3158

NOTES:

1. MASS BALANCE TABLES TO BE USED IN CONJUNCTION WITH 10FMD002, & 10FMD003.
2. PHASE 1 MASS BALANCE REPRESENTS RCS RECYCLE WITH 100% OF AIR PULLED FROM SILO 4 RECYCLED BACK TO SILO 4.
3. PHASE 2 MASS BALANCE REPRESENTS RCS OPERATION DURING RETRIEVAL MODE FROM SILOS AND AIRFLOW THROUGH EQUIPMENT MODULES.

PHASE 1 (SEE NOTE 2)

STREAM NUMBER	1	2	3	4	5	6	7	8	9
COMPONENT	AIR FROM SILO 4	AIR TO SILO 4	AIR TO STACK	FAN RECYCLE FLOW	AIR TO FAN	MAKE-UP AIR	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOUSRE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INLFLOW
AIR (LBS/HR)	2,166	2,166	216.6	1,949.4	4,332	--	--	--	--
WATER (LBS/HR)	40.6	40.6	4.1	36.5	81.2	--	--	--	--
TOTAL (LBS/HR)	2,206.6	2,206.6	220.7	1,985.9	4,413.2	--	--	--	--
FLOW (CFM)	500	500	50	450	1,000	50	--	--	--
FLOW (GPM)	--	--	--	--	--	--	--	--	--
RADON (PICOCURIES/L)	--	--	--	--	--	--	--	--	--
RADON (CURIES/HR)	--	--	--	--	--	--	--	--	--
TEMPERATURE (DEG F)	75	75	75	75	75	--	--	--	--
PRESSURE (INCHES WC)	--	--	--	--	--	--	--	--	--
NOTES									

PHASE 2 (SEE NOTE 3)

STREAM NUMBER	1	2	3	4	5	6	7	8	9
COMPONENT	AIR FROM SILO 4	AIR TO SILO 4	AIR TO STACK	FAN RECYCLE FLOW	AIR TO FAN	MAKE-UP AIR	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW
AIR (LBS/HR)	1,083	--	3,249	1,083	4,332	2,166	361	361	361
WATER (LBS/HR)	20.3	--	60.9	20.3	81.2	40.6	6.8	6.8	6.8
TOTAL (LBS/HR)	1,103.3	--	3,309.9	1,103.3	4,413.2	2,206.6	367.8	367.8	367.8
FLOW (CFM)	250	--	750	250	1,000	500	83	83	83
FLOW (GPM)	--	--	--	--	--	--	--	--	--
RADON (PICOCURIES/L)	--	--	--	--	--	--	--	--	--
RADON (CURIES/HR)	--	--	--	--	--	--	--	--	--
TEMPERATURE (DEG F)	75	--	75	75	75	75	75	75	75
PRESSURE (INCHES WC)	--	--	--	--	--	--	--	--	--
NOTES									

UNCONTROLLED INFORMATION ONLY

3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE

		DATE
DRAWN BY	B J DAVIS	01/07/00
DESIGNED BY	B J DAVIS	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
PROCESS FLOW DIAGRAM
MASS BALANCE-RADON CONTROL

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD001	2

000001

FILENAME: 10FMD001.DWG

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3158

FULL-SCALE MOCKUP MASS BALANCE TABLE

FSMS INVENTORY		STREAM NUMBER	37	1	1	2	3	4	30	5	6	7	7	7	21	22	8	28	29	9
		STREAM DESCRIPTION	DECANT FROM TTA TO UF MAKE-UP CONNECTION	DECANT FROM UF MAKE-UP CONNECTION (BULK RETRIEVAL)	DECANT FROM UF MAKE-UP CONNECTION (CATS)	DECANT DILUTION WATER	DECANT FLUSH WATER	DECANT WATER TO BE FILTERED	DECANT MAKE-UP TO FILTER PROCESS TANK			SLURRY DISCHARGE (BULK RETRIEVAL)	SLURRY DISCHARGE RETRIEVED WASTE (BULK RETRIEVAL)	SLURRY DISCHARGE (CATS WITH DILUTION WATER)	SLURRY DISCHARGE (FROM SREE TO SLURRY PUMP)		SLURRY LINE FROM UF SYSTEM	UF SUPPLY FROM PROCESS TANK	UF RETURN TO PROCESS TANK	
TOTAL SOLIDS (LB)	184,751		NOTE 3					NOTE 3	NOTE 3				NOTE 2				NOTE 3	NOTE 3	NOTE 3	
BENTOGROUT (LB)	3,791	FLOW (GPM)	300	250	250	50	250	300	50			296	296	275	25		300	300	100	
FIU SIMULANT (LB)	180,960	% SOLIDS (WT)	0	0	0	0	0	0	0			15.0	15.0	3.6	32		0	0	0	
VOLUME BENTOGROUT (GAL) IN-SITU	1,575	SOLIDS PER GAL (LB)	0	0	0	0	0	0	0			1.334	1.334	0.293	3.183		0	0	0	
VOLUME FIU (GAL) IN-SITU	20,886	SOLIDS PER DAY (LB)	0	0	0	0	0	0	0			189,520	189,520	38,795	38,811		0	0	0	
WATER (LB)	94,886	MINUTES PER DAY OPERATION (MIN)	480	480	480	60	60	24	375			480	480	480	480		25	375	375	
TOTAL MASS (LB)	279,637	TOTAL VOLUME PER DAY (GALLONS)	144,000	120,000	120,000	3,000	15,000	7,050	18,750			142,072	142,072	132,192	12,192		7,500	112,500	37,500	
VOLUME WATER (GALLONS)	11,861	DAYS OF OPERATION	1.01	0.76	0.25	0	0	1.01	1.01			0.76	0.76	0.25	0.25		1.01	1.01	1.01	
TOTAL VOLUME (GALLONS)	22,461	TOTAL VOLUME (GALLONS)	145,440	91,200	30,000	0	0	7,121	18,938			107,975	107,975	33,048	3,048		7,575	113,625	37,875	
		TOTAL MASS SOLIDS (LB)	0	0	0	0	0	0	0			144,035	144,035	9,699	9,703		0	0	0	
		SOLIDS PER HOUR (LB/HR)	0	0	0	0	0	0	0			23,690	23,690	4,849	4,851		0	0	0	

FULL-SCALE MOCKUP MASS BALANCE TABLE – CONT.

FSMS INVENTORY		STREAM NUMBER	10	11	12	13	14	15	18	19
		STREAM DESCRIPTION	SREE SPRAYERS (FILTERED WATER)	EMMA, SPRAY WAND, AND DECON SPRAY RINGS (FILTERED WATER)	FILTRATE RECIRCULATION LOOP (FILTERED WATER)	HP JET PUMP SUPPLY (FILTERED WATER)	RINCE WATER (FILTERED)	FROM UF TO FW TANK (FILTERED WATER)	MAKE-UP WATER	MAKE-UP WATER TO FILTRATE TANK
TOTAL SOLIDS (LB)	184,751							NOTE 3	NOTE 3	NOTE 3
BENTOGROUT (LB)	3,791	FLOW (GPM)	6	40	60	10	150	20	200	200
FIU SIMULANT (LB)	180,960	% SOLIDS (WT)	0	0	0	0	0	0	0	0
VOLUME BENTOGROUT (GAL) IN-SITU	1,575	SOLIDS PER GAL (LB)	0	0	0	0	0	0	0	0
VOLUME FIU (GAL) IN-SITU	20,886	SOLIDS PER DAY (LB)	0	0	0	0	0	0	0	0
WATER (LB)	94,886	MINUTES PER DAY OPERATION (MIN)	240	60	30	480	2	375	90	30
TOTAL MASS (LB)	279,637	TOTAL VOLUME PER DAY (GALLONS)	1,440	2,400	1,800	4,800	300	7,500	18,000	6,000
VOLUME WATER (GALLONS)	11,861	DAYS OF OPERATION	0.25	5	0.25	0.25	1.01	1.01	11.00	1.00
TOTAL VOLUME (GALLONS)	22,461	TOTAL VOLUME (GALLONS)	360	12,000	450	1,200	303	7,575	198,000	6,000
		TOTAL MASS SOLIDS (LB)	0	0	0	0	0	0	0	0
		SOLIDS PER HOUR (LB/HR)	0	0	0	0	0	0	0	0

NOTES:

1. MASS BALANCE TABLES TO BE USED IN CONJUNCTION WITH 10FMD007, 10FMD008, 10FMD009, 10FMD010 & 10FMD011.
2. STREAM OF APPROXIMATE WASTE RETRIEVED (SLURRY SOLIDS 15% – DECANT SOLIDS 2 %).
3. DURING ICAT & SOT OPERATION OF THE FULL-SCALE MOCKUP (FSM), COMPONENTS AND FLOW STREAMS OF THE PERMANENT FACILITY WILL BE USED. CERTAIN FLOW STREAM IDENTIFIERS HAVE BEEN DUPLICATED ON THIS MASS BALANCE WHEN COMPARED TO OTHER SYSTEM MASS BALANCES. THE STREAMS ARE DUPLICATED BECAUSE THE MASS BALANCE VALUES ARE DIFFERENT DURING FSM OPERATION AS OPPOSED TO NORMAL SYSTEM OPERATION. ALL OF THE DUPLICATE STREAM NUMBERS DO NOT APPEAR ON THE FULL-SCALE MOCKUP SYSTEM (FSMS) PROCESS FLOW DIAGRAMS. THE LIST BELOW SHOWS THE LOCATION OF THE DUPLICATE STREAMS NOT SHOWN ON THE FSMS PROCESS FLOW DIAGRAMS. THE VALUES PRESENTED ON THIS DRAWING SHOULD ONLY BE USED FOR FSM OPERATION. STREAM NUMBERS ARE PRESENTED IN THE ORDER THEY APPEAR ON THE MASS BALANCE.

STREAM NUMBER	DRAWING
37	12FMD001 12FMD002 12FMD003 12FMD004 12FMD005
4	12FMD001 12FMD008
30	12FMD001
8	12FMD001 12FMD007
28	12FMD007 12FMD008
29	12FMD007 12FMD008
9	12FMD007 12FMD008
15	12FMD007 12FMD008
18	12FMD001
19	12FMD008

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THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/01/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY B J DAVIS	DATE 01/07/00	
DESIGNED BY B J DAVIS	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM PROCESS FLOW DIAGRAM MASS BALANCE TABLE

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD006	2

000002

FILENAME: 10FMD006.DWG

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3158

SILO 2 – AWRS MASS BALANCE TABLE

INVENTORY		STREAM NUMBER	37	1	1	2	3	4	30	5	6	7	7	7	21	22	8	28	29
		STREAM DESCRIPTION	DECANT FROM TTA TO UF MAKE-UP CONNECTION	DECANT FROM UF MAKE-UP CONNECTION (BULK RETRIEVAL)	DECANT FROM UF MAKE-UP CONNECTION (CATS)	DECANT DILUTION WATER	DECANT FLUSH WATER	DECANT WATER TO BE FILTERED	DECANT MAKE-UP TO FILTER PROCESS TANK			SLURRY DISCHARGE (BULK RETRIEVAL)	SLURRY DISCHARGE RETRIEVED WASTE (BULK RETRIEVAL)	SLURRY DISCHARGE (CATS WITH DILUTION WATER)	SLURRY DISCHARGE (FROM SREE TO SLURRY PUMP)		SLURRY LINE FROM UF SYSTEM	UF SUPPLY FROM PROCESS TANK	UF RETURN TO PROCESS TANK
													NOTE 2						
TOTAL SOLIDS (LB)	9,130,965	FLOW (GPM)	300	250	250	50	250	300	50			275.7	275.7	271	21		300	300	280
BENTOGROUT (LB)	187,369	% SOLIDS (WT)	2.0	2.0	2.0	2.0	2.0	2.0	2.0			15.0	13.38	4.6	31.0		4.0	2.0	2.14
K-65 (LB)	8,943,596	SOLIDS PER GAL (LB)	0.167	0.167	0.167	0.167	0.167	0.167	0.167			1.315	1.164	0.387	2.983		0.336	0.167	0.179
VOLUME BENTOGROUT (GALLONS) IN-SITU	83,011	SOLIDS PER DAY (LB)	24,050	20,042	20,042	501	2,505	1,177	1,253			173,968	153,959	50,344	30,071		2,519	18,789	18,770
VOLUME K-65 (GALLONS) IN-SITU	751,141	MINUTES PER DAY OPERATION (MIN)	480	480	480	60	60	24	150			480	480	480	480		25	375	375
WATER (LB)	3,911,803	TOTAL VOLUME PER DAY (GALLONS)	144,000	120,000	120,000	3,000	15,000	7,050	7,500			132,314	132,314	130,080	10,080		7,500	112,500	105,000
TOTAL MASS (LB)	13,042,768	DAYS OF OPERATION	71.52	56.34	15.18	0.00	0.00	74.02	74.02			56.34	56.34	15.18	15.18		74.02	74.02	74.02
VOLUME WATER (GALLONS)	468,749	TOTAL VOLUME (GALLONS)	10,299,519	6,761,069	1,821,863	0	0	521,872	555,183			7,454,874	7,454,874	1,974,900	153,037		555,183	8,327,749	7,772,566
TOTAL VOLUME (GALLONS)	834,152	TOTAL MASS SOLIDS (LB)	1,720,188	1,129,209	304,281	0	0	87,161	92,725			9,801,761	8,674,417	764,325	456,548		186,500	1,390,870	1,369,403
CURIES	9,682	SOLIDS PER HOUR (LB/HR)	3,006	2,505	2,505	501	2,505	3,006	501			21,746	19,245	6,293	3,759		6,047	3,006	3,003
		CURIES	1,824	1,197	323	0	0	92	98			10,393	9,198	810	484		198	1,475	1,473

SILO 2 – AWRS MASS BALANCE TABLE – CONT.

INVENTORY		STREAM NUMBER	9	10	11	12	13	14	15	16	17	18	19	20	23	24	25	26	27
		STREAM DESCRIPTION		SREE SPRAYERS (FILTERED WATER)	EMMA, SPRAY WAND, AND DECON SPRAY RINGS (FILTERED WATER)	FILTRATE RECIRCULATION LOOP (FILTERED WATER)	HP JET PUMP SUPPLY (FILTERED WATER)	RINCE WATER (FILTERED)	FROM UF TO FW TANK (FILTERED WATER)	TTA HP DECON (FILTERED WATER)	AWWTP SUPPLY	MAKE-UP WATER TO TTA	MAKE-UP WATER TO FILTRATE TANK	RCS CONDENSATE RETURN	STORAGE TANK 2B SUMP DRAIN	STORAGE TANK 1B SUMP DRAIN	STORAGE TANK 2A SUMP DRAIN	STORAGE TANK 1A SUMP DRAIN	FROM TTA SUMP PUMP LINE
															NOTE 3	NOTE 3	NOTE 3	NOTE 3	NOTE 3
TOTAL SOLIDS (LB)	9,130,965	FLOW (GPM)		6	40	60	10	150	20	40	80	200	200	50	0	0	0	0	300
BENTOGROUT (LB)	187,369	% SOLIDS (WT)		0	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20
K-65 (LB)	8,943,596	SOLIDS PER GAL (LB)		0	0	0	0	0	0	0	0	0	0	0	1.80	1.80	1.80	1.80	1.80
VOLUME BENTOGROUT (GALLONS) IN-SITU	83,011	SOLIDS PER DAY (LB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUME K-65 (GALLONS) IN-SITU	751,141	MINUTES PER DAY OPERATION (MIN)		480	60	480	480	2	375	20	0	90	30	60	0	0	0	0	0
WATER (LB)	3,911,803	TOTAL VOLUME PER DAY (GALLONS)		2,880	2,400	28,800	4,800	300	7,500	800	0	18,000	6,000	3,000	0	0	0	0	0
TOTAL MASS (LB)	13,042,768	DAYS OF OPERATION		15.18	5.00	15.18	15.18	71.52	74.02	0.00	0.00	21.00	21.00	4.00	0	0	0	0	0
VOLUME WATER (GALLONS)	468,749	TOTAL VOLUME (GALLONS)		43,725	12,000	437,247	72,875	21,457	555,183	0	0	378,000	126,000	12,000	0	0	0	0	0
TOTAL VOLUME (GALLONS)	834,152	TOTAL MASS SOLIDS (LB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CURIES	9,682	SOLIDS PER HOUR (LB/HR)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		CURIES		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTES:

1. MASS BALANCE TABLES TO BE USED IN CONJUNCTION WITH DRAWINGS 11FMD003 THRU 11FMD009, & 12FMD001 THRU 12FMD008.
2. STREAM OF APPROXIMATE WASTE RETRIEVED (SLURRY SOILDS 15% – DECANT SOLIDS 2%).
3. TTA TANK FOUNDATION DRAIN.

INFORMATION ONLY
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DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
PROCESS FLOW DIAGRAM
MASS BALANCE TABLE – SHT 1

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY B J DAVIS	DATE 01/07/00	
DESIGNED BY B J DAVIS	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

SIZE	SCALE:	DWG. NO.	REV
D	NONE	11FMD001	2

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

FILENAME: 11FMD001.DWG

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SILO 1 – AWRS MASS BALANCE TABLE

INVENTORY		STREAM NUMBER	37	1	1	2	3	4	30	5	6	7	7	7	21	22	8	28	29
		STREAM DESCRIPTION	DECANT FROM TTA TO UF MAKE-UP CONNECTION	DECANT FROM UF MAKE-UP CONNECTION (BULK RETRIEVAL)	DECANT FROM UF MAKE-UP CONNECTION (CATS)	DECANT DILUTION WATER	DECANT FLUSH WATER	DECANT WATER TO BE FILTERED	DECANT MAKE-UP TO FILTER PROCESS TANK			SLURRY DISCHARGE (BULK RETRIEVAL)	SLURRY DISCHARGE RETRIEVED WASTE (BULK RETRIEVAL)	SLURRY DISCHARGE (CATS WITH DILUTION WATER)	SLURRY DISCHARGE (FROM SREE TO SLURRY PUMP)		SLURRY LINE FROM UF SYSTEM	UF SUPPLY FROM PROCESS TANK	UF RETURN TO PROCESS TANK
													NOTE 2						
TOTAL SOLIDS (LB)	9,130,965	FLOW (GPM)	300	250	250	50	250	300	50			275.7	275.7	271	21		300	300	280
BENTOGROUT (LB)	187,369	% SOLIDS (WT)	2.0	2.0	2.0	2.0	2.0	2.0	2.0			15.0	13.38	4.6	31.0		4.0	2.0	2.14
K-65 (LB)	8,943,596	SOLIDS PER GAL (LB)	0.167	0.167	0.167	0.167	0.167	0.167	0.167			1.315	1.164	0.387	2.983		0.336	0.167	0.179
VOLUME BENTOGROUT (GALLONS) IN-SITU	83,011	SOLIDS PER DAY (LB)	24,050	20,042	20,042	501	2,505	1,177	1,253			173,968	153,959	50,344	30,071		2,519	18,789	18,770
VOLUME K-65 (GALLONS) IN-SITU	751,141	MINUTES PER DAY OPERATION (MIN)	480	480	480	60	60	24	150			480	480	480	480		25	375	375
WATER (LB)	3,911,803	TOTAL VOLUME PER DAY (GALLONS)	144,000	120,000	120,000	3,000	15,000	7,050	7,500			132,314	132,314	130,080	10,080		7,500	112,500	105,000
TOTAL MASS (LB)	13,042,768	DAYS OF OPERATION	80.69	65.48	15.21	0.00	0.00	83.19	83.19			65.48	65.48	15.21	15.21		83.19	83.19	83.19
VOLUME WATER (GALLONS)	468,749	TOTAL VOLUME (GALLONS)	11,619,977	7,858,042	1,825,272	0	0	5,865,520	623,957			8,664,415	8,664,415	1,978,595	153,023		623,957	9,359,357	8,735,400
TOTAL VOLUME (GALLONS)	834,152	TOTAL MASS SOLIDS (LB)	1,940,726	1,312,421	304,850	0	0	97,958	104,211			11,920,080	10,081,826	765,755	457,403		209,602	1,563,165	1,561,517
CURIES	9,682	SOLIDS PER HOUR (LB/HR)	3,006	2,505	2,505	501	2,505	3,006	501			21,746	19,245	6,293	3,759		6,047	3,006	3,003
		CURIES	3,197	2,162	502	0	0	161	172			18,768	16,609	1,262	754		345	2,575	2.572

SILO 1 – AWRS MASS BALANCE TABLE – CONT.

