

AUG 23 1982

To J.C. Ledvina

Date 8/23/82

Returning this to you. We have discussed your point about admitting guilt in our writings. I agree you have a good point. We have taken action to keep that in mind in the future which should solve the problem.

VVC 000013912



RECEIVED

AUG 04 1982

Interoffice Communication

To J. W. Ware
From M. J. Marritt
Date July 28, 1982
Subject Evaluation of Incinerating DuPont
Heavy Chlorinated Hydrocarbons
REVISED ISSUE

ROUTE TO: _____

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FILE: LCV 111

Attached is an evaluation of firing DuPont Heavy Chlorinated Hydrocarbons in the VCM Plant incinerator. The evaluation has been updated since my letter of 3-26-82 to include the cost of a new storage tank, the cost of mixing the DuPont heavies with VCM Plant light ends, the additional maintenance cost for the primary incinerator firebox due to firing the heavies, and the environmental impact of incinerating the heavies.

The evaluation shows the incinerator capacity is sufficient to handle the increased load of firing DuPont heavies at the present time and after the plant modernization. However, present storage facilities are not satisfactory, therefore requiring a new storage tank and unloading facility. The economic evaluation projects the transfer prices required for a 30.0% DCF rate of return on the capital investment. The prices are preliminary estimates which may change with a more definitive cost estimate for the required capital. The prices range from 5.1 to 9.3 ¢/lb. DuPont heavies (1982 prices), depending on the option of feedstock and product usage. Table 1, below, shows a summary of the economic evaluation.

TABLE 1. REQUIRED TRANSFER PRICE

	<u>Sell 2.5MM lbs./yr. HCl (neutralize remainder)</u>	<u>Neutralize All The HCl Produced</u>
Base Case (4MM lbs./yr.)	5.1 ¢/lb.	9.3 ¢/lb.
CCl ₄ Case (5MM lbs./yr.)	5.3 ¢/lb.	8.6 ¢/lb.

The environmental impact of firing DuPont heavies in the VCM Plant incinerator affects several Federal and State environmental regulations, including the Resource Conservation and Recovery Act (RCRA), the Department of Transportation laws (DOT), and the National Emission Standard for Hazardous Air Pollutants for vinyl chloride (NESHAP). Both the RCRA and DOT regulations can be met by the VCM Plant. However, compliance with RCRA regulations will include submitting a new permit to the State for approval and changing several operating procedures at the incinerator such as increasing monitoring and recordkeeping.

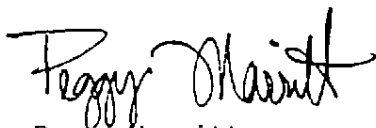
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In addition, firing the DuPont heavies could adversely affect the VCM Plant's compliance with NESHAP regulations. The NESHAP regulations limit and/or prohibit the discharge of vinyl chloride to the atmosphere, including by-passes of the plant's vents at the incinerator. The projected increase in maintenance downtime for the primary incinerator due to firing DuPont heavies will increase the likelihood of an incinerator by-pass. In addition, the load increase on the incinerator due to the DuPont heavies will decrease the extra capacity margin of the incinerator, which protects against an automatic shutdown of the incinerator during upset conditions in the plant. Therefore, the decreased capacity margin will also increase the VCM Plant's probability of NESHAP violations. Administrative action by the EPA is possible related to violations of the NESHAP regulations.

In summary, the VCM Plant incinerator has the capacity to fire DuPont heavies and with the addition of a storage tank and unloading station, the VCM Plant will have storage capabilities to fire DuPont heavies. However, because of the potential environmental impact of increasing NESHAP violations and the possibility of fines and penalties due to these violations, it is not recommended that DuPont Heavy Chlorinated Hydrocarbons be fired in the VCM Plant incinerator.

Attached is the detailed review of each factor considered in the evaluation stating the assumptions and conclusions. Two separate feedstocks were considered in the evaluation: a feedstock of 4MM lbs./yr. and a feedstock of 5MM lbs./yr. (the composition of both feedstocks is shown in Appendix A). The difference between the first feedstock and the second feedstock is an additional 1MM lbs./yr. of CCl_4 . The two feedstocks are referred to as the "base case" and the " CCl_4 Case", respectively.

If you have any questions or comments, please contact me at 5128.



