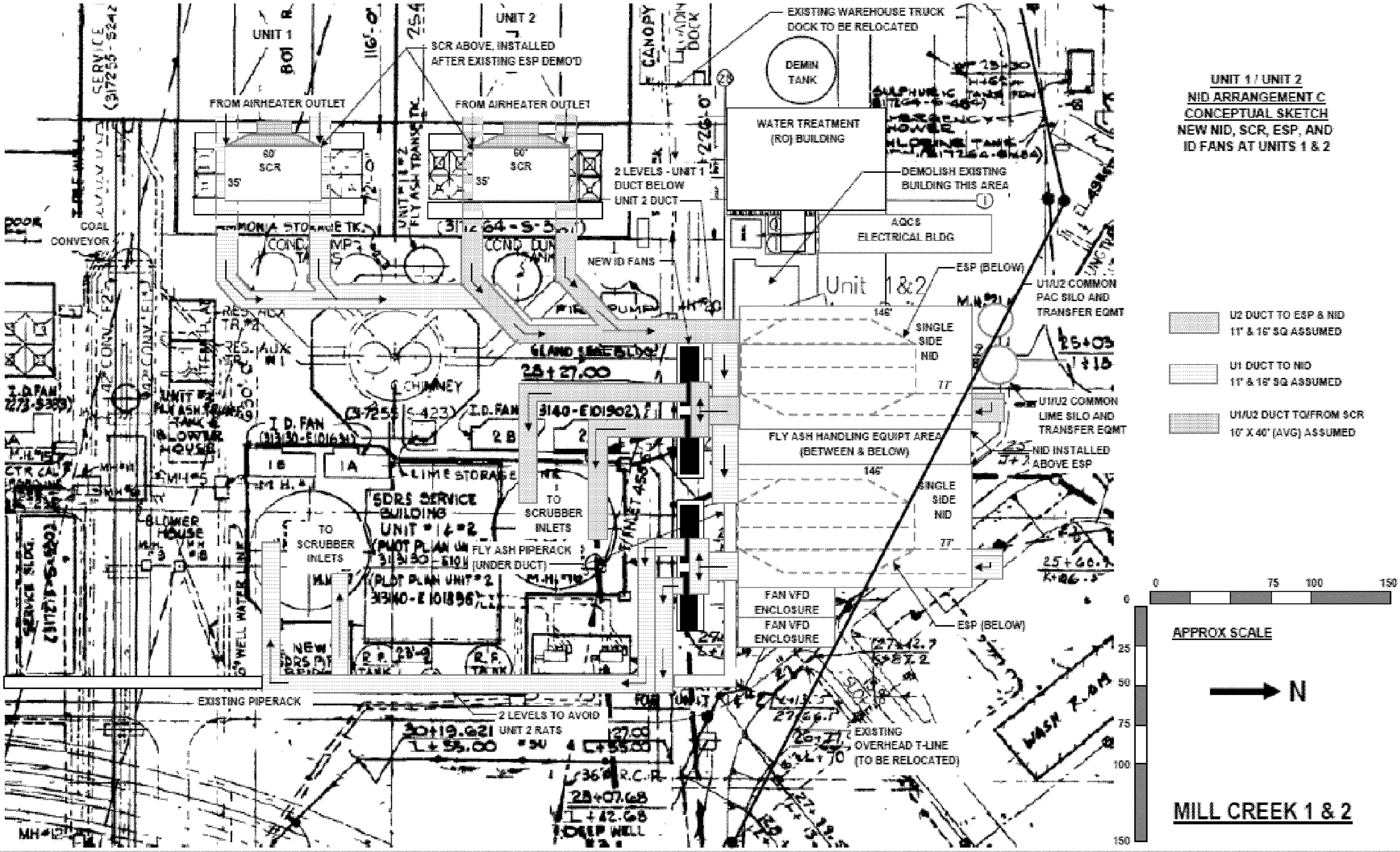
Mill Creek Unit 1 and Unit 2 (NID arrangement C)



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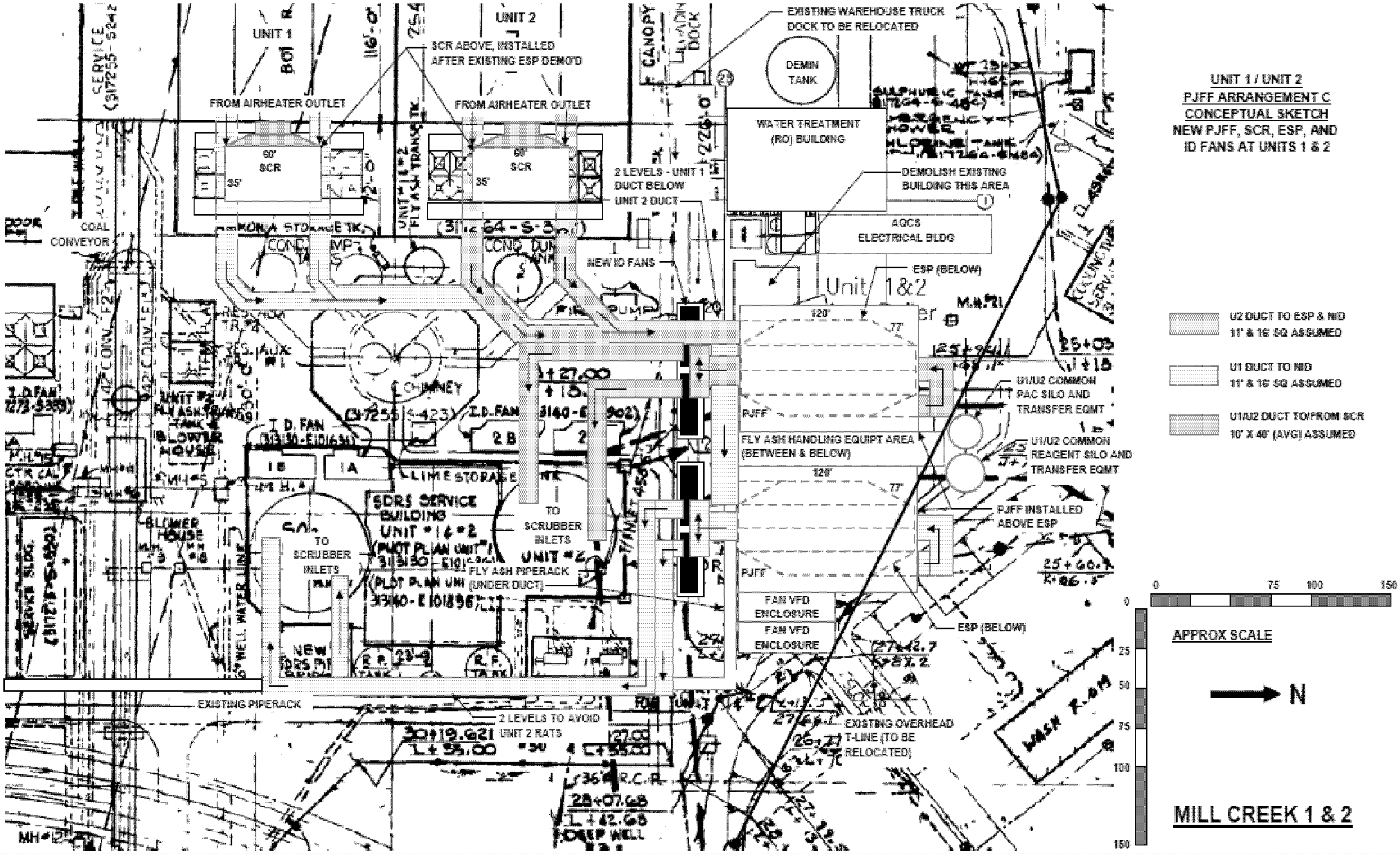
Mill Creek Unit 1 and Unit 2 (PJFF arrangement C)



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Mill Creek Unit 1 and Unit 2 (arrangement C)

- Pros:
  - New CS-ESP pre-filter for Unit 1 and Unit 2 – reduced ash land-fill capacity required
  - Constructability advantage
- Cons:
  - Longer ductwork – higher capital costs and increased pressure drop
  - Higher potential for ash dropout
  - Elevated structure required for NID or PJFF
  - Unit 1 and Unit 2 auxiliary boiler building requires demolition
  - Relocate overhead transmission lines north of Unit 2

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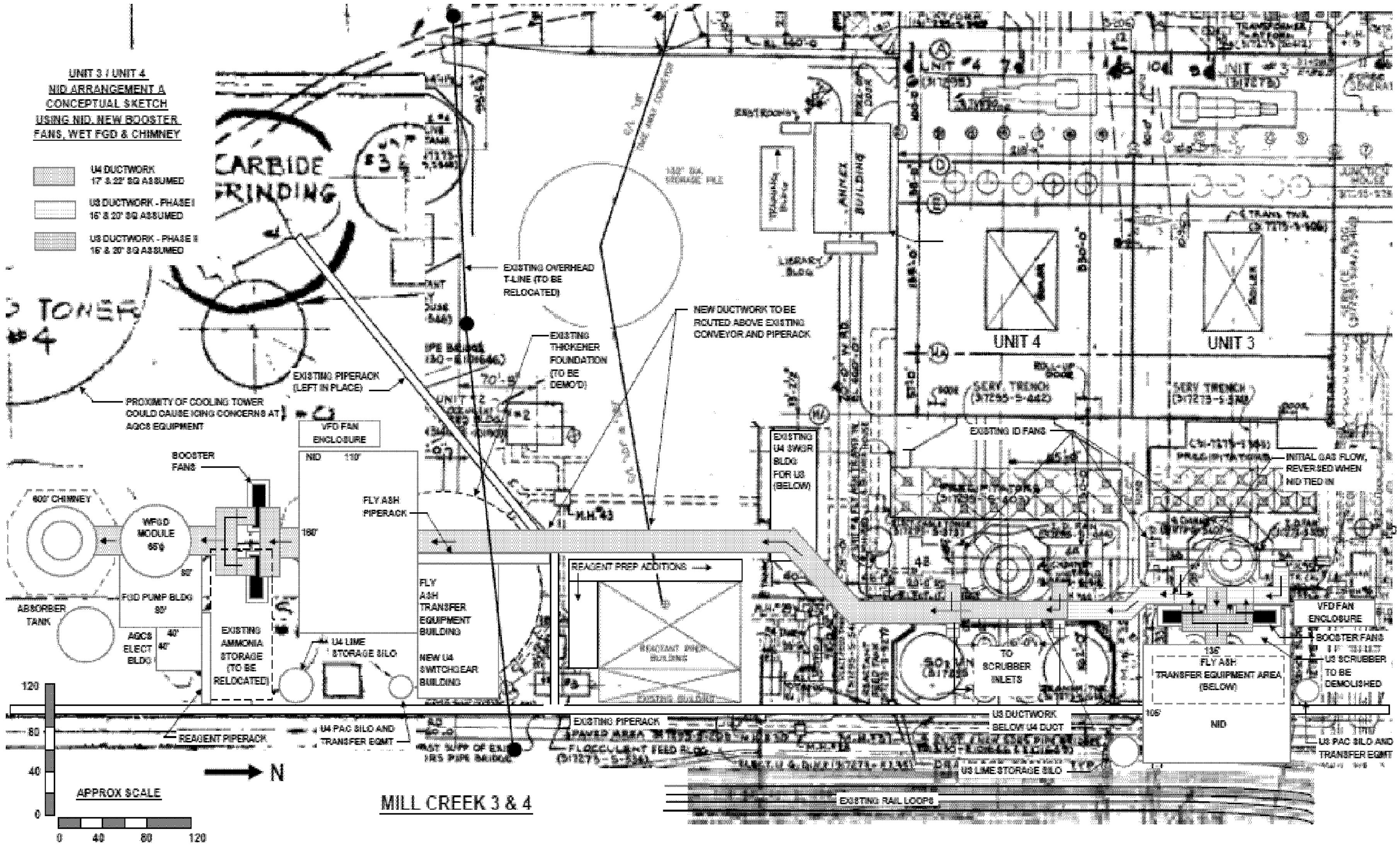
Mill Creek Unit 3 and Unit 4 (NID arrangement A)



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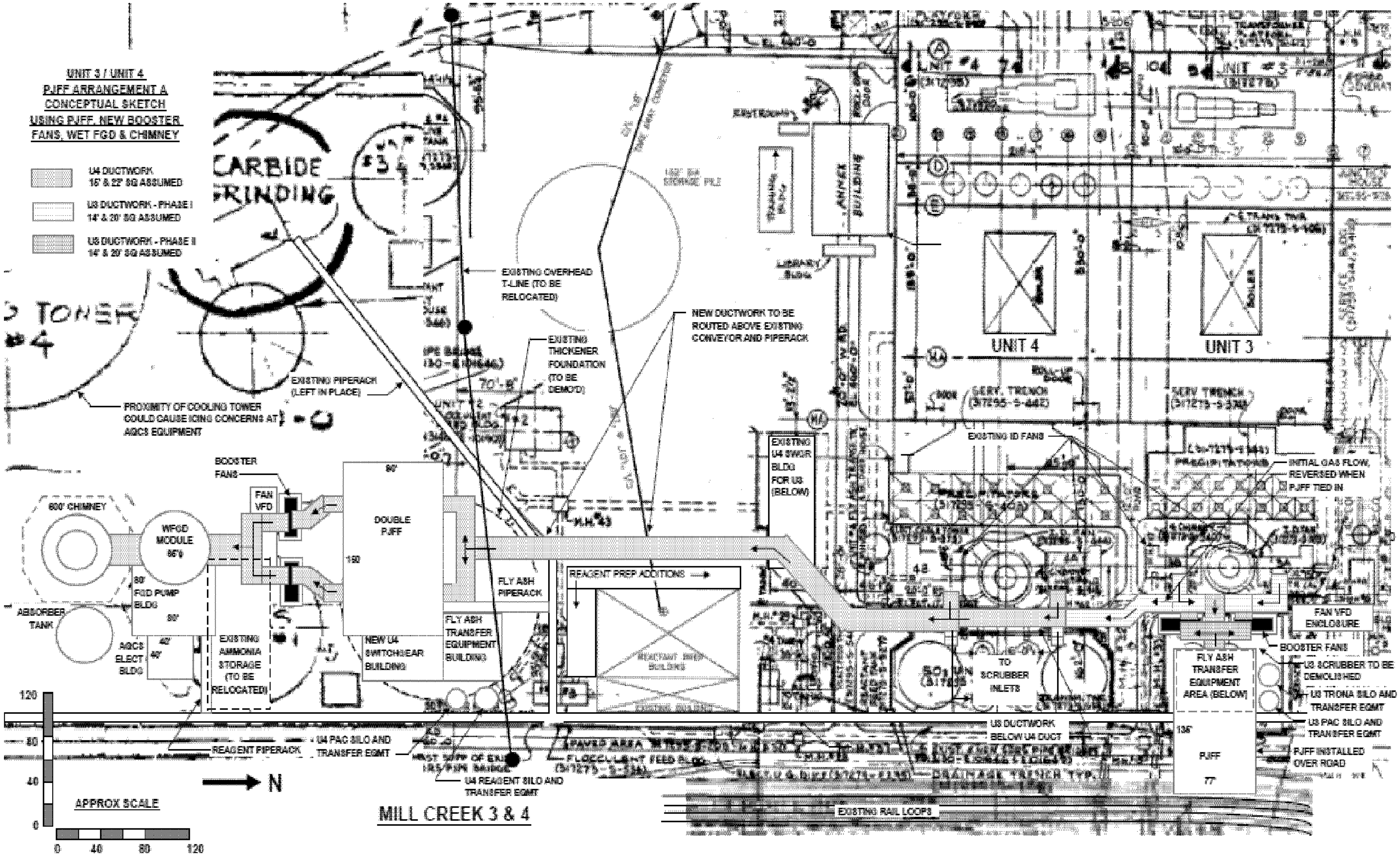
Mill Creek Unit 3 and Unit 4 (PJFF arrangement A)



