Delta Energy Center; Plant #12095
1200 Arcy Lane, Pittsburg CA 94565

BACKGROUND

The Delta Energy Center (DEC) is applying for the following changes to the permit conditions governing their gas turbines.

- DEC is requesting an increase in the gas turbine start-up mass emission rates to account for the extended duration of cold* steam turbine start-ups which can take up to six hours (360 minutes). Under the current permit conditions, cold gas turbine start-ups are limited to 180 minutes.

- DEC is requesting the exclusion of gas turbine combustor tuning activities from the BACT emission rate limits governing baseload gas turbine operation. The exclusion would apply to combustor tuning activities that occur after the periodic replacement of combustor parts under routine maintenance. After approximately 10,000 firing hours, selected components of the gas turbine combustors must be replaced as recommended maintenance. After the new parts are installed, the turbine combustors must be tuned at various speeds and load levels. During this tuning, the turbine is held at various operating points for several minutes at a time. The turbine does not comply continuously with the CO and NOx emission limitations while it is being tuned.

*cold steam turbine start-ups occur after the steam turbine has been down for more than 72 hours

The proposed changes will not require any increases in facility daily emissions since the operator will still comply with the requirement that only one turbine can be in start-up mode at any one time. The proposed changes will not result in any increase in annual mass emission rates since the steam turbine cold starts will occur only a few times per year and combustor tuning episodes will only occur every 10,000 firing hours for each gas turbine. Therefore, no offsets will be required. However, the increases in gas turbine start-up emission rates for NOx and CO trigger PSD modeling to determine the 1-hr NOx and 1-hr & 8-hr CO impacts of the revised operating profile of the DEC.

CRITERIA-POLLUTANT EMISSION SUMMARY

Annual Average Project Emissions Increase:

Pollutant	lb/day	ton/yr
POC	0	0
NO_x	0	0
SO_2	0	0
CO	0	0
PM_{10}	0	0
NPOC	0	0

Daily Maximum Emissions by Source (lb/day):

As stated earlier, there will be no increase in maximum daily mass emissions for any pollutants for the gas turbines as a result of the proposed changes in permit conditions. Although the gas turbine start-up emission rates will increase when the steam turbine is "cold" (ie has been down for more than 72 hours), the existing daily combined mass limits for the gas turbines will not be exceeded since they are based upon the "worst-case" emission scenario wherein all three turbines will be started in one day. The owner/operator will manage the start-up of the gas turbines so that the daily limits are not exceeded.

PERMIT CONDITION CHANGES

S-3, S-5, & S-7 Gas Turbines

Under the current definition established when the DEC was originally permitted, the duration of a cold gas turbine start-up is limited to 180 minutes. The term "cold gas turbine start-up" is a misnomer since the controlling factor in the duration of a gas turbine start-up is the temperature of the steam turbine and not the gas turbine. If the steam turbine is down for more than 72 hours, then its components must be brought up to temperature slowly to control the rate of thermal expansion of those components.

During the original permitting of the DEC, Calpine assumed that true "cold" steam turbine start-ups, which can last up to 360 minutes, would not occur because they expected at least one turbine to be in operation virtually year round to satisfy expected demand. Therefore, they did not expect the steam turbine to be down for more than 72 hours. However, they have experienced cold steam turbine start-ups which have required start-ups in excess of 180 minutes in accordance with steam turbine manufacturer's (Toshiba) recommendations.

The gas turbine start-up limits will be modified as shown in part 23 of condition 17154:

23. The regulated air pollutant mass emission rates from each of the Gas Turbines (S-1, S-3, and S-5) during a start-up or a shutdown, or during a combustor tuning period shall not exceed the limits established below. (PSD)

	Start-Up (lb/start-up)	Shutdown (lb/shutdown)	Steam Turbine Cold Start-up or Combustor Tuning Period (lb/start-up or lb/period)
Oxides of Nitrogen (as NO_2)	240	80	300
Carbon Monoxide (CO)	2,514	902	9,750
Precursor Organic Compounds (as CH_4)	48	16	96

The following definition of steam turbine cold start-up, combustor tuning activities, and combustor tuning period will be added to the permit conditions.

Steam Turbine Cold Start-up: The lesser of the first 360 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated or the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of conditions 22(b) and 22(d), following a steam turbine shutdown of at least 72 hours.

Combustor Tuning Activites:	All testing, adjustment, tuning, and calibration activities recommended by the gas turbine manufacturer to insure safe and reliable steady-state operation of the gas turbines following replacement of the combustor. This includes, but is not limited to, adjusting the amount of fuel distributed between the combustion turbine's staged fuel systems to simultaneously minimize NOx and CO production while minimizing combustor dynamics and ensuring combustor stability.
Combustor Tuning Period:	The cumulative period, not to exceed 360 minutes, during which combustor tuning activities are taking place

FACILITY CUMULATIVE INCREASE
(since April 5, 1991)

As stated earlier, the proposed permit condition changes will not result in any increase in facility annual emissions. Therefore, there will be no change in the facility cumulative increase.