Peggy Marritt
Process Engineer

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cc: JAD-RB-MLA-JRH-PLF-DLD-MGH-PE
JJH-JCL-CAG

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INCINERATOR CAPACITY

Assumptions

- 1) The DuPont heavies will not be available until 1984 or 1985.
- 2) The design combustion rate of the incinerator is 48MM BTU/hr. and the design combustion rate of the VCM Plants vents after the modernization is 32MM BTU/hr. Therefore, the maximum allowable duty from liquids firing is 16MM BTU/hr.
- 3) The DuPont heavies will be diluted on a 1:1 ratio with VCM Plant light ends to improve fluid flow capabilities and increase the BTU value of the firing liquid.
- 4) The heat of combustion of the base case mixture is 3513 BTU/lb. (3027 BTU/lb. DuPont heavies and 4000 BTU/lb. light ends).
- 5) The heat of combustion of the CCl_4 case mixture is 3317 BTU/lb. (2635 BTU/lb. DuPont heavies and 4000 BTU/lb. light ends).
- 6) The maximum capacity of the Combustion Air Blower, BL-901, is 10,400 dry SCFM at 95°F and a rated motor horsepower of 250 (per 1981 CED test run).
- 7) The DuPont heavies will be fired only in the primary incinerator train.

Conclusions - Base Case

- 1) The maximum allowable flowrate of the base case mixture (DuPont heavies plus light ends) is 4554 lbs./hr.
- 2) The base case mixture must be fired at least 1757 hrs./yr. (at the maximum firing rate) to consume the 4MM lbs./yr. DuPont heavies or 21.8% of the primary incinerator operating time. Lower firing rates and increased firing time, however, may be chosen as the actual operating conditions.
- 3) The combustion air flowrate required to fire the base case mixture along with the plant's vents is 5653 SCFM. Therefore, BL-901 has sufficient capacity. However, the extra capacity margin (up to 10,400 SCFM) before an automatic shutdown of BL-901 due to high amperage is reduced by 19.3%.

Conclusions - CCl_4 Case

- 1) The maximum allowable flowrate of the CCl_4 case mixture (DuPont heavies plus light ends) is 4824 lbs./hr.
- 2) The CCl_4 case mixture must be fired at least 2073 hrs./yr. (at the maximum firing rate) to consume the 5MM lbs./yr. DuPont heavies or 25.8% of the primary incinerator operating time. Lower firing rates and increased firing time, however, may be chosen as the actual operating conditions.
- 3) The combustion air flowrate required to fire the CCl_4 case mixture along with the plant's vents is 5629 SCFM. Therefore, BL-901 has sufficient capacity. However, the extra capacity margin (up to 10,400 SCFM) before an automatic shutdown of BL-901 due to high amperage is reduced by 18.9%.

STORAGE LOCATION

Assumptions

- 1) Existing Tars Storage Tank, T-405, currently used to store VCM Plant EDC and VCM Heavy Ends, cannot be used to store DuPont heavies due to the probability of contaminating the DuPont heavies with sodium salts.
- 2) Existing Wet Crude EDC Storage Tank, T-452, is presently not being used. However, it is used during periods of inventory problems with the VCM Plant Heavy Ends and therefore cannot be dedicated solely for storing DuPont heavies.
- 3) Existing Liquids Fuel Tank, T-902, has a maximum capacity of 15,228 gallons equivalent to only four tank truck loads of DuPont heavies. T-902 cannot be used to store DuPont heavies because it will be necessary to have T-902 available for storing only light ends until the ability to make saleable muriatic acid with DuPont heavies and light ends can be determined. In addition, after the testing is completed, T-902 will be used for mixing the DuPont heavies with the light ends before firing.

Conclusions - Base Case and CCl₄ Case

- 1) A new storage tank for storing DuPont heavies and the associated tank vent piping will be required.
- 2) The new tank will be a 420,000 gallon cone roof tank (42.5' diameter by 40' high, approximately the size of T-452) and will be located south of T-451 in the main plant tank farm. The vent piping will tie into the existing tank farm blowers. The estimated total installed cost is \$100,000 (per order of magnitude estimate by JRH).

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TRANSPORATION AND UNLOADING FACILITIES

Assumptions

- 1) The DuPont heavies cannot be unloaded by ship or barge at the VCM Plant because of the unavailability of existing loading/unloading stations at the dock. In addition, the cost of new facilities would be prohibitive.
- 2) The DuPont heavies cannot be unloaded by railcar at the VCM Plant because severe scheduling problems would result at the EDC railcar station (Track 4, Spot 2) due to transfers of both caustic and EDC at the EDC railcar station.

Conclusions - Base Case and CCl₄ Case

- 1) The DuPont heavies will be transported and unloaded by tank truck.
- 2) A new unloading station and transfer line (pump and associated piping) will be required. The new transfer line will tie into the existing light ends transfer line to the incinerator. The estimated installed cost is \$22,000 (per order of magnitude estimate by JRH).