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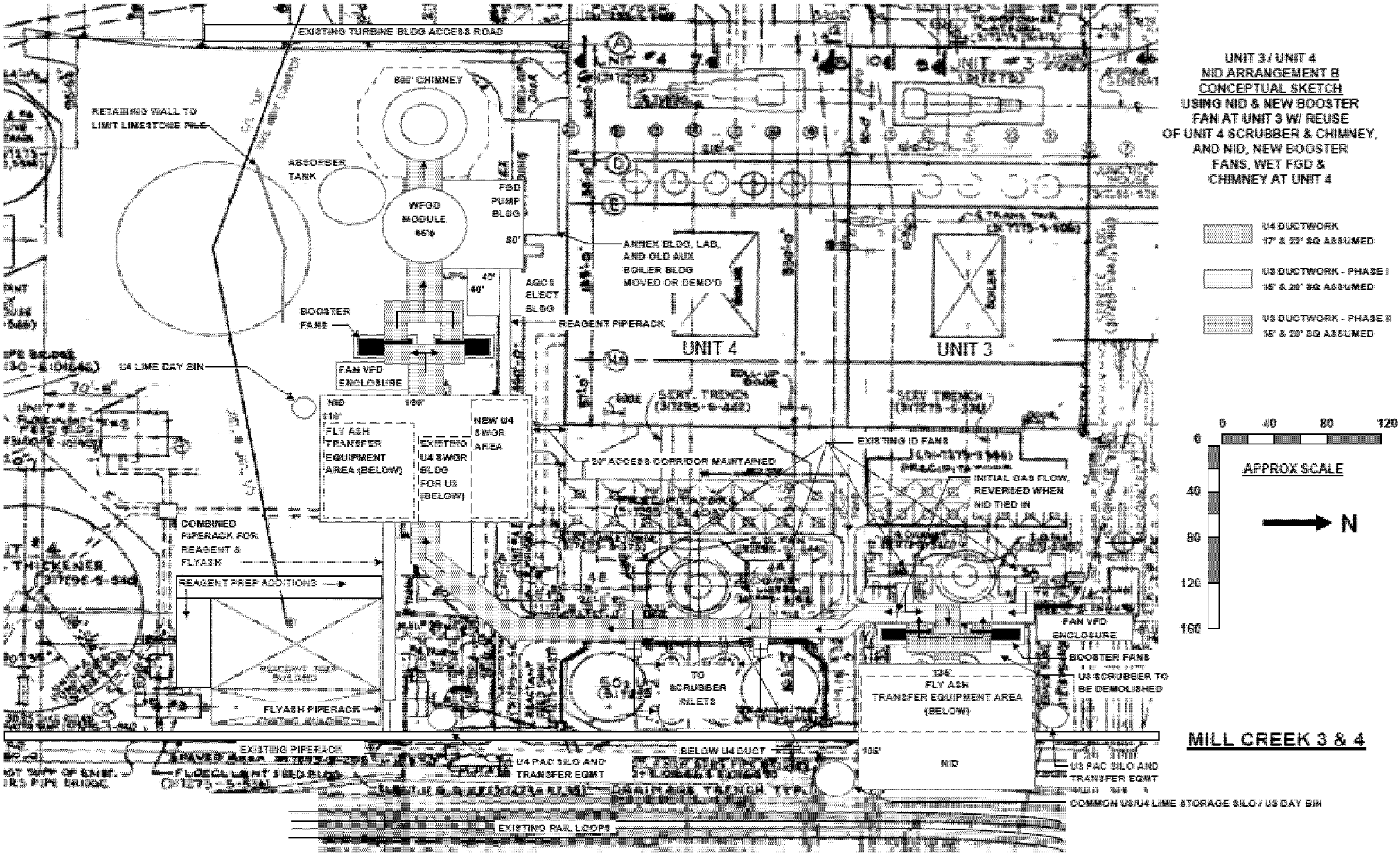
Mill Creek Unit 3 and Unit 4 (arrangement A)

- Pros:
  - Constructability advantage
  - Capital cost savings for Unit 3 by re-using Unit 4 scrubber modules and stack
- Cons:
  - Additional ductwork (above existing limestone conveyor)
  - Demolition of abandoned thickener
  - Relocation of ammonia storage and overhead transmission lines
  - Close proximity with cooling tower - icing concerns

Mill Creek Unit 3 and Unit 4 (NID arrangement B)



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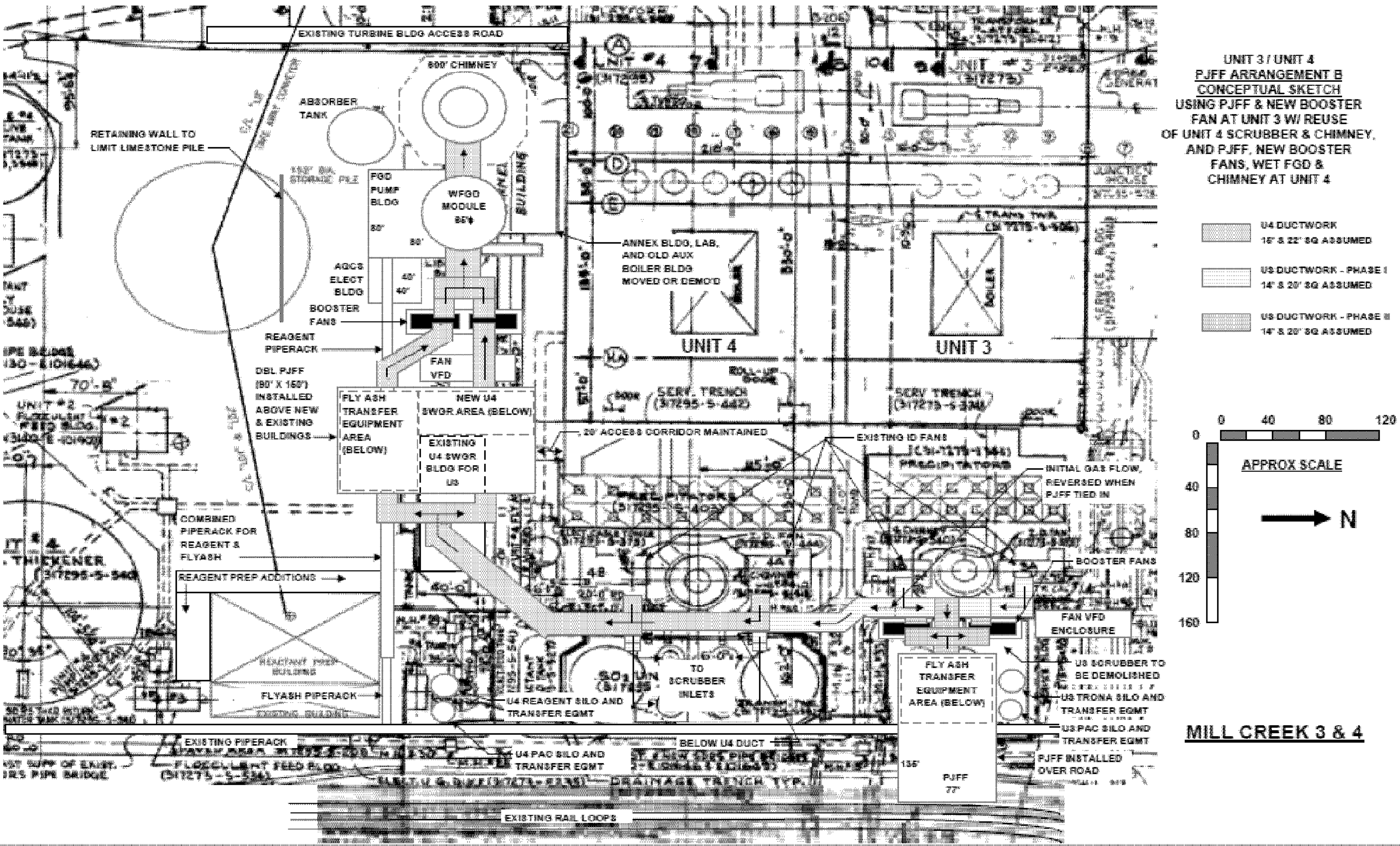
Mill Creek Unit 3 and Unit 4 (PJFF arrangement B)



Mill Creek Unit 3 and Unit 4 (arrangement B)

- Pros:
  - Less ductwork
  - Capital cost savings for Unit 3 by re-using Unit 4 scrubber modules and stack
- Cons:
  - Demolition and relocation of annex building, lab building and old auxiliary boiler building
  - Limited access to Unit 4 boiler

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NID
vs
PJFF with Sorbent Injection

PJFF- sorbent inj. / NID technology comparison

Factor	PJFF w/ sorbent injection	NID
Equipment Cost	Lower	Higher
Footprint	Smaller	Larger
Reagent Cost	Higher	Lower
Auxiliary Power	Lower	Higher
Pressure Drop	Lower	Higher

PJFF- sorbent inj. / NID technology comparison

Factor	PJFF w/ sorbent injection	NID
Plugging Potential	N/A	Higher
Recycle	No	Yes
Maintenance	Lower	Higher
Water Injected	No	Yes
Inlet Temperature Limitations	None	< 350 F

PJFF- sorbent inj. / NID technology comparison

Factor	PJFF w/ sorbent injection	NID
HCl Removal	Lower	Higher
Co-Benefits: Waste Water Reduction	None	Higher
Experience	Good	Limited

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3-D Model

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Summary / Wrap-up and Discussions

From: Saunders, Eileen
To: Straight, Scott
Sent: 11/4/2010 12:01:00 PM
Subject: FW: Draft Mill Creek Validation and Brown Kickoff Presentations for Review.
Attachments: Draft Brown kickoff Presentation 110310.pdf; Draft Mill Creek Validation Presentation 110310.pdf

Scott,

Here are the slides for the Brown and MC presentations next week. I left you a voicemail that I would like you to hear regarding how I told B&V to proceed for the meetings.

Thank you,

Eileen

From: Hillman, Timothy M. [mailto:HillmanTM@bv.com]
Sent: Wednesday, November 03, 2010 10:32 AM
To: Saunders, Eileen
Cc: Lucas, Kyle J.; Wehrly, M. R.; Crabtree, Jonathan D.
Subject: Draft Mill Creek Validation and Brown Kickoff Presentations for Review.
Importance: High

Eileen,

Please find attached draft presentations for the Mill Creek validation and Brown kickoff meetings. I'm circulating them to you at the same time as my team for final review.

I believe you'll find the Brown kickoff presentation very similar to the previous ones. We've included slides on PJFF and SCR vs. SNCR as requested.
In the Mill Creek validation presentation, we have included the arrangement sketches for the different options and summarized the major pros and cons of each. These slides should facilitate additional discussions where more detail can be discussed on the attributes of each arrangement. Finally, we have a placeholder in the side deck for the 3-D models of the arrangement alternatives that we are currently working on. I think the 3-D models will be invaluable during are meeting, as a picture speaks a thousand words.

If you could provide a quick review of these and let us know your thoughts by the end of the day, then we will be in a position to finalize them and prepare copies for next week.

Best regards,

Tim Hillman | Project Manager
Power Generation - Environmental Services
Black & Veatch - Building a World of Difference™
11401 Lamar Avenue
Overland Park, KS 66211
Phone: **(913) 458-7928**
Email: **hillmantm@bv.com**

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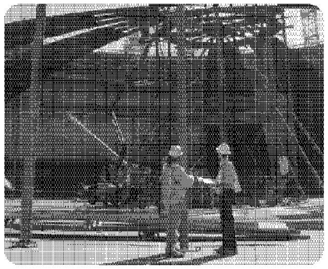

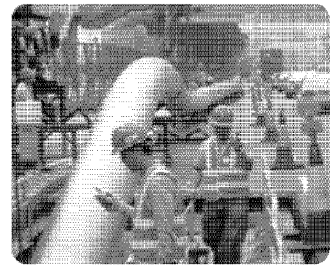
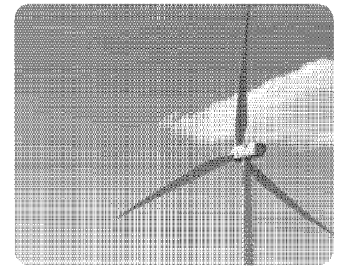

Phase II AQC Study
Brown Station Kickoff

LG&E KU

PPL companies

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November 2010

Agenda

- Regulatory drivers
- PJFF overview
- SCR vs. SNCR
- Overview of phase I results

Regulatory drivers – still uncertainty

Program Name	Regulated Pollutants	Forecasted Date for Compliance
PSD/NSR	SAM Units 1-3	Draft Permit Limit for SCR Startup
1-hour NAAQS for NO_x	NO_x	January 2017
1-hour NAAQS for SO_2	SO_2	June 2017
Clean Air Transport Rule	NO_x SO_2	Beginning in 2012 Phase in 2014
New EGU MACT	Mercury Acids (HCl) Metals (PM) Metals (AS) Organics (CO) Dioxin/Furan	Estimated January, 2015; with 1-yr extension - January, 2016

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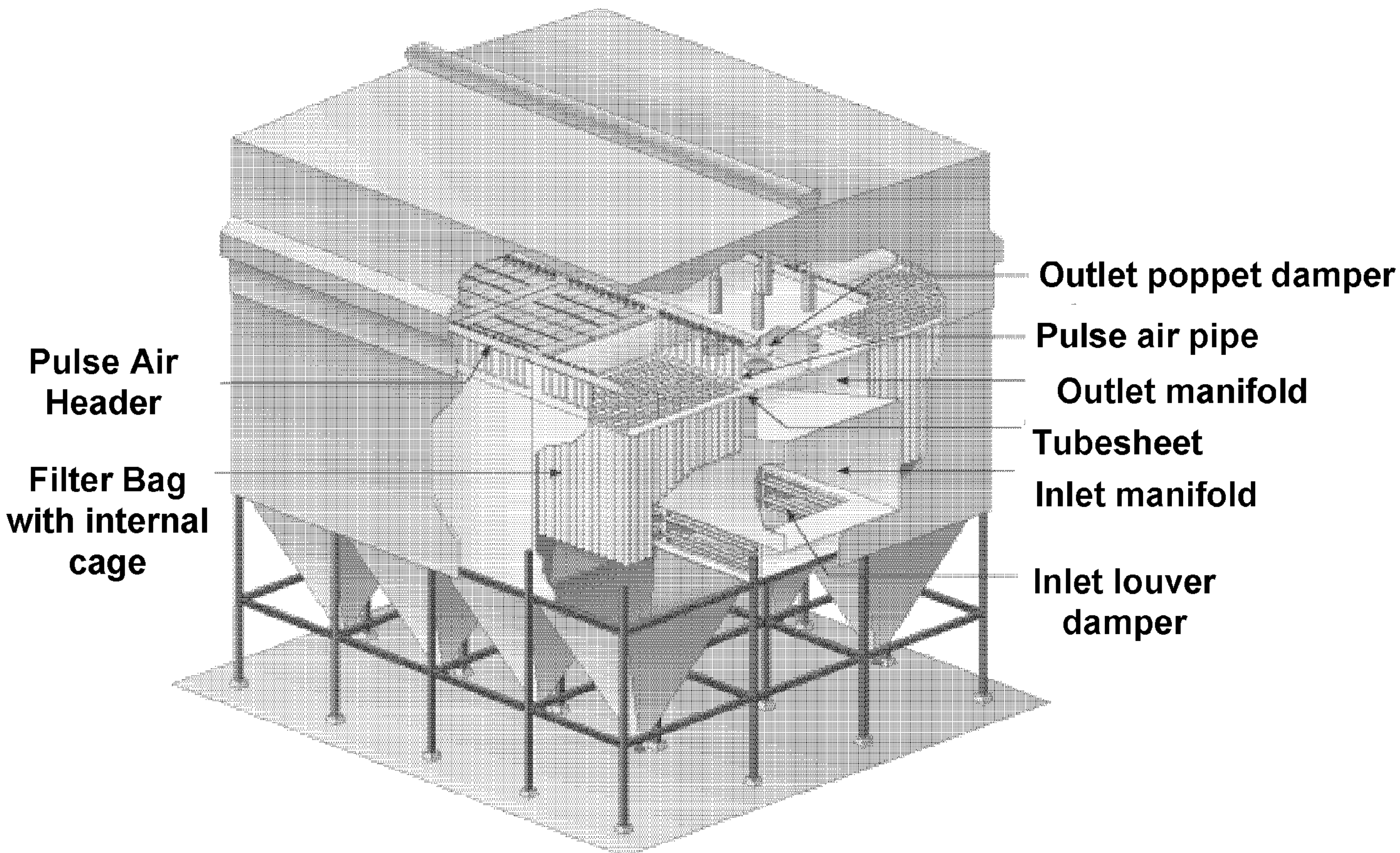
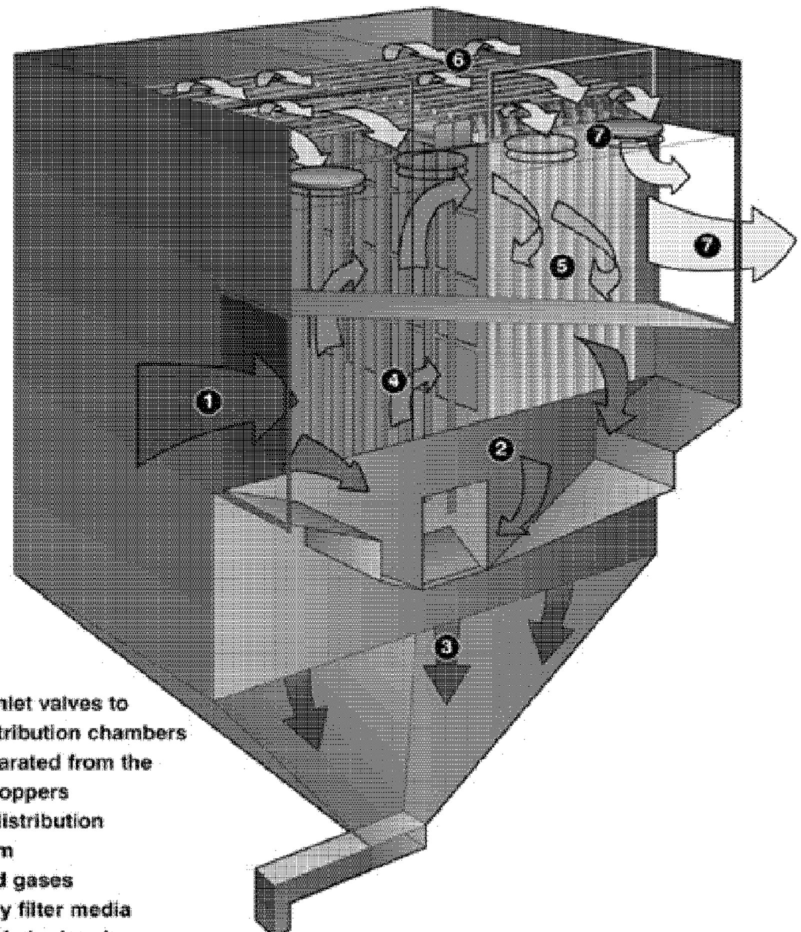
PJFF Overview