TOXIC RISK SCREENING ANALYSIS

Because the proposed permit condition changes will not result in any increase in annual toxic air contaminant emissions from any source at the DEC facility, no toxic risk screening is required.

BACT ANALYSIS

Because the proposed permit condition changes will not result in any increase in daily or annual emissions from any source at the DEC facility, the BACT provision of NSR does not apply.

OFFSET ANALYSIS

Because the proposed permit condition changes will not result in any increase in facility annual criteria pollutant emissions, the offset provisions of NSR do not apply.

PSD AIR QUALITY IMPACT ANALYSIS

When the DEC was originally permitted, the short-term air quality impacts during gas turbine start-up periods was modeled to comply with the District PSD regulations. Although PSD delegation was recently revoked by EPA, the District regulations still contain the PSD modeling requirements. Therefore, the 1-hr NOx and 1-hr & 8-hr CO impacts of the DEC during start-up must be remodeled to reflect the increases in short-term NOx and CO emission rates. EPA Region IX will issue the revised PSD permit.

The changes in gas turbine start-up emission rates are shown in the following table:

Current and Proposed Emission Rate Limits during Steam Turbine Cold Start-up and Combustor Tuning

	NOx		CO		POC	
Operating Mode	Current	Proposed	Current	Proposed	Current	Proposed
Steam Turbine Cold Start-up or Combustor Tuning (lb/hr)	80	120	838	3,700	16	16
Steam Turbine Cold Start-up or Combustor Tuning (lb/period)	240	300	2,514	9,750	48	96

Because the SCR systems will be in operation during the steam turbine cold start-ups and combustor tuning, the percentage increase in NOx emissions is much less than the percentage increase in CO emissions.

The results of the revised modeling are shown below.

California and National Ambient Air Quality Standards and
Ambient Air Quality Levels from the Proposed Project ($\mu g/m^3$)

Pollutant	Averaging Time	Maximum Background	Maximum Project impact	Maximum Project impact plus maximum background	California Standards	National Standards
NO_2	1-hour	164	185	349	470	---
CO	1-hour	7,130	5,085	12,215	23,000	40,000
CO	8-hour	4,375	633	5,008	10,000	10,000

As shown, the maximum project impacts resulting from the increased gas turbine NOx and CO emission rates during start-up and combustor tuning will not result in the exceedance of any applicable state or federal ambient air quality standards.

Pursuant to BAAQMD Regulation 2-2-414.1, the applicant has submitted a modeling analysis that adequately estimates the revised air quality impacts of the DEC project. The applicant's analysis was based on EPA-approved models and was performed in accordance with District Regulation 2-2-414.

Pursuant to Regulation 2-2-414.2, the District has found that the modeling analysis has demonstrated that the proposed emission increases from the DEC facility, in conjunction with all other applicable emissions, will not cause or contribute to a violation of applicable ambient air quality standards for NO_2 and CO or an exceedance of any applicable PSD increment.

Please see appendix A for further detail regarding the PSD air quality impact analysis.

TITLE IV/V OPERATING PERMIT ANALYSIS

Pursuant to Regulation 2-6-226.6, the proposed changes in gas turbine start-up emission rates, allowance for combustor tuning, and related changes in permit conditions constitute significant permit revisions for the purposes of Title V permitting since they trigger case-by-case determinations relative to the air quality impact analysis requirements of PSD. Consequently, the public notice and public comment requirements of Regulation 2-6-412 must be fulfilled prior to the issuance of the revised Title V permit for the facility.

FEE SUMMARY

Source	Filing Fee[a]	Major Facility Review Permit Revision Fee[b]	Permit to Operate Fee	Sub-Total
S-1 Gas Turbine	$250.00	$150.00	$0.00	$400.00
S-3 Gas Turbine	$0.00	$150.00	$0.00	$150.00
S-5 Gas Turbine	$0.00	$150.00	$0.00	$150.00
			Grand Total	**$700.00**
			Amount Paid	**$700.00**
			Amount Due	**$0.00**
			Log Number	**H959W**

[a]per Regulation 3-306.1, administrative permit condition changes shall be subject to a filing fee for a single source

[b]per Regulation 3, Schedule P, part 6

STATEMENT OF COMPLIANCE

S-1, S-3, and S-5 Gas Turbines are expected to continue to comply all applicable District, State, and Federal regulations and District permit conditions. As discussed earlier, the proposed increases in gas turbine start-up emission rates complies with the air quality impact analysis requirements of PSD.

This project is **categorically exempt** from District CEQA Regulation 2-1-311 pursuant to Regulation 2-1-312.11 (Permit applications for a new/modified source(s) or for process changes which will satisfy the "No Net Emission Increase" provisions of Regulation 2, Rule 2, and for which there is no possibility that the project may have any significant environmental effect in connection with any environmental media or resources other than air quality) and therefore is not subject to CEQA review.