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ECONOMIC EVALUATION

Assumptions

- 1) The heat of combustion from the liquids firing will be sufficient for the pilot flame (minimum of 2.4MM BTU/hr.) thereby eliminating the use of natural gas (approximately 5500 SCFH).
- 2) An increase of 6078 lbs./hr. 250 psig steam for the base case mixture and the CCl_4 case mixture will be claimed as a savings per the projected steam balance after the plant modernization.
- 3) The light ends used for diluting the DuPont heavies will be accounted for as a lost sales. Note: if a higher priced outlet is found for the light ends (greater than Vulcan's price of .75 ¢/lb), the incremental sales price above the .75 ¢/lb. will be added directly to the calculated transfer price for the DuPont heavies since the dilution ratio is 1:1. e.g., if 3.5¢/lb. could be obtained for light ends, the transfer price for the base case with acid sales would be 7.85 ¢/lb. ($5.1 + 3.5 - .75 = 7.85$).
- 4) The SO_2 and 10% caustic usage will increase by the same amount as seen when burning VCM Plant light ends.
- 5) Only two options exist for the HCl produced in the incinerator due to firing DuPont heavies.
 - a) Selling 2.5MM lbs./yr. 27% muriatic acid and neutralizing the remainder of the HCl produced.
 - b) Neutralizing all the HCl produced.

Note:

The third option of purifying the muriatic acid and concentrating to 31.5%, thereby allowing all the HCl produced to be sold rather than neutralized, was not considered because the Carbon Bed Project for muriatic acid quality improvement has not been approved and the quality of the 31.5% acid to be produced with the heavies after installation of the carbon bed is unknown.

- 6) The annual maintenance cost for the firebox in the primary train will increase due to firing the DuPont heavies. The \$95,900 maintenance value used in the economics is based on the actual maintenance cost increase for the primary incinerator firebox in 1982 as compared to 1981 with the costs adjusted to the annual operating time for the primary train in both years. (a mixture of VCM Plant light ends and heavy ends have been fired at the incinerator an average of 13 days per month in 1982 while only a minimal amount of light ends were fired in 1981 for test purposes).
- 7) There will be no increase in metals concentration in the effluent to the LCCP wastewater treatment facility from the incinerator wastewater. This assumption is based on lack of definite data.
- 8) DuPont will pay freight and provide tank trucks and drivers.

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Economic Evaluation (continued)

- 9) A 30.0% DCF rate of return over a ten year project life is required to pay out the new storage tank, unloading station, and associated vent and transfer piping. (\$122,000 capital investment).
- 10) Current costs (1982 IPA figures) and 1982 capital budget cost projections were used in the economic evaluation to provide greater accuracy and to keep the prices in equivalent 1982 dollars although the DuPont heavies will not be available until 1984 or 1985.

Conclusions - Base Case

- 1) At 5.1 ¢/lb. base case DuPont heavies, there is a 30.0% DCF rate of return with a payout period of 5.0 years for selling 2.5MM lbs./yr. HCl and neutralizing the remainder.
- 2) At 9.3 ¢/lb. base case DuPont heavies, there is a 30.0% DCF rate of return with a payout period of 3.9 years for neutralizing all the HCl produced.

Conclusions - CCl₄ Case

- 1) At 5.3 ¢/lb. CCl₄ case DuPont heavies, there is a 30.0% DCF rate of return with a payout period of 4.8 years for selling 2.5MM lbs./yr. HCl and neutralizing the remainder.
- 2) At 8.6 ¢/lb. CCl₄ case DuPont heavies, there is a 30.0% DCF rate of return with a payout period of 3.7 years for neutralizing all the HCl produced.

Summary of Cost Evaluation Required Transfer Price to be Received From DuPont

	<u>Sell 2.5MM Lbs./Yr. HCl (neutralize remainder)</u>	<u>Neutralize All the HCl</u>
Base Case (4MM lbs/yr)	5.1 ¢/lb.	9.3 ¢/lb.
CCl ₄ Case (5MM lbs/yr)	5.3 ¢/lb.	8.6 ¢/lb.

(See Appendix B for DCF Printouts)

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ENVIRONMENTAL IMPACT

Assumptions

- 1) All Resource Conservation and Recovery Act (RCRA) and State of Louisiana requirements for a hazardous waste incinerator can be met by the VCM Plant including:
 - a) required permit changes. At the present time, the extent of the changes required for the RCRA permit are unknown but range from a simple modification of the permit to a full scale resubmittal of the permit for State approval.
 - b) required modifications in operating procedures such as increased monitoring, 99.99% efficiency, etc.
- 2) All Department of Transportation (DOT) requirements for transporting a hazardous waste can be met by the VCM Plant or DuPont including:
 - a) manifesting the waste - VCM Plant and DuPont.
 - b) obtaining hazardous waste identification numbers for the wastes - DuPont.
 - c) obtaining transporter identification numbers from the State of Texas and the State of Louisiana - DuPont.
- 3) The annual maintenance downtime for the primary incinerator will severely increase due to the additional load of firing the DuPont heavies. This assumption is based on actual records of maintenance downtime for the primary incinerator as compared to the standby incinerator in 1981 and 1982 which show the primary incinerator's maintenance downtime in 1981 was only slightly greater than the standby incinerator's downtime. However, in 1982 the primary incinerator's maintenance downtime increased significantly over the standby incinerator's downtime. Again, note that VCM Plant light ends and heavy ends were fired for an average of 13 days per month in 1982.
- 4) Incinerator by-passes are violations of the National Emission Standard for Hazardous Air Pollutants for vinyl chloride (NESHAP) and can be subject to EPA enforcement action.