PJFF – overall layout



Courtesy: Babcock & Wilcox

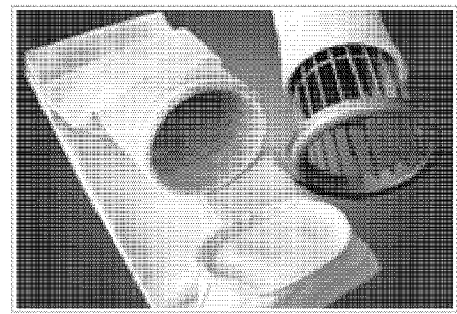
PJFF – flow diagram



1. Process gas inlet
2. Gas passes through inlet valves to pre-separator and distribution chambers
3. Heavy particulate separated from the gas for collection in hoppers
4. Gas passes through distribution system giving optimum dispersion of dust and gases
5. Particulate removed by filter media
6. Gas passes to cleaned air chamber
7. Clean gases exit through outlet valves and cleaned air duct

PJFF advantages vs. DESP

- Fuel flexibility
- High efficiency especially on $PM_{2.5}$
- Performance is less susceptible to plant operating conditions
- Works well during startups
- Better control of hazardous air pollutants such as heavy metals (Ar, Ni, Pb, etc.)
- Allows reagent injection to work better (Hg or SO_3)



PJFF disadvantages vs. DESP

- Bags damaged by high temperatures
- High pressure drop
- Periodic bag replacement

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SCR vs. SNCR

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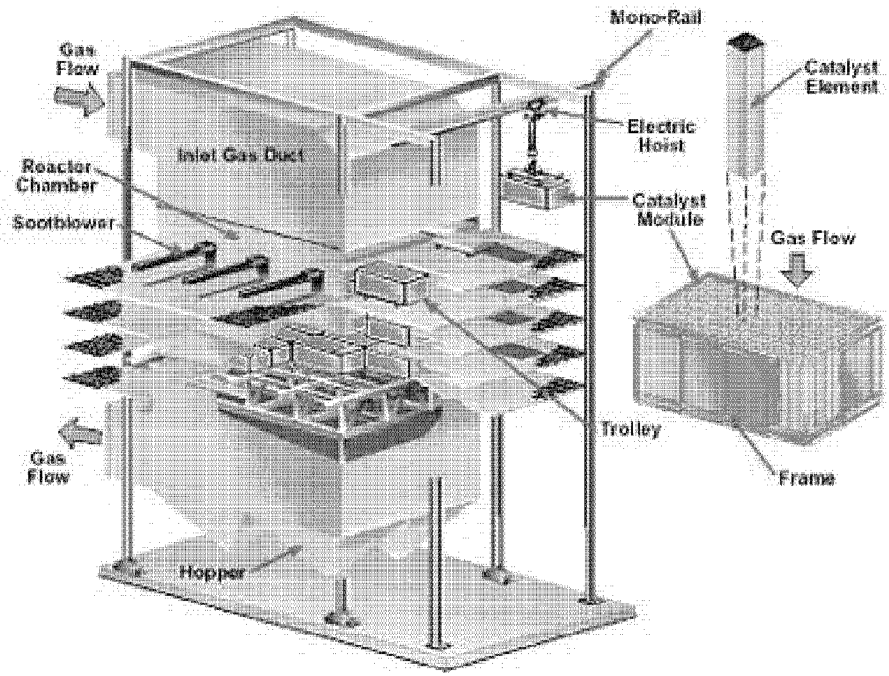
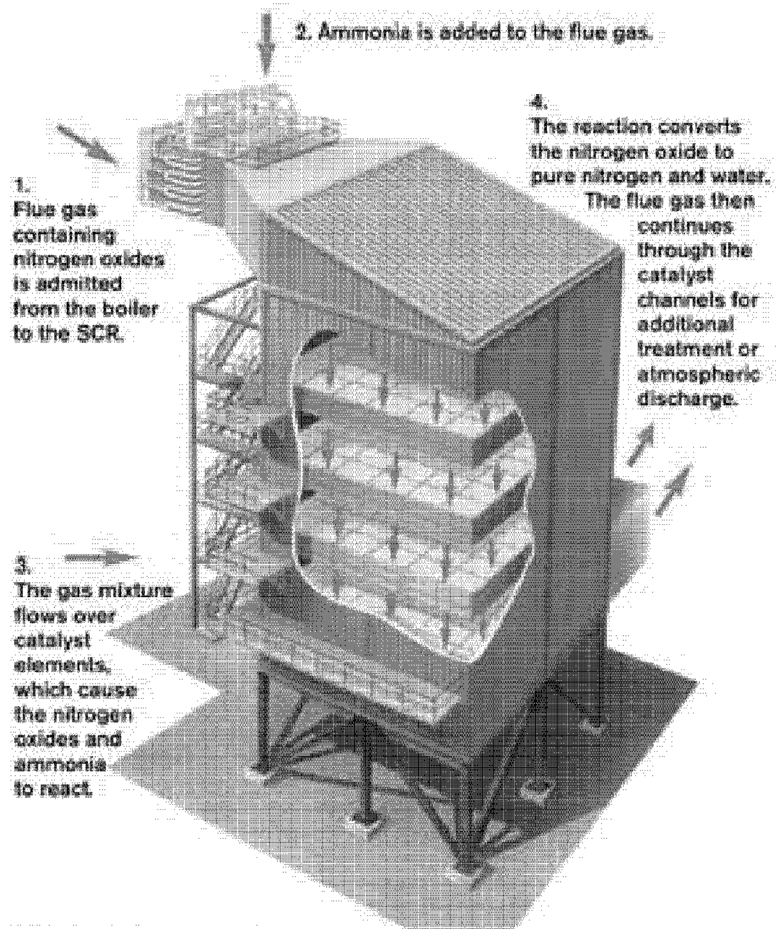
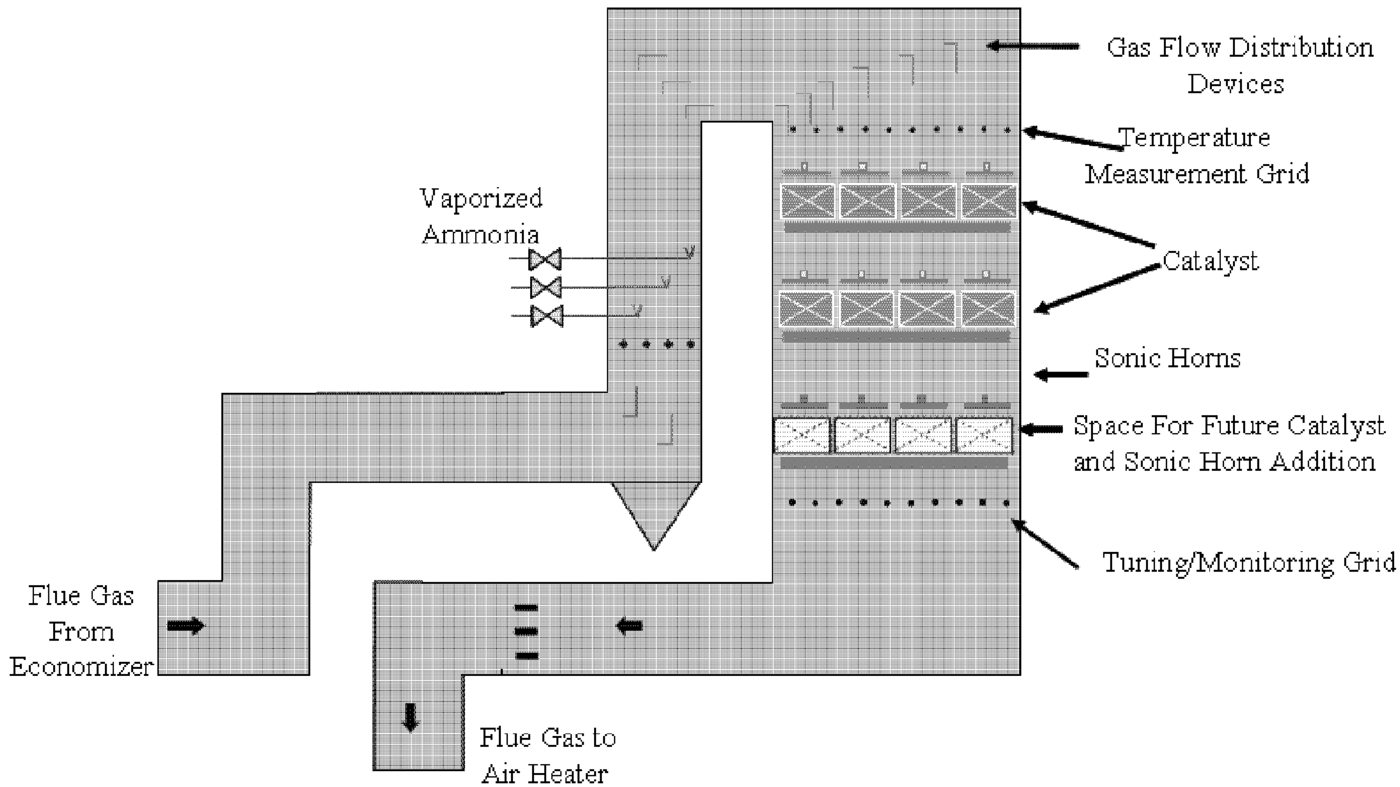
SCR – overall layout



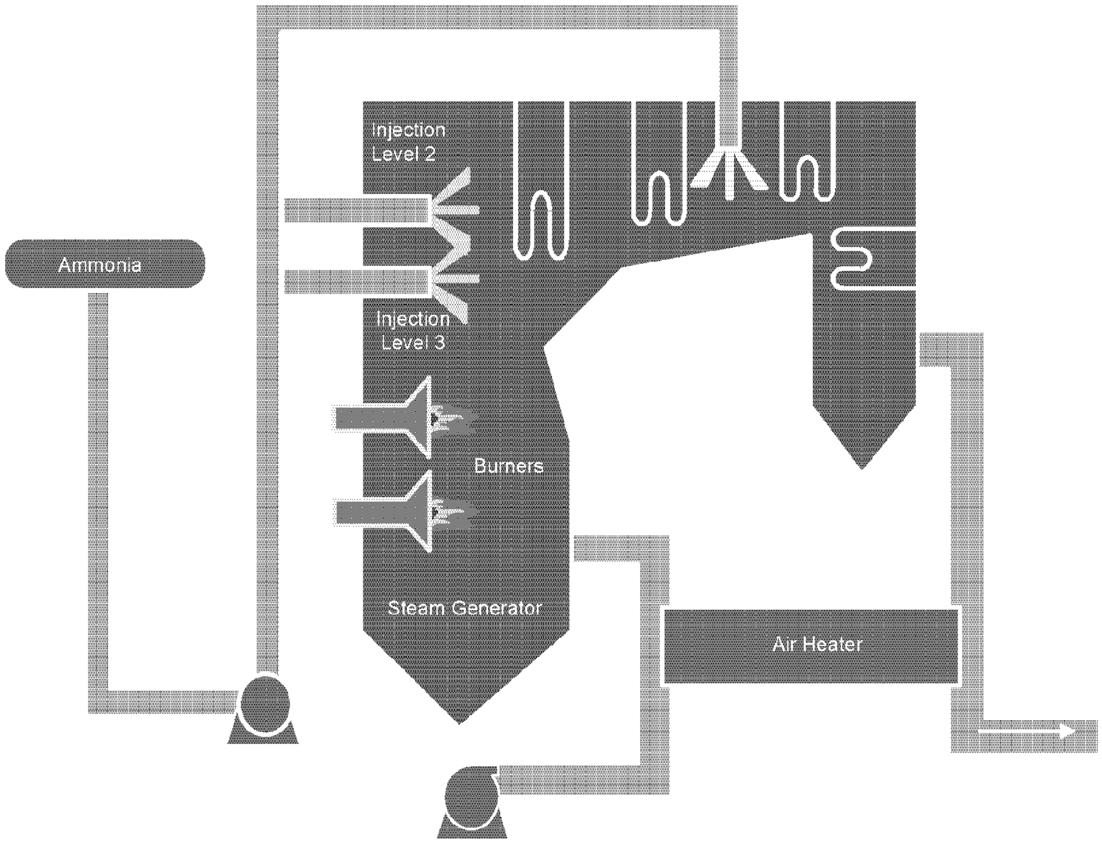
SCR – flow diagram



SCR – process


Gas Flow Distribution Devices
Temperature Measurement Grid
Vaporized Ammonia
Catalyst
Sonic Horns
Space For Future Catalyst and Sonic Horn Addition
Tuning/Monitoring Grid
Flue Gas From Economizer
Flue Gas to Air Heater

SNCR – overview



SNCR disadvantages

- High ammonia slip
- Large boilers complicate reagent injection
- High reagent usage
- Not as responsive to load changes

SCR disadvantages

- SCR catalyst oxidizes SO_2 to SO_3
- Requires catalyst
- Potential of plugging, erosion and poisoning of the catalyst
- Catalyst disposal and storage liability

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Overview of Phase I Results

Phase I AQCS results for Brown Station

- Brown Unit 1
  - Upgrade Low NOx Burners (LNB)
  - Over-Fire Air (OFA)
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection
- Brown Unit 2
  - Selective Catalytic Reduction (SCR) System
  - Pulse Jet Fabric Filter (PJFF)
  - Sorbent Injection
  - Powdered Activated Carbon (PAC) Injection
- Brown Unit 3
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection

Phase I AQCS results for Brown Station (Options)

- Brown Units 1 & 2
  - Upgrade Low NOx Burners (LNB) for Unit 1
  - Over-Fire Air (OFA) for Unit 1
  - Selective Catalytic Reduction (SCR) for Unit 1
  - Selective Catalytic Reduction (SCR) for Unit 2
  - Common Units 1 and 2 Pulse Jet Fabric Filter (PJFF)
  - Sorbent Injection for Common Units 1 and 2 PJFF
  - Powdered Activated Carbon (PAC) Injection for Common Units 1 and 2 PJFF
- Brown Unit 3
  - Pulse Jet Fabric Filter (PJFF)
  - Powdered Activated Carbon (PAC) Injection