The DEC facility is **not** located within 1000 feet of the outer boundary of a K-12 school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

A Toxics Risk Screening Analysis is not required due to the proposed changes in permit conditions because there will be no resulting increase in toxic air contaminant emissions from the DEC facility. TBACT does not apply to this project.

The proposed emission rate changes and permit condition changes do not trigger new reviews of the BACT, Offsets, PSD, NSPS, and NESHAPS regulations.

PERMIT CONDITIONS

Permit condition #17154 will be modified as shown below:

Conditions for
S-1, S-3, & S-5 Gas Turbines, S-2, S-4, & S-6 HRSGs, and S-9 Cooling Tower

Definitions:

Hour:	Any continuous 60-minute period
Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours.
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf.
Rolling 3-hour period:	Any three-hour period that begins on the hour and does not include start-up or shutdown periods.
Firing Hours:	Period of time during which fuel is flowing to a unit, measured in fifteen minute increments.
MM BTU:	million British thermal units
Gas Turbine Start-up Mode:	The lesser of the first 180 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated or the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of parts 22(b) and 22(d).
Steam Turbine Cold Start-up:	The lesser of the first 360 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated or the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of conditions 22(b) and 22(d), following a steam turbine shutdown of at least 72 hours.
Gas Turbine Shutdown Mode:	The lesser of the 30-minute period immediately prior to the termination of fuel flow to the Gas Turbine or the period of time from non-compliance with any requirement listed in parts 22(b) through 22(d) until termination of fuel flow to the Gas Turbine.
Specified PAHs:	The polycyclic aromatic hydrocarbons listed below shall be considered Specified PAHs for these permit conditions. Any emission limits for Specified PAHs refer to the sum of the emissions for all six of the following compounds. Benzo[a]anthracene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Dibenzo[a,h]anthracene Indeno[1,2,3-cd]pyrene
Corrected Concentration:	The concentration of any pollutant (generally NO_x, CO, or NH_3) corrected to a standard stack gas oxygen concentration. For emission point P-1 (S-1 Gas Turbine and S-2 HRSG), emission point P-2 (S-3 Gas Turbine and S-4 HRSG), and emission point P-3 (S-5 Gas Turbine and S-6 HRSG) the standard stack gas oxygen concentration is 15% O_2 by volume on a dry basis.
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the DEC construction contractor to insure safe and reliable steady state operation of the gas turbines, heat

	recovery steam generators, steam turbine, auxiliary boiler, and associated electrical delivery systems.
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when a gas turbine is first fired, whichever occurs first. The period shall terminate when the plant has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange. The commissioning period shall not exceed 180 days under any circumstances.
Combustor Tuning Activites:	All testing, adjustment, tuning, and calibration activities recommended by the gas turbine manufacturer to insure safe and reliable steady-state operation of the gas turbines following replacement of the combustor. This includes, but is not limited to, adjusting the amount of fuel distributed between the combustion turbine's staged fuel systems to simultaneously minimize NOx and CO production while minimizing combustor dynamics and ensuring combustor stability.
Combustor Tuning Period:	The cumulative period, not to exceed 360 minutes, during which combustor tuning activities are taking place
Precursor Organic Compounds (POCs):	Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate
CEC CPM:	California Energy Commission Compliance Program Manager
DEC:	Delta Energy Center

Conditions for the Commissioning Period

1. The owner/operator of the Delta Energy Center (DEC) shall minimize emissions of carbon monoxide and nitrogen oxides from S-1, S-3, & S-5 Gas Turbines and S-2, S-4, & S-6 Heat Recovery Steam Generators (HRSGs) to the maximum extent possible during the commissioning period. Parts 1 through 13 shall only apply during the commissioning period as defined above. Unless otherwise indicated, parts 14 through 59 shall apply after the commissioning period has ended. (PSD for NOx and CO)

2. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the combustors of S-1, S-3, & S-5 Gas Turbines, and S-2, S-4, & S-6 Heat Recovery Steam Generators, shall be tuned to minimize the emissions of carbon monoxide and nitrogen oxides. (PSD for NOx and CO)

3. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the A-1, A-2, and A-3 SCR Systems shall be installed, adjusted, and operated to minimize the emissions nitrogen oxides from S-1, S-3, & S-5 Gas Turbines and S-2, S-4, & S-6 Heat Recovery Steam Generators. (PSD for NOx and CO)

4. Coincident with the steady-state operation of A-1, A-2, & A-3 SCR Systems pursuant to parts 3, 8, 9, and 10, the Gas Turbines (S-1, S-3, & S-5) and the HRSGs (S-2, S-4, & S-6) shall comply with the NO_x emission limitations specified in parts 22(a) and 22(b). (BACT)

5. The owner/operator of the DEC shall submit a plan to the District Permit Services Division and the CEC CPM at least four weeks prior to first firing of S-1, S-3, or S-5 Gas Turbines describing the procedures to be followed during the commissioning of the turbines, HRSGs, and steam turbine. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the Dry-Low-NO_x combustors, the installation and operation of the SCR systems and oxidation catalysts, the installation, calibration, and testing of the CO and NO_x continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-1, S-3, & S-5) and, HRSGs (S-2, S-4, & S-6), without abatement by their respective SCR Systems. (PSD for NOx and CO)

6. During the commissioning period, the owner/operator of the DEC shall demonstrate compliance with parts 8 through 10 and part 12 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:

   firing hours
   fuel flow rates
   stack gas nitrogen oxide emission concentrations,
   stack gas carbon monoxide emission concentrations
   stack gas oxygen concentrations.