Conclusions - Base Case and CCl₄ Case

- 1) DuPont heavies should not be fired in the VCM Plant Incinerator. The increased downtime of the primary incinerator will require increased operation of the standby incinerator with no back-up. In addition, the extra capacity margin of the primary incinerator will be reduced when firing DuPont heavies. Therefore, the probability and frequency of NESHAP violations will increase.

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APPENDIX A

<u>Component</u>	<u>Composition of Base Case Feedstock Weight % (1)</u>	<u>Composition of CCl₄ Case Feedstock Weight % (1)</u>
C ₂ HCl ₃	12.8	10.2
C ₂ Cl ₄	8.8	7.0
C ₂ Cl ₆	18.4	14.7
C ₂ HCl ₅	15.7	12.6
1,1,2 C ₂ H ₃ Cl ₃	12.5	10.0
1,1,1,2 C ₂ H ₂ Cl ₄	3.3	2.6
1,1,2,2 C ₂ H ₂ Cl ₄	6.5	5.2
C ₃ H ₃ Cl ₃	1.6	1.3
C ₃ H ₂ Cl ₄	1.3	1.0
C ₃ H ₄ Cl ₂	0.3	0.2
C ₄ 's	18.8	15.0
CCl ₄	0	20.0

(1) up to 1% hexachlorobutadiene
up to 1% hexachlorobenzene

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DETERMINATION OF THE POLYMERIZATION OF 2,4-DINITROPHENOL

(f) STRAIGHT LINE

Country	1	2	3	4	5	6	7	8	9	10
1. Argentina	370.0	370.0	370.0	370.0	370.0	370.0	370.0	370.0	370.0	370.0
2. Australia	38.9	40.4	41.9	43.4	44.9	46.4	47.9	49.4	50.9	52.4
3. Austria	45.5	46.4	47.3	48.2	49.1	50.0	50.9	51.8	52.7	53.6
4. Belgium	471.2	485.8	496.8	504.6	509.7	513.8	516.9	519.0	520.1	521.2
5. Canada	4.2	5.2	5.6	6.0	6.4	6.8	7.2	7.6	8.0	8.4
6. Denmark	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2
7. France	6.4	7.6	7.7	8.1	8.5	8.9	9.3	9.7	10.1	10.5
8. Germany	46.9	48.2	49.7	51.1	52.6	54.1	55.6	57.1	58.6	60.1
9. Greece	190.9	202.4	229.1	252.0	271.9	289.8	305.7	320.6	335.5	350.4
10. India	30.0	30.0	34.0	38.0	42.0	46.0	50.0	54.0	58.0	62.0
11. Italy	5.0	10.0	15.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
12. Japan	1.0	1.1	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
13. Korea	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0	34.0	36.0
14. Mexico	394.7	435.3	466.9	500.5	534.1	567.7	601.3	634.9	668.5	702.1
15. Netherlands	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3
16. New Zealand	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
17. Norway	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
18. Sweden	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0
19. Switzerland	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
20. Taiwan	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
21. United Kingdom	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
22. United States	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
23. USSR	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
24. Yugoslavia	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9

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UNITED STATES GOVERNMENT

OFFICE OF THE SECRETARY OF DEFENSE

DEFENSE PROGRAMS AND ACTIVITIES

Activity	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Research and Development	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Production	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Procurement	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Operations and Maintenance	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Disposal	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Construction	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Transportation	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Communications	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Medical	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Education	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Personnel	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Food and Clothing	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Other	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Total	12,000.0	12,000.0	12,000.0	12,000.0	12,000.0	12,000.0	12,000.0	12,000.0	12,000.0	12,000.0	12,000.0

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DEFENSE PROGRAMS AND ACTIVITIES

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UNITED STATES BUREAU OF MINES

REPORT OF INVESTIGATION NO. 10000

MINERAL RESOURCES OF THE UNITED STATES

UNITED STATES	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Production	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Consumption	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Stockpile	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Imports	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Exports	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Production	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Consumption	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Stockpile	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Imports	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0
Exports	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0

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WASHINGTON, D. C. 20540

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