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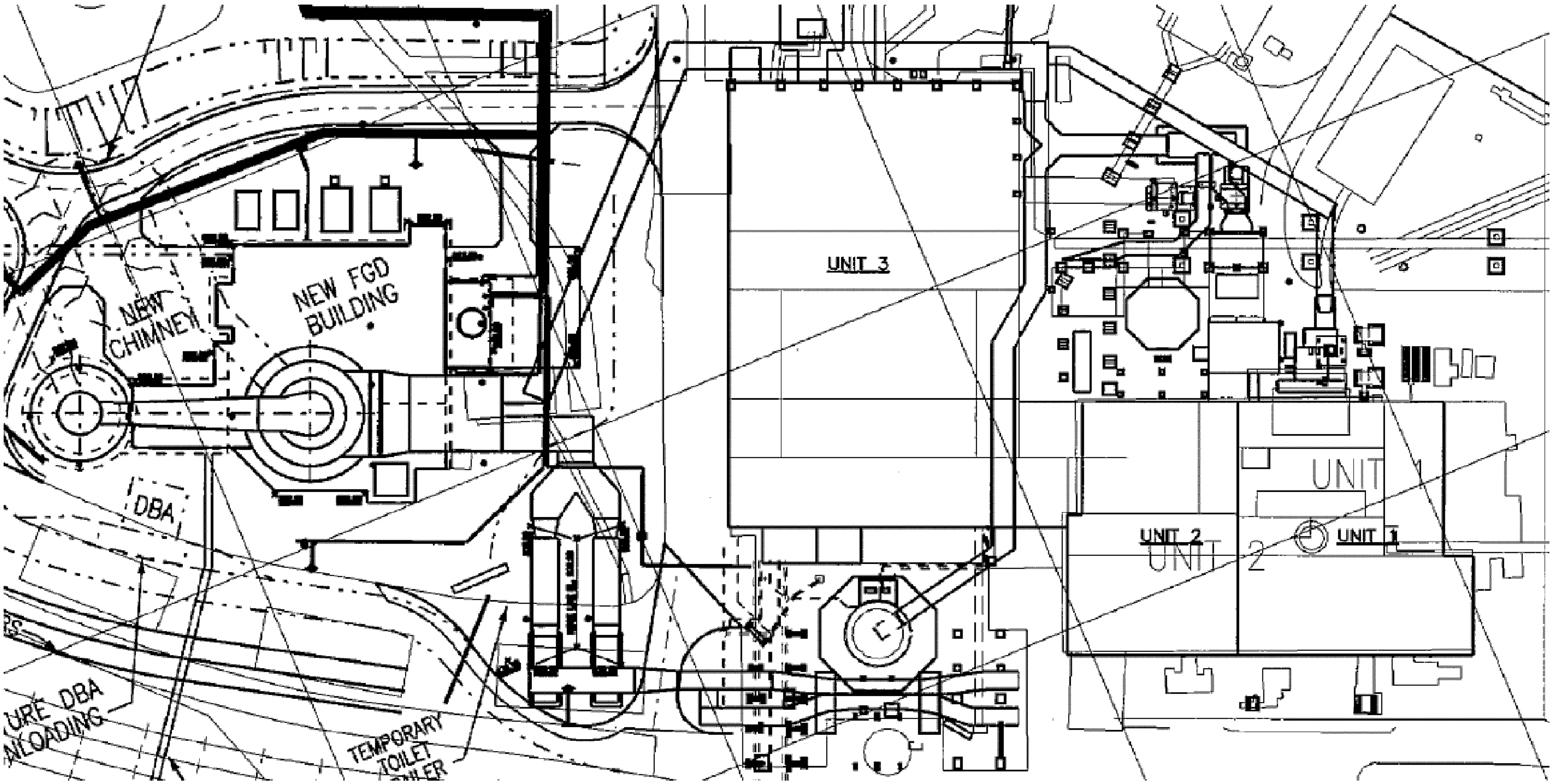
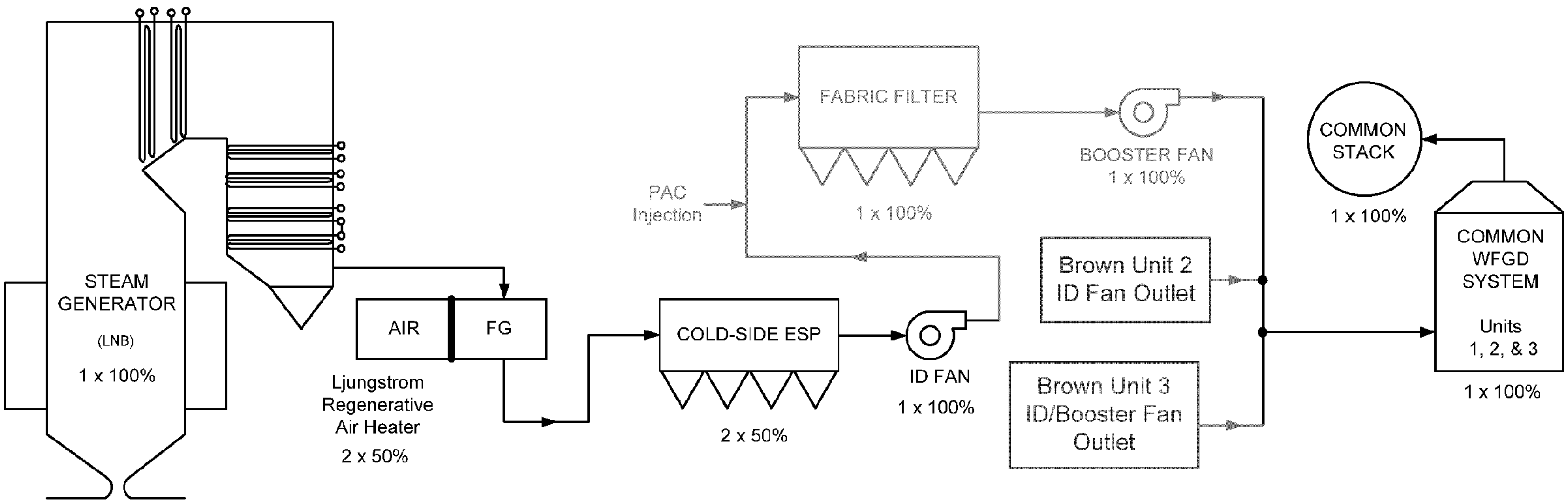
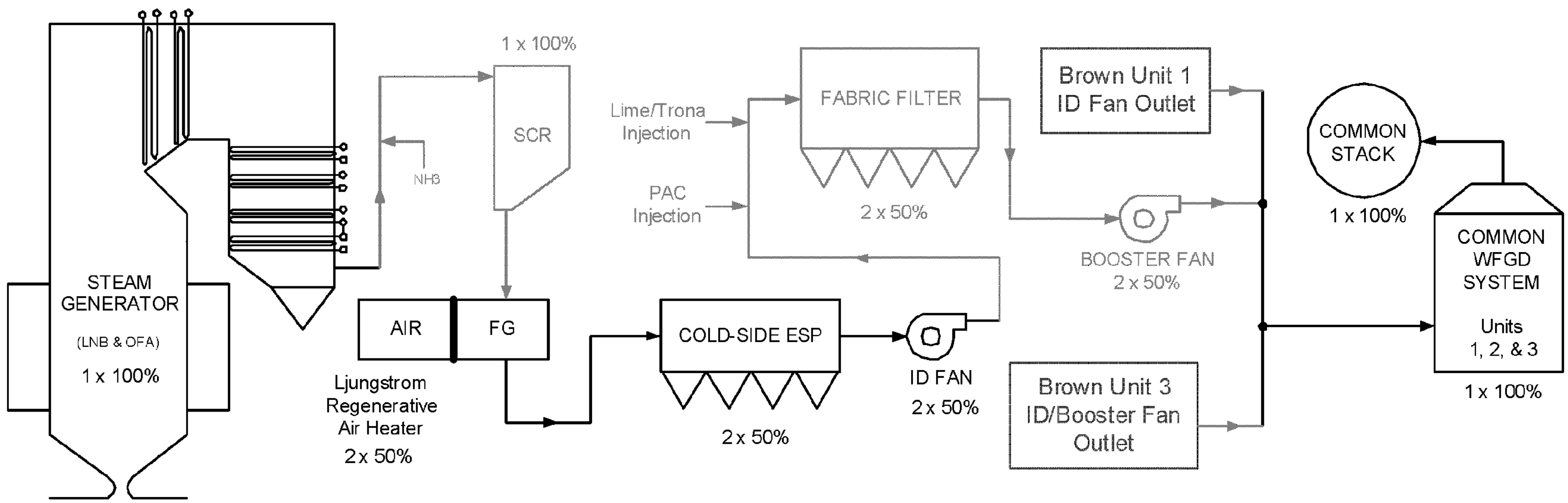
Existing Brown layout



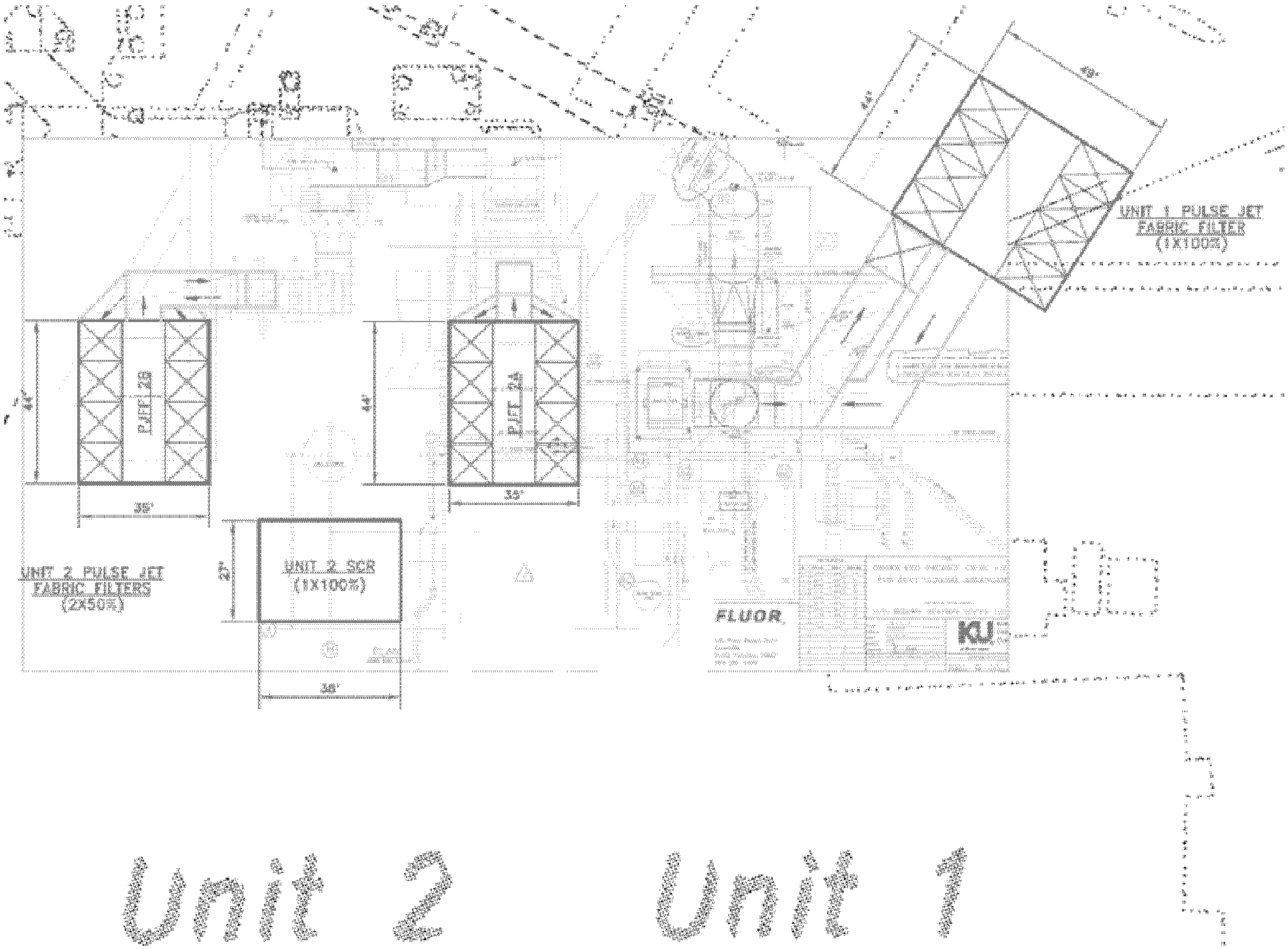
Brown Unit 1 process flow diagram



Brown Unit 2 process flow diagram



Brown Unit 1 and Unit 2 layout



 October 6, 2010

Brown Unit 2 SCR challenges

- Real estate constraints
- Difficult crane access
- Demolish existing mechanical dust collector
- Demolish abandoned Unit 2 stack
- Modify boiler building structural steel bracing and girts
- Demolish and relocate field fabricated tank located in base of abandoned Unit 2 chimney shell
- Demolish and relocate Unit 2 auxiliary transformer
- Pick and slide execution method to erect SCR

Brown Unit 2 PJFF challenges

- Elevated PJFF
- Real estate constraints
- Difficult crane access
- Pick and slide execution method to erect fabric filter modules
- Extensive underground investigation required prior to installing new foundations for structural steel support frame
- Heavy foundations required on outer ends
- Difficult to stage construction equipment near ID fans

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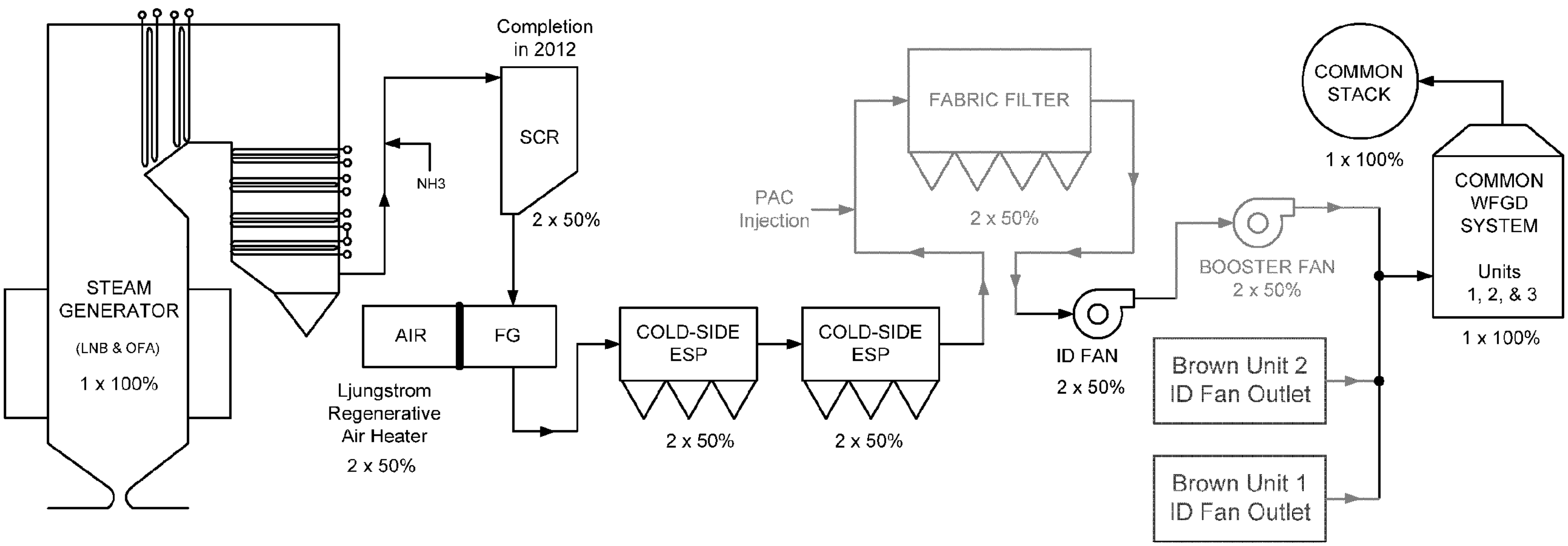
Brown Unit 3 process flow diagram