   The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbines (S-1, S-3, & S-5) and HRSGs (S-2, S-4, & S-6). The owner/operator shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to District personnel upon request. (BACT, offsets)

7. The District-approved continuous monitors specified in part 6 shall be installed, calibrated, and operational prior to first firing of the Gas Turbines (S-1, S-3, & S-5) and Heat Recovery Steam Generators (S-2, S-4, & S-6). After first firing of the turbines, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the resulting range of CO and NO_x emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval. (BACT, offsets)

8. The total number of firing hours of S-1 Gas Turbine and S-2 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-1 SCR System shall not exceed 300 hours during the commissioning period. Such operation of S-1 Gas Turbine and S-2 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed

without the SCR system in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire. (PSD for NOx and CO)

9. The total number of firing hours of S-3 Gas Turbine and S-4 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-3 SCR System shall not exceed 300 hours during the commissioning period. Such operation of S-3 Gas Turbine and S-4 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire. (PSD for NOx and CO)

10. The total number of firing hours of S-5 Gas Turbine and S-6 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-3 SCR System shall not exceed 300 hours during the commissioning period. Such operation of S-3 Gas Turbine and S-4 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 300 firing hours without abatement shall expire. (PSD for NOx and CO)

11. The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM_{10}, and sulfur dioxide that are emitted by the Gas Turbines (S-1, S-3, & S-5) and Heat Recovery Steam Generators (S-2, S-4, & S-6) during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in part 37. (offsets)

12. Combined pollutant mass emissions from the Gas Turbines (S-1, S-3, & S-5) and Heat Recovery Steam Generators (S-2, S-4, & S-6) shall not exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-1, S-3, & S-5). (PSD for NOx and CO)

NO_x (as NO_2)	5,266 pounds per calendar day	400.4 pounds per hour
CO	16,272 pounds per calendar day	1,192 pounds per hour
POC (as CH_4)	686 pounds per calendar day	
PM_{10}	756 pounds per calendar day	
SO_2	82.5 pounds per calendar day	

13. Prior to the end of the Commissioning Period, the Owner/Operator shall conduct a District and CEC approved source test using external continuous emission monitors to determine compliance with part 23. The source test shall determine NO_x, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods. Twenty calendar days before the execution of the source tests, the Owner/Operator shall submit to the District and the CEC Compliance Program Manager (CPM) a detailed source test plan designed to satisfy the requirements of this condition. The District and the CEC CPM will notify the

Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CEC CPM comments into the test plan. The Owner/Operator shall notify the District and the CEC CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CEC CPM within 30 days of the source testing date. (PSD for NOx and CO)

Conditions for the Gas Turbines (S-1, S-3, & S-5) and the Heat Recovery Steam Generators (HRSGs; S-2, S-4, & S-6).

14. The Gas Turbines (S-1, S-3, and S-5) and HRSG Duct Burners (S-2, S-4, and S-6) shall be fired exclusively on natural gas with a maximum sulfur content of 0.25 grain per 100 standard cubic feet. (BACT for SO_2 and PM_{10})

15. The combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-1 & S-2, S-3 & S-4, and S-5 & S-6) shall not exceed 2,125 MM BTU per hour, averaged over any rolling 3-hour period. (PSD for NO_x)

16. The combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-1 & S-2 and S-3 & S-4) shall not exceed 50,024 MM BTU per calendar day. (PSD for PM_{10})

17. The combined cumulative heat input rate for the Gas Turbines (S-1, S-3, & S-5) and the HRSGs (S-2, S-4, & S-6) shall not exceed 53,188,532 MM BTU per year. (Offsets)

18. The HRSG duct burners (S-2, S-4, and S-6) shall not be fired unless its associated Gas Turbine (S-1, S-3, and S-5, respectively) is in operation. (BACT for NO_x)

19. S-1 Gas Turbine and S-2 HRSG shall be abated by the properly operated and properly maintained A-1 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-1 catalyst bed has reached minimum operating temperature. (BACT for NO_x)

20. S-3 Gas Turbine and S-4 HRSG shall be abated by the properly operated and properly maintained A-2 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-2 catalyst bed has reached minimum operating temperature. (BACT for NO_x)

21. S-5 Gas Turbine and S-6 HRSG shall be abated by the properly operated and properly maintained A-3 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-3 catalyst bed has reached minimum operating temperature. (BACT for NO_x)