INVENTORY		STREAM NUMBER	9	10	11	12	13	14	15	16	17	18	19	20	23	24	25	26	27
		STREAM DESCRIPTION		SREE SPRAYERS (FILTERED WATER)	EMMA, SPRAY WAND, AND DECON SPRAY RINGS (FILTERED WATER)	FILTRATE RECIRCULATION LOOP (FILTERED WATER)	HP JET PUMP SUPPLY (FILTERED WATER)	RINCE WATER (FILTERED)	FROM UF TO FW TANK (FILTERED WATER)	TTA HP DECON (FILTERED WATER)	AWWTP SUPPLY	MAKE-UP WATER TO TTA	MAKE-UP WATER TO FILTRATE TANK	RCS CONDENSATE RETURN	STORAGE TANK 2B SUMP DRAIN	STORAGE TANK 1B SUMP DRAIN	STORAGE TANK 2A SUMP DRAIN	STORAGE TANK 1A SUMP DRAIN	FROM TTA SUMP PUMP LINE
															NOTE 3	NOTE 3	NOTE 3	NOTE 3	NOTE 3
TOTAL SOLIDS (LB)	10,539,229	FLOW (GPM)		6	40	60	10	150	20	40	80	200	200	50	0	0	0	0	300
BENTOGROUT (LB)	214,613	% SOLIDS (WT)		0	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20
K-65 (LB)	10,324,616	SOLIDS PER GAL (LB)		0	0	0	0	0	0	0	0	0	0	0	1.80	1.80	1.80	1.80	1.80
VOLUME BENTOGROUT (GALLONS) IN-SITU	95,136	SOLIDS PER DAY (LB)		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
VOLUME K-65 (GALLONS) IN-SITU	867,074	MINUTES PER DAY OPERATION (MIN)		480	60	480	480	300	375	20	480	90	30	60	0	0	0	0	0
WATER (LB)	4,510,370	TOTAL VOLUME PER DAY (GALLONS)		2,880	2,400	28,800	4,800	80.69	7,500	800	34,400	18,000	6,000	3,000	0	0	0	0	0
TOTAL MASS (LB)	15,049,599	DAYS OF OPERATION		15.21	5.00	15.21	15.21	24,208	83.19	0.00	0.00	22.10	21.70	5.00	0	0	0	0	0
VOLUME WATER (GALLONS)	540,475	TOTAL VOLUME (GALLONS)		43,807	12,000	438,065	73,011	0	623,957	0	0	397,800	124,200	15,000	0	0	0	0	0
TOTAL VOLUME (GALLONS)	962,204	TOTAL MASS SOLIDS (LB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CURIES	17,363	SOLIDS PER HOUR (LB/HR)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		CURIES		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INFORMATION ONLY

UNCONTROLLED

NOTES:

1. MASS BALANCE TABLES TO BE USED IN CONJUNCTION WITH DRAWINGS 11FMD003 THRU 11FMD009, 12FMD001 THRU 12FMD008, & 51FMD001.
2. STREAM OF APPROXIMATE WASTE RETRIEVED (SLURRY SOILDS 15% – DECANT SOLIDS 2%).
3. TTA TANK FOUNDATION DRAIN.

3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THERETO HAVE BEEN REVIEWED AND INITIALS BELOW INDICATE THEIR ACCEPTANCE

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

		DATE
DRAWN BY	B J DAVIS	01/07/00
DESIGNED BY	B J DAVIS	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
PROCESS FLOW DIAGRAM
MASS BALANCE TABLE – SHT 2

SIZE D | SCALE: NONE | DWG. NO. 11FMD002 | REV 2

000004

FILENAME: 11FMD002.DWG

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NOTES:

3158

1. MASS BALANCE TABLE TO BE USED IN CONJUNCTION WITH DRAWINGS 13FMD002, 13FMD003, & 13FMD004.
2. STREAM OF APPROXIMATE WASTE RETRIEVED (SLURRY SOILDS 15% – DECANT SOILDS 2%).
3. TTA TANK FOUNDATION DRAIN.

TYPICAL TTA TANK – MASS BALANCE

SILO 1 TTA TANK INVENTORY			STREAM NUMBER	1	2	3	7	7	16	23	24	25	26	27
			STREAM DESCRIPTION	SLUICING WATER	DILUTION WATER	FLUSH WATER	SLURRY DISCHARGE	RETRIEVED WASTE	TTA HP DECON (FILTERED WATER)	STORAGE TANK 2B SUMP DRAIN	STORAGE TANK 2A SUMP DRAIN	STORAGE TANK 1B SUMP DRAIN	STORAGE TANK 1A SUMP DRAIN	FROM TTA SUMP PUMP TO SLURRY LINE
TOTAL SOLIDS (LB)	5,270,000							NOTE 2		NOTE 3	NOTE 3	NOTE 3	NOTE 3	NOTE 3
BENTOGROUT (LB)	107,000		FLOW (GPM)	300	50	300	331	331	40	0	0	0	0	300
K-65 (LB)	5,160,000		% SOLIDS (WT)	2.0	2.0	2.0	15.0	13.38	0	20.0	20.0	20.0	20.0	20.0
WATER (LB)	4,660,000		SOLIDS PER GAL (LB)	0.167	0.167	0.167	1.315	1.164	0	1.798	1.798	1.798	1.798	1.798
TOTAL MASS (LB)	9,930,000		SOLIDS PER DAY (LB)	24,050	501	3,006	208,897	184,944	0	0	0	0	0	0
VOLUME WATER (GALLONS)	559,000		MINUTES PER DAY OPERATION (MIN)	480	60	60	480	480	20	0	0	0	0	0
TOTAL VOLUME (GALLONS)	750,000		TOTAL VOLUME PER DAY (GALLONS)	144,000	3,000	18,000	158,880	158,880	800	0	0	0	0	0
TOTAL SOLIDS (GALLONS)	190,000		DAYS OF OPERATION	28.49	0	0	28.49	28.49	5	0	0	0	0	0
CURIES	8,680		TOTAL VOLUME (GALLONS)	4,102,986	0	0	4,526,961	4,526,961	4,000	0	0	0	0	0
			TOTAL MASS SOLIDS (LB)	685,266	0	0	5,952,105	5,269,615	0	0	0	0	0	0
			SOLIDS PER HOUR (LB/HR)	3,006	501	3,006	26,112	23,118	0	0	0	0	0	0
			CURIES	1,129	0	0	9,806	8,681	0	0	0	0	0	0

TYPICAL TTA TANK – MASS BALANCE

SILO 2 TTA TANK INVENTORY			STREAM NUMBER	1	2	3	7	7	16	23	24	25	26	27
			STREAM DESCRIPTION	SLUICING WATER	DILUTION WATER	FLUSH WATER	SLURRY DISCHARGE	RETRIEVED WASTE	TTA HP DECON (FILTERED WATER)	STORAGE TANK 2B SUMP DRAIN	STORAGE TANK 2A SUMP DRAIN	STORAGE TANK 1B SUMP DRAIN	STORAGE TANK 1A SUMP DRAIN	FROM TTA SUMP PUMP TO SLURRY LINE
TOTAL SOLIDS (LB)	4,570,000							NOTE 2		NOTE 3	NOTE 3	NOTE 3	NOTE 3	NOTE 3
BENTOGROUT (LB)	93,700		FLOW (GPM)	300	50	300	331	331	40	0	0	0	0	300
K-65 (LB)	4,470,000		% SOLIDS (WT)	2.0	2.0	2.0	15.0	13.38	0	20.0	20.0	20.0	20.0	20.0
WATER (LB)	4,250,000		SOLIDS PER GAL (LB)	0.167	0.167	0.167	1.315	1.164	0	1.798	1.798	1.798	1.798	1.798
TOTAL MASS (LB)	8,820,000		SOLIDS PER DAY (LB)	24,050	501	3,006	208,897	184,944	0	0	0	0	0	0
VOLUME WATER (GALLONS)	510,000		MINUTES PER DAY OPERATION (MIN)	480	60	60	480	480	20	0	0	0	0	0
TOTAL VOLUME (GALLONS)	675,000		TOTAL VOLUME PER DAY (GALLONS)	144,000	3,000	18,000	158,880	158,880	800	0	0	0	0	0
TOTAL SOLIDS (GALLONS)	165,000		DAYS OF OPERATION	24.69	0	0	28.69	24.69	5	0	0	0	0	0
CURIES	4,840		TOTAL VOLUME (GALLONS)	3,554,740	0	0	3,922,063	3,922,063	4,000	0	0	0	0	0
			TOTAL MASS SOLIDS (LB)	593,700	0	0	5,156,778	4,565,483	0	0	0	0	0	0
			SOLIDS PER HOUR (LB/HR)	3,006	501	3,006	26,112	23,118	0	0	0	0	0	0
			CURIES	630	0	0	5,469	4,842	0	0	0	0	0	0

INFORMATION ONLY

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3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
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RPE

DRAWN BY B J DAVIS	DATE 01/07/00	
DESIGNED BY B J DAVIS	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
TRANSFER TANK WASTE RETRIEVAL PROCESS FLOW DIAGRAM MASS BALANCE TABLE

SIZE	SCALE:	DWG. NO.	REV
D	NONE	13FMD001	2

000005

FILENAME: 13FMD001.DWG

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DECANT SUMP RETRIEVAL – AWRS MASS BALANCE TABLE

INVENTORY			STREAM NUMBER	31	34	40	41
			STREAM DESCRIPTION	SLUICE WATER FROM HP PUMP SKID	SLURRY FROM DECANT TANK TO VAC TRUCK	RINSE WATER TO VAC TRUCK	SLURRY FROM VAC TRUCK TO TTA TANK
TOTAL SLUDGE VOLUME (GAL)	1000		FLOW (GPM)	20.0	80.0	30.0	300.0
VOLUME K-65 (GAL) IN-SITU	477		% SOLIDS (WT)	0.0%	15.0%	0.0%	13.4%
VOLUME WATER (GAL) IN-SITU	523		SOLIDS PER GAL (LB/GAL)	0.000	1.310	0.000	1.170
K-65 (LB) IN-SITU	5686		SOLIDS PER HOUR (LB/HR)	0	6289	0	21058
WATER (LB) IN-SITU	4362		SOLIDS PER BATCH (LB/BATCH)	0	3275	0	3276
TOTAL MASS (LB) IN-SITU	10048		MINUTES PER BATCH OPERATION (MIN)	125	31	10	9
VOLUME OF SUPERNATE WATER IN-SITU (GAL)	2000		TOTAL VOLUME PER BATCH (GAL/BATCH)	2500	2500	300	2800
TOTAL VOLUME IN-SITU (GAL)	3000		NUMBER OF BATCHES	1.3	1.7	1.7	1.7
TOTAL TTA DISCHARGE (GAL)	4861		TOTAL VOLUME (GALLONS)	3340	4340	521	4861
			TOTAL MASS SOLIDS (LB)	0	5686	0	5686
CURIES	10		CURIES	0	10	0	10

NOTES:

1. MASS BALANCE TABLE TO BE USED IN CONJUNCTION WITH DRAWINGS 14FMD002, 14FMD003, & 14FMD004.

INFORMATION ONLY

UNCONTROLLED

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

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DRAWN BY B J DAVIS	DATE 01/07/00	
DESIGNED BY B J DAVIS	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

3158

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
DECANT SUMP RETRIEVAL SYSTEM
PROCESS FLOW DIAGRAM
MASS BALANCE TABLE

SIZE	SCALE:	DWG. NO.	REV
D	NONE	14FMD001	2

000006

FILENAME: 14FMD001.DWG

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PHASE 1 – SILO 1 AND SILO 2 HEADSPACE REDUCTION

STREAM NUMBER	1	2	3	4	5	6	6A	7	8	9	9A	10	11	12	13	14	15	16	17	18	19	20
COMPONENT	AIR FLOW FROM SILO 1	AIR FLOW FROM SILO 2	AIR FLOW FROM TTA	AIR TO CHILLER	AIR TO CARBON BED	AIR FROM CARBON BED	FAN INLET (TREATED GAS + FAN RECYCLE + MAKEUP)	AIR TO SILO 1	AIR TO SILO 2	MAKEUP AIR TO TTA	RECYCLE AIR TO TTA	CONDENSATE TO HOLD-UP TANKS	AIR FROM FUTURE WASTE TREATMENT AREA	RCS TO STACK	BUILDING VENT TO STACK	AIR TO STACK	FAN RECYCLE FLOW	MAKE-UP AIR	CONDENSATE TO FILTRATE TANKS	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW
AIR (LBS/HR)	1081	1081	--	2161	2161	2161	2919	976	976	--	--	--	--	210	40219	40436	758	--	--	--	--	--
WATER (LBS/HR)	20	20	--	41	2	2	2	1	1	--	--	39	--	0	757	757	0	--	12519	--	--	--
TOTAL, (LBS/HR)	1101	1101	--	2202	2163	2163	2921	977	977	--	--	39	--	210	40976	41193	758	--	12519	--	--	--
FLOW (CFM)	250	250	--	500	454	454.00	649	225	225	--	--	--	--	50	9310	9360	175	--	--	--	--	--
FLOW (GPM)	--	--	--	--	--	--	--	--	--	--	--	0.08	--	--	--	--	--	--	25	--	--	--
RADON (PICOCURIES/L)	252197	249622	--	250910	276253	27	27	27	27	--	--	138043	--	27	0	0.144	27	--	2443	--	--	--
RADON (CURIES/HR)	1.07E-01	1.06E-01	--	2.13E-01	2.13E-01	2.08E-05	2.97E-05	1.03E-05	1.03E-05	--	--	2.44E-06	--	2.29E-06	0.00E+00	2.29E-06	8.0E-06	--	1.39E-05	--	--	--
TEMPERATURE (DEG F)	75	75	--	75	36	40	51	73	73	--	--	40	--	73	75	75	73	--	--	--	--	--
PRESSURE (INCHES WC)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NOTES	RELATIVE HUMIDITY= 100%. RADON CONCENTRATION STEADY STATE	RELATIVE HUMIDITY= 100%. RADON CONCENTRATION STEADY STATE	TTA NOT FUNCTIONAL IN PHASE 1	FLOW REPRESENTS SILOS 1 AND 2	CHILLER CONDITIONS AIR TO 40°F AND 15% RELATIVE HUMIDITY	RADON REMOVAL BASED ON K=13 AND 4 CARBON BEDS	FLOW IS CARBON BED EXHAUST PLUS FAN RECYCLE FLOW + MAKEUP AIR. INCL. FAN HEAT			TTA NOT FUNCTIONAL IN PHASE 1	TTA NOT FUNCTIONAL IN PHASE 1		FUTURE WASTE TREATMENT AREA NOT FUNCTIONAL IN PHASE 1	RELATIVE HUMIDITY= 14.2%	NOTE 2	RELATIVE HUMIDITY= 99.5%	FLOW ENTERS FAN SUCTION AFTER CARBON BEDS		INTERMITTENT FLOW; DECAYED BY STORAGE	EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 1	EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 1	EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 1

PHASE 2A – SILO 1 RETRIEVAL, SILO 2 HEADSPACE REDUCTION, TTA VENTILATION

STREAM NUMBER	1	2	3	4	5	6	6A	7	8	9	9A	10	11	12	13	14	15	16	17	18	19	20
COMPONENT	AIR FLOW FROM SILO 1	AIR FLOW FROM SILO 2	AIR FLOW FROM TTA	AIR TO CHILLER	AIR TO CARBON BED	AIR FROM CARBON BED	FAN INLET (TREATED GAS + FAN RECYCLE + MAKEUP)	AIR TO SILO 1	AIR TO SILO 2	MAKEUP AIR TO TTA	RECYCLE AIR TO TTA	CONDENSATE TO HOLD-UP TANKS	AIR FROM FUTURE WASTE TREATMENT AREA	RCS TO STACK	BUILDING VENT TO STACK	AIR TO STACK	FAN RECYCLE FLOW	MAKE-UP AIR	CONDENSATE TO FILTRATE TANKS	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW
AIR (LBS/HR)	1081	1081	1081	3243	3243	3243	4326	--	976	1081	--	--	--	2267	40233	42511	1084	--	--	324	324	324
WATER (LBS/HR)	20	20	20	61	3	3	3	--	1	20	--	58	--	2	758	760	0	--	12519	6	6	6
TOTAL, (LBS/HR)	1101	1101	1101	3304	3246	3246	4329	--	977	1101	--	58	--	2269	40991	43271	1084	--	12519	330	330	330
FLOW (CFM)	250	250	250	750	681	681	960	--	225	250	--	--	--	525	9310	9835	250	--	--	75	75	75
FLOW (GPM)	--	--	--	--	--	--	--	--	--	--	--	0.12	--	--	--	--	--	--	25	--	--	--
RADON (PICOCURIES/L)	1665166	251623	272500	729763	803472	1701	1701	--	1701	0	--	401500	--	1701	0	90	1701	--	7106	0	0	0
RADON (CURIES/HR)	2.07E-01	1.07E-01	1.16E-01	9.30E-01	9.30E-01	1.97E-03	2.77E-03	--	6.56E-04	0.00E+00	--	1.07E-05	--	1.52E-03	0.00E+00	1.52E-03	7.07E-04	--	4.03E-05	0.00E+00	0.00E+00	0.00E+00
TEMPERATURE (DEG F)	75	75	75	75	36	40	51	--	73	75	--	40	--	73	75	75	73	--	--	75	75	75
PRESSURE (INCHES WC)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	==	==	--	--
NOTES	RELATIVE HUMIDITY=100 %. RADON CONCENTRATION STEADY STATE	RELATIVE HUMIDITY=100 %. RADON CONCENTRATION STEADY STATE	RELATIVE HUMIDITY=100 %. RADON CONCENTRATION STEADY STATE	FLOW REPRESENTS SILOS 1 AND 2 PLUS TTA	CHILLER CONDITIONS AIR TO 40°F AND 15% RELATIVE HUMIDITY	RADON REMOVAL BASED ON K=13 AND 4 CARBON BEDS	FLOW IS CARBON BED EXHAUST PLUS FAN RECYCLE FLOW + MAKEUP AIR. INCL. FAN HEAT	NO RECYCLE FLOW TO SILO1 IN PHASE 2A		NO FLOW IN STREAM 9 DURING RECIRC OF TTA	9A FLOW EQUAL TO STREAM 8 DURING RECIRC OF TTA		FUTURE WASTE TREATMENT AREA NOT FUNCTIONAL IN PHASE 2	RELATIVE HUMIDITY=4.4%	NOTE 2	RELATIVE HUMIDITY= 95.1%			INTERMITTENT FLOW; DECAYED BY STORAGE	SILO 1	SILO 1	SILO 1

PHASE 2B – SILO 1 RETRIEVAL, TTA VENTILATION

STREAM NUMBER	1	2	3	4	5	6	6A	7	8	9	9A	10	11	12	13	14	15	16	17	18	19	20
COMPONENT	AIR FLOW FROM SILO 1	AIR FLOW FROM SILO 2	AIR FLOW FROM TTA	AIR TO CHILLER	AIR TO CARBON BED	AIR FROM CARBON BED	FAN INLET (TREATED GAS + FAN RECYCLE + MAKEUP)	AIR TO SILO 1	AIR TO SILO 2	MAKEUP AIR TO TTA	RECYCLE AIR TO TTA	CONDENSATE TO HOLD-UP TANKS	AIR FROM FUTURE WASTE TREATMENT AREA	RCS TO STACK	BUILDING VENT TO STACK	AIR TO STACK	FAN RECYCLE FLOW	MAKE-UP AIR	CONDENSATE TO FILTRATE TANKS	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW
AIR (LBS/HR)	--	1081	2161	3242	3242	3242	4326	--	--	2161	--	--	--	3242	40233	43487	1084	--	--	324	324	324
WATER (LBS/HR)	--	20	41	61	2	2	3	--	--	41	--	58	--	2	758	760	1	--	12519	6	6	6
TOTAL, (LBS/HR)	--	1101	2202	3303	3244	3244	4329	--	--	2202	--	58	--	3246	40991	44247	1085	--	12519	330	330	330
FLOW (CFM)	--	250	500	750	681	681	960	--	--	500	--	--	--	750	9310	10060	250	--	--	75	75	75
FLOW (GPM)	--	--	--	--	--	--	--	--	--	--	--	0.12	--	--	--	--	--	--	25	--	--	--
RADON (PICOCURIES/L)	--	912497	211373	445081	490036	1037	1037	--	--	0	--	244872	--	1037	0	72	1037	--	4334	0	0	0
RADON (CURIES/HR)	--	3.88E-01	1.80E-01	5.67E-01	5.67E-01	1.20E-03	1.69E-03	--	--	0.00E+00	--	6.50E-06	--	1.32E-03	0.00E+00	1.32E-03	4.41E-04	--	2.46E-05	0.00E+00	0.00E+00	0.00E+00
TEMPERATURE (DEG F)	--	75	75	75	36	40	51	--	--	75	--	40	--	73	75	75	73	--	--	75	75	75
PRESSURE (INCHES WC)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NOTES	NO FLOW FROM SILO 1 IN PHASE 2B	RELATIVE HUMIDITY=100%. RADON CONCENTRATION STEADY STATE	RELATIVE HUMIDITY=100%. RADON CONCENTRATION STEADY STATE	FLOW REPRESENTS SILOS 1 AND 2 PLUS TTA	CHILLER CONDITIONS AIR TO 40F AND 15% RELATIVE HUMIDITY	RADON REMOVAL BASED ON K=13 AND 4 CARBON BEDS	FLOW IS CARBON BED EXHAUST + FAN RECYCLE FLOW + MAKEUP AIR. INCL. FAN HEAT	NO RECYCLE FLOW TO SILOS IN PHASE 2B	NO RECYCLE FLOW TO SILOS IN PHASE 2B	NO FLOW IN STREAM 9 DURING RECIRC OF TTA	9A FLOW EQUALS 2X STREAM 8 IN PHASE 2A DURING RECIRC OF TTA		FUTURE WASTE TREATMENT AREA NOT FUNCTIONAL IN PHASE 2B	RELATIVE HUMIDITY=4.4%	NOTE 2	RELATIVE HUMIDITY= 92.8%			INTERMITTENT FLOW; DECAYED BY STORAGE	SILO 2	SILO 2	SILO 2

3158

NOTES:

1. FOR FLOW DIAGRAMS SEE DRAWINGS 20FMD003 THRU 20FMD011.
2. STREAM 13 FLOW FROM 77FMD002.
3. INFILTRATION INTO SILOS ASSUMED TO BE 10% OF EXHAUST FLOWRATE.
4. AIR STREAMS FROM CARBON BED DRYING FAN (FAN-20-003) TO DESICCANT DRYERS OR HEPA FILTERS ARE NOT INCLUDED IN THE MASS BALANCE. THESE FLOW STREAMS ARE NOT PART OF NORMAL OPERATIONS, BUT ARE USED FOR MAINTENANCE ACTIVITIES TO RECLAIM CARBON BED PERFORMANCE.