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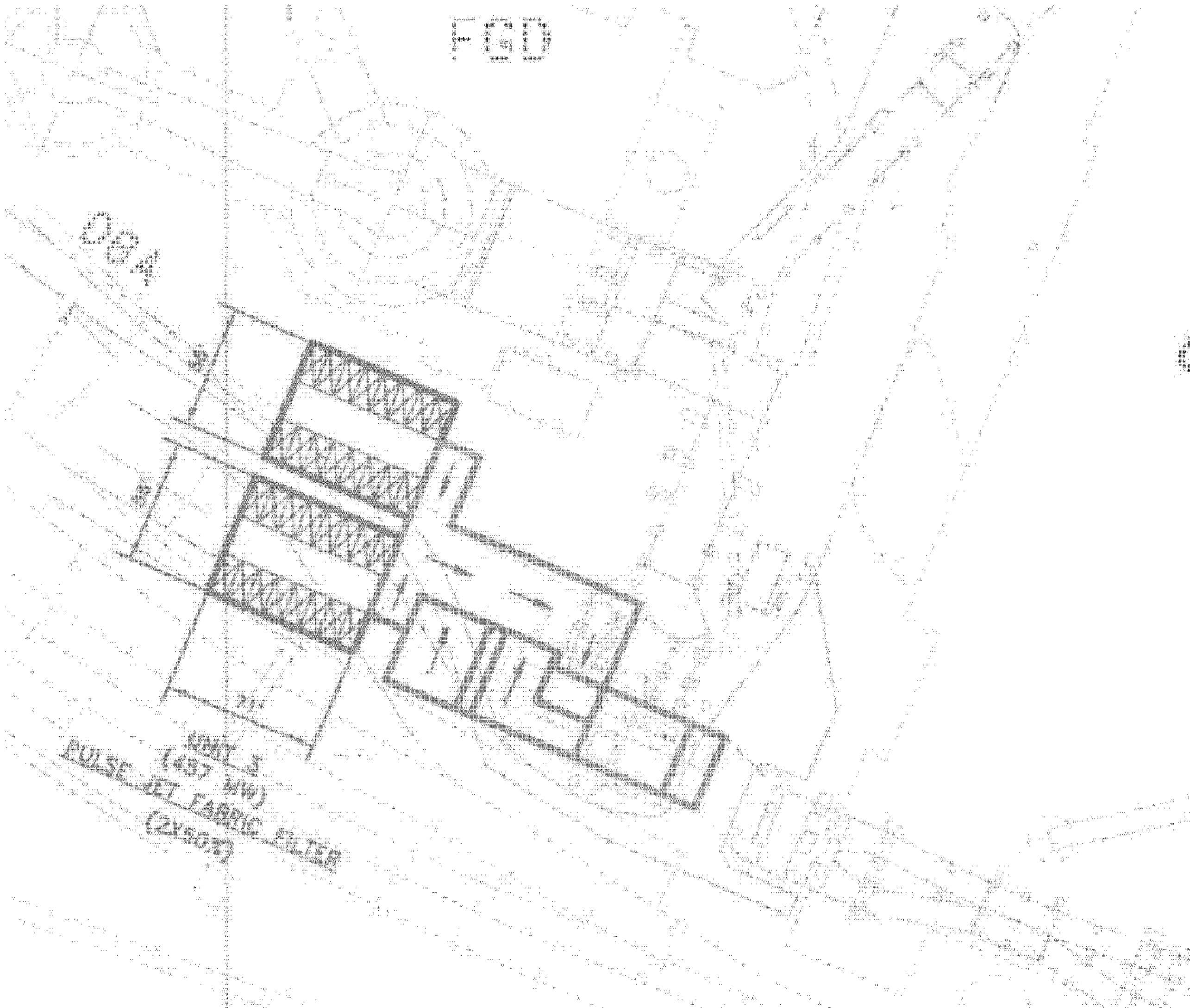
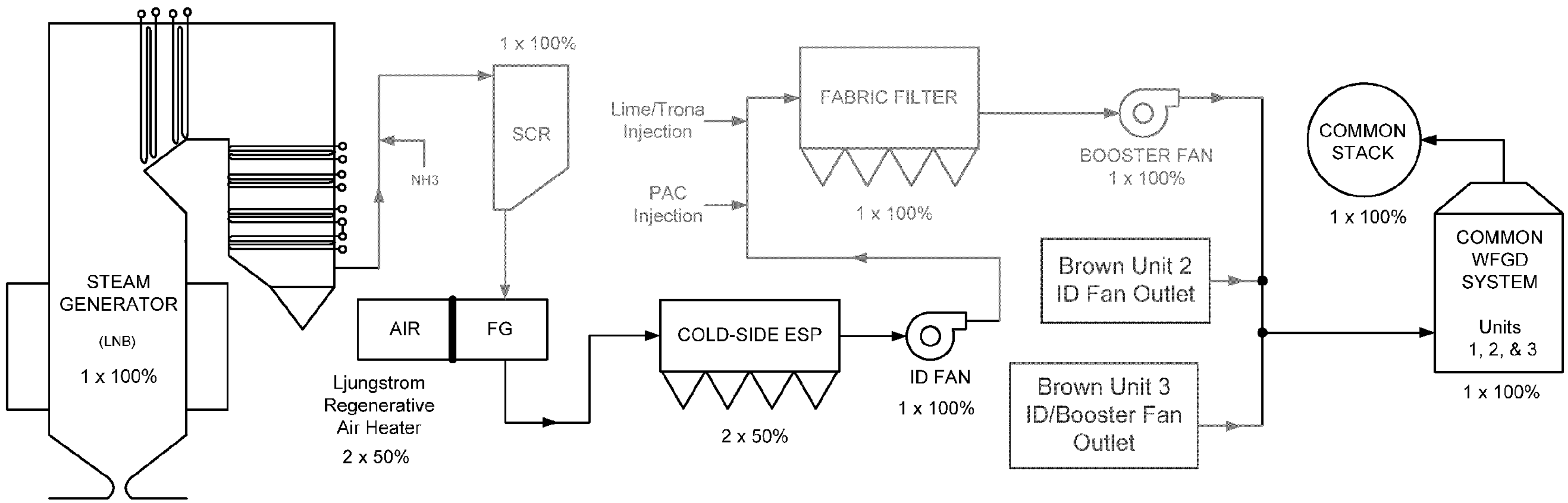
Brown Unit 3 layout



Brown Unit 1 process flow diagram (option)



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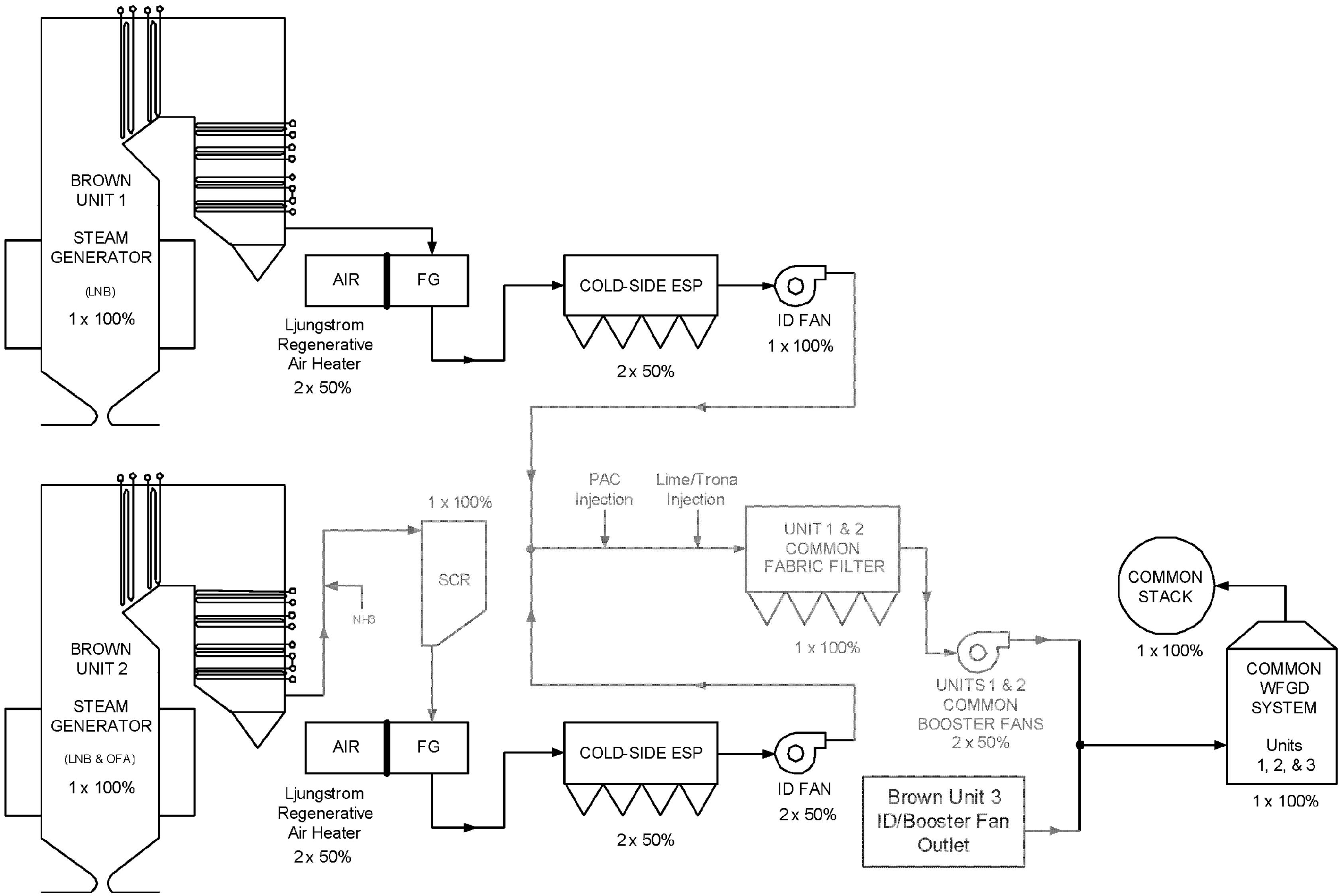
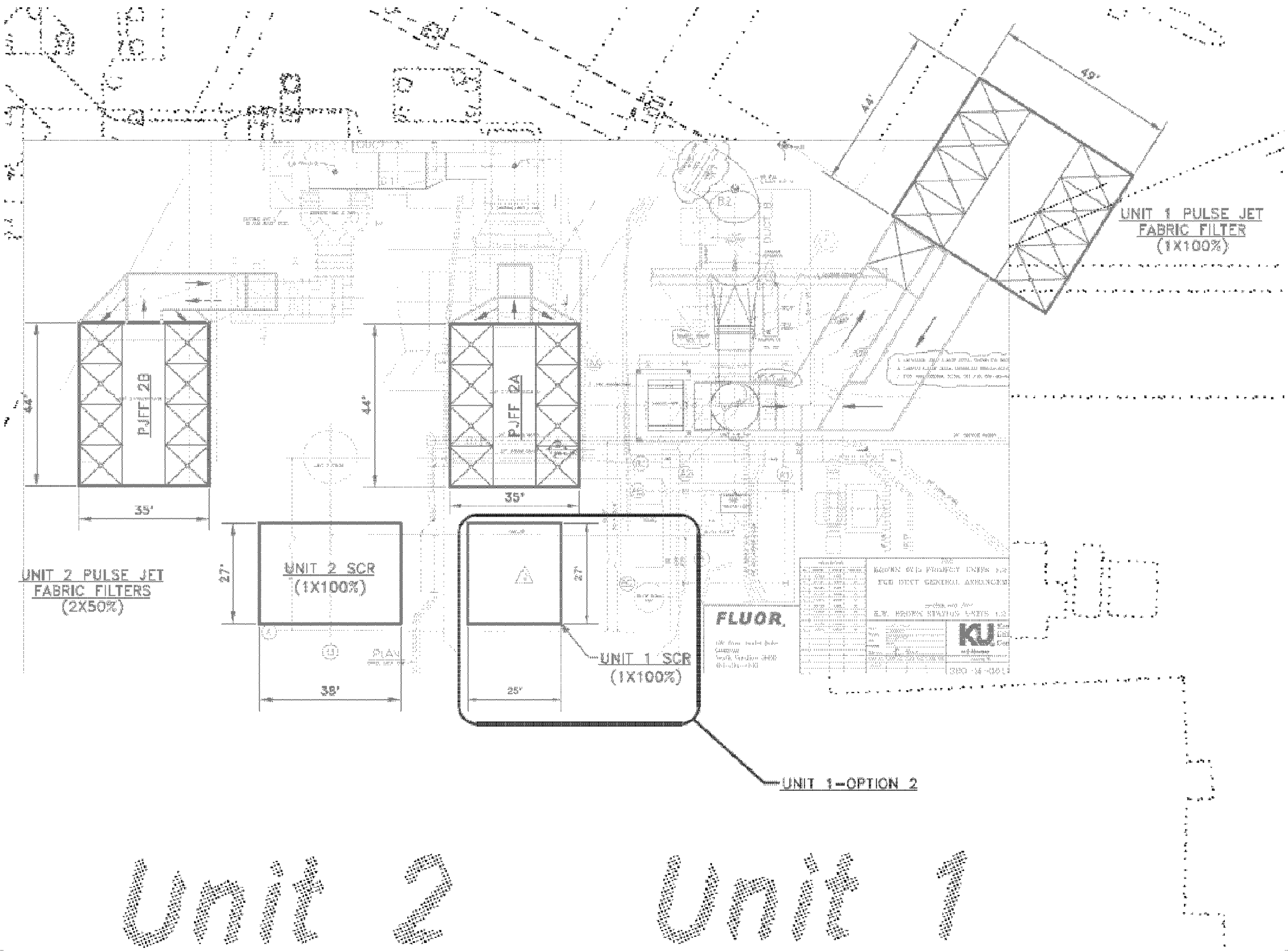
Brown Unit 1 and Unit 2 process flow diagram (option)



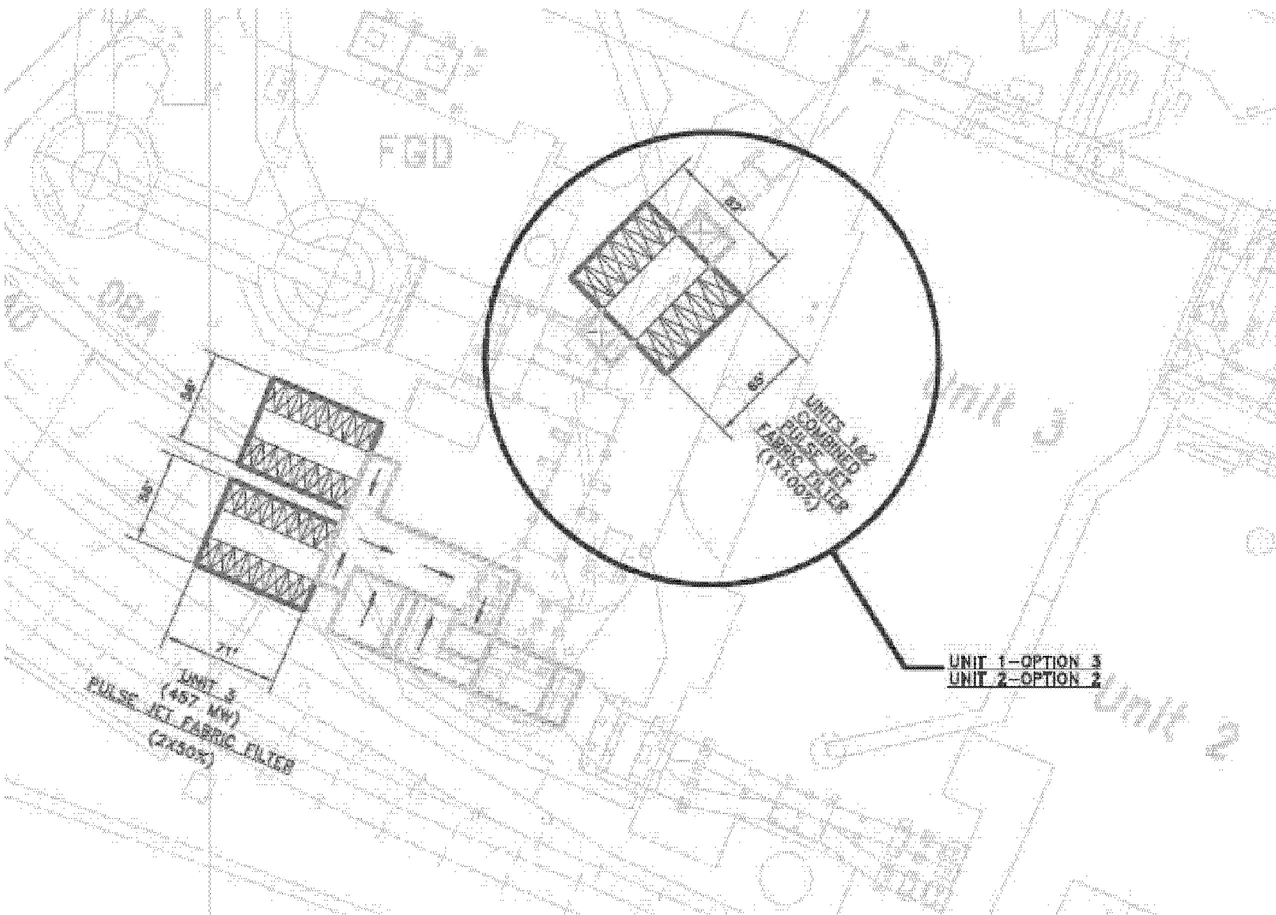
Brown Unit 1 and Unit 2 layout (option)



Brown Unit 1 SCR challenges (option)