22. The Gas Turbines (S-1, S-3, & S-5) and HRSGs (S-2, S-4, & S-6) shall comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode and steam injection power augmentation mode. Requirements (a) through (h) do not apply during a gas turbine start-up or shutdown, a steam turbine cold start-up, or a gas turbine combustor tuning period. (BACT, PSD, and Toxic Risk Management Policy)

(a) Nitrogen oxide mass emissions (calculated as NO_2) at P-1 (the combined exhaust point for the S-1 Gas Turbine and the S-2 HRSG after abatement by A-1 SCR System) shall not exceed 19.2 pounds per hour or 0.00904 lb/MM BTU (HHV) of natural gas fired. Nitrogen oxide mass emissions (calculated as NO_2) at P-2 (the combined exhaust point for the S-3 Gas Turbine and the S-4 HRSG after abatement by A-3 SCR System) shall not exceed 19.2 pounds per hour or 0.00904 lb/MM BTU (HHV) of natural gas fired. Nitrogen oxide mass emissions (calculated as NO_2) at P-3 (the combined exhaust point for the S-5 Gas Turbine and the S-6 HRSG after abatement by A-3 SCR System) shall not exceed 19.2 pounds per hour or 0.00904 lb/MM BTU (HHV) of natural gas fired. (PSD for NO_x)

(b) The nitrogen oxide emission concentration at emission points P-1, P-2, and P-3 each shall not exceed 2.5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (BACT for NO_x)

(c) Carbon monoxide mass emissions at P-1, P-2, and P-3 each shall not exceed 0.022 lb/MM BTU (HHV) of natural gas fired or 46.75 pounds per hour, averaged over any rolling 3-hour period. If compliance test results or continuous emissions monitoring data indicate that this level cannot be achieved during power steam augmentation operations, the owner/operator may seek approval for a higher CO mass emission limit for this operating mode, not to exceed 113.7 pounds per hour or 0.0535 lb/MM BTU of natural gas fired. (PSD for CO)

(d) The carbon monoxide emission concentration at P-1, P-2, and P-3 each shall not exceed 10 ppmv, on a dry basis, corrected to 15% O_2, averaged over any rolling 3-hour period. If compliance test results or continuous emissions monitoring data indicate that this level cannot be achieved during power steam augmentation operations, the owner/operator may seek approval for a higher CO emission limit for this operating mode, not to exceed 24.3 ppmv, on a dry basis, corrected to 15% O_2, averaged over any rolling 3-hour period. (BACT for CO)

*(e) Ammonia (NH_3) emission concentrations at P-1, P-2, and P-3 each shall not exceed 10 ppmv, on a dry basis, corrected to 15% O_2, averaged over any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to A-1, A-2, and A-3 SCR Systems. The correlation between the gas turbine and HRSG heat input rates, A-1, A-2, and A-3 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1, P-2, and P-3 shall be determined in accordance with part #42. (TRMP for NH_3)

(f) Precursor organic compound (POC) mass emissions (as CH_4) at P-1, P-2, and P-3 each shall not exceed 5.33 pounds per hour or 0.00251 lb/MM BTU of natural gas fired. (BACT)

(g) Sulfur dioxide (SO_2) mass emissions at P-1, P-2, and P-3 each shall not exceed 1.49 pounds per hour or 0.0007 lb/MM BTU of natural gas fired. (BACT)

(h) Particulate matter (PM_{10}) mass emissions at P-1, P-2, and P-3 each shall not exceed 9 pounds per hour or 0.00424 lb/MM BTU of natural gas fired. (BACT)

23. The regulated air pollutant mass emission rates from each of the Gas Turbines (S-1, S-3, and S-5) during a start-up or a shutdown, or during a combustor tuning period shall not exceed the limits established below. (PSD)

	Start-Up (lb/start-up)	Shutdown (lb/shutdown)	Steam Turbine Cold Start-up or Combustor Tuning Period (lb/start-up or lb/period)
Oxides of Nitrogen (as NO_2)	240	80	300
Carbon Monoxide (CO)	2,514	902	9,750
Precursor Organic Compounds (as CH_4)	48	16	96

24. No more than one of the Gas Turbines (S-1, S-3, and S-5) shall be in start-up mode, supporting a steam turbine cold start-up, or undergoing combustor tuning at any one time. The total number of hours during which the Gas Turbines (S-1, S-3, and S-5) may be operated to support a steam turbine cold start-up or may undergo combustor tuning shall not exceed 30 hours per year per gas turbine. (PSD)

25. The heat recovery steam generators (S-2, S-4, & S-6) and associated ducting shall be designed such that an oxidation catalyst can be readily installed and properly operated if deemed necessary by the APCO to insure compliance with the CO emission rate limitations of parts 22(c) and 22(d). (BACT)

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36. Total combined emissions from the Gas Turbines, and HRSGs (S-1, S-2, S-3, S-4, S-5, and S-6) including emissions generated during Gas Turbine start-ups and shutdowns, steam turbine cold start-ups, and combustor tuning activities shall not exceed the following limits during any calendar day:

