ENGINEERING EVALUATION
UNISYS CORPORATION
P#16986-A#12509
1601 Harbor Bay Parkway
Alameda, CA 94502

BACKGROUND

Unisys Corporation has applied for an Authority to Construct and/or Permit to Operate the following equipment:

S-1 Emergency Standby Generator Set: Diesel Engine Make: Cummins; Model: QSX15-G(; Rated Horsepower: 750 HP

This Generator Set is located at 1601 Harbor Bay Parkway, Alameda, CA 94502. The generator set will provide emergency electrical power in the event of a blackout at the Unisys Corporation. This emergency engine must be periodically tested to ensure that they will generate when needed. Since generator set S-1 will be located at a distance of approximately 500 feet from the Chinese Christian School boundary line, the engine will not be allowed to operate between the hours of 7:30 p.m. and 3:30 p.m. on days when school is in session.

EMISSIONS SUMMARY

Annual Emissions:

The 750 HP diesel engine at S-1 is CARB Certified and the emission factors are listed below in Table (1). For this report, it is assumed that the emission value of Total Unburned Hydrocarbons (HC) is equivalent to the emission value of POC.

Table 1

Component	Emission (g/kw·hr)	Emission (g/bhp·hr)
NOx	5.98	4.698
CO	0.60	0.447
POC	0.38	0.234
PM_{10}	0.10	0.075
SO_2*	0.25	0.184

**The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*
SO_2 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (454 g/lb) = 0.184 g/hp-hr

Maximum Emissions in Tons per year:

Table 2

NOx	= (4.698 g/bhp-hr)*(750 hp)*(50 hrs/yr)*(1lb/453.6g) =	388.39 lb/yr = 0.194 TPY
CO	= (0.447 g/bhp-hr)*(750 hp)*(50 hrs/yr)*(1lb/453.6g) =	36.99 lb/yr = 0.018 TPY
POC	= (0.234 g/bhp-hr)*(750 hp)*(50 hrs/yr)*(1lb/453.6g) =	18.99 lb/yr = 0.009 TPY
PM_{10}	= (0.075 g/bhp-hr)*(750 hp)*(50 hrs/yr)*(1lb/453.6g) =	6.17 lb/yr = 0.003 TPY
SO_2	= (0.184 g/bhp-hr)*(750 hp)*(50 hrs/yr)*(1lb/453.6g) =	15.41 lb/yr = 0.008 TPY

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations. Check Table (3) for emissions per day.

Table 3

NOx	= (4.698 g/bhp-hr)*(750 hp)*(24 hrs/day)*(1lb/453.6g) =	186.43 lb/day
CO	= (0.447 g/bhp-hr)*(750 hp)*(24 hrs/day)*(1lb/453.6g) =	17.76 lb/day
POC	= (0.234 g/bhp-hr)*(750 hp)*(24 hrs/day)*(1lb/453.6g) =	9.11 lb/day
PM_{10}	= (0.075 g/bhp-hr)*(750 hp)*(24 hrs/day)*(1lb/453.6g) =	2.96 lb/day
SO_2	= (0.184 g/bhp-hr)*(750 hp)*(24 hrs/day)*(1lb/453.6g) =	7.40 lb/day

Plant Cumulative Increase: (tons/year): Cumulative increase from the plant is as shown in Table (4).

Table 4

Pollutant	Existing	New	Total
NOx	0	0.194	0.194
CO	0	0.018	0.018
POC	0	0.009	0.009
PM10	0	0.003	0.003
SO_2	0	0.008	0.008
NPOC	0	0.000	0.000

Toxic Risk Screening:
The toxic emission of diesel particulate exceeds the District Risk Screening Trigger, as shown in Table (5) below, and a Risk Screening Analysis has been performed.

Table 5

Source:	PM_{10} Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)[1]	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.075	750	50	6.20	0.64	Yes

Calculation:
PM_{10} from CARB Certified levels 0.10 (g/kW-hr) / 1.341 (kW/hp) = 0.075 (g/hp-hr)
Diesel Exhaust Particular Emission (lb/yr.) = PM_{10} (g/hp-hr) * HP * Annual Usage (hr/yr)
= 0.075 * 750 * 50
= 2812.5 g/yr / 453.6 g/lb
= 6.2 lb/yr

Since the engine meets TBACT requirements (emission level of 0.15 g/hp-hr or less), the maximum acceptable cancer risk is estimated at 10 in a million. Results from the health risk screening analysis show that for 50 hours of operation per year, excluding periods when operation is required due to emergency conditions, the risk to the maximally exposed nearest receptor is 2.67 in a million. The analysis was performed at a PM_{10} emission of 6.2 lb/year (see the May 12, 2005 memo from the Toxics Evaluation Section). In accordance with the District's Risk Management Policy, this risk level is considered acceptable.