UNCONTROLLED INFORMATION ONLY

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2	05/15/00	BJD	GCH	KDR	REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	KR		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY B J DAVIS	DATE 01/07/00	
DESIGNED BY B J DAVIS	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
RADON CONTROL SYSTEM
PROCESS FLOW DIAGRAM
MASS BALANCE TABLES – SHT 1

SIZE	SCALE:	DWG. NO.	REV
D	NONE	20FMD001	2

000007

FILENAME: 20FMD001.DWG

G:\CHARGE\FDF\SILOS\MEC\SYS20\20fmd001.dwg Thu Jun 22 14:04:36 2000

3158

PHASE 2C – TTA VENTILATION

STREAM NUMBER	1	2	3	4	5	6	6A	7	8	9	9A	10	11	12	13	14	15	16	17	18	19	20	21
COMPONENT	AIR FLOW FROM SILO 1	AIR FLOW FROM SILO 2	AIR FLOW FROM TTA	AIR TO CHILLER	AIR TO CARBON BED	AIR FROM CARBON BED	FAN INLET (TREATED GAS + FAN RECYCLE + MAKEUP)	AIR TO SILO 1	AIR TO SILO 2	MAKEUP AIR TO TTA	RECYCLE AIR TO TTA	CONDENSATE TO HOLD-UP TANKS	AIR FROM FUTURE WASTE TREATMENT AREA	RCS TO STACK	BUILDING VENT TO STACK	AIR TO STACK	FAN RECYCLE FLOW	MAKE-UP AIR	CONDENSATE TO FILTRATE TANKS	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW	AIR FLOW FROM DECANT SUMP
AIR (LBS/HR)	--	--	2161	2161	2161	2161	2919	--	--	2161	--	--	--	2161	40233	42401	758	0.00	--	--	--	--	360.12
WATER (LBS/HR)	--	--	41	41	2	2	2	--	--	41	--	39	--	1	758	759	1	0.00	12519	--	--	--	6.78
TOTAL, (LBS/HR)	--	--	2202	2202	2163	2163	2921	--	--	2202	--	39	--	2162	40991	43160	759	0.00	12519	--	--	--	366.90
FLOW (CFM)	--	--	500	500	454	454	649	--	--	500	--	--	--	500	9310	9810	175	0.00	--	--	--	--	83.00
FLOW (GPM)	--	--	--	--	--	--	--	--	--	--	--	0.08	--	--	--	--	--	--	25	--	--	--	--
RADON (PICOCURIES/L)	--	--	211373	211373	232723	23	23	--	--	0	--	116292	--	23	0	1	23	0	2058	--	--	--	--
RADON (CURIES/HR)	--	--	1.80E-01	1.80E-01	1.80E-01	1.75E-05	2.50E-05	--	--	0.00E+00	--	2.06E-06	--	1.93E-05	0.00E+00	1.93E-05	6.7E-06	0.00E+00	1.17E-05	--	--	--	--
TEMPERATURE (DEG F)	--	--	75	75	36	40	51	--	--	75	--	40	--	73	75	75	73	75	--	--	--	--	75
PRESSURE (INCHES WC)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NOTES	NO FLOW FROM SILO IN PHASE 2C	NO FLOW FROM SILO IN PHASE 2C		FLOW REPRESENTS WTA PLUS TTA	CHILLER CONDITIONS AIR TO 40F AND 15% RELATIVE HUMIDITY	RADON REMOVAL BASED ON K=13 AND 4 CARBON BEDS	FLOW IS CARBON BED EXHAUST PLUS FAN RECYCLE FLOW + MAKEUP AIR. INCL. FAN HEAT	NO FLOW TO SILOS IN PHASE 2C	NO FLOW TO SILOS IN PHASE 2C	NO FLOW IN STREAM 9 DURING RECIRC OF TTA	9A FLOW EQUALS 2X STREAM 8 IN PHASE 2A DURING RECIRC OF TTA		FUTURE WASTE TREATMENT NOT FUNCTIONAL IN PHASE 2C	RELATIVE HUMIDITY=4.4%	NOTE 2	RELATIVE HUMIDITY= 95.1%			INTERMITTENT FLOW; DECAYED BY STORAGE	EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 2C	EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 2C	EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 2C	DECANT SUMP NOTE 3

HOLD

PHASE 3 – TTA VENTILATION, FUTURE WASTE TREATMENT

STREAM NUMBER	1	2	3	4	5	6	6A	7	8	9	9A	10	11	12	13	14	15	16	17	18	19	20
COMPONENT	AIR FLOW FROM SILO 1	AIR FLOW FROM SILO 2	AIR FLOW FROM TTA	AIR TO CHILLER	AIR TO CARBON BED	AIR FROM CARBON BED	FAN INLET (TREATED GAS + FAN RECYCLE + MAKEUP)	AIR TO SILO 1	AIR TO SILO 2	MAKEUP AIR TO TTA	RECYCLE AIR TO TTA	CONDENSATE TO HOLD-UP TANKS	AIR FROM FUTURE WASTE TREATMENT AREA	RCS TO STACK	BUILDING VENT TO STACK	AIR TO STACK	FAN RECYCLE FLOW	MAKE-UP AIR	CONDENSATE TO FILTRATE TANKS	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW	EQUIPMENT ENCLOSURE AIR INFLOW
AIR (LBS/HR)	--	--	2161	4321.4	4321	4321	4321	--	--	2161	--	--	2161	4321	48233	44551	--	--	--	--	--	--
WATER (LBS/HR)	--	--	41	82	3	3	3	--	--	41	--	78	41	3	758	761	--	--	12519	--	--	--
TOTAL, (LBS/HR)	--	--	2202	4403	4324	4324	4324	--	--	2202	--	78	2202	4324	40991	45312	--	--	12519	--	--	--
FLOW (CFM)	--	--	500	1000.00	908	908	908	--	--	500	--	--	500	979	9310	10289	--	--	--	--	--	--
FLOW (GPM)	--	--	--	--	--	--	--	--	--	--	--	0.16	--	--	--	--	--	--	25	--	--	--
RADON (PICOCURIES/L)	--	--	710019	565009	622078	6140	6140	--	--	0	--	310854	420000	6140	0	584	--	--	5501	--	--	--
RADON (CURIES/HR)	--	--	6.03E-01	9.60E-01	9.60E-01	9.47E-03	9.47E-03	--	--	0.00E+00	--	1.10E-05	3.57E-01	1.02E-02	0.00E+00	1.02E-02	--	--	3.12E-05	--	--	--
TEMPERATURE (DEG F)	--	--	75	75	36	40	40	--	--	75	--	40	75	62	75	75	--	--	--	--	--	--
PRESSURE (INCHES WC)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NOTES	NO FLOW FROM SILO IN PHASE 3	NO FLOW FROM SILO IN PHASE 3		FLOW REPRESENTS WTA PLUS TTA	CHILLER CONDITIONS AIR TO 40F AND 15% RELATIVE HUMIDITY	RADON REMOVAL BASED ON K=13 AND 4 CARBON BEDS	FLOW IS CARBON BED EXHAUST PLUS FAN RECYCLE FLOW + MAKEUP AIR. INCL. FAN HEAT	NO FLOW TO OR FROM SILOS IN PHASE 3	NO FLOW TO OR FROM SILOS IN PHASE 3	NO FLOW IN STREAM 9 DURING RECIRUCLATION OF TTA	9A FLOW EQUALS 2X STREAM 8 IN PHASE 2A DURING RECIRC OF TTA			RELATIVE HUMIDITY=6.4%	NOTE 2	RELATIVE HUMIDITY= 93.9%	NO FAN RECYCLE IN PHASE 3			EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 3	EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 3	EQUIPMENT ENCLOSURES NOT INSTALLED IN PHASE 3

INFORMATION ONLY

UNCONTROLLED

3158

NOTES:

1. FOR FLOW DIAGRAMS SEE DRAWINGS 20FMD003 THRU 20FMD011.
2. STREAM 13 ORIGINATES ON 77FMD002.
3. STREAM 21 IN PHASE 2C – FOR INFORMATION ONLY – NOT INCLUDED IN OVERALL MASS BALANCE DUE TO DURATION OF DECANT SUMP ACTIITIES BEING LESS THAN ONE WEEK WITH LIMITED KNOWLEDGE OF RADON CONCENTRATIONS IN TANK.
4. AIR STREAMS FROM CARBON BED DRYING FAN (FAN-20-003) TO DESICCANT DRYERS OR HEPA FILTERS ARE NOT INCLUDED IN THE MASS BALANCE. THESE FLOW STREAMS ARE NOT PART OF NORMAL OPERATIONS, BUT ARE USED FOR MAINTENANCE ACTIVITIES TO RECLAIM CARBON BED PERFORMANCE.

HOLD

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2	05/15/00	BJD	GCH	KDR	REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	KR		PRELIMINARY DESIGN SUBMITTAL

RPE: KENNETH D. RICKETT, PE NO. [illegible], 5/15/00, REVISION 2

		DATE
DRAWN BY	B J DAVIS	01/07/00
DESIGNED BY	B J DAVIS	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
RADON CONTROL SYSTEM
PROCESS FLOW DIAGRAM
MASS BALANCE TABLES – SHT 2

SIZE	SCALE:	DWG. NO.	REV
D	NONE	20FMD002	2

000008

FILENAME: 20FMD002.DWG

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3158

RCS BUILDING VENTILATION

STREAM NUMBER	1	2	3	3A	4	5	13
COMPONENT	TOTAL RCS BLDG. SUPPLY	RCS BUILDING 1ST FLOOR SUPPLY	RCS BUILDING 2ND FLOOR SUPPLY	HVAC SUPPLY TO CARBON BED BLDG.	RCS BUILDING 2ND FLOOR EXHAUST	RCS BUILDING 1ST FLOOR & CARBON BED BLDG. COMBINED EXHAUST	BUILDING VENTILATION EXHAUST TO STACK
AIR (LBS/HR)	33,703	24,864	8,837	3,898	9,834	30,497	40,331
WATER (LBS/HR)	619	458	162	72	181	561	741
TOTAL (LBS/HR)	34,322	25,322	8,999	3,970	10,015	31,058	41,072
FLOW (CFM)	7,780	5,740	2,040	900	2,270	7,040	9,310
FLOW (GPM)	--	--	--	--	--	--	--
RADON (PICOCURIES/L)	0	0	0	0	0	0	0
RADON (CURIES/HR)	0	0	0	0	0	0	0
TEMPERATURE (DEG F)	75	75	75	60	75	75	75
PRESSURE (INCHES WC)	--	--	--	--	--	--	--
NOTES	RELATIVE HUMIDITY = 100%						NOTE 2

NOTES:

1. FOR FLOW DIAGRAMS SEE DRAWINGS 77FMD003, & 77FMD005.
2. STREAM 13 ALSO APPEARS ON 20FMD002.
3. RCS BUILDING WILL BE VENTILATED TO MAINTAIN A SLIGHTLY NEGATIVE PRESSURE WITHIN EACH BUILDING. DISCHARGE WILL BE APPROXIMATELY 10% GREATER THAN SUPPLY TO MAINTAIN NEGATIVE PRESSURE BOUNDARY.

INFORMATION ONLY

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3158

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
C	05/15/00	BJD			REVISED PER CP-00-001 & ISSUED FOR 90% REVIEW
B	01/07/00	BJD			ISSUED FOR OHIO EPA REVIEW
A		BJD			PRELIMINARY DESIGN SUBMITTAL

RPE

		DATE
DRAWN BY	BJD	5-15-00
DESIGNED BY	BJD	5-15-00
CHECKED BY		
APPROVED BY		
APPROVED BY		

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

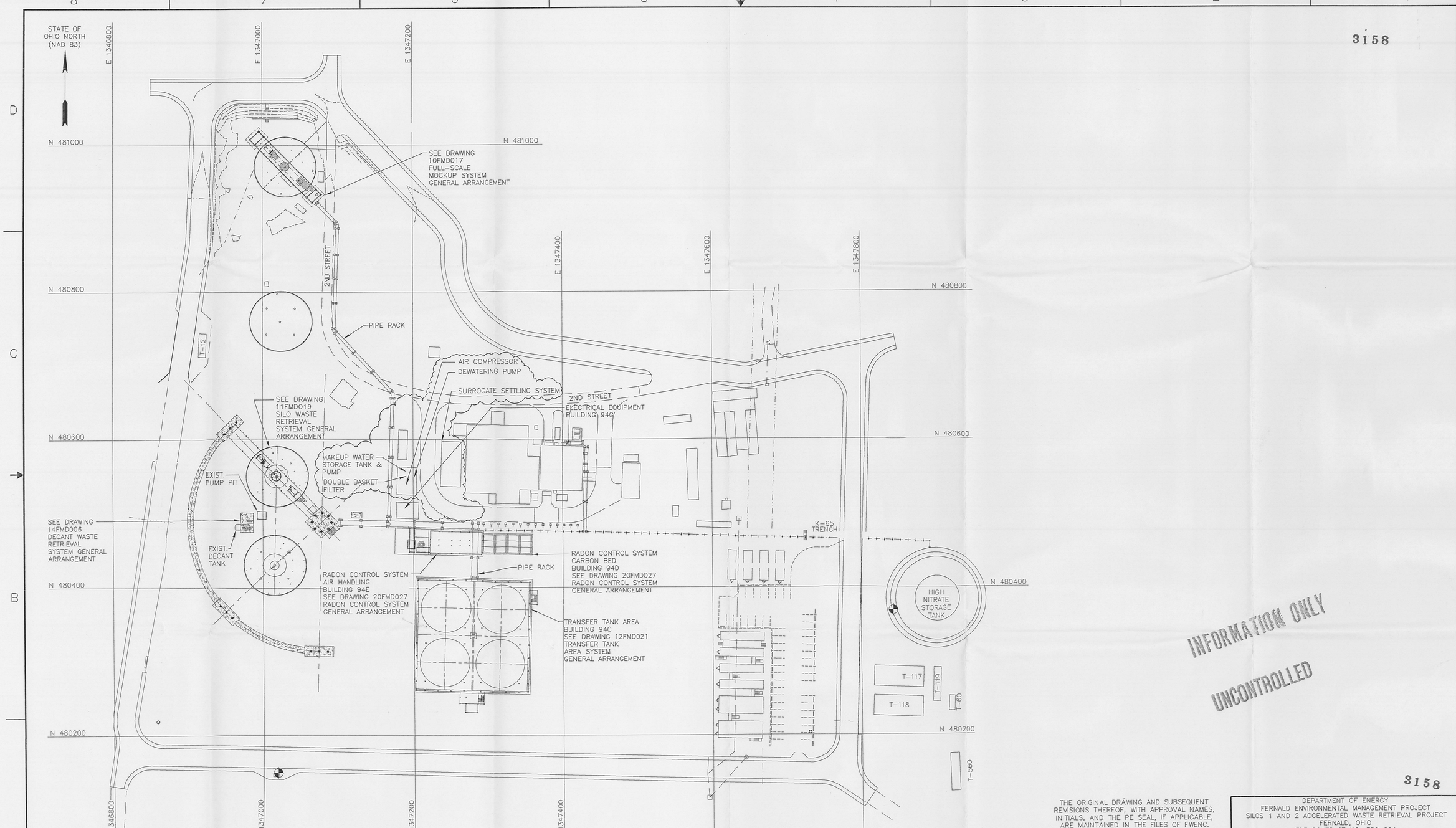
TITLE
MISC FACILITIES HVAC SYSTEM
HVAC FLOW DIAGRAM
MASS BALANCE TABLE

SIZE	SCALE:	DWG. NO.	REV
D	NONE	77FMD002	C

FILENAME: 77FMD002.DWG

G:\CHARGE\FDFSILOS\MEC\SYS77\77fmd002.dwg Thu Jun 22 14:07:09 2000

3158



INFORMATION ONLY

UNCONTROLLED

3158

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
3					RELOCATED EQUIPMENT, DELETED EQUIPMENT AND ADDED EQUIPMENT
2	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
MISC FACILITIES
GENERAL ARRANGEMENT
KEY PLAN

SIZE	SCALE:	DWG. NO.	REV
D	1"=60'-0"	05FMD010	3

3158

000010

FILENAME: 05FMD010.DWG

XREF DRAWINGS: 60-PROP.DWG 60-EXIST.DWG

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3158

STATE OF OHIO NORTH (NAD 83)

ROLL-OFF DEWATERING PHASE SEPARATORS

PHS-10-001

PHS-10-002

PHS-10-003

DEWATERING PUMP PMP-10-001

EXIST. TRAILER TO BE REMOVED

CAMERA PORT 3 LOCATIONS SEE NOTE 1

SLURRY MODULE SLR-11-200 SEE NOTE 1

HIGH PRESSURE PUMP SKID SKD-11-250

2ND STREET

FSMS RCS FAN FAN-10-001

PIPE RACK

℄ ACCESS OPENING (10'-0"W x 8'-0"H)

SILO 4

SILO 4 SUPER STRUCTURE (EXISTING)

SILO 3

MCC-1

A

10FMD018

10FMD017

TNK-10-001 SURROGATE TANK

MATCHLINE 11FMD019

EMMA MODULE EMA-14-400 SEE NOTE 1

CONTROL TRAILER T-409

SLUICER MODULE (SLC-11-203) WITH DEBRIS REMOVAL MODULE (DRM-11-600) SEE NOTE 1

NOTES:

1. FOR RISER DETAILS, SEE SILO PENETRATION AND RISER INSTALLATION PLAN, DOCUMENT NO. 624-P622-63

REFERENCE DRAWINGS:

05FMD010 GENERAL ARRANGEMENT KEY PLAN

INFORMATION ONLY

UNCONTROLLED

3158

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

LETTER OR NUMBER OF SECTION OR DETAIL

DRAWING ON WHICH SECTION OR DETAIL IS TAKEN

DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE

[redacted]

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
GENERAL ARRANGEMENT
SHEET 1 OF 2

SIZE	SCALE:	DWG. NO.	REV
D	1"=20'-0"	10FMD017	2

XREF DRAWINGS: 05FMD010.DWG
60-PROP.DWG
60-EXIST.DWG

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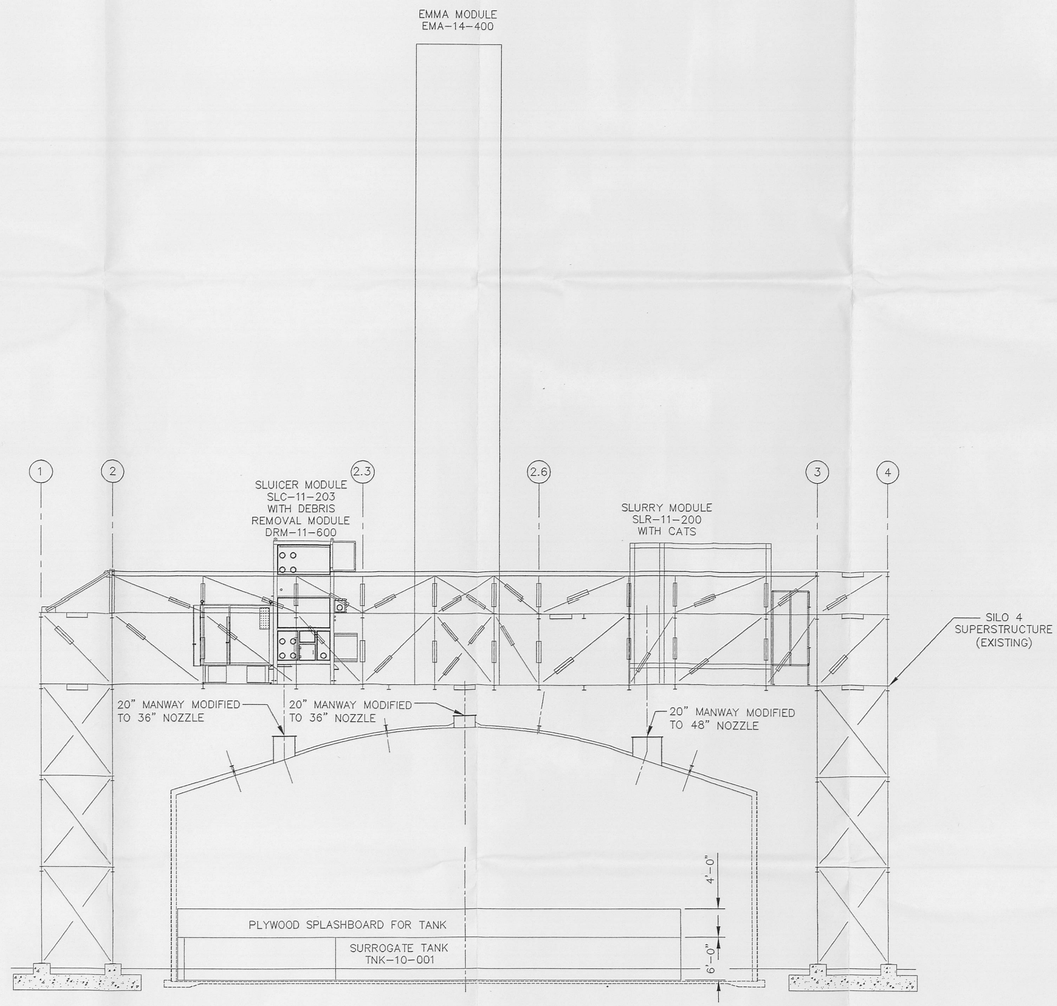
000011