(a)	1,990.8 pounds of NO_x (as NO_2) per day	(CEQA)
(b)	12,756.4 pounds of CO per day	(PSD)
(c)	478.2 pounds of POC (as CH_4) per day	(CEQA)
(d)	648 pounds of PM_{10} per day	(PSD)
(e)	96.6 pounds of SO_2 per day	(BACT)

37. Cumulative combined emissions from the Gas Turbines, and HRSGs, (S-1, S-2, S-3, S-4, S-5, and S-6) including emissions generated during gas turbine start-ups, and gas turbine shutdowns, steam turbine cold start-ups, and combustor tuning activities shall not exceed the following limits during any consecutive twelve-month period:

(a)	240.2 tons of NO_x (as NO_2) per year	(Offsets, PSD)
(b)	1,105.4 tons of CO per year	(Cumulative Increase)
(c)	64.68 tons of POC (as CH_4) per year	(Offsets)
(d)	118.26 tons of PM_{10} per year	(Offsets, PSD)
(e)	18.42 tons of SO_2 per year	(Cumulative Increase)

*38. The maximum projected annual toxic air contaminant emissions (per part 45) from the Gas Turbines, and HRSGs combined (S-1, S-2, S-3, S-4, S-5, and S-6) shall not exceed the following limits:

(a) 5,691 pounds of formaldehyde per year
(b) 704 pounds of benzene per year
(c) 120 pounds of Specified polycyclic aromatic hydrocarbons (PAHs) per year

unless requirement (d) is satisfied:

(d) The owner/operator shall perform a health risk assessment using the emission rates determined by source test and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. This risk analysis shall be submitted to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission
limits will result in a cancer risk of not more than 1.0 in one million, the District and the CEC CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (TRMP)

39. The owner/operator shall demonstrate compliance with parts 19 through 21, 22(a) through 22(d), 23, 24, 36(a), 36(b), 37(a), and 37(b), and also the NO_x emission limits in 40 CFR 60.44a(a), 40 CFR 60.44a(d),

and 40 CFR 60.332(a)(1) by using properly operated and maintained continuous monitors (during all hours of operation including equipment Start-up and Shutdown and combustor tuning periods) for all of the following parameters:

(a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1 and S-2 combined, S-3 and S-4 combined, and S-5 and S-6 combined.
(b) Oxygen (O_2) Concentrations, Nitrogen Oxides (NO_x) Concentrations, and Carbon Monoxide (CO) Concentrations at each of the following exhaust points: P-1, P-2, and P-3.
(c) Ammonia injection rate at A-1, A-2, and A-3 SCR Systems
(d) Steam injection rate at S-1, S-3, & S-5 Gas Turbine Combustors

The owner/operator shall record all of the above parameters every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each hour. For each calendar day, the owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations.

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

(e) Heat Input Rate for each of the following sources: S-1 and S-2 combined, S-3 and S-4 combined, and S-5 and S-6 combined.
(f) Corrected NO_x concentrations, NO_x mass emissions (as NO_2), corrected CO concentrations, and CO mass emissions at each of the following exhaust points: P-1, P-2, and P-3.

For each source, source grouping, or exhaust point, the owner/operator shall record the parameters specified in parts 39(e) and 39(f) at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

(g) total Heat Input Rate for every clock hour and the average hourly Heat Input Rate for every rolling 3-hour period.
(h) on an hourly basis, the cumulative total Heat Input Rate for each calendar day for the following: each Gas Turbine and associated HRSG combined and all six sources (S-1, S-2, S-3, S-4, S-5, & S-6) combined.
(i) the average NO_x mass emissions (as NO_2), CO mass emissions, and corrected NO_x and CO emission concentrations for every clock hour and for every rolling 3-hour period.
(j) on an hourly basis, the cumulative total NO_x mass emissions (as NO_2) and the cumulative total CO mass emissions, for each calendar day for the following: each Gas Turbine and associated HRSG combined and all eight sources (S-1, S-2, S-3, S-4, S-5, and S-6) combined.
(k) For each calendar day, the average hourly Heat Input Rates, Corrected NO_x emission concentrations, NO_x mass emissions (as NO_2), corrected CO emission concentrations, and CO mass emissions for each Gas Turbine and associated HRSG combined
(l) on a daily basis, the cumulative total NO_x mass emissions (as NO_2) and cumulative total CO mass emissions, for the previous consecutive twelve month period for all six sources (S-1, S-2, S-3, S-4, S-5, and S-6) combined.

