



Interoffice Communication

To Ron Bryan
From V. M. Fisher
Date January 27, 1983
Subject VOC Fugitive Emissions Register

A system for tracking the VCM Plant's Volatile Organic Compound (VOC) fugitive emissions offsets has been developed to insure that increases from the Modernization Project are adequately offset and/or for use in offsetting the future expansion.

Sometimes equipment modifications, because of either engineering changes or maintenance changes, qualify as VOC offsets. Currently, there is no way of keeping track of these offsets. To track these offsets a register has been set up. This register is a simplified ledger system providing a see-at-a-glance comparison between the equipment modification offset credits and the remaining offsetting potential.

The Process Engineering and Maintenance Departments should be aware of these equipment modifications as specified in the VOC Fugitive Emission regulations. Also, both departments should be aware of the plant's equipment that is defined as VOC controllable fugitive emission sources (refer to Table 2). If any of this equipment is modified by either a process design or a maintenance field change, then the Environmental Coordinator should be notified. He should be notified in the following manner:

- 1) For maintenance field changes submit a copy of the work order to the Environmental Coordinator with a brief explanation.
- 2) For process design changes, a VOC Fugitive Emission Update would be included as part of the "Environmental Impact Statement". This update would state whether or not the design affects the status of the VOC offsets. If the design affects the VOC offsets, the Environmental Coordinator and the engineer issuing the design will follow the project until its installation in the field.

Upon receiving notification that the modifications have been completed, the coordinator will enter the following information into the VOC Emissions Register:

Date - Record the date the equipment was modified.

Project Description - Give a brief explanation of the type of equipment modification and a work order or a design number (This will help in verifying the offset's validity if necessary.).

Offset Credit - Enter the estimated VOC fugitive emissions offset for the particular equipment modification, refer to Table 2.

Offset Credit Balance - Compute the new total of offset credits from equipment modifications.

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The plant had an estimated VOC fugitive emissions offsetting capability of 28.2861 lbs./hr (Note that this is a revision since the October 27, 1982 update):

<u>Existing Equipment in VOC Service</u>	<u>Estimated VOC Emissions Offsets</u>
47 Pumps	5.1183 lbs./hr.
27 Sampling Connections	0.8910 lbs./hr.
84 Safety Relief Valves	19.2612 lbs./hr.
6 Compressors	3.0156 lbs./hr.
Total	28.2861 lbs./hr.

These estimated offsets are the maximum credits which can be received for the equipment modifications. The actual credit which can be received depends on the number of new valves added in conjunction with the equipment modification:

Maximum Emission Credit for Equipment Modification. (See Table 2)	-	Number of New Valves Added	x	Emission Factor for Valves in Either Liquid or Gas Service. (See Table 2)	=	Net Emission Offset Credit for the Equipment Modification.
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The Net Emission Offset Credit for the Equipment Modification is recorded in the VOC Fugitive Emission Register under Offset Credit.

So far, 4.0645 lbs./hr. of offsets from equipment modifications have been credited. These credits have been already entered into the VOC Fugitive Emission Register. To counterbalance the estimated VOC fugitive emissions expected from the Oxy Modernization project, a total of 5.8060 lbs./hr. of offset credits are needed. Plans for other equipment modifications are discussed in a class "A" process design ("VOC Regulation Compliance -- VCM Modernization" issued March 12, 1982) by Jeff McCrary, PED. This design provides for the installation of rupture disks under thirty-five relief valves, and the removal of two relief valves which are in VOC service. The retrofitting of the safety relief valves will begin during the turnaround and will be completed after startup. However, eight relief valves will have to be modified by the startup date to have enough offset credits to counterbalance the modernization project. Once this retrofitting work is complete, it will result in additional offset credits of 8.2381 lbs./hr. The offset credits, in excess of the 1.7415 lbs./hr. needed for the modernization project, will be accumulated to counterbalance future fugitive emission increases, such as for a plant expansion.