FILENAME: 10FMD017.DWG

3158



A SECTION
SCALE: 1"=10'-0"
10FMD017 — 10FMD018

INFORMATION ONLY

UNCONTROLLED

3158

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

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SECTION & DETAIL KEY

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2	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE
[redacted]

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
SECTION
SHEET 2 OF 2

SIZE	SCALE:	DWG. NO.	REV
D	1"=10'-0"	10FMD018	2

FILENAME: 10FMD018.DWG

000012

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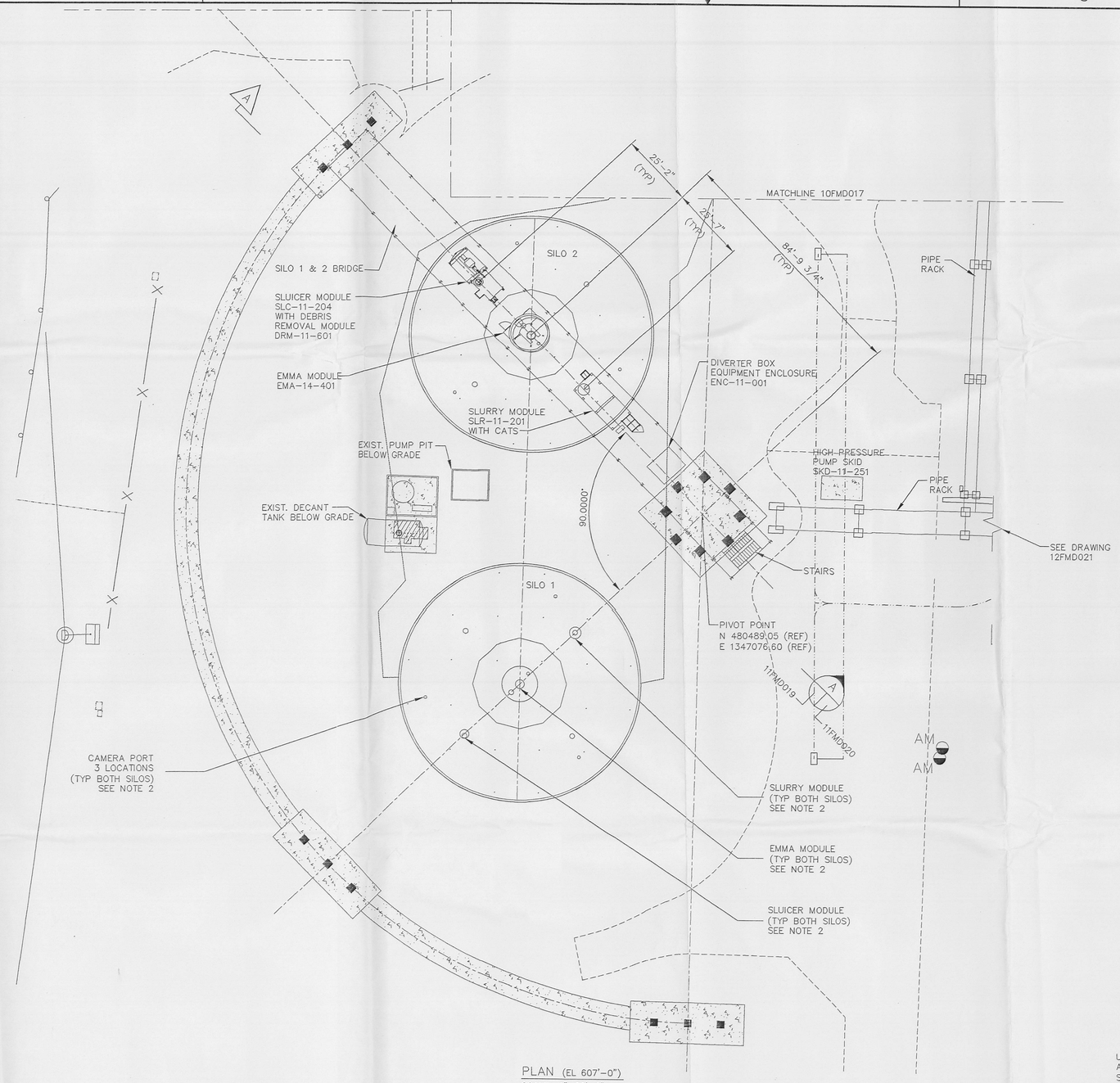
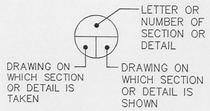
3158

NOTES:

1. BRIDGE CRANE SHOWN IN SILO 2 OPERATION POSITION, SILO 1 IS SIMILAR.
2. FOR RISER DETAILS, SEE SILO PENETRATION AND RISER INSTALLATION PLAN, DOCUMENT NO. 624-P622-63



PLAN (EL 607'-0")
SCALE: 1"=20'-0"



SECTION & DETAIL KEY

UNCONTROLLED INFORMATION ONLY

REFERENCE DRAWINGS:

05FMD010 GENERAL ARRANGEMENT KEY PLAN

3158

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

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2	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE: KENNETH D. RICKETT, PROFESSIONAL ENGINEER, 01/07/00

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
GENERAL ARRANGEMENT
SILO 1 & 2 BRIDGE

SIZE	SCALE:	DWG. NO.	REV
D	1"=20'-0"	11FMD019	2

FILENAME: 11FMD019.DWG

XREF DRAWINGS: 10FMD010.DWG 60-PROP.DWG 60-EXIST.DWG

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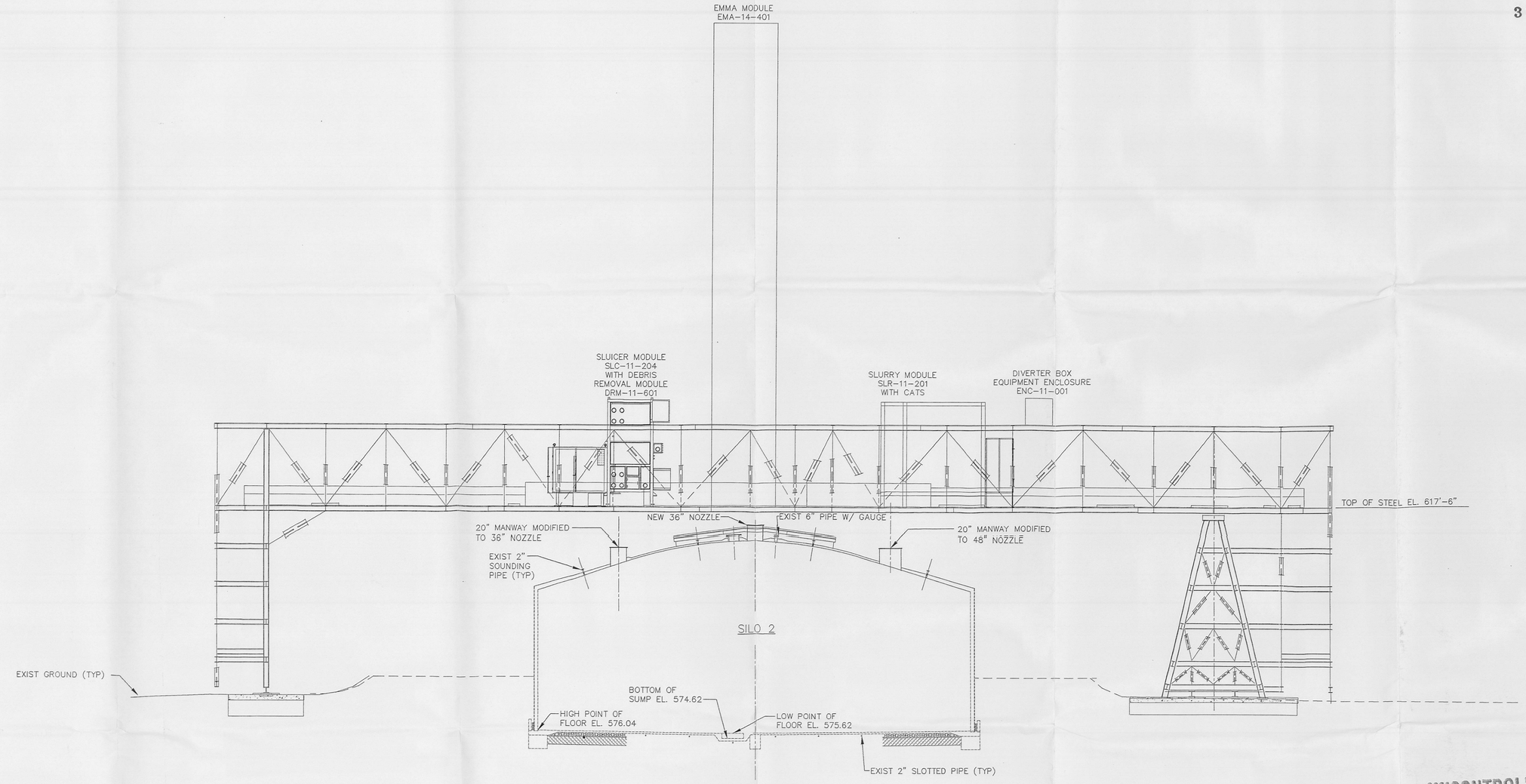
3158



A SECTION
SCALE: 1"=10'-0"
11FMD019 — 11FMD020

UNCONTROLLED

INFORMATION ONLY

3158

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE
[redacted]

DRAWN BY	W C BLUME	DATE 01/07/00
DESIGNED BY	W C BLUME	DATE 01/07/00
CHECKED BY	S W HUNGATE	DATE 01/07/00
APPROVED BY	KENNETH RICKETT	DATE 01/07/00
APPROVED BY	JOHN LAWSON	DATE 01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
GENERAL ARRANGEMENT
SILO 1 & 2 BRIDGE

SIZE	SCALE:	DWG. NO.	REV
D	1"=10'-0"	11FMD020	2

FILENAME: 11FMD020.DWG

3158

000014

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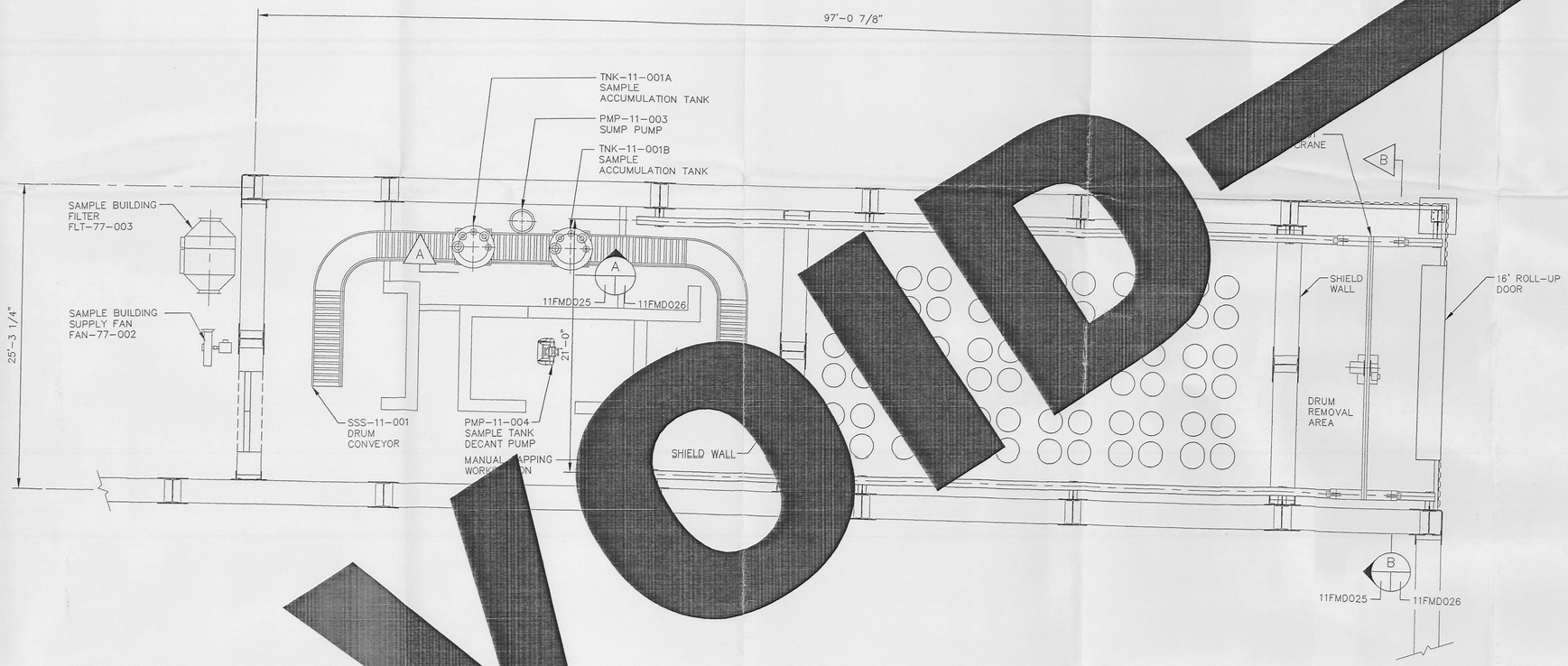
3158



PLAN VIEW
SCALE: 3/16"=1'-0"

VOID

UNCONTROLLED INFORMATION ONLY

REFERENCE DRAWINGS:

05FMD010 GENERAL ARRANGEMENT KEY PLAN

3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
GENERAL ARRANGEMENT
SAMPLE BUILDING

DRAWN BY W C BLUME	DATE 01/07/00
DESIGNED BY W C BLUME	DATE 01/07/00
CHECKED BY S W HUNGATE	DATE 01/07/00
APPROVED BY KENNETH RICKETT	DATE 01/07/00
APPROVED BY JOHN LAWSON	DATE 01/07/00

RPE

SIZE	SCALE:	DWG. NO.	REV
D	3/16" = 1'-0"	11FMD025	2

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					DRAWING VOIDED
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

000015

FILENAME: 11FMD025

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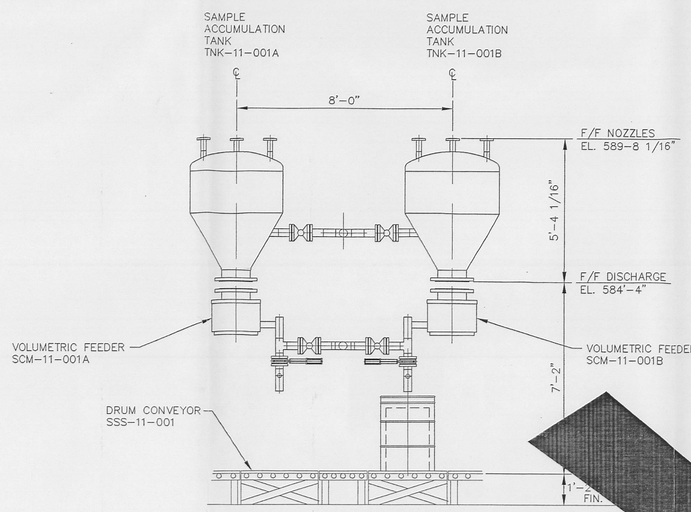
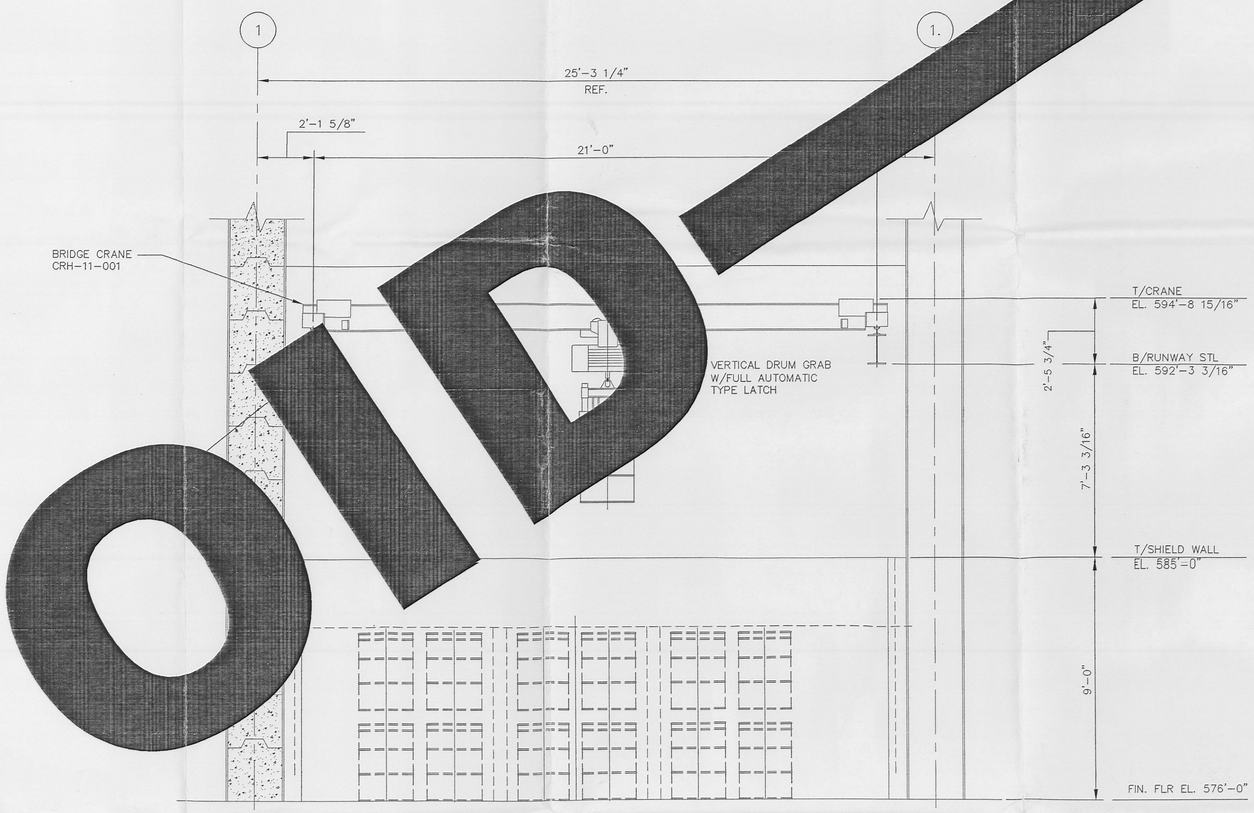
3158



A SECTION
SCALE: 3/8" = 1'-0"
11FMD025 — 11FMD026



B SECTION
SCALE: 3/8" = 1'-0"
11FMD025 — 11FMD026

VOID

INFORMATION ONLY

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3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					DRAWING VOIDED
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
SECTIONS & DETAILS
SAMPLE BUILDING