STATEMENT OF COMPLIANCE

S-1 will be operated as emergency standby engines and therefore are not subject to the emission rate limits in Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"). S-1 is subject to the monitoring and record keeping requirements of Regulation 9-8-530 and the SO_2 limitations of 9-1-301 (ground-level concentration) and 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9-1 is expected since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all sources, S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). These engines are not expected to produce visible emissions or fallout in violation of this regulation and they will be assumed to comply with Regulation 6 pending a regular inspection.

This application is considered ministerial under the District's proposed CEQA guidelines (Regulation 2-1-312) and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

.

Best Available Control Technology:

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO_2 or PM_{10}.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutants: POC, NOx and CO. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to the meet BACT 2 limits presented below in Table (6).

Table 6

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
POC	1. ***0.30 g/bhp-hr*** *[62 ppmvd @ 15% O_2]* [a,b] 2. ***1.5 g/bhp-hr*** *[309 ppmvd @ 15% O_2]* [b]	1. *Catalytic Oxidation and CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine* [a,b] 2. *CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine b,c*
NOx	1. ***1.5 g/bhp-hr*** *[107 ppmvd @ 15% O_2]* [a,b] 2. ***6.9 g/bhp-hr*** *[490 ppmvd @ 15% O_2]* [a,b,c] ***3. 69 g/bhp-hr*** *[490 ppmvd @ 15% O_2]*	1. *Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler* [a,b] 2. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler* [a,b,c] 3. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler*
CO	1. *n/s* 2. 2.75 ***g/bhp-hr*** *[319 ppmvd @ 15% O2]* [b,c]	1. *Catalytic Oxidation* [b] 2. *CARB or EPA (or equivalent) low-CO emitting certified engine b,c*

For POC, NOx, and CO, the emission limits set by BACT 2 are met, as shown in Table (7) below.

Table 7

Pollutant	Engine Emission Factors with Catalyst (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
POC	0.230	1.50	YES
NOx	4.698	6.90	YES
CO	0.447	2.75	YES

Therefore, S-1 is determined to comply with the BACT 2 limits for POC, NOx and CO. Since CARB certification data was used to establish the POC, NOx and CO emission factors, the BACT 2 emission limits have not been incorporated into the permit conditions and are assumed to be complied with through the design standards demonstrated by the CARB certification testing.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.
PSD, NSPS, and NESHAPS do not apply.

ATCM: This facility will comply with new ATCM. Compliance with the following permit conditions will meet the ATCM requirements.

PERMIT CONDITIONS

Plant #: 1236; Application #: 11785; Company Name: Town of Windsor; Condition: #22017; For S-1

1. Hours of Operation: The owner/operator shall operate the emergency standby engine(s) only to mitigate emergency conditions or for reliability-related activities. Operating while mitigating emergency conditions is unlimited. Operating for reliability-related activities are limited to 50 hours per any calendar year.
   [Basis: Regulation 9-8-331]

   "Emergency Conditions" is defined as any of the following:
   a. Loss of regular natural gas supply.
   b. Failure of regular electric power supply.
   c. Flood mitigation.
   d. Sewage overflow mitigation.
   e. Fire.
   f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.
      [Basis: Regulation 9-8-231]

      "Reliability-related activities" is defined as any of the following:
   a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
   b. Operation of an emergency standby engine during maintenance of a primary motor.
   [Basis: Regulation 9-8-232]

2. The owner/operator shall not operate the emergency standby engine(s) for testing or maintenance between 7:30 AM and 3:30 PM on days when schools are in session.
   [Basis: ATCM]

3. The owner/operator shall equip the emergency standby engine(s) with either:
   a. non-resettable totalizing meter that measures the hours of operation for the engine; or

b. a non-resettable fuel usage meter, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.
[Basis: Regulation 9-8-530]

4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 2 years and shall make the log available for District inspection upon request:
   a. Hours of operation (total).
   b. Hours of operation (emergency).
   c. For each emergency, the nature of the emergency condition.
   d. Fuel usage for engine(s) if a non-resettable fuel usage meter is utilized.
   [Basis: Regulations 9-8-530 and 1-441]

RECOMMENDATION

Issue an Authority to Construct to Unisys Corporation, Located at 1601 Harbor Bay Parkway, Alameda, CA 94502:

EXEMPTIONS

None.

By: Madhav Patil Date: 05/24/05

Air Quality Engineering