Attached are a list of the existing equipment in VOC service (Table 1), the equipment fugitive emission factors (Table 2), revised projected fugitive emissions for Oxy Modernization and Plant Expansion (Table 3), a copy of the "VOC Impact on Future Plant Process Designs" letter, and a copy of the actual entries made in the register. The register and Table 1 should be updated by the Environmental Coordinator as equipment modifications are completed.

This register is for internal use only.

If there are any questions or comments please contact me.


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Process Engineer

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cc: JAD-JWW-MLA-JRH-JMT-SRA-PLF-DLD-JGC-PDD-MWC-MJA-SJR-SWS-SCR
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Table 1. Existing Equipment in VOC Service

<u>Pumps</u>	<u>Description</u>	<u>Status</u>
1. P-102A	Caustic Wash	Tandem Seals 12/6/82
*2. P-102B	Caustic Wash	
3. P-103A	L. E. Column Feed	
4. P-103B	L. E. Column Feed	
5. P-104A	L. E. Column Reflux	
6. P-104B	L. E. Column Reflux	
7. P-105A	H. E. Column Feed	
8. P-105B	H. E. Column Feed	
9. P-106A	H. E. Column Reflux & Product Transfer	
10. P-106B	H. E. Column Reflux & Product Transfer	
*11. P-108	EDC Tar Still Overheads	
*12. P-109A	EDC Tar Still Bottoms	
*13. P-110A	Water Wash Recycle	
*14. P-110B	Water Wash Recycle	
*15. P-110C	Water Wash Recycle	
16. P-112	EDC Transfer	
17. P-115	Oil Pump (BL-301)	
18. P-255	EDC Circulating Pump	
*19. P-402	Light Ends Transfer Pump	
*20. P-405A	EDC Tar Transfer	
21. P-425	EDC Unloading	
22. P-450	EDC Transfer	
23. P-451A	Pure EDC Transfer	
24. P-451B	Pure EDC Transfer	
25. P-452	EDC Transfer	

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<u>Pumps</u>	<u>Description</u>	<u>Status</u>
26. P-453	Wet Crude EDC Rerun	
*27. P-454	T-453 Water Pumpout	
28. P-460	Slop Tank Transfer	
29. P-500	EDC Phase Transfer	
*30. P-503A	T-512 Water Phase Transfer	
*31. P-512A	T-514 Ejector Pump	
*32. P-512B	T-514 Ejector Pump	
*33. P-504	C-500 Transfer Pump	
*34. P-605A	Lube Oil Console	
*35. P-605B	Lube Oil Console	
*36. P-606A	Main Oil Pump (BL-501)	
*37. P-606B	Main Oil Pump (BL-501)	
*38. P-607A	Main Oil Pump (BL-605)	
*39. P-607B	Main Oil Pump (BL-605)	
*40. P-902A	Liquid Feed to Incinerator	
*41. P-902B	Liquid Feed to Incinerator	
*42. P-902C	Liquid Feed to Incinerator	
*43. P-902D	Liquid Feed to Incinerator	
*44. P-911	Flame Arrestor Pumpout	
*45. P-911B	Flame Arrestor Pumpout	
*46. P-912	Flame Arrestor Pumpout	
*47. P-912B	Flame Arrestor Pumpout	

*Equipment requires extensive modifications or replacement to qualify as an offset.

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<u>Compressors</u>	<u>Description</u>	<u>Status</u>
*1. BL-410A	Freon	
*2. BL-410B	Freon	
3. BL-501	Propylene	Iso-seals with a closed loop system for vents
*4. BL-502	Freon	
*5. BL-602A	Freon	
*6. BL-602B	Freon	

*Equipment requires extensive modifications or replacement to qualify as an offset.