SIZE	SCALE:	DWG. NO.	REV
D	3/8" = 1'-0"	11FMD026	2

000016

FILENAME: 11FMD026

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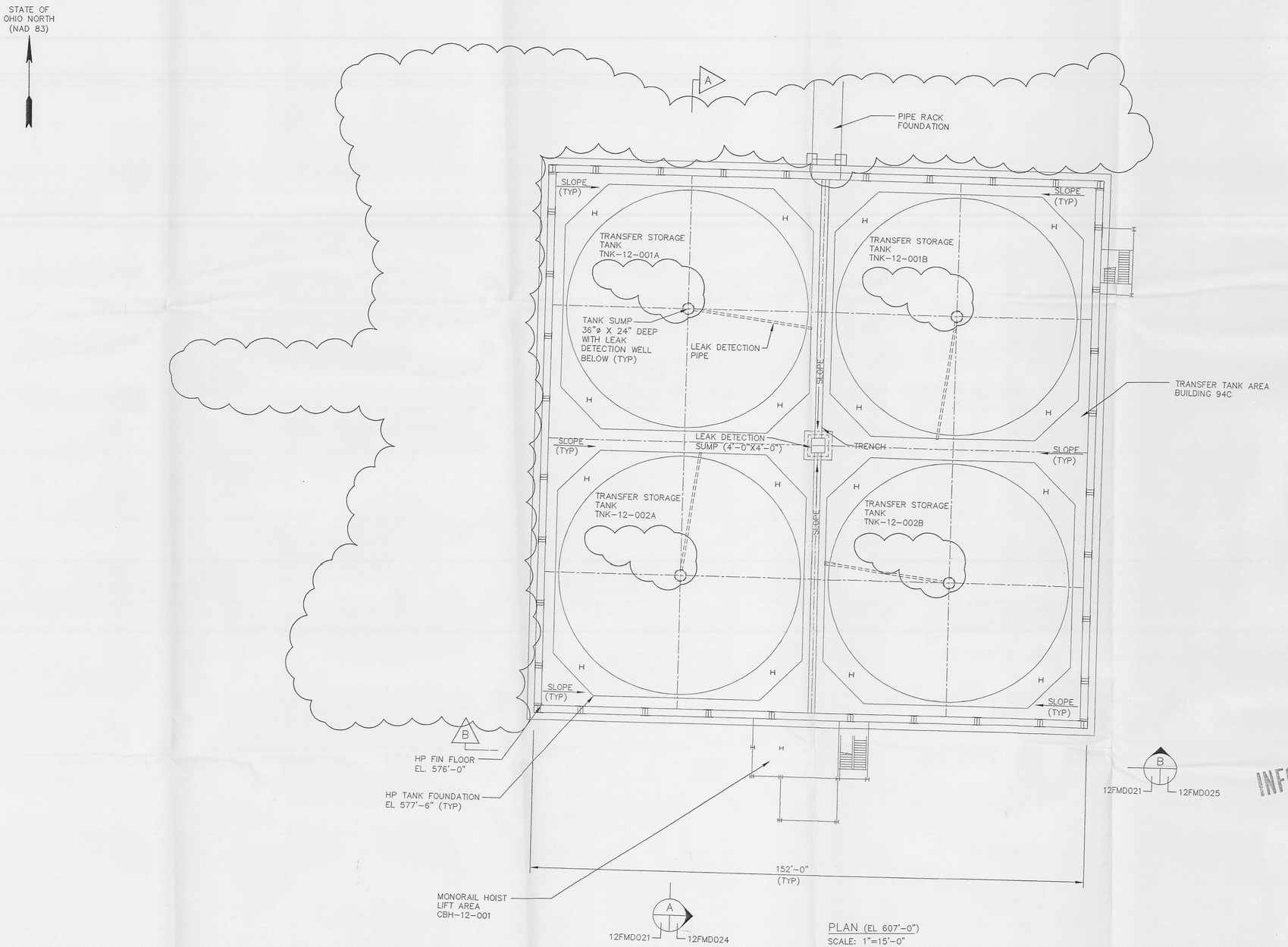
3158

NOTES:

1. RATE OF FLOOR SLOPE IS 1"/8'-0" UNLESS NOTED OTHERWISE.



PLAN (EL 607'-0")
SCALE: 1"=15'-0"

UNCONTROLLED INFORMATION ONLY

REFERENCE DRAWINGS:
05FMD010 GENERAL ARRANGEMENT KEYPLAN

3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
TRANSFER TANK SYSTEM
GENERAL ARRANGEMENT
SHEET 1 OF 6

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

SIZE	SCALE:	DWG. NO.	REV
D	1"=15'-0"	12FMD021	2

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

XREF DRAWINGS: 10FMD010.DWG

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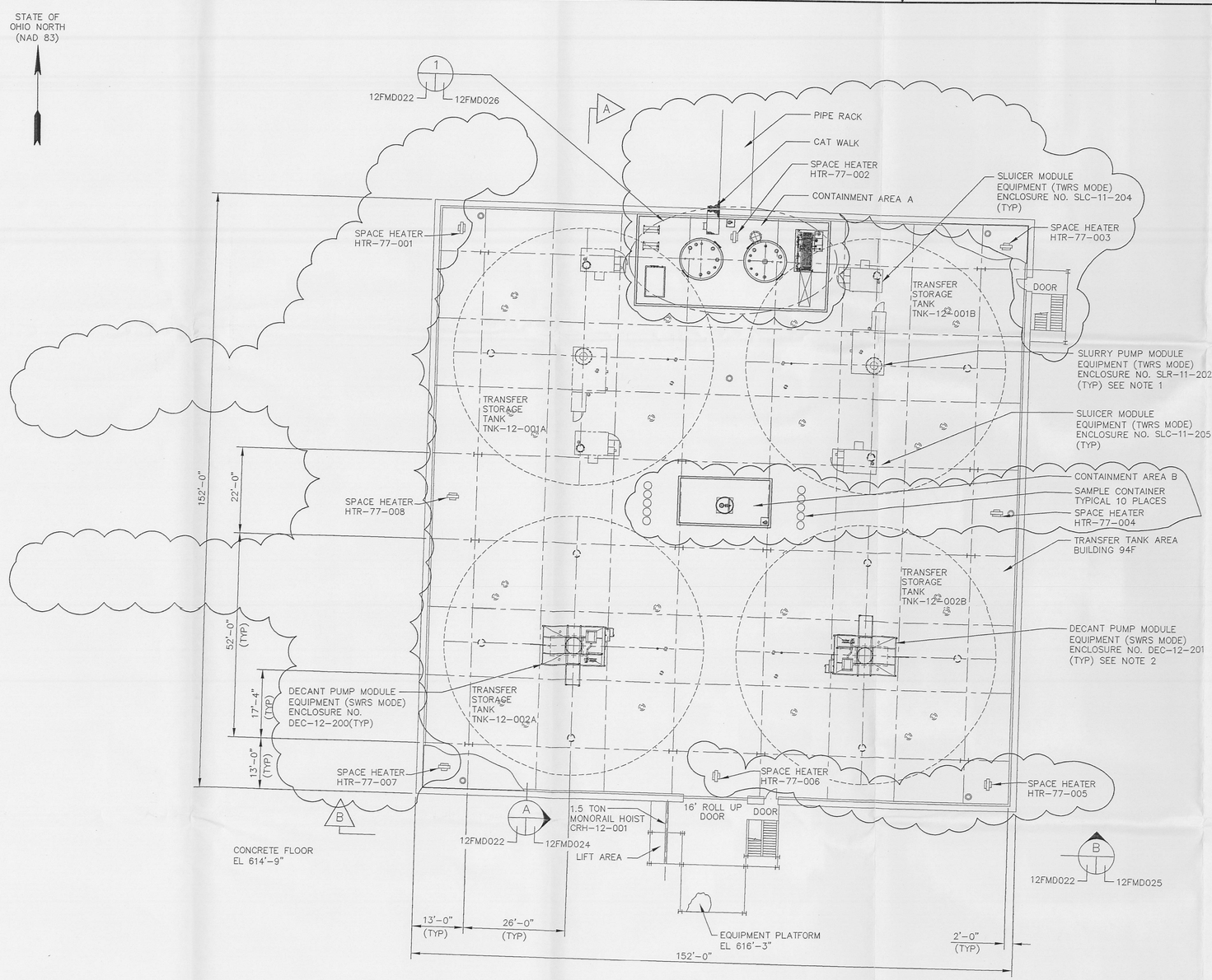
000017 1 FILENAME: 12FMD021.DWG



PLAN (EL 638'-0")
SCALE: 1"=15'-0"

NOTES:

3158

1. TANK TNK-12-001B IS SHOWN WITH TWRS MODE EQUIPMENT IN PLACE. THIS SAME EQUIPMENT WILL MOVE FROM TANK TO TANK. THE EQUIPMENT SHOWN ON TANK TNK-12-001A IS FOR ORIENTATION PURPOSES ONLY.
2. TANK TNK-12-002A & 002B REFLECTS EQUIPMENT REQUIRED FOR SWRS MODE. THE DECANT MODULES WILL BE MOVED AS REQUIRED.

UNCONTROLLED

INFORMATION ONLY

3158

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

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		DATE
DRAWN BY	W C BLUME	01/07/00
DESIGNED BY	W C BLUME	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
TRANSFER TANK SYSTEM
GENERAL ARRANGEMENT
SHEET 2 OF 6

SIZE	SCALE:	DWG. NO.	REV
D	1"=15'-0"	12FMD022	2

FILENAME: 12FMD022.DWG

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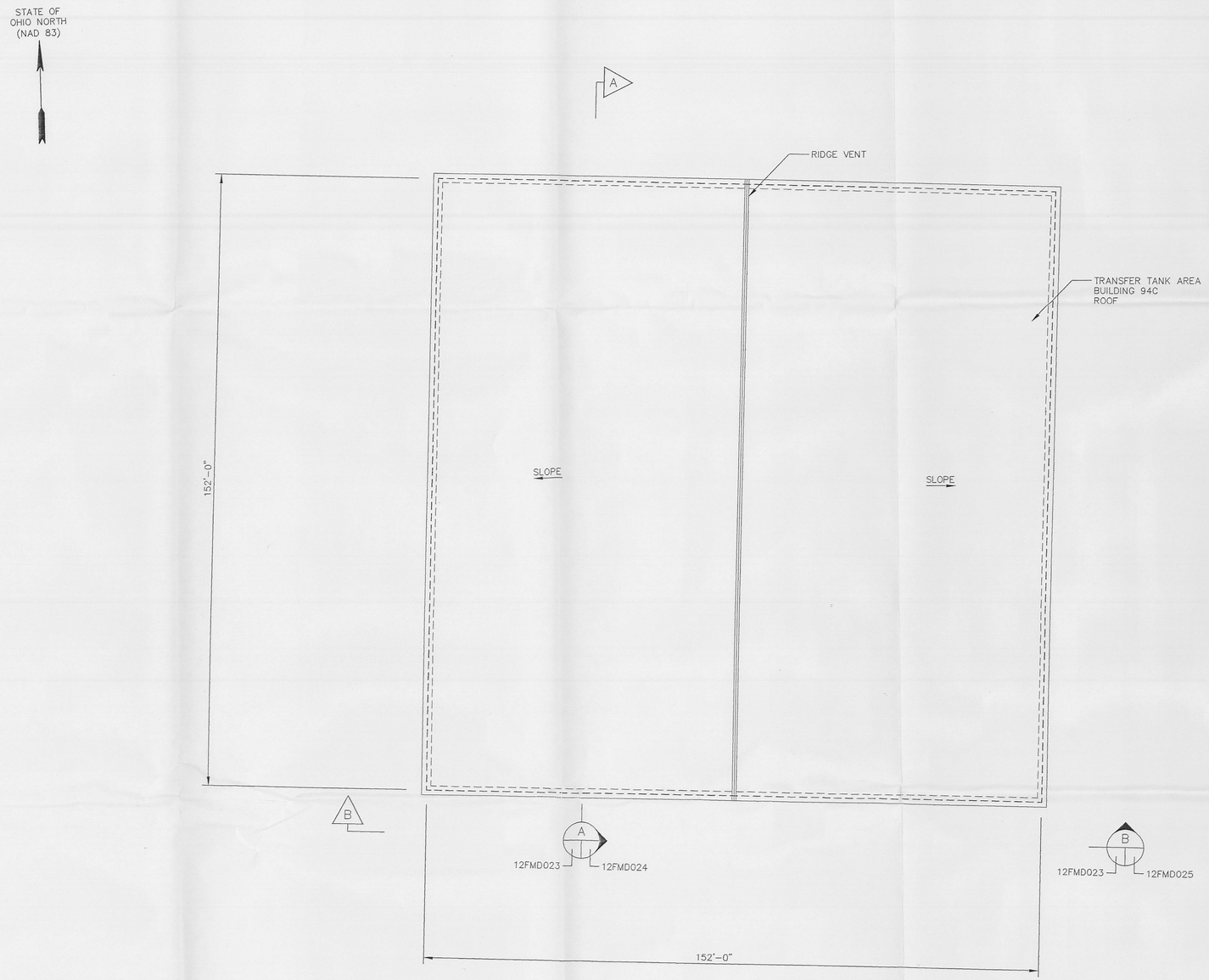
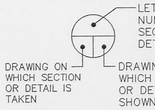


PLAN (EL 650'-0")
SCALE: 1"=15'-0"



SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE
[redacted]

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
TRANSFER TANK SYSTEM
GENERAL ARRANGEMENT
SHEET 3 OF 6

SIZE	SCALE:	DWG. NO.	REV
D	1"=15'-0"	12FMD023	1

INFORMATION ONLY

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3158

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FILENAME: 12FMD023.DWG

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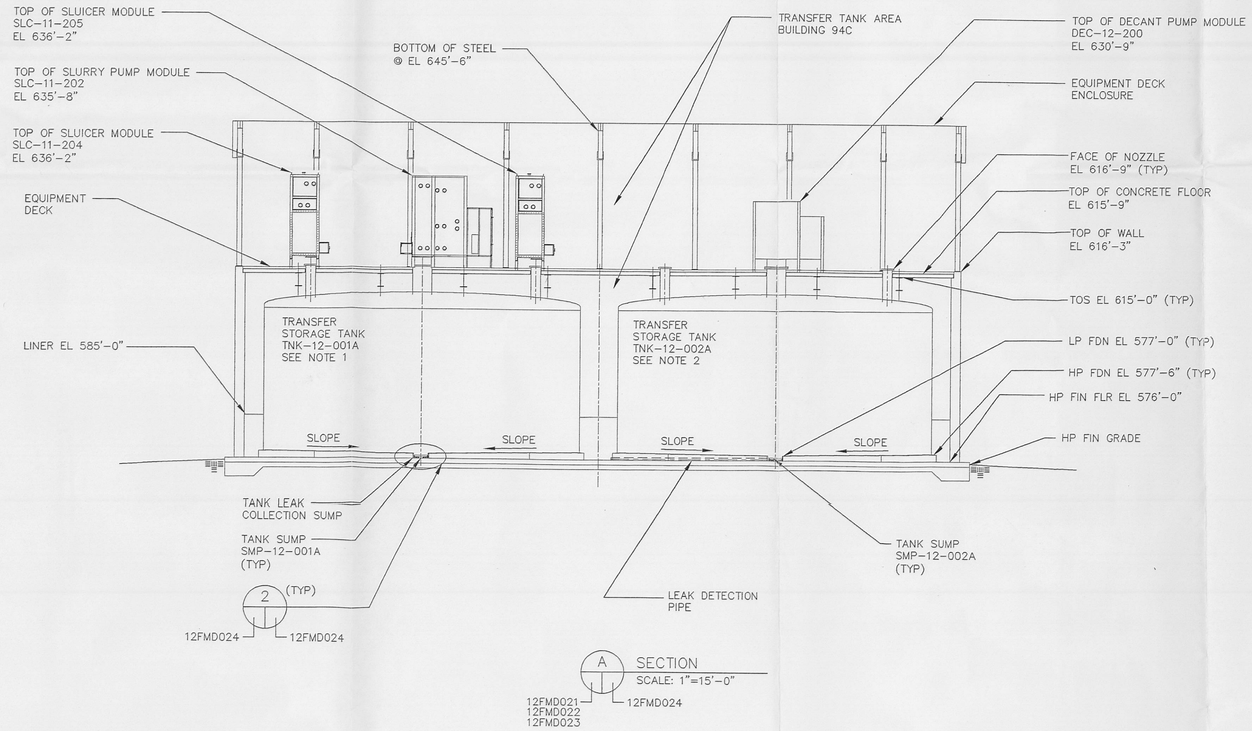
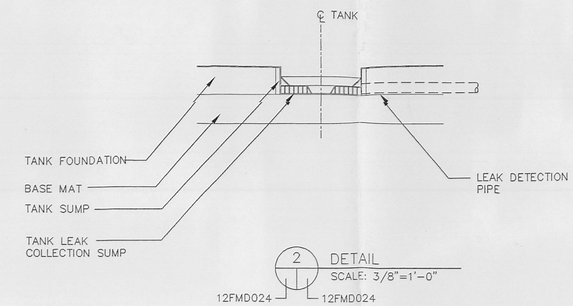
3158

NOTES:

1. TNK-12-001A IS SHOWN IN TWRS MODE.
2. TNK-12-002A IS SHOWN IN SWRS MODE.





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INFORMATION ONLY

3158

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
TRANSFER TANK SYSTEM
GENERAL ARRANGEMENT
SHEET 4 OF 6

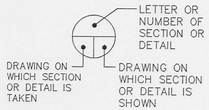
DRAWN BY W C BLUME	DATE 01/07/00
DESIGNED BY W C BLUME	DATE 01/07/00
CHECKED BY S W HUNGATE	DATE 01/07/00
APPROVED BY KENNETH RICKETT	DATE 01/07/00
APPROVED BY JOHN LAWSON	DATE 01/07/00

RPE
KENNETH D. RICKETT
REG. NO. 10374
01/07/00
REVISION

SIZE	SCALE:	DWG. NO.	REV
D	1"=15'-0"	12FMD024	1

FILENAME: 12FMD024.DWG

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL



SECTION & DETAIL KEY

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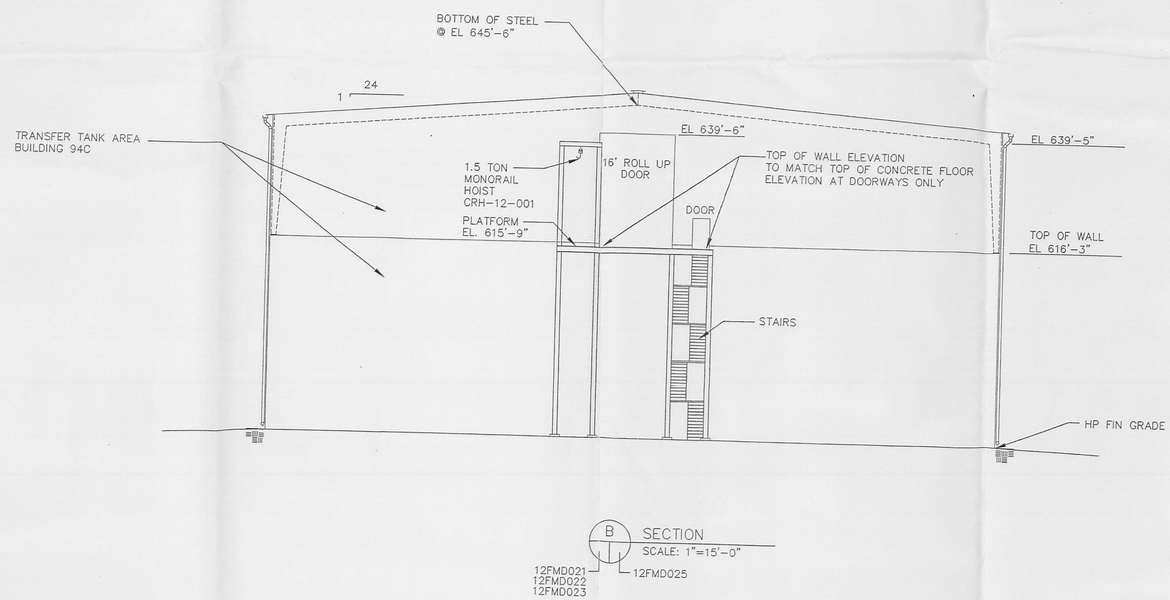
000020

3158



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3158

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

LETTER OR NUMBER OF SECTION OR DETAIL

DRAWING ON WHICH SECTION OR DETAIL IS TAKEN

DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

[redacted]

DRAWN BY	W C BLUME	DATE 01/07/00
DESIGNED BY	W C BLUME	DATE 01/07/00
CHECKED BY	S W HUNGATE	DATE 01/07/00
APPROVED BY	KENNETH RICKETT	DATE 01/07/00
APPROVED BY	JOHN LAWSON	DATE 01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
TRANSFER TANK SYSTEM
GENERAL ARRANGEMENT
SHEET 5 OF 6