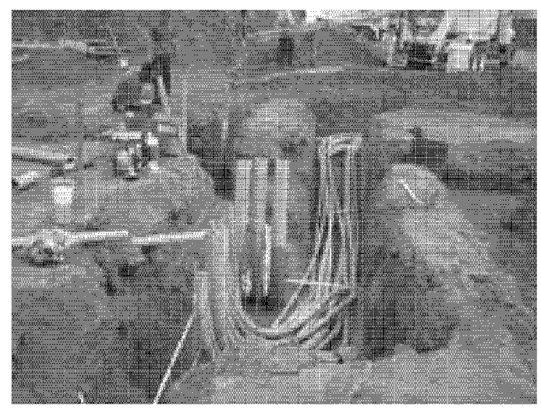
- Real estate constraints
- Extensive relocation of existing plant components
- Rotation of secondary air heater duct
- Modify boiler building structural steel and bracing to accommodate ductwork
- Relocate switchgear in the boiler building

Brown Unit 1 and Unit 2 layout (option)



Brown Units 1 & 2 combined PJFF challenges (option)

- Elevated PJFF
- Demolish and relocate underground utilities
- Modify structural steel frame work
- Fabric filter built on standard frame above existing ductwork

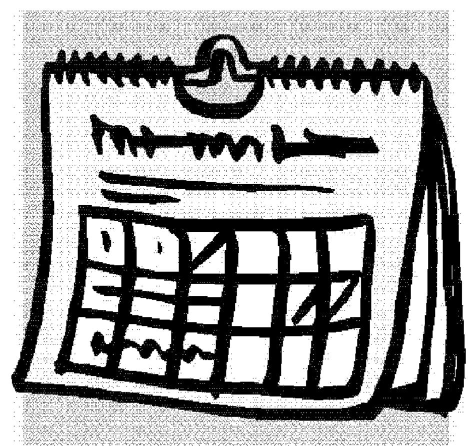


Typical PJFF schedule

- 30 to 36 months
  - Engineering & procurement – 12 -16 months
  - Erect PJFF foundations – 6 months
  - Erect PJFF – 10 -12 months
  - Tie-in outage – 1 month
  - Start-up – 1 month

Typical SCR schedule

- 32 to 36 months
  - Engineering & procurement – 16 months
  - Erect SCR foundations – 4 months
  - Erect SCR support steel – 4 months
  - Erect SCR & ductwork – 8 months
  - Tie-in outage – 1 month
  - Start-up – 1 month



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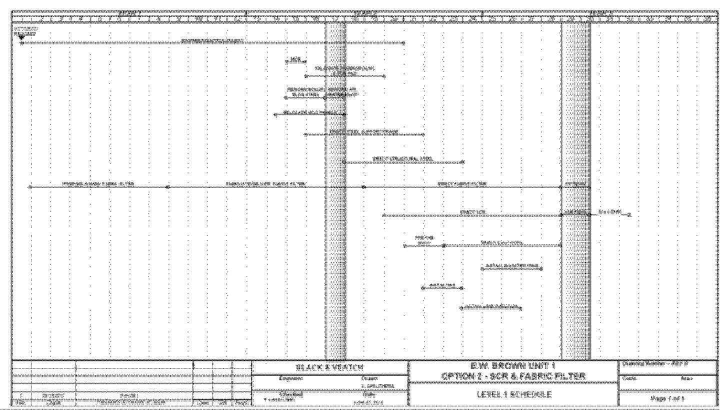
Phase I implementation schedule

- Brown Unit 1 PJFF – 32 months
- Brown Unit 2 SCR & PJFF – 34 months
- Brown Unit 3 PJFF – 30 months
- Option - Brown Unit 1 SCR – 32 months
- Option - Combined Brown Units 1 & 2 PJFF – 30 months



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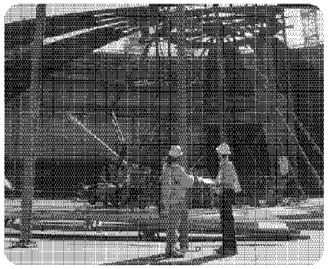

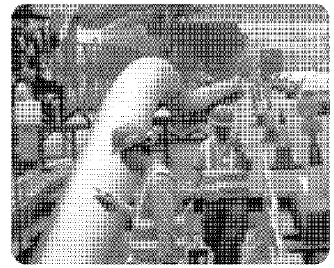
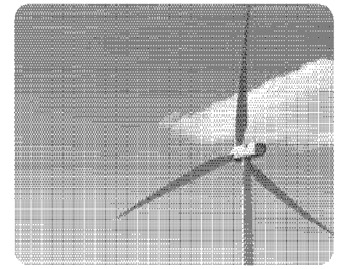

Phase II AQC Study
Mill Creek Validation

LG&E KU

PPL companies

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November 2010

Agenda

- Units 1, 2, 3 and 4 AQC equipment train
- Unit AQC equipment conceptual layout
- NID vs PJFF comparison
- 3-D Model
- Summary / wrap-up and discussions

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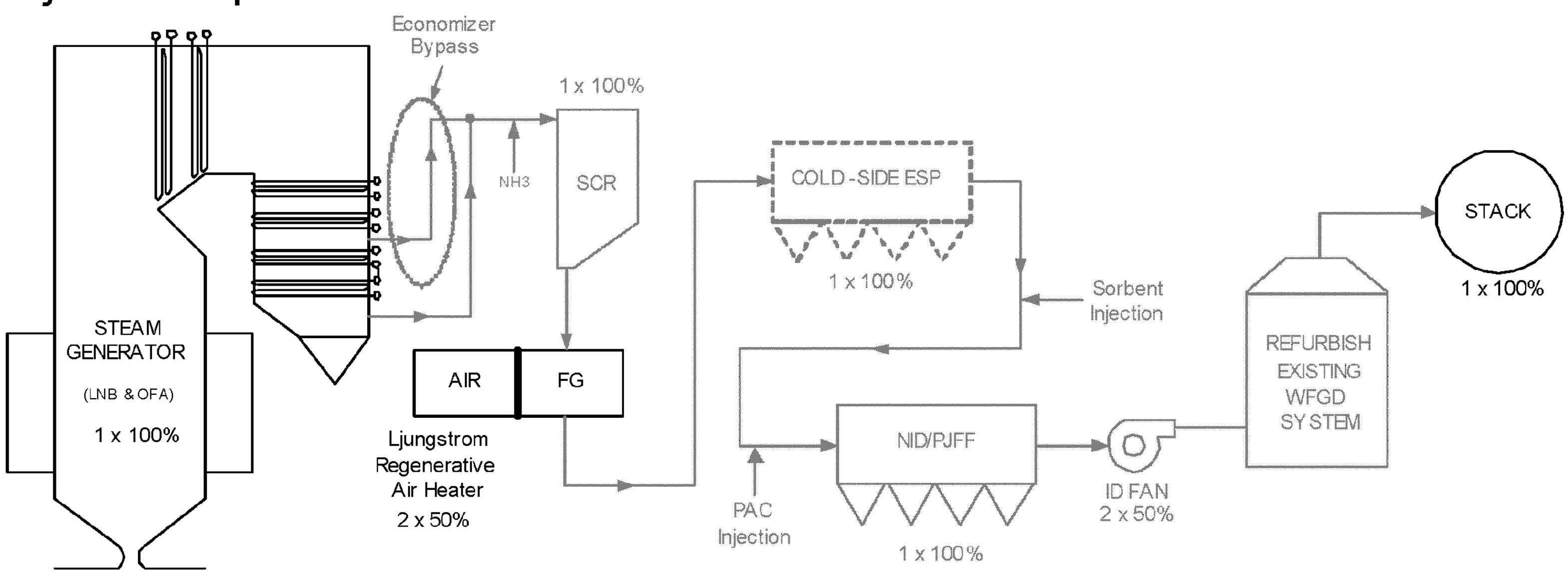
AQC Equipment Train
Mill Creek Units 1, 2, 3 and 4

November 9, 2010

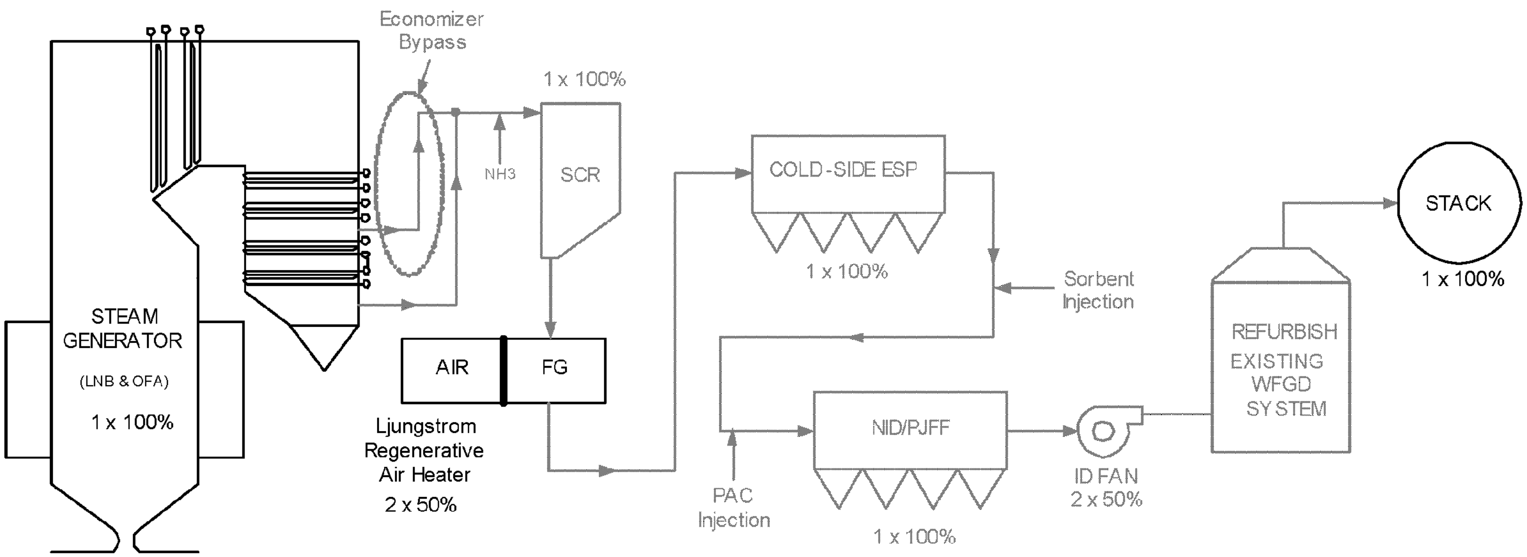
Mill Creek Unit 1 AQC process flow diagram

- Add new pre-filter CS-ESP (alternative)
- Add new ID fans
- Add new NID or PJFF/duct injection option
- Demolish existing CS-ESP
- Add new SCR at old CS-ESP
- Upgrade and refurbish existing WFGD system



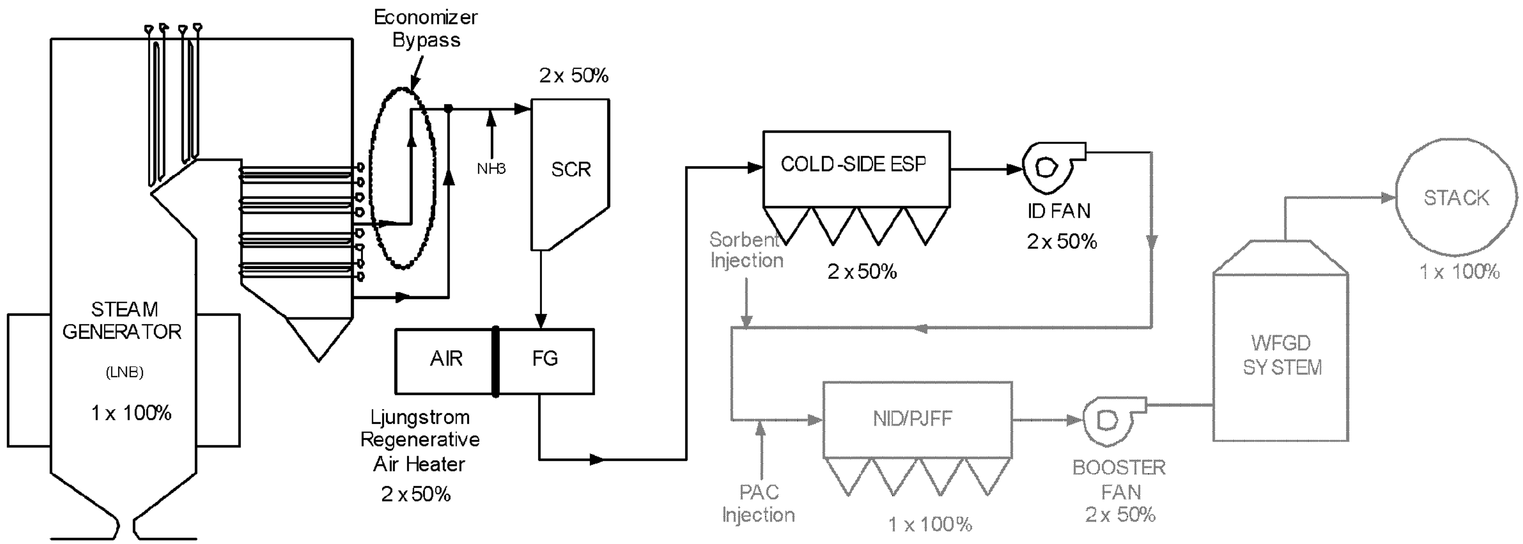
Mill Creek Unit 2 AQC process flow diagram

- Add new CS-ESP (pre-filter)
- Add new ID fans
- Add new NID or PJFF/duct injection option
- Demolish existing CS-ESP
- Add new SCR at old CS-ESP
- Upgrade and refurbish existing WFGD system



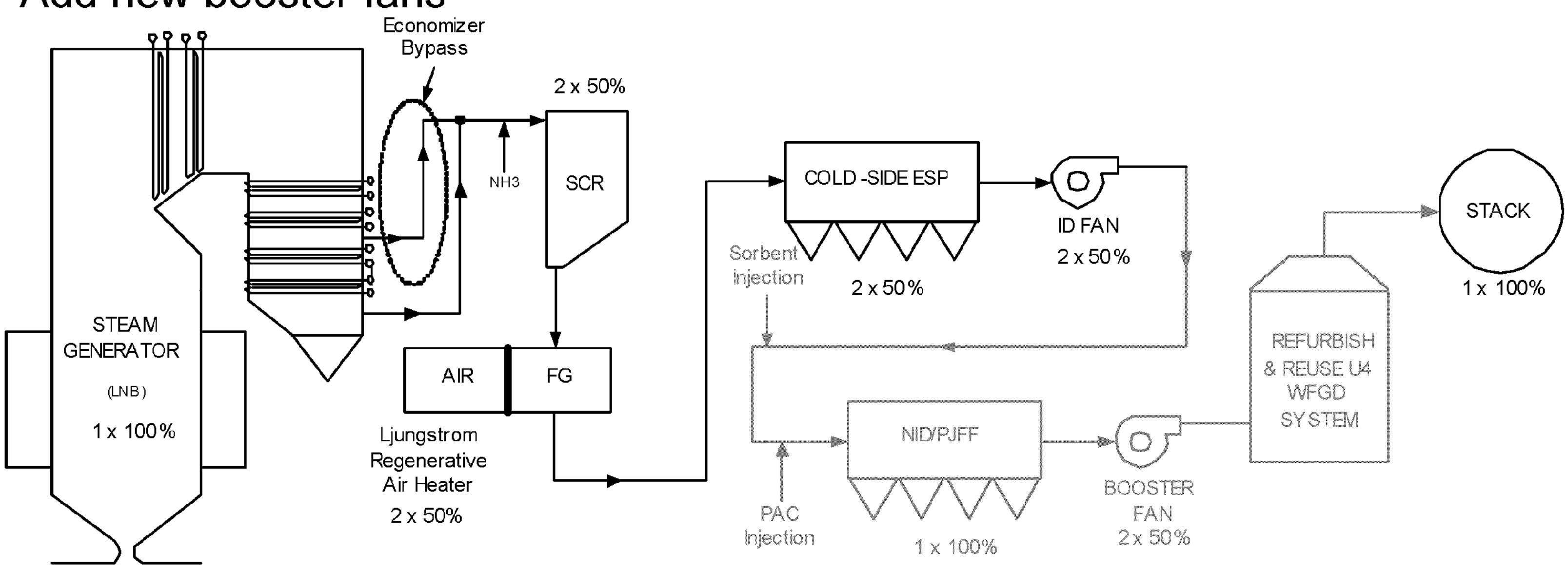
Mill Creek Unit 4 AQC process flow diagram

- Add new stack
- Add new NID or PJFF/duct injection option
- Add new booster fans
- Add new Unit 4 WFGD