Sample Connections

1. C-102 EDC Feed
2. C-102 EDC Bottoms
3. C-103 EDC Reflux
4. R-101 EDC
5. R-102 EDC
6. R-103 EDC
7. T-101 EDC
8. C-203 Bottoms
9. T-103A EDC
10. P-110A Discharge
11. P-110B Discharge
12. P-110C Discharge
13. P-102A Discharge
14. P-102B Discharge
15. T-102 EDC
16. S-309 EDC
17. S-307 EDC
18. S-306 EDC
19. H-201A
20. H-201B
21. C-204 Make
22. Vaporizer Feed
23. S-102 pH
24. EDCTS Pumpout EDC
25. S-109 EDC
26. VTS Overhead
27. VTS Pumpout EDC

Status

Closed Loop Sample - Glove Box #1
Closed Loop Sample - Glove Box #1
Closed Loop Sample - Glove Box #1
Closed Loop Sample - Glove Box #2
Closed Loop Sample - Glove Box #2
Closed Loop Sample - Glove Box #2
Closed Loop Sample - Glove Box #2
Closed Loop Sample - Glove Box #1
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Closed Loop Sample - Glove Box #5
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Closed Loop Sample - Glove Box #5
Closed Loop Sample - Glove Box #5

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<u>Safety Relief Valve</u>	<u>Description</u>	<u>Status</u>
1. RV-101A (1)	F-101A	
2. RV-101B (1)	F-101B	
3. RV-102 (1)	R-103	
4. RV-103A	R-101	Installed RD-101
5. RV-104(1)	T-101	
6. RV-106C (1)	H-105A	
7. RV-106D (1)	H-105B	
8. RV-108A (1)	C-103	
9. RV-108B (1)	C-103	
10. RV-108C (1)	H-108A	
11. RV-108D (1)	H-108B	
12. RV-111	S-109	
13. RV-115	C-101	Installed RD-115
14. RV-115A	C-101A	Installed RD-115A
15. RV-118 (1)	S-103	
16. RV-125	BL-602	(2)
17. RV-126	BL-602	(2)
18. RV-127	BL-602	(2)
19. RV-128	BL-602	(2)
20. RV-129	BL-602	(2)
21. RV-130	BL-602	(2)
22. RV-131	BL-602	(2)
23. RV-132	BL-602	(2)
24. RV-133	BL-602	(2)
25. RV-134	BL-602	(2)
26. RV-135	BL-602	(2)
27. RV-136	BL-502	
28. RV-137	BL-502	(2)

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<u>Safety Relief Valve</u>	<u>Description</u>	<u>Status</u>
29. RV-138	BL-502	(2)
30. RV-139	BL-502	
31. RV-140	BL-502	(2)
32. RV-141	BL-502	
33. RV-147	BL-502	(2)
34. RV-148	BL-502	(2)
35. RV-149	BL-502	
36. RV-150	BL-502	
37. RV-155A/B	F-105A/B	
38. RV-162	P-109A	
39. RV-203(1)	H-213	
40. RV-206C	H-206A	
41. RV-206D	H-206B	
42. RV-213	H-212	Installed RD-213
43. RV-214	H-212	Installed RD-214
44. RV-230A	H-201A	Installed RD-230A
45. RV-230B	H-201B	Installed RD-230B
46. RV-231A	H-201A	Installed RD-231A
47. RV-231B	H-201B	Installed RD-231B
48. RV-240A (1)	S-312	(2)
49. RV-242	H-204	
50. RV-246	R-102	Insatllled RD-102
51. RV-315 (1)	S-215	(2)
52. RV-316	H-308	Installed RD-317
53. RV-318 (1)	H-306	
54. RV-415	P-405	
55. RV-453	F-102	(2)
56. RV-456	H-491	(2)
57. RV-457	H-491	(2)