SIZE	SCALE:	DWG. NO.	REV
D	1"=15'-0"	12FMD025	1

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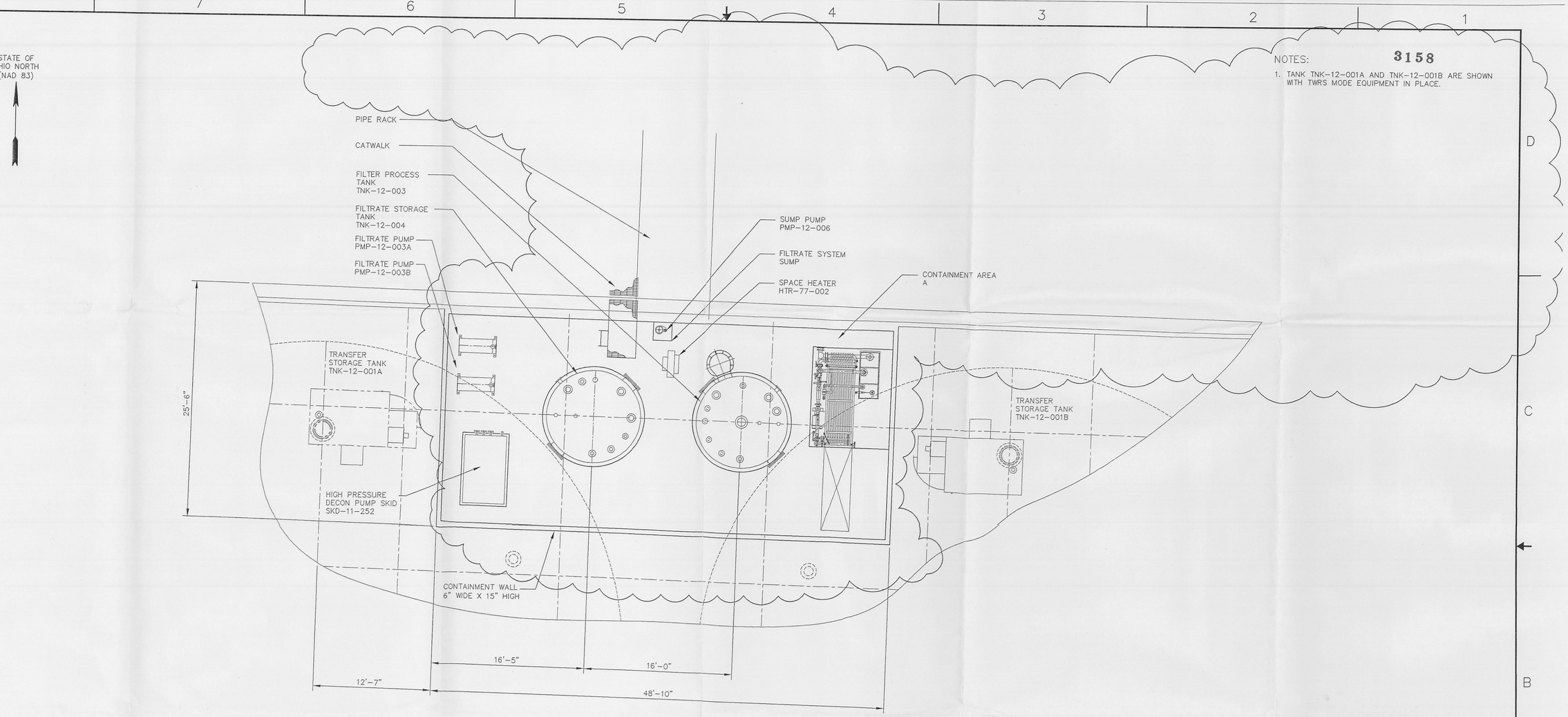
NOTES:

1. TANK TNK-12-001A AND TNK-12-001B ARE SHOWN WITH TWRS MODE EQUIPMENT IN PLACE.

3158



PARTIAL PLAN VIEW-EQUIPMENT DECK

ULTRA FILTRATION SYSTEM AND FILTRATE STORAGE AREA

1 DETAIL
SCALE: 3/16"=1'-0"
12FMD022 — 12FMD026

INFORMATION ONLY

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3158

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LETTER OR NUMBER OF SECTION OR DETAIL

DRAWING ON WHICH SECTION OR DETAIL IS TAKEN

DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
TRANSFER TANK SYSTEM
GENERAL ARRANGEMENT
SHEET 6 OF 6

SIZE	SCALE:	DWG. NO.	REV
D	3/16" = 1'-0"	12FMD026	2

000022

FILENAME: 12FMD026.DWG

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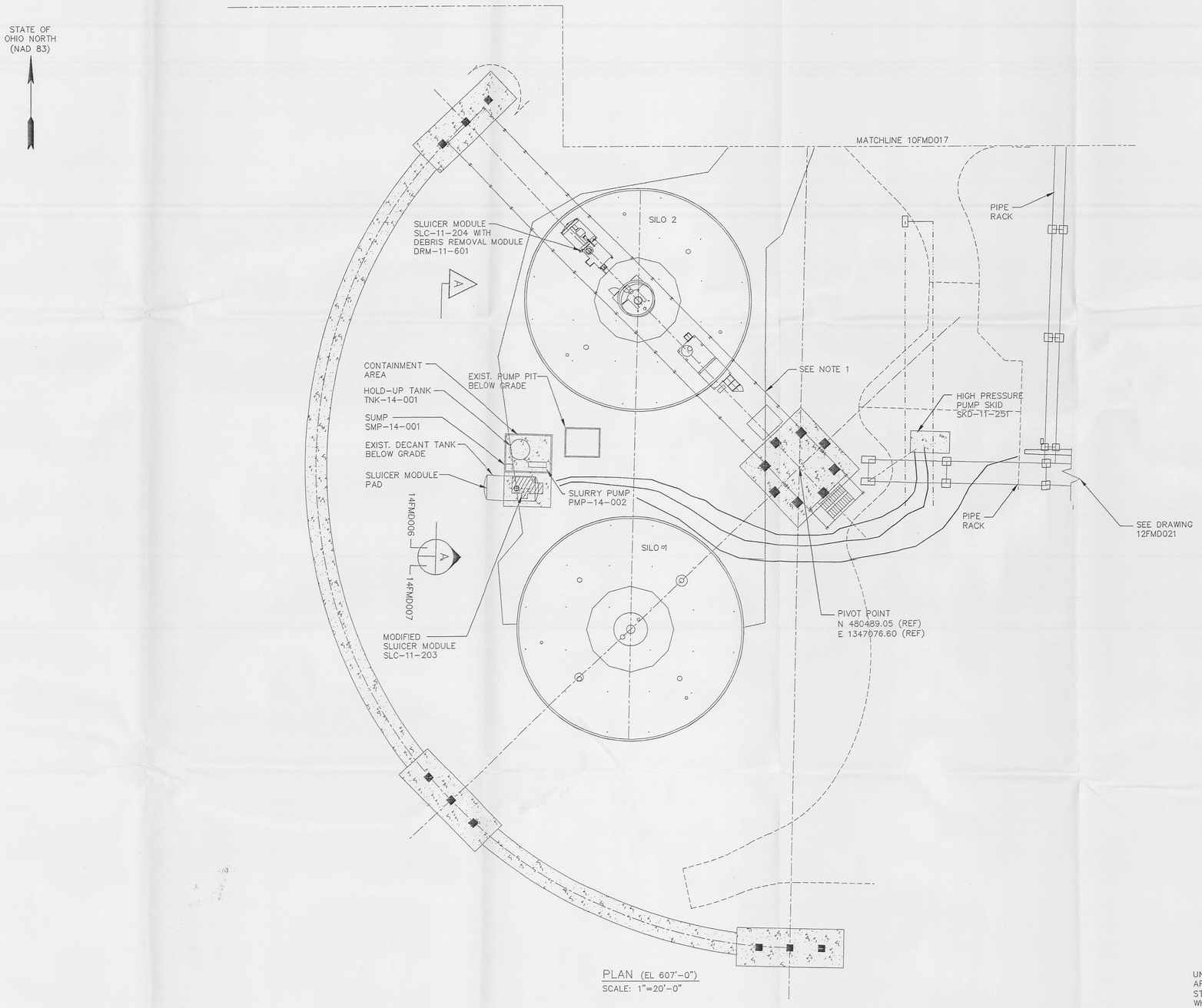
NOTES: 3158

1. BRIDGE CRANE SHOWN IN SILO 2 OPERATION POSITION, SILO 1 IS SIMILAR.



PLAN (EL 607'-0")
SCALE: 1"=20'-0"

UNCONTROLLED INFORMATION ONLY

REFERENCE DRAWINGS:

05FMD010 GENERAL ARRANGEMENT KEY PLAN

3158

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

LETTER OR NUMBER OF SECTION OR DETAIL

DRAWING ON WHICH SECTION OR DETAIL IS TAKEN

DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

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2	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

[redacted]

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
DECANT WASTE RETRIEVAL SYSTEM
GENERAL ARRANGEMENT
SHEET 1 OF 2

SIZE	SCALE:	DWG. NO.	REV
D	1"=20'-0"	14FMD006	2

XREF DRAWINGS: 10FMD010.DWG 60-PROP.DWG 60-EXIST.DWG

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FILENAME: 14FMD006.DWG

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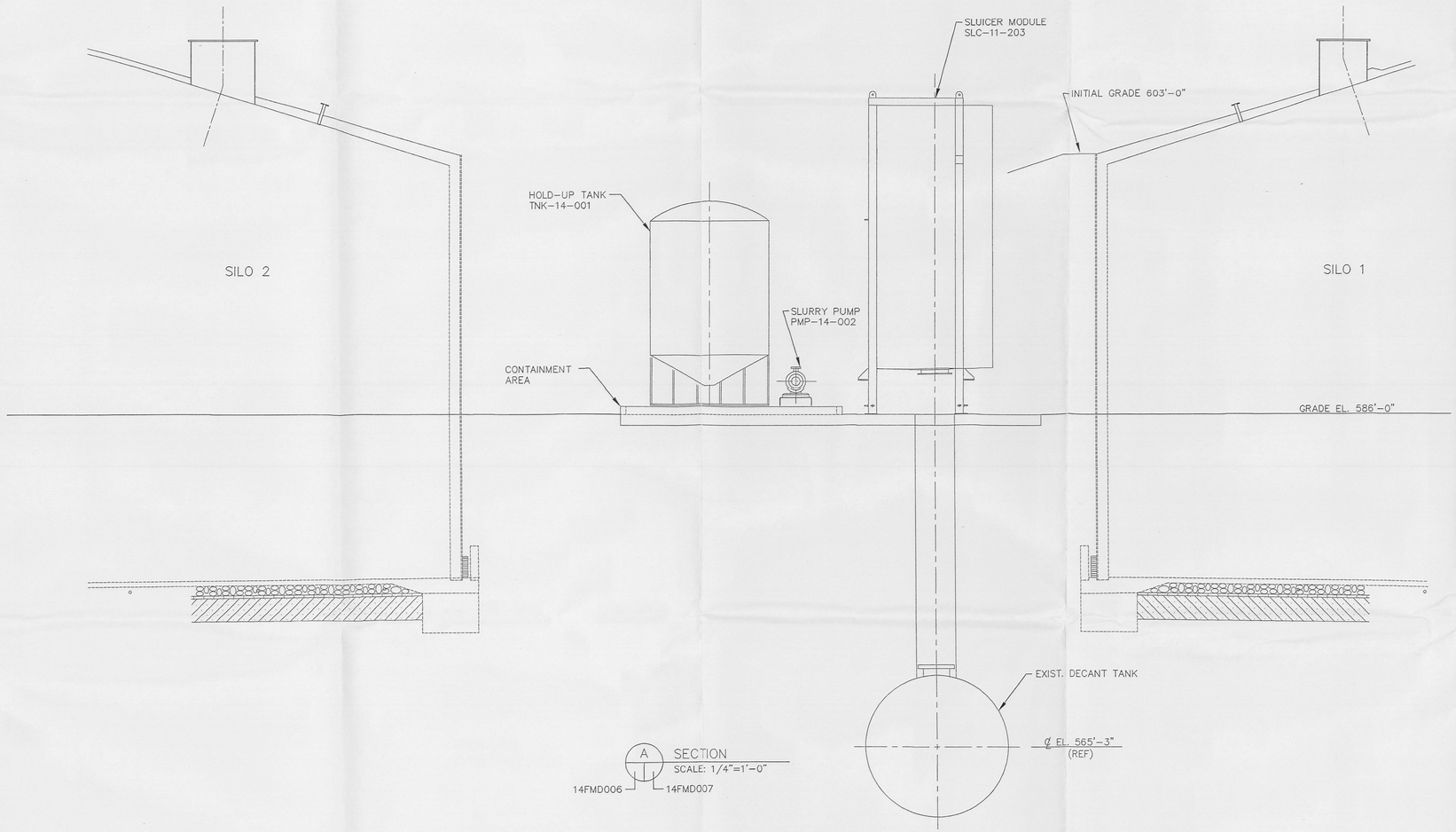

UNCONTROLLED

INFORMATION ONLY

3158

UNDER TEMPORARY AUTHORIZATION (BASED ON APPLICATION TO REGISTER BY COMITY IN THE STATE OF OHIO, DATED DECEMBER 6, 1999) WHICH WILL EXPIRE ON MARCH 31, 2000.

LETTER OR NUMBER OF SECTION OR DETAIL

DRAWING ON WHICH SECTION OR DETAIL IS TAKEN

DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE

KENNETH D. KICKELL
No. 41347
01/07/00
DIVISION

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
DECANT WASTE RETRIEVAL SYSTEM
GENERAL ARRANGEMENT
SHEET 2 OF 2

SIZE	SCALE:	DWG. NO.	REV
D	1/4" = 1'-0"	14FMD007	2

000024

FILENAME: 14fmd007.DWG

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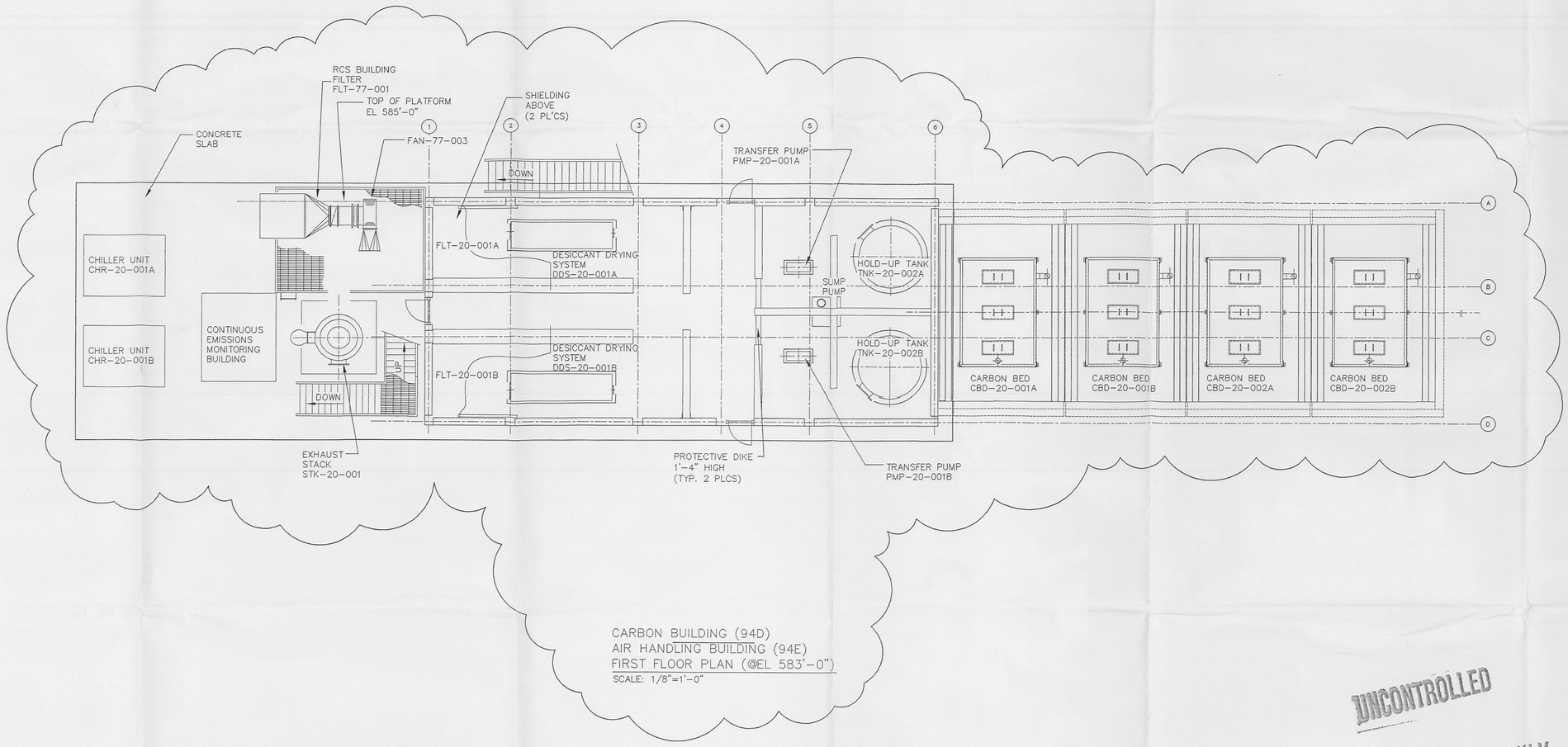
NOTES: 3158

1. FOR CLARITY SYSTEM 20 RCS AND SYSTEM 77 MISCELLANEOUS HVAC FACILITIES HVAC SYSTEM ARE PRESENTED ON SYSTEM 20 DRAWINGS.



CARBON BUILDING (94D)
AIR HANDLING BUILDING (94E)
FIRST FLOOR PLAN (@EL 583'-0")
SCALE: 1/8"=1'-0"

UNCONTROLLED

INFORMATION ONLY

3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
RADON CONTROL SYSTEM
GENERAL ARRANGEMENT
1ST FLOOR

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2	05/15/00	JG	GCH	KDR	REVISED PER CHANGE PROPOSAL CP-00-004
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	MBF		PRELIMINARY DESIGN SUBMITTAL

RPE
[redacted]

		DATE
DRAWN BY	W C BLUME	01/07/00
DESIGNED BY	W C BLUME	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

SIZE	SCALE:	DWG. NO.	REV
D	1/8"=1'-0"	20FMD027	2

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

000025

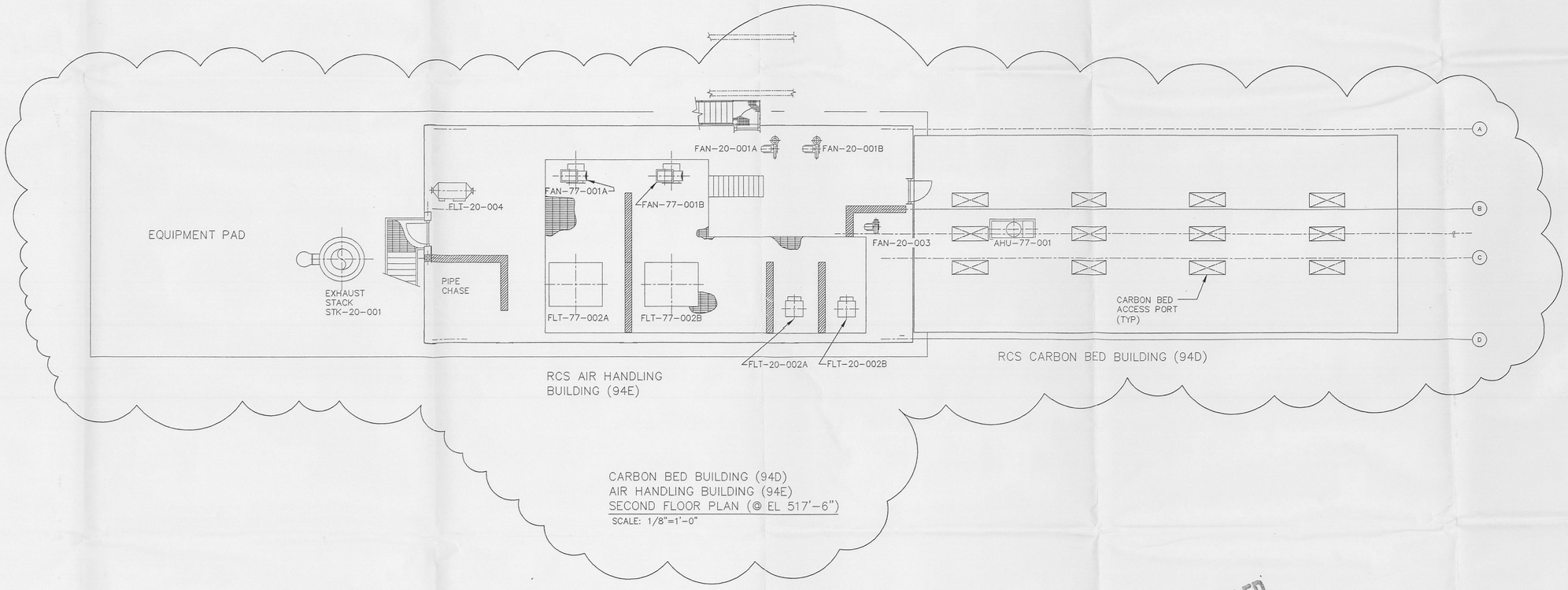
FILENAME: 20FMD027.DWG

G:\CHARGE\VDFSILOS\MEC\SYS20\20fmd027.dwg Thu Jun 22 14:26:11 2000

3158

NOTES:

1. FOR CLARITY SYSTEM 20 RCS AND SYSTEM 77 MISCELLANEOUS HVAC FACILITIES HVAC SYSTEM ARE PRESENTED ON SYSTEM 20 DRAWINGS.