Mill Creek Unit 3 AQC process flow diagram

- Upgrade and refurbish existing Unit 4 WFGD to re-use as unit 3 WFGD
- Reuse Unit 4 stack for Unit 3 (following Reuse of Unit 4 WFGD)
- Demolish existing Unit 3 WFGD
- Add new NID or PJFF/duct injection option
- Add new booster fans



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AQC Conceptual Sketches

AQC validation

- Validation report determined no fatal flows for the selected AQC equipment
- AQC equipment can meet identified emission targets
- Two or more arrangements possible for AQC equipment
- Pros and cons identified for each alternative

AQC conceptual sketches

- Unit 1 and Unit 2
  - 3 NID alternatives (A, B, and C)
  - 3 PJFF alternatives (A, B, and C)
- Unit 3 and Unit 4
  - 2 NID alternatives (A and B)
  - 2 PJFF alternatives (A and B)

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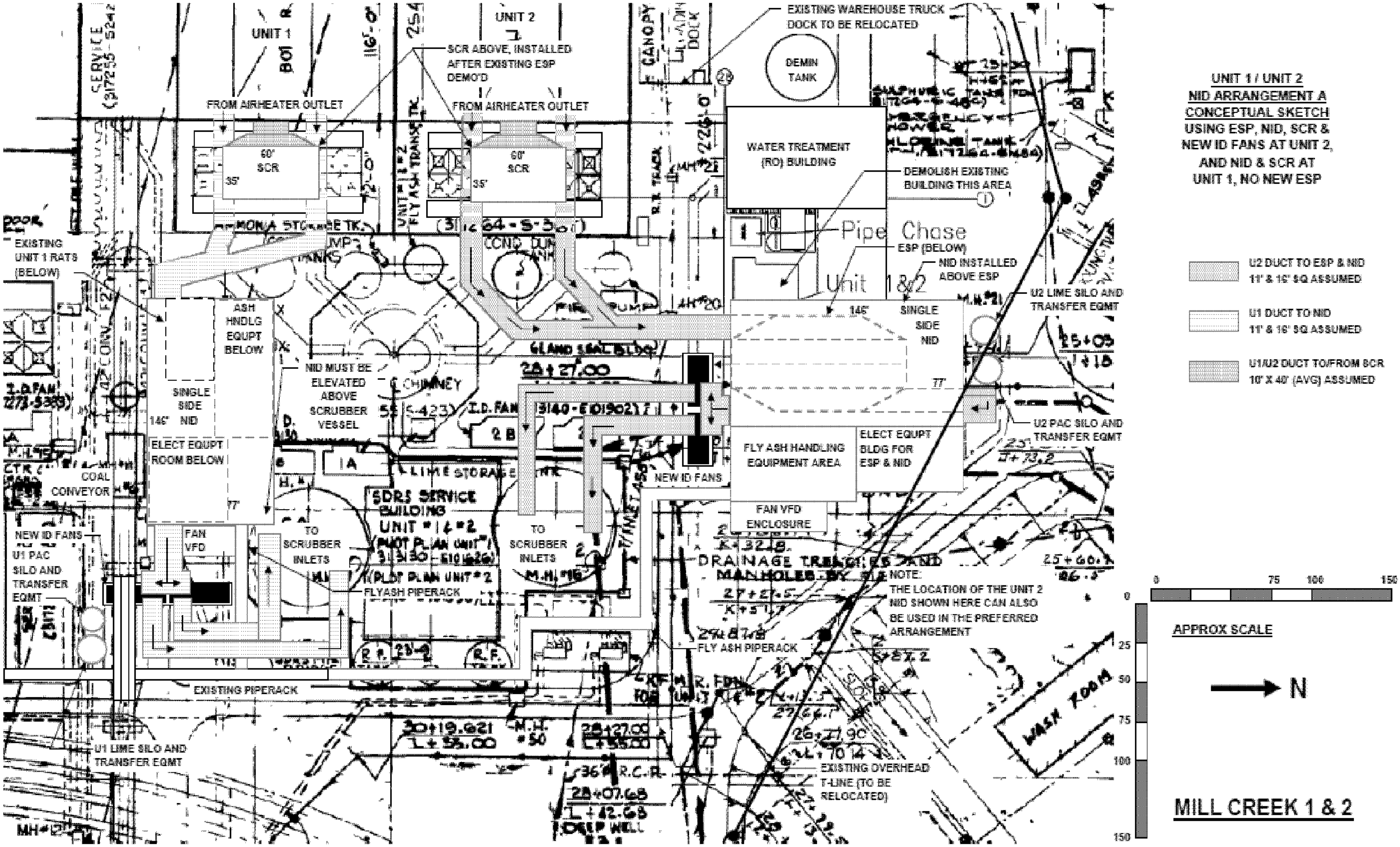
Mill Creek Unit 1 and Unit 2 (NID arrangement A)



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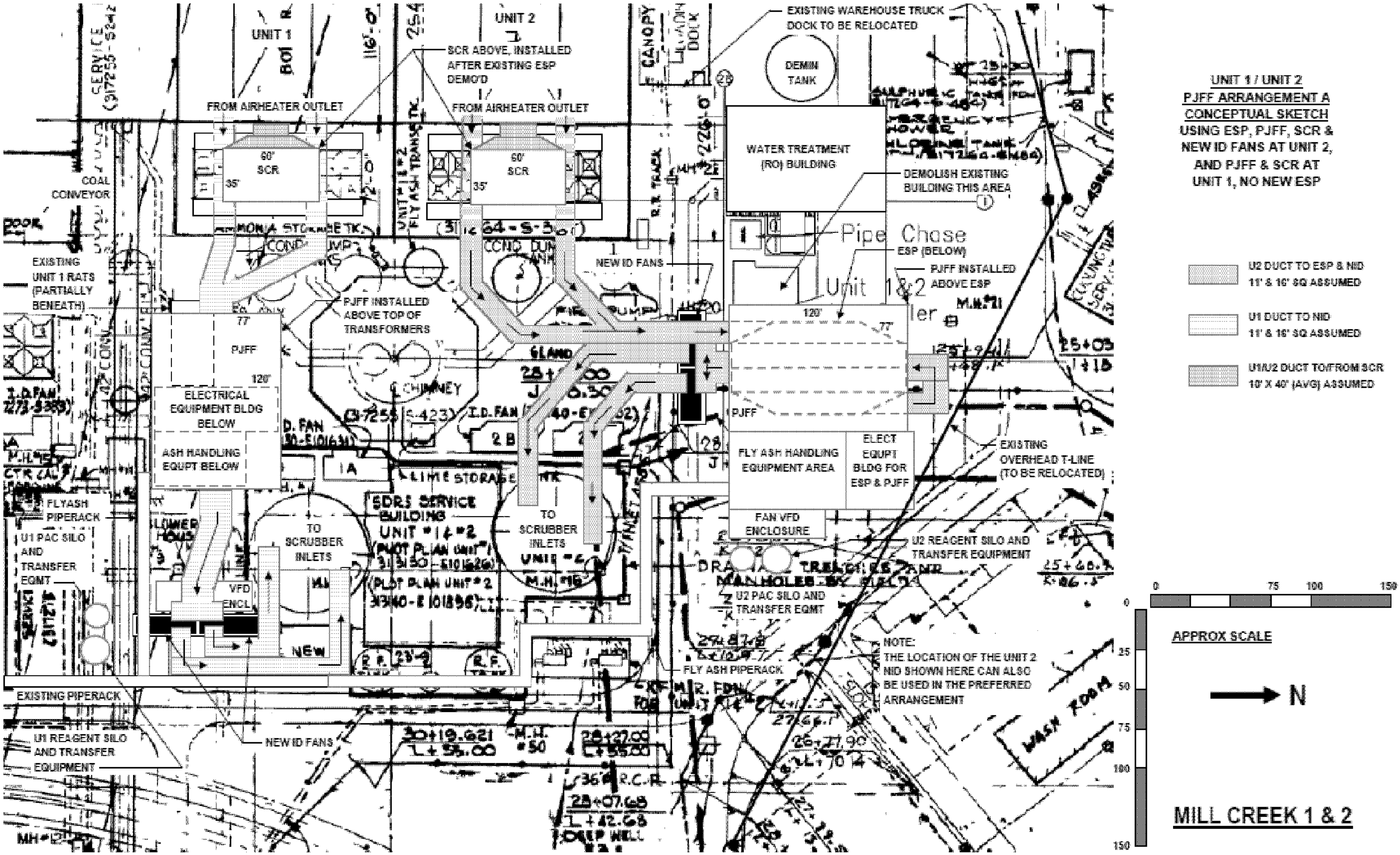
Mill Creek Unit 1 and Unit 2 (PJFF arrangement A)



Mill Creek Unit 1 and Unit 2 (arrangement A)

- Pros:
  - Optimized ductwork – less capital cost and pressure drop
  - Less ash drop out during low load
- Cons:
  - No pre-filter CS-ESP for Unit 1 only due to space constraints
  - Unit 1 requires ash land-filling capacity
  - Restricted access for Unit 1 SCR construction
  - Elevated structure required for NID or PJFF
  - Unit 1 and Unit 2 auxiliary boiler building requires demolition
  - Relocate overhead transmission lines north of Unit 2

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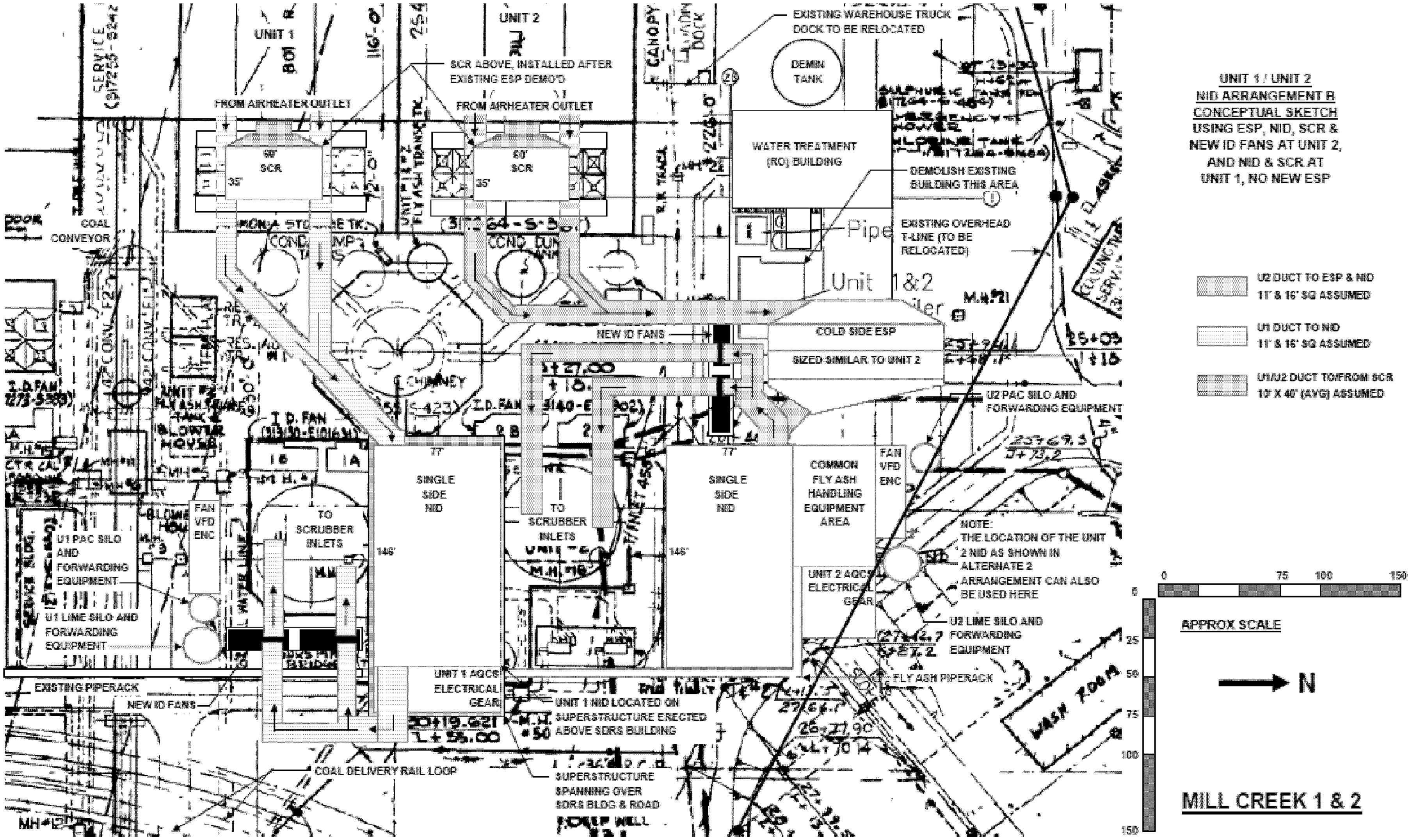
Mill Creek Unit 1 and Unit 2 (NID arrangement B)



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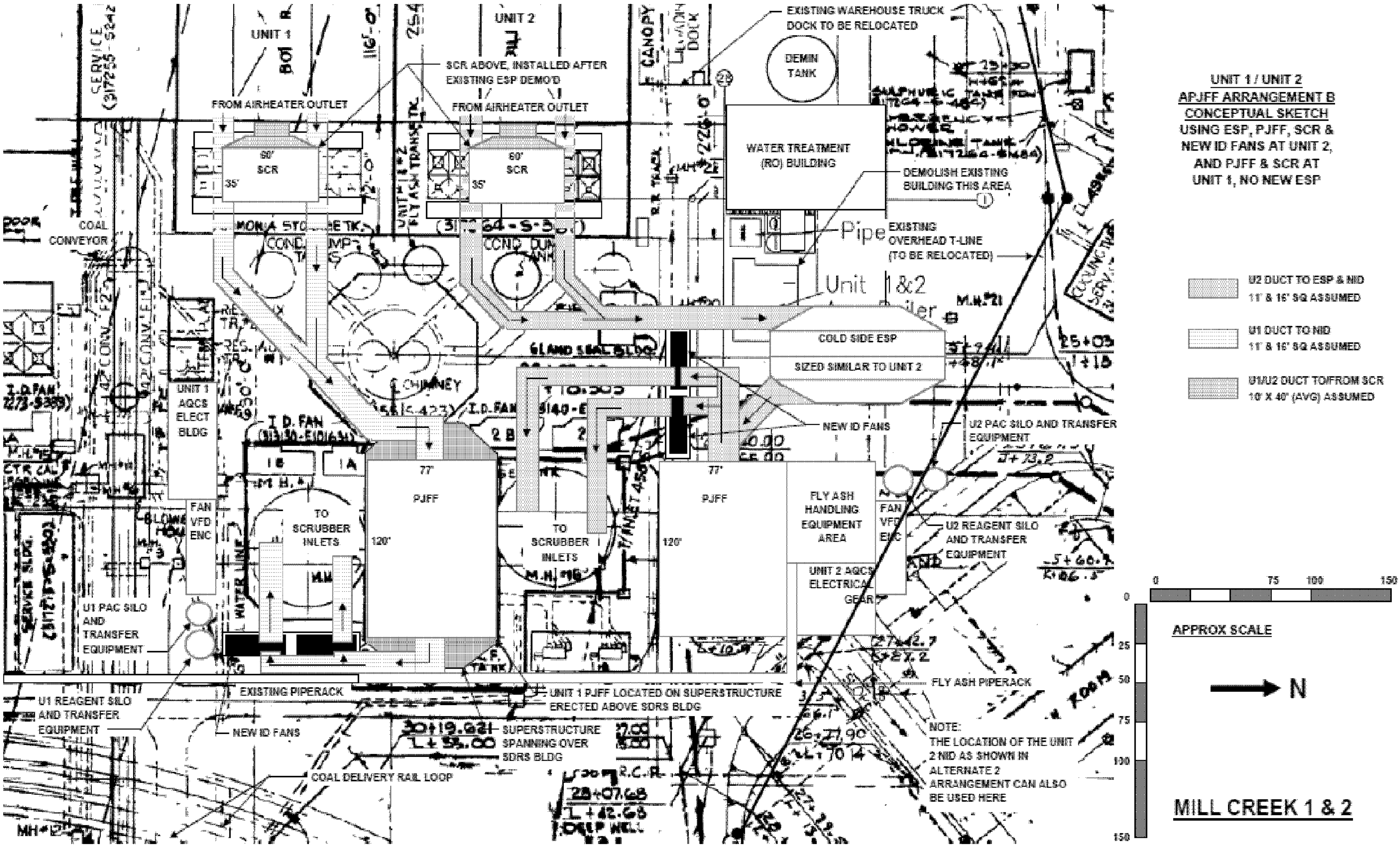
Mill Creek Unit 1 and Unit 2 (PJFF arrangement B)



Mill Creek Unit 1 and Unit 2 (arrangement B)