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<u>Safety Relief Valve</u>	<u>Description</u>	<u>Status</u>
58. RV-458	H-491	(2)
59. RV-463	H-491	(2)
60. RV-464	BL-410 Intercooler	(2)
61. RV-465	BL-410 Intercooler	(2)
62. RV-466	BL-410 Receiver	(2)
63. RV-467	BL-410 Receiver	(2)
64. RV-468	BL-410 Oil Pot	(2)
65. RV-469	BL-410 Oil Pot	(2)
66. RV-505	S-505	
67. RV-497 (1)	BL-501	(2)
68. RV-600 (1)	T-506	(2)
69. RV-601 (1)	T-502	
70. RV-604 (1)	T-503	(2)
71. RV-605 (1)	T-504	(2)
72. RV-606 (1)	H-502	(2)
73. RV-607 (1)	H-501	(2)
74. RV-617 (1)	S-105B	
75. RV-618 (1)	S-105A	
76. RV-623	H-103	(2)
77. RV-631	H-611	
78. RV-644	C-102	
79. RV-656	S-460	(2)
80. RV-677	Tars Trailer	(2)
81. RV-702	T-461	
82. RV-904	T-902	
83. RV-106A	C-102	
84. RV-144	S-313	Removed from Service

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Notes:

- (1) Equipment requires extensive modifications or replacement to qualify as an offset.
- (2) Modification planned, class "A" process design, "VOC Regulation Compliance -- VCM Modernization" issued by Jeff McCrary, PED.

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Table 2. Equipment Fugitive Emission Factors

<u>Source</u>	<u>Average SOCM I Emission Factor Lb/Hr/ Source (1)</u>
Pumps - light liquid	0.1089
Valves - gas	0.0123 (2)
- light liquid	0.0157 (2)
Compressors	0.5026
Safety/Relief Valves - gas	0.2293
Sampling Connections	0.0330

Notes:

- (1) In an addendum (47FR 19724, May 7, 1982) to the Background Information Document (BID) (EPA-450/3-80-033a), the EPA issued these revised Synthetic Organic Chemical Manufacturing Industry (SOCMI) fugitive emission factors.
- (2) Use the appropriate valve emission factor for all new valves installed with an equipment modification to determine the net offset credit.

Maximum Emission Credit for Equipment Modification	-	Number of New Valves Added	x	Emission Factor for Valves in Either Liquid or Gas Service	=	Net Emission Offset Credit for the Equip- ment Modification
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TABLE 3
REVISED PROJECTED FUGITIVE EMISSIONS
FOR OXY MODERNIZATION AND PLANT EXPANSION

<u>Fugitive Emission Source</u>	<u>Number of Sources</u>	<u>Uncontrolled Emission Factor lb/hr</u>	<u>Total Uncontrolled Emissions lb/hr</u>	<u>Controlled Emission Factor</u>	<u>Total Controlled Emissions lb/hr</u>
New Pumps (Controlled) ²	2			0.00	0.00
New Relief Valves (Controlled) ²	6			0.00	0.00
New Non-Vinyl Compressors (Controlled) ²	3			0.00	0.00
<u>New Valves</u>					
<u>Plant Expansion (1)</u>					
Process Valves in Vapor Service	241	.0123	2.964		
Process Valves in Liquid Service	500	.0157	7.850		
Instrument Valves in Vapor Service	298	.0123	3.665		
Instrument Valves in Liquid Service	381	.0157	5.982		
Total	1,420		20.461		
<u>Oxy Modernization(2)</u>					
Process Valves in Vapor Service	107	.0123	1.316		
Process Valves in Liquid Service	98	.0157	1.539		
Instrument Valves in Vapor Service	185	.0123	2.276		
Instrument Valves in Liquid Service	43	.0157	0.675		
Total	433		5.806		

NOTES:

- 1) A definitive estimate of the entire expansion from PED.
- 2) A preliminary estimate of the oxychlorination revamp and direct chlorination modification from PED.
- 3) Estimated valve split for the entire expansion is 40% in vapor service and 60% in liquid service. Estimated valve split for the oxychlorination revamp and direct chlorination modification is 70% in vapor service and 30% in liquid service.