CARBON BED BUILDING (94D)
AIR HANDLING BUILDING (94E)
SECOND FLOOR PLAN (@ EL 517'-6")
SCALE: 1/8"=1'-0"

UNCONTROLLED INFORMATION ONLY

3158

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DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

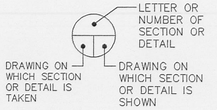
TITLE
RADON CONTROL SYSTEM
GENERAL ARRANGEMENT
2ND FLOOR

DRAWN BY W C BLUME	DATE 01/07/00
DESIGNED BY W C BLUME	DATE 01/07/00
CHECKED BY S W HUNGATE	DATE 01/07/00
APPROVED BY KENNETH RICKETT	DATE 01/07/00
APPROVED BY JOHN LAWSON	DATE 01/07/00

RPE
KENNETH D. RICKETT
REG. NO. 11-34413
5/15/00
REVISION

SIZE	SCALE:	DWG. NO.	REV
D	1/8"=1'-0"	20FMD028	2

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2	05/15/00	JG	GCH	KDR	REVISED PER CHANGE PROPOSAL CP-00-004
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	MBF		PRELIMINARY DESIGN SUBMITTAL



SECTION & DETAIL KEY

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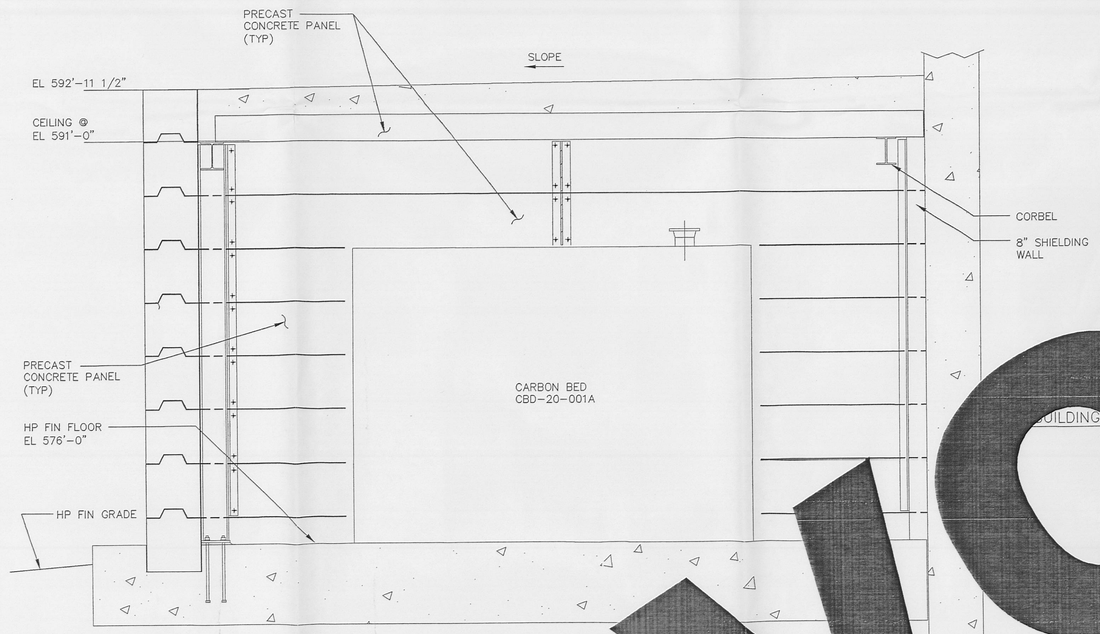
FILENAME: 20FMD028.DWG

000026



B SECTION
SCALE: 3/8"=1'-0"
20FMD027
20FMD028
20FMD029

DRAWING ... WHICH ... SECTION OR ... DETAIL IS SHOWN
DETAIL KEY

NOTES:

1. FOR CLARITY SYSTEM 20 RCS AND SYSTEM 77 MISCELLANEOUS HVAC FACILITIES HVAC SYSTEM ARE PRESENTED ON SYSTEM 20 DRAWINGS.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2	05/15/00	JG	GCH	KDR	DRAWING VOIDED
1	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	WCB	MBF		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY W C BLUME	DATE 01/07/00	
DESIGNED BY W C BLUME	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
RADON CONTROL SYSTEM
GENERAL ARRANGEMENT
SECTIONS & DETAILS

SIZE	SCALE:	DWG. NO.	REV
D	3/8"=1'-0"	20FMD029	2

FILENAME: 20FMD029.DWG

VOID
UNCONTROLLED INFORMATION ONLY
3158
3158
000027

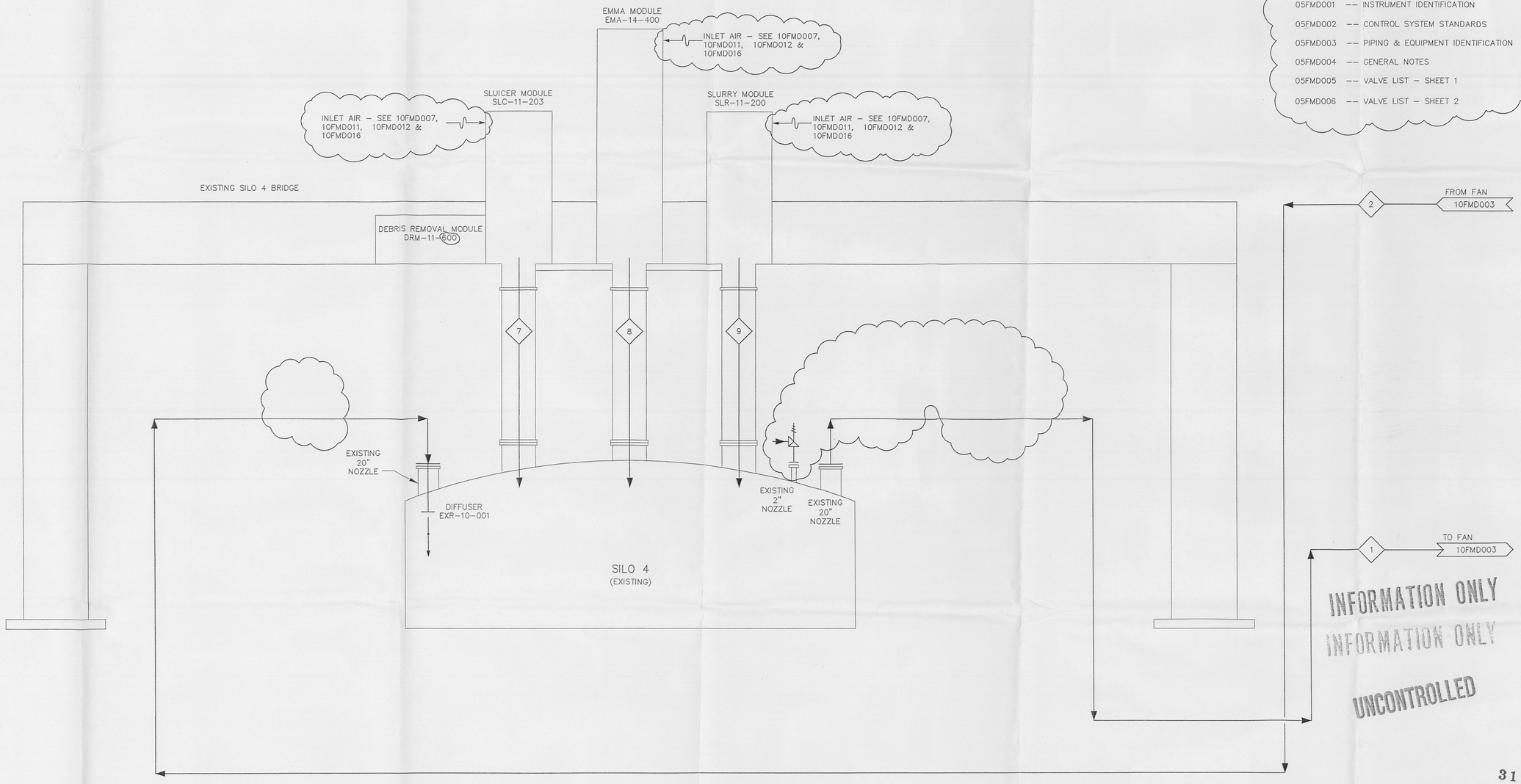
G:\CHARGE\FDF\SILOS\MEC\SYS20\20fmd029.dwg Thu Jun 22 14:27:43 2000

NOTES: 3158

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 10FMD001.

REFERENCE DRAWINGS:

05FMD001 -- INSTRUMENT IDENTIFICATION
05FMD002 -- CONTROL SYSTEM STANDARDS
05FMD003 -- PIPING & EQUIPMENT IDENTIFICATION
05FMD004 -- GENERAL NOTES
05FMD005 -- VALVE LIST - SHEET 1
05FMD006 -- VALVE LIST - SHEET 2



INFORMATION ONLY

INFORMATION ONLY

UNCONTROLLED

3158

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2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY B J DAVIS	DATE 01/07/00	
DESIGNED BY B J DAVIS	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
PROCESS FLOW DIAGRAM
RADON CONTROL SYSTEM

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD002	2

000028

FILENAME: 10FMD002.DWG

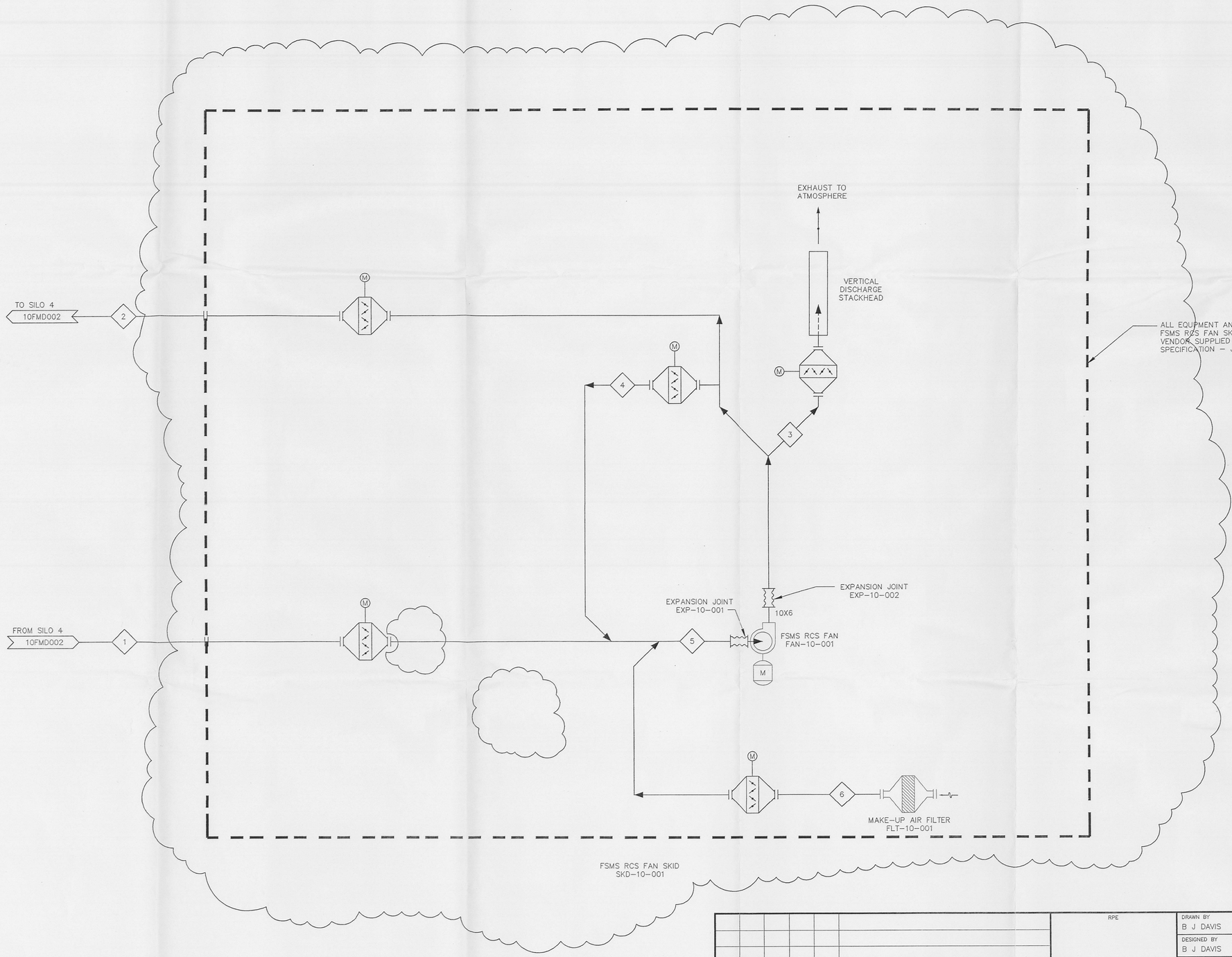
G:\CHARGE\FDFSILOS\MED\SYS10\10FMD002.DWG Thu Jun 22 14:33:36 2000

NOTES: 3158

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 10FMD001.

REFERENCE DRAWINGS:

05FMD001 -- INSTRUMENT IDENTIFICATION
05FMD002 -- CONTROL SYSTEM STANDARDS
05FMD003 -- PIPING & EQUIPMENT IDENTIFICATION
05FMD004 -- GENERAL NOTES
05FMD005 -- VALVE LIST - SHEET 1
05FMD006 -- VALVE LIST - SHEET 2



INFORMATION ONLY

UNCONTROLLED

3158

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE

		DATE
DRAWN BY	B J DAVIS	01/07/00
DESIGNED BY	B J DAVIS	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
PROCESS FLOW DIAGRAM
RADON CONTROL SYSTEM

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD003	2

FILENAME: 10FMD003.DWG

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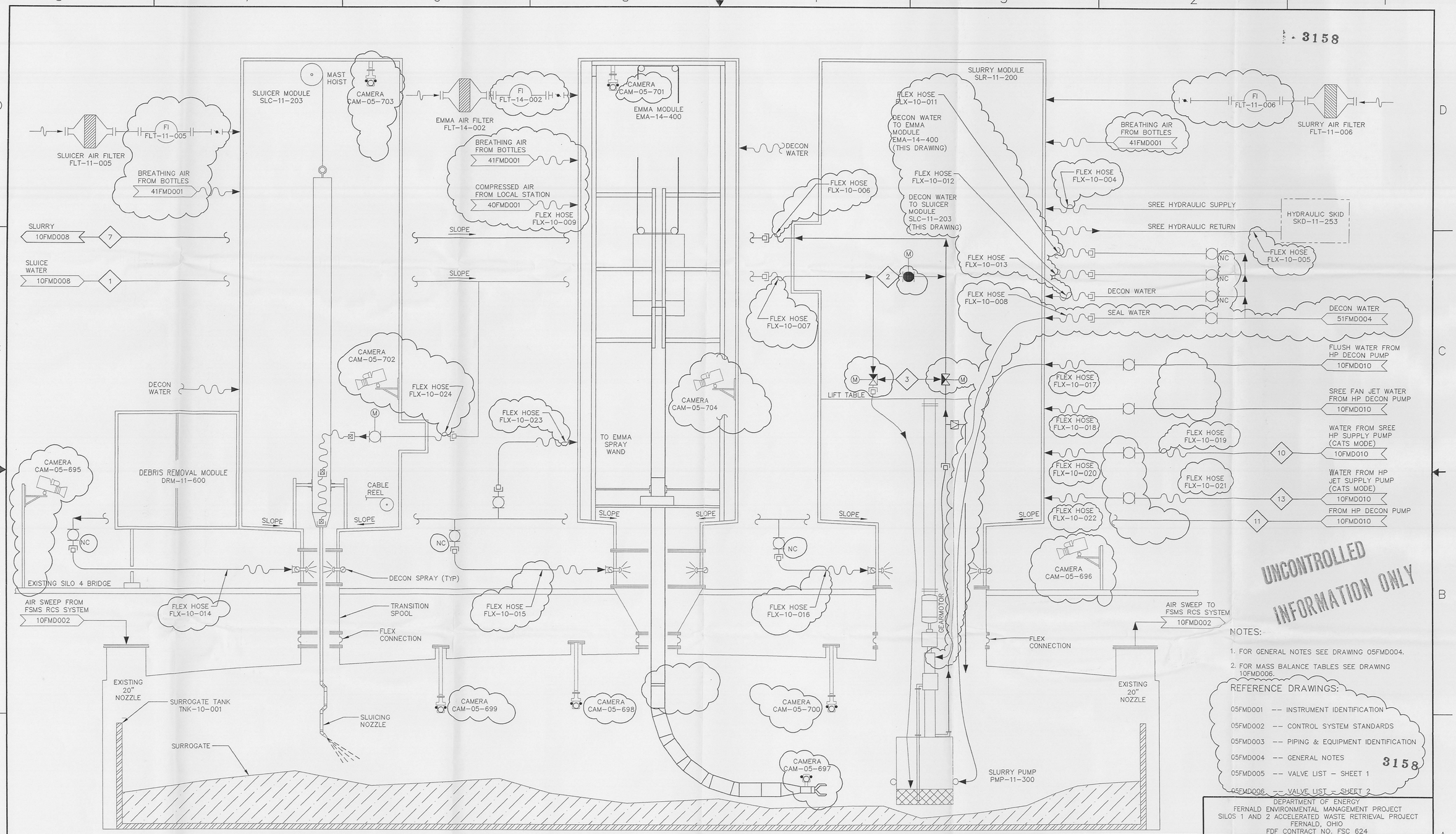
000029



SILO 4 – SWRS MODE

UNCONTROLLED INFORMATION ONLY

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 10FMD006.

REFERENCE DRAWINGS:

05FMD001 -- INSTRUMENT IDENTIFICATION
05FMD002 -- CONTROL SYSTEM STANDARDS
05FMD003 -- PIPING & EQUIPMENT IDENTIFICATION
05FMD004 -- GENERAL NOTES
05FMD005 -- VALVE LIST – SHEET 1
05FMD006 -- VALVE LIST – SHEET 2

3158

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	RAR		PRELIMINARY DESIGN SUBMITTAL

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

RPE

		DATE
DRAWN BY	B J DAVIS	01/07/00
DESIGNED BY	B J DAVIS	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	J LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
PROCESS FLOW DIAGRAM
SILO 4 – SWRS MODE

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD007	2

FILENAME: 10FMD007.DWG

000030

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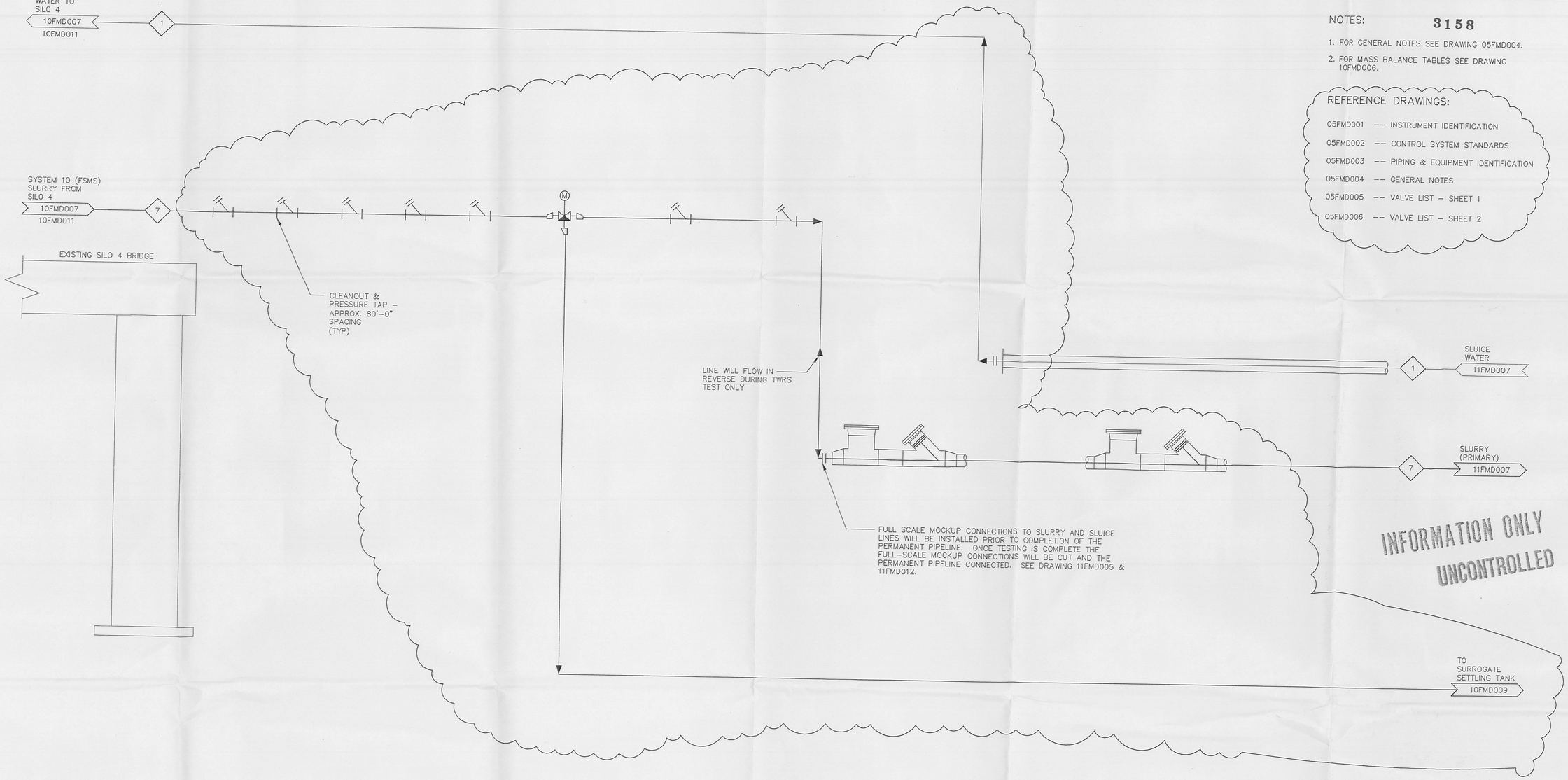


NOTES: **3158**

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 10FMD006.