(1-520.1, 9-9-501, BACT, Offsets, NSPS, PSD, Cumulative Increase)

40. To demonstrate compliance with parts 22(f), 22(g), 22(h), 36(c) through 36(e), and 37(c) through 37(e), the owner/operator shall calculate and record on a daily basis, the Precursor Organic Compound (POC) mass emissions, Fine Particulate Matter (PM_{10}) mass emissions (including condensable particulate matter), and Sulfur Dioxide (SO_2) mass emissions from each power train. The owner/operator shall use the actual Heat Input Rates calculated pursuant to part 39, actual Gas Turbine Start-up Times, actual Gas Turbine Shutdown Times, actual steam turbine sold start-up times, actual gas turbine combustor tuning times, and CEC and District-approved emission factors to calculate these emissions. The calculated emissions shall be presented as follows:

    (a) For each calendar day, POC, PM_{10}, and SO_2 Emissions shall be summarized for: each power train (Gas Turbine and its respective HRSG combined) and all six sources (S-1, S-2, S-3, S-4, S-5, and S-6) combined.
    (b) on a daily basis, the cumulative total POC, PM_{10}, and SO_2 mass emissions, for each year for all six sources (S-1, S-2, S-3, S-4, S-5, and S-6) combined.

    (Offsets, PSD, Cumulative Increase)

*41. To demonstrate compliance with part 38, the owner/operator shall calculate and record on an annual basis the maximum projected annual emissions of: Formaldehyde, Benzene, and Specified PAH's. Maximum projected annual emissions shall be calculated using the maximum Heat Input Rate of 53,188,532 MM BTU/year and the highest emission factor (pounds of pollutant per MM BTU of Heat Input) determined by any source test at any Gas Turbine, and HRSG. (TRMP)

*42. Within 60 days of start-up of the DEC, the owner/operator shall conduct a District-approved source test on exhaust point P-1, P-2, or P-3 to determine the corrected ammonia (NH_3) emission concentration to determine compliance with part 22(e). The source test shall determine the correlation between the heat input rates of the gas turbine and associated HRSG, A-1, A-2, or A-3 SCR System ammonia injection rate, and the corresponding NH_3 emission concentration at emission point P-1, P-2, or P-3. The source test shall be conducted over the expected operating range of the turbine and HRSG (including, but not limited to minimum, 70%, 85%, and 100% load) to establish the range of ammonia injection rates necessary to achieve NO_x emission reductions while maintaining ammonia slip levels. Continuing compliance with part 22(e) shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. (TRMP)

43. Within 60 days of start-up of the DEC and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-1, P-2, and P-3 while each Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum load (including steam injection power augmentation mode) to determine compliance with parts 22(a), (b), (c), (d), (f), (g), and (h), while each Gas Turbine and associated Heat Recovery Steam Generator are operating at minimum load to determine compliance with parts 22(c) and (d), and to verify the accuracy of the continuous emission monitors required in part 39. The owner/operator shall test for (as a minimum): water content, stack gas

flow rate, oxygen concentration, precursor organic compound concentration and mass emissions, nitrogen oxide concentration and mass emissions (as NO_2), carbon monoxide concentration and mass emissions, sulfur dioxide concentration and mass emissions, methane, ethane, and particulate matter (PM_{10}) emissions including condensable particulate matter. (BACT, offsets)

44. The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section and the CEC CPM prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section and the CEC CPM in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the Owner/Operator shall measure the contribution of condensable PM (back half) to the total PM_{10} emissions. However, the Owner/Operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. Source test results shall be submitted to the District and the CEC CPM within 60 days of conducting the tests. (BACT)

*45. Within 60 days of start-up of the DEC and on an biennial basis (once every two years) thereafter, the owner/operator shall conduct a District-approved source test on exhaust point P-1, P-2, or P-3 while the Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum allowable operating rates to demonstrate compliance with part 38. Unless the requirements of part 45(b) have been met, the owner/operator shall determine the formaldehyde, benzene, and Specified PAH emission rates (in pounds/MM BTU). If any of the above pollutants are not detected (below the analytical detection limit), the emission concentration for that pollutant shall be deemed to be one half (50%) of the detection limit concentration. (TRMP)

(a) The owner/operator shall calculate the maximum projected annual emission rate for each pollutant by multiplying the pollutant emission rate (in pounds/MM BTU; determined by source testing) by 53,188,532 MM BTU/year.

(b) If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to part (a) for any of the compounds listed below are less than the BAAQMD Toxic Risk Management Policy trigger levels shown, then the owner/operator may discontinue future testing for that pollutant:

Benzene	≤	221 pounds/year
Formaldehyde	≤	1,834 pounds/year
Specified PAHs	≤	38 pounds/year

(TRMP)

46. The owner/operator of the DEC shall submit all reports (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual. (Regulation 2-6-502)

47. The owner/operator of the DEC shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas sulfur content analysis results, emission calculation records, records of steam turbine cold start-up and gas turbine combustor tuning activities, records of plant upsets and related incidents. The owner/operator shall make all records and reports available to District and the CEC CPM staff upon request. (Regulation 2-6-501)

48. The owner/operator of the DEC shall notify the District and the CEC CPM of any violations of these permit conditions. Notification shall be submitted in a timely manner, in accordance with all applicable District Rules, Regulations, the Manual of Procedures, and standard condition I.F. Notwithstanding the notification and reporting requirements given in any District Rule, Regulation, the Manual of Procedures or standard condition I.F, the owner/operator shall submit written notification (facsimile is acceptable) to the Enforcement Division within 96 hours of the violation of any permit condition. (Regulation 2-1-403)