- Pros:
  - Optimized ductwork – less capital cost and pressure drop
  - Less ash drop out during low load
- Cons:
  - No pre-filter CS-ESP for Unit 1 – space constraints
  - Unit 1 requires ash land-filling capacity
  - Elevated structure required for NID or PJFF
  - Unit 1 and Unit 2 auxiliary boiler building requires demolition
  - Relocate overhead transmission lines north of Unit 2

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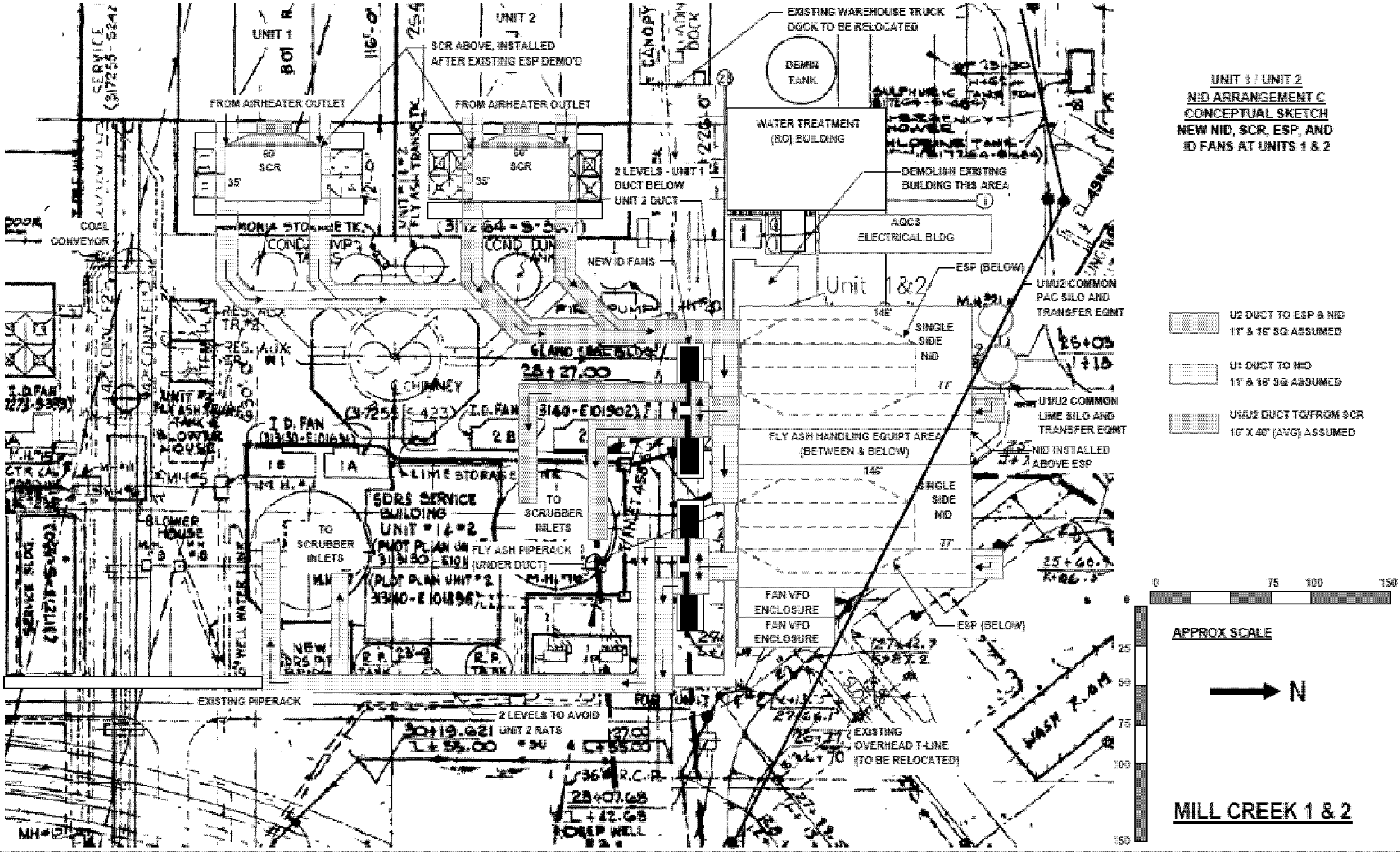
Mill Creek Unit 1 and Unit 2 (NID arrangement C)



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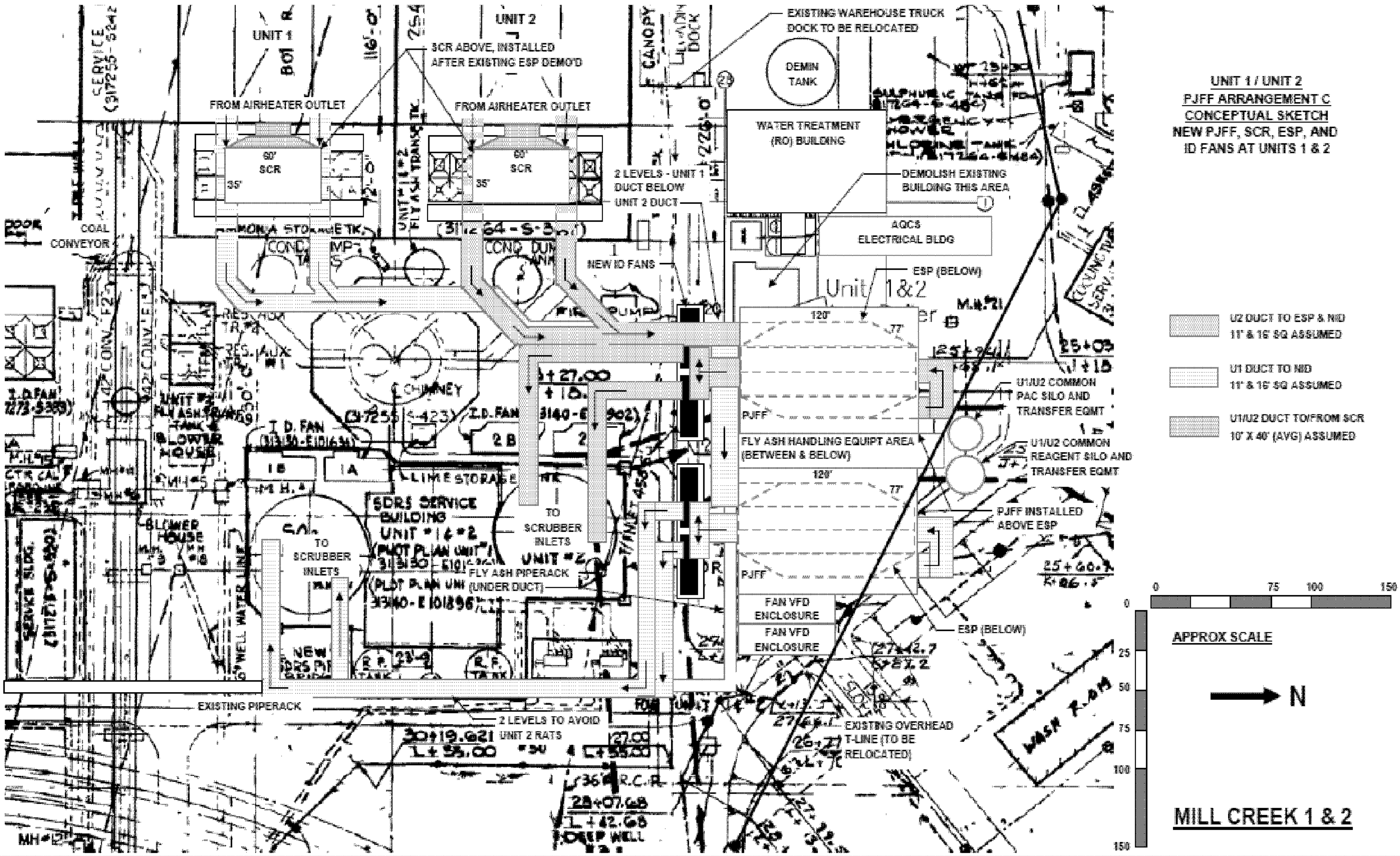
Mill Creek Unit 1 and Unit 2 (PJFF arrangement C)



Mill Creek Unit 1 and Unit 2 (arrangement C)

- Pros:
  - New CS-ESP pre-filter for Unit 1 and Unit 2 – reduced ash land-fill capacity required
  - Constructability advantage
- Cons:
  - Longer ductwork – higher capital costs and increased pressure drop
  - Higher potential for ash dropout
  - Elevated structure required for NID or PJFF
  - Unit 1 and Unit 2 auxiliary boiler building requires demolition
  - Relocate overhead transmission lines north of Unit 2

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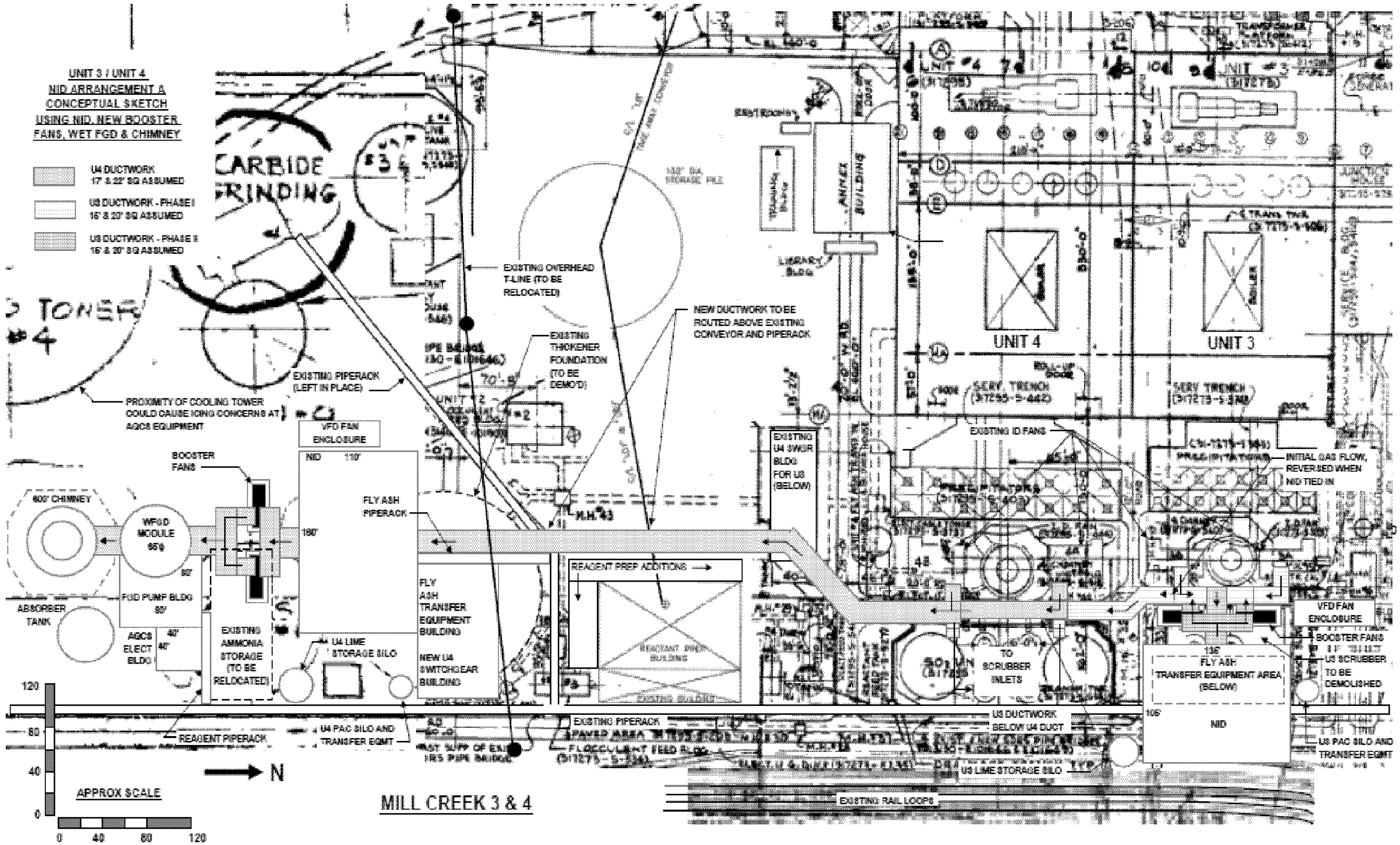
Mill Creek Unit 3 and Unit 4 (NID arrangement A)



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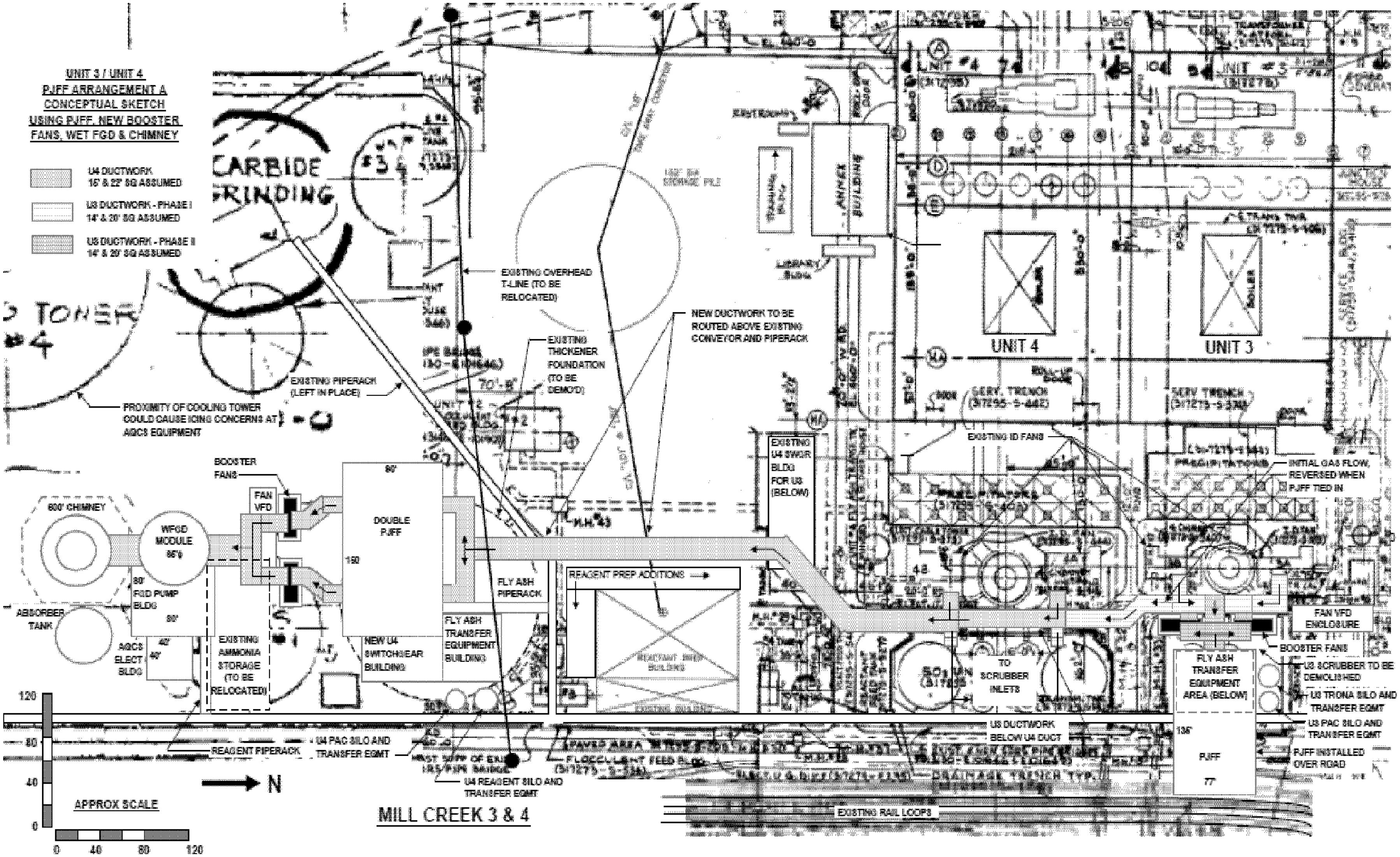
Mill Creek Unit 3 and Unit 4 (PJFF arrangement A)



Mill Creek Unit 3 and Unit 4 (arrangement A)

- Pros:
  - Constructability advantage
  - Capital cost savings for Unit 3 by re-using Unit 4 scrubber modules and stack
- Cons:
  - Additional ductwork (above existing limestone conveyor)
  - Demolition of abandoned thickener
  - Relocation of ammonia storage and overhead transmission lines
  - Close proximity with cooling tower - icing concerns