REFERENCE DRAWINGS:

05FMD001 –– INSTRUMENT IDENTIFICATION
05FMD002 –– CONTROL SYSTEM STANDARDS
05FMD003 –– PIPING & EQUIPMENT IDENTIFICATION
05FMD004 –– GENERAL NOTES
05FMD005 –– VALVE LIST – SHEET 1
05FMD006 –– VALVE LIST – SHEET 2

INFORMATION ONLY
UNCONTROLLED

3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP–00–001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY B J DAVIS	DATE 01/07/00	
DESIGNED BY B J DAVIS	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL–SCALE MOCKUP SYSTEM
PROCESS FLOW DIAGRAM
SLURRY & WATER PIPING TIE–IN

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD008	2

G:\CHARGE\FIFSILOS\WEC\SYS10\10fmd008.dwg Thu Jun 22 14:43:54 2000

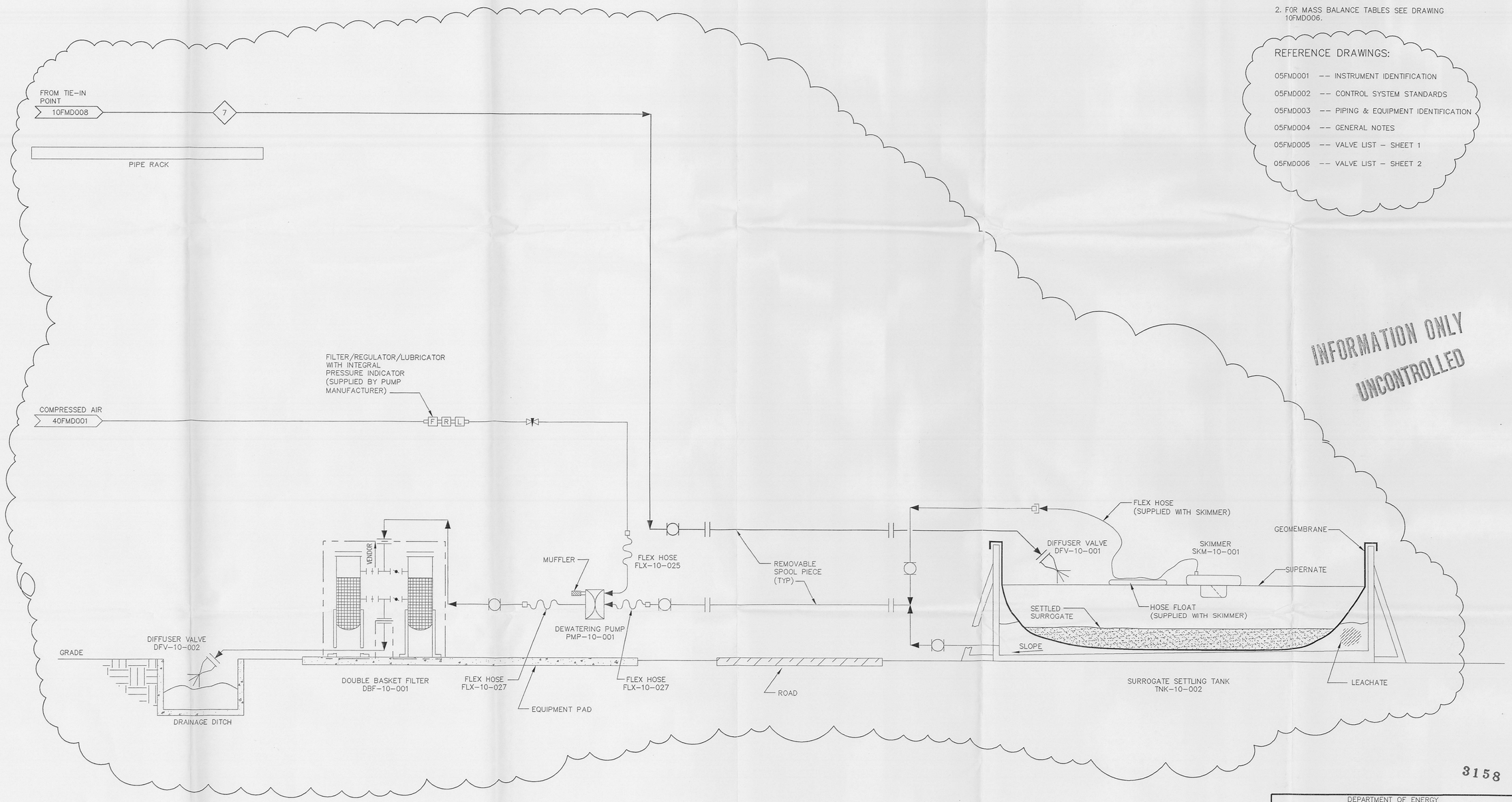
NOTES:

3158

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 10FMD006.

REFERENCE DRAWINGS:

05FMD001 -- INSTRUMENT IDENTIFICATION
05FMD002 -- CONTROL SYSTEM STANDARDS
05FMD003 -- PIPING & EQUIPMENT IDENTIFICATION
05FMD004 -- GENERAL NOTES
05FMD005 -- VALVE LIST - SHEET 1
05FMD006 -- VALVE LIST - SHEET 2



INFORMATION ONLY
UNCONTROLLED

3158

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY B J DAVIS	DATE 01/07/00	
DESIGNED BY B J DAVIS	DATE 01/07/00	
CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
PROCESS FLOW DIAGRAM
SURROGATE DEWATERING

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD009	2

FILENAME: 10FMD009.DWG

000032

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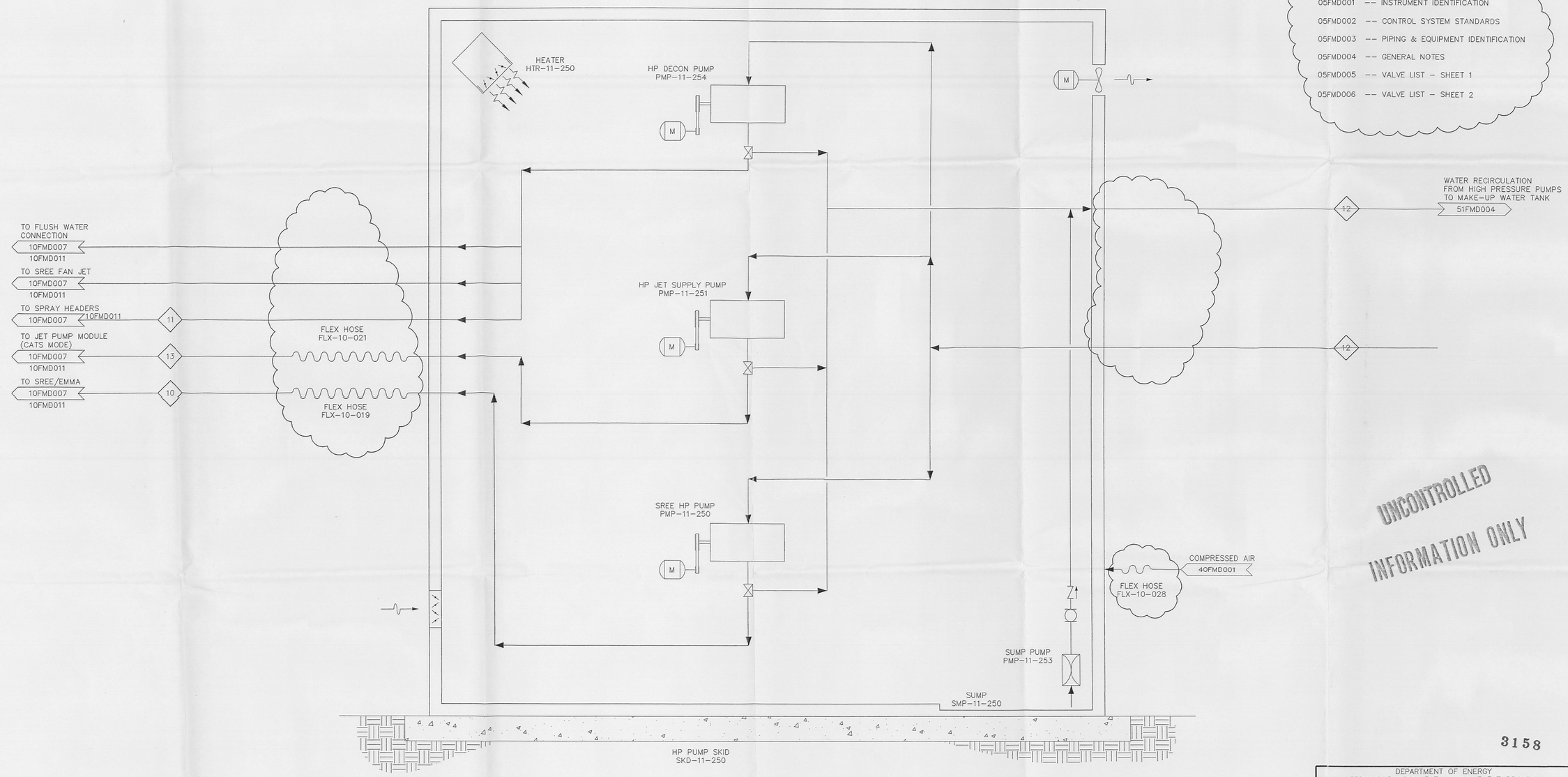
NOTES: 3158

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 10FMD006.

REFERENCE DRAWINGS:

05FMD001 -- INSTRUMENT IDENTIFICATION
05FMD002 -- CONTROL SYSTEM STANDARDS
05FMD003 -- PIPING & EQUIPMENT IDENTIFICATION
05FMD004 -- GENERAL NOTES
05FMD005 -- VALVE LIST - SHEET 1
05FMD006 -- VALVE LIST - SHEET 2



UNCONTROLLED INFORMATION ONLY

3158

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE

		DATE
DRAWN BY	B J DAVIS	01/07/00
DESIGNED BY	B J DAVIS	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
PROCESS FLOW DIAGRAM
HP PUMP SKID SKD-11-250

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD010	2

FILENAME: 10FMD010.DWG

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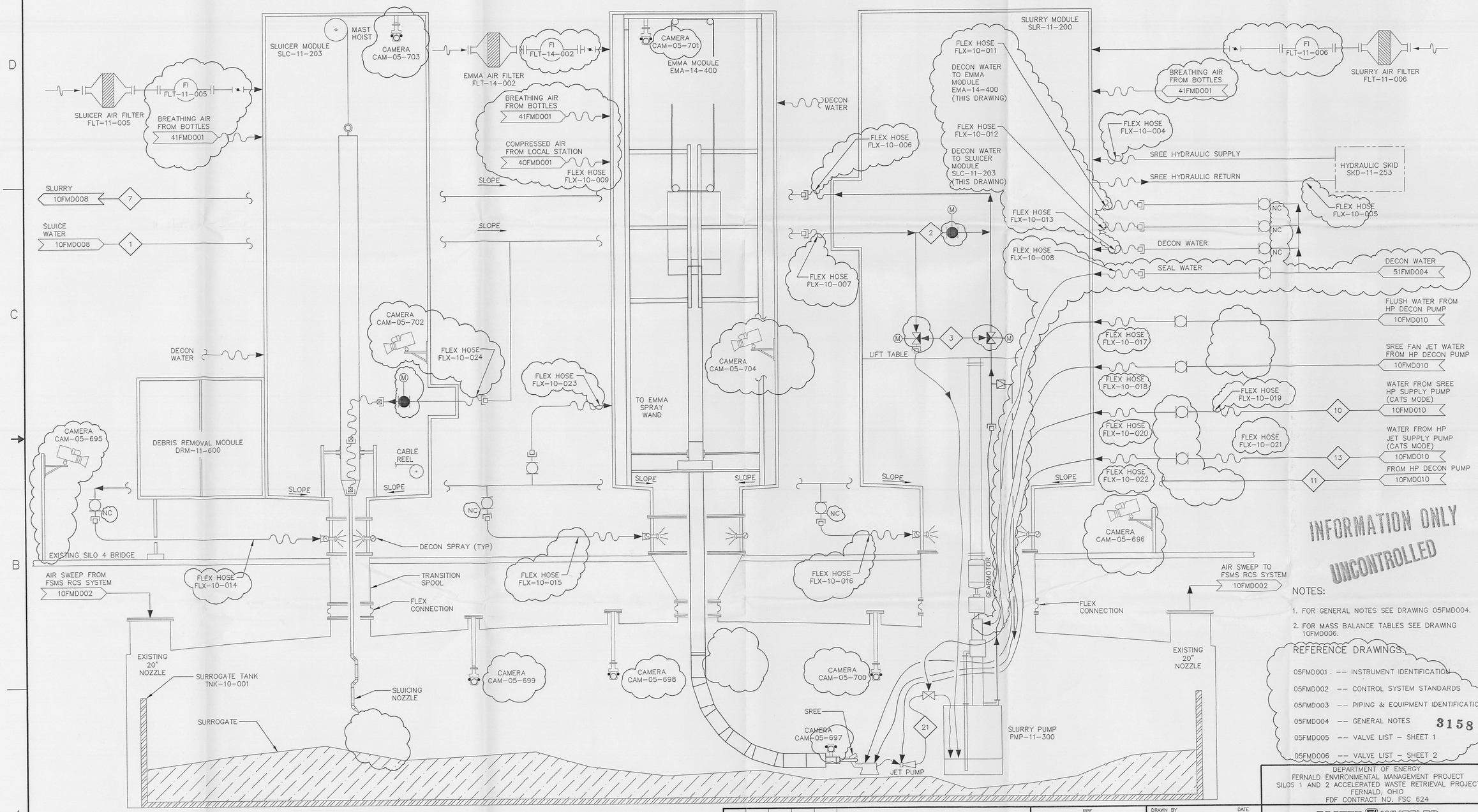
000033

3158



SILO 4 – CATS MODE

INFORMATION ONLY

UNCONTROLLED

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 10FMD006.

REFERENCE DRAWINGS:

05FMD001 -- INSTRUMENT IDENTIFICATION
05FMD002 -- CONTROL SYSTEM STANDARDS
05FMD003 -- PIPING & EQUIPMENT IDENTIFICATION
05FMD004 -- GENERAL NOTES
05FMD005 -- VALVE LIST – SHEET 1
05FMD006 -- VALVE LIST – SHEET 2

3158

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	RAR		PRELIMINARY DESIGN SUBMITTAL

RPE

DRAWN BY B J DAVIS	DATE 01/07/00	
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CHECKED BY S W HUNGATE	DATE 01/07/00	
APPROVED BY KENNETH RICKETT	DATE 01/07/00	
APPROVED BY JOHN LAWSON	DATE 01/07/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
FULL-SCALE MOCKUP SYSTEM
PROCESS FLOW DIAGRAM
SILO 4 – CATS MODE

SIZE	SCALE:	DWG. NO.	REV
D	NONE	10FMD011	2

000034

FILENAME: 10FMD011.DWG

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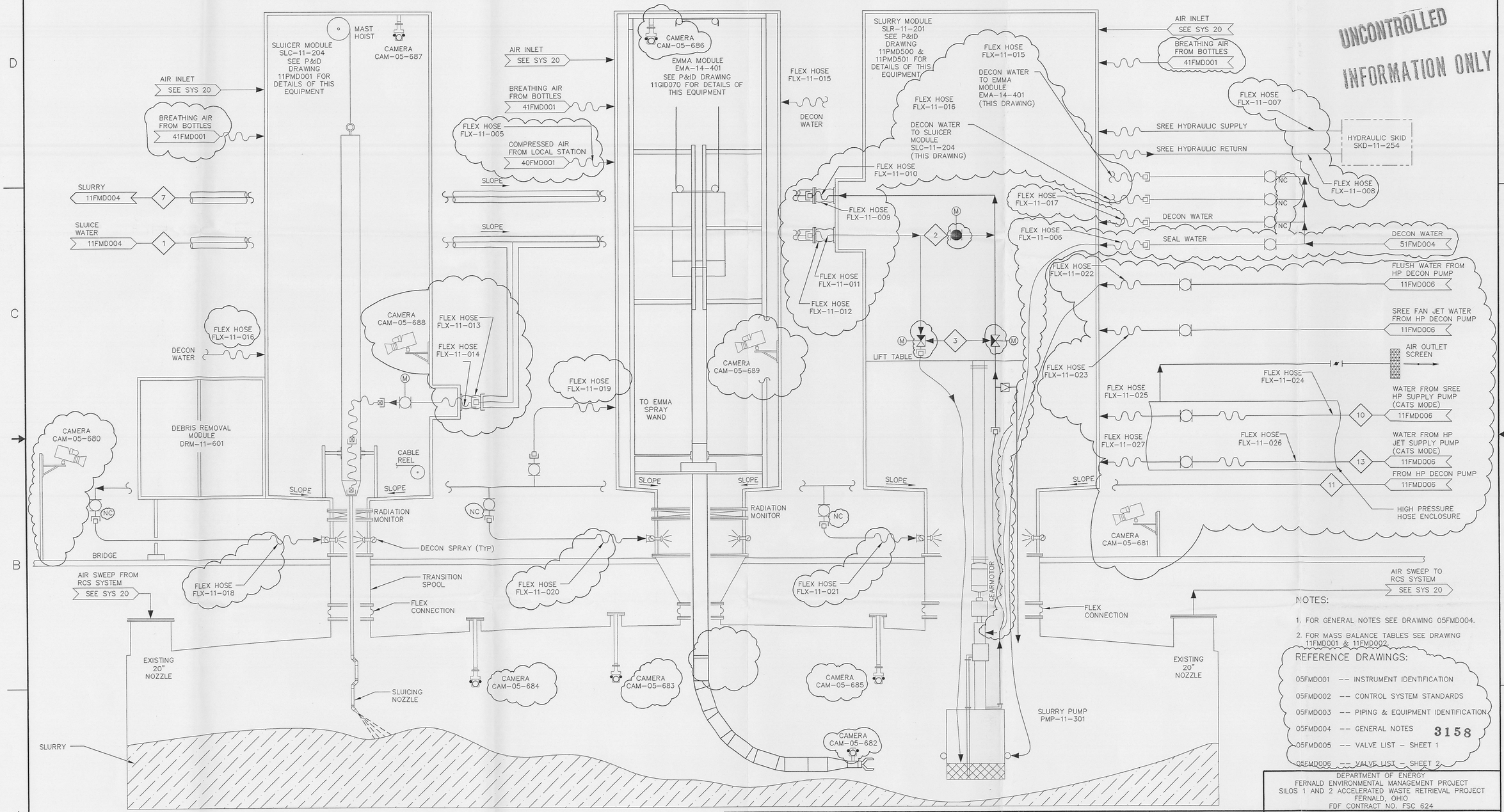
3158

UNCONTROLLED INFORMATION ONLY



SILO 2 – SWRS MODE

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 11FMD001 & 11FMD002.

REFERENCE DRAWINGS:

05FMD001 -- INSTRUMENT IDENTIFICATION
05FMD002 -- CONTROL SYSTEM STANDARDS
05FMD003 -- PIPING & EQUIPMENT IDENTIFICATION
05FMD004 -- GENERAL NOTES
05FMD005 -- VALVE LIST – SHEET 1
05FMD006 -- VALVE LIST – SHEET 2

3158

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
2					REVISED PER CHANGE PROPOSAL CP-00-001
1	01/07/00	BJD	SWH	KDR	CERTIFIED FOR CONSTRUCTION
0	11/01/99	BJD	SWH		PRELIMINARY DESIGN SUBMITTAL

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DESIGNED BY	B J DAVIS	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
PROCESS FLOW DIAGRAM
SILO 2 – SWRS MODE

SIZE	SCALE:	DWG. NO.	REV
D	NONE	11FMD003	2

000035

FILENAME: 11FMD003.DWG

G:\CHARGE\FDF\SILOS\MED\SYS11\11fmd003.dwg Thu Jun 22 14:54:21 2000