49. The stack height of emission points P-1, P-2, and P-3 shall each be at least 144 feet above grade level at the stack base. (PSD, TRMP)

50. The Owner/Operator of DEC shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall be subject to BAAQMD review and approval.
(Regulation 1-501)

51. Within 180 days of the issuance of the Authority to Construct for the DEC, the Owner/Operator shall contact the BAAQMD Technical Services Division regarding requirements for the continuous monitors, sampling ports, platforms, and source tests required by parts 42, 43, and 45. All source testing and monitoring shall be conducted in accordance with the BAAQMD Manual of Procedures. (Regulation 1-501)

52. Deleted

53. Deleted

54. Deleted

55. Pursuant to 40 CFR Part 72.30(b)(2)(ii) of the Federal Acid Rain Program, the owner/operator of the Delta Energy Center shall submit an application for a Title IV operating permit at least 24 months prior to the initial operation of any of the gas turbines (S-1, S-3, & S-5) or HRSGs (S-2, S-4, & S-6). (Regulation 2, Rule 7)

56. The Delta Energy Center shall comply with the continuous emission monitoring requirements of 40 CFR Part 75. (Regulation 2, Rule 7)

57. The owner/operator shall take monthly samples of the natural gas combusted at the DEC. The samples shall be analyzed for sulfur content using District-approved laboratory methods. The test results shall be retained on site for a minimum of five years from the test date. (cumulative increase)

58. The cooling towers shall be properly installed and maintained to minimize drift losses. The cooling towers shall be equipped with high-efficiency mist eliminators with a maximum guaranteed drift rate of 0.0005%. The maximum total dissolved solids (TDS) measured at the base of the cooling towers or at the point of return to the wastewater facility shall not be higher than 5,233 ppmw (mg/l). The owner/operator shall sample the water at least once per day. (PSD, BACT, cumulative increase)

59. The owner/operator shall perform a visual inspection of the cooling tower drift eliminators at least once per calendar year, and repair or replace any drift eliminator components which are broken or missing. Prior to initial operation of the Delta Energy Center, the owner/operator shall have the cooling tower vendor's field representative inspect the cooling tower drift eliminators and certify that the installation was performed in a satisfactory manner. The CPM may, in years 5 and 15 of cooling tower operation, require the owner/operator to perform a source test to determine the PM_{10} emission rate from the cooling tower to verify continued compliance with the vendor-guaranteed drift rate specified in part #58. (PSD, BACT, cumulative increase)

60. The Owner/Operator shall submit a Preplanned Abatement Strategy as described in BAAQMD Regulation 4, Air Pollution Episode Plan, within 120 days after issuance of the Title V permit. After the plan has been approved by the APCO, the owner/operator shall keep records of implementation on an event basis. (Basis: BAAQMD Regulation 4)

61. The owner/operator shall comply with the applicable requirements of 40 CFR Part 60 Subpart GG, excluding sections 60.334(a) and 60.334(c)(1). The sulfur content of the natural gas fuel shall be monitored in accordance with the following custom schedule approved by the USEPA on August 14, 1987:
    a. The sulfur content shall be measured twice per month for the first six months of operation.
    b. If the results of the testing required by Part 26a are below 0.2% sulfur by weight, the sulfur content shall be measured quarterly for the next year of operation.
    c. If the results of the testing required by Part 26b are below 0.2% sulfur by weight, the sulfur shall be measured semi-annually for the remainder of the permit term.
    d. The nitrogen content of the fuel gas shall not be monitored in accordance with the custom schedule.
    (Basis: NSPS)

62. To demonstrate compliance with condition 24, the owner/operator shall record the start time, end time, and duration of each steam turbine cold start-up and each gas turbine combustor tuning period. On an annual basis, the owner/operator shall submit a report to the District and the CEC CPM describing the total number of hours during which each turbine was operated in support of a steam turbine cold start-up or combustor tuning mode during the year. (PSD)

RECOMMENDATION

Issue a **Change of Conditions Letter** for the following sources:

S-1 Combustion Gas Turbine #1, Westinghouse 501FD; 2003 MM BTU per hour, natural gas fired, equipped with dry low-NOx Combustors, abated by A-1 Selective Catalytic Reduction System

S-3 Combustion Gas Turbine #2, Westinghouse 501FD; 2003 MM BTU per hour, natural gas fired, equipped with dry low-NOx Combustors, abated by A-2 Selective Catalytic Reduction System

S-5 Combustion Gas Turbine #3, Westinghouse 501FD; 2003 MM BTU per hour, natural gas fired, equipped with dry low-NOx Combustors, abated by A-3 Selective Catalytic Reduction System

_____ _____

Air Quality Engineer II **Date**

APPENDIX A

PSD AIR QUALITY IMPACT ANALYSIS

Application 7068