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MCAS EL TORO
SSIC #5090.3

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
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5090
Ser 06CC.DG/168
March 10, 2000

Ms. Triss Chesney
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Department of Toxic Substances Control
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Subj: RESPONSE TO JANUARY 27, 2000 DTSC LETTER ADDRESSING INSTALLATION RESTORATION PROGRAM (IRP) SITE 24, NOVEMBER AND DECEMBER 1999 PROGRESS REPORTS

Dear Ms. Chesney:

Provided as an enclosure, is our response to the concerns you raised in the subject letter. For your convenience, both text and calculations are provided. I believe that in your review of this enclosure, you will find that the soil vapor extraction system at IRP Site 24 continues to operate efficiently, effectively, and within all regulatory guidelines. Reference to sections 6.5 and 7.2.5 of the September 1997, Draft Final ROD for OU-2A Site 24-VOC Source Area, may also be of benefit.

Your attentiveness in the review of these progress reports is notable, and speaks well of the team approach in place for the protection of human health and the environment. Please contact myself at (619) 532-0784 or Ms. Lynn Hornecker at (619) 532-0783, should your have further questions.

Sincerely,

DEAN GOULD
Base Realignment and Closure
Environmental Coordinator
By direction of the Commander

Enclosure: (1) Response to Comments (w/calculations) on DTSC review of November and December 1999 IRP Site 24 progress reports

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Project Title: IRP Site 24, Vadose Zone Remediation, Monthly Progress Report – November 1999
Marine Corps Air Station, El Toro
Reviewer: Department of Toxic Substances Control
January 27, 2000

Comment No.	Comment	Response
1	**General Comments:** "...We also want to call your close attention to what may be signs of reaching the limit of the adsorptive capacity of the activated carbon vessels. As shown in Table 2-2 and 2-3 on pages 2-26 and 2-27, respectively, of the November Progress Report, the exit concentration of freon-113 from both activated carbon vessels is increasing at an apparently accelerating fashion. Surprisingly , trichloroethene (TCE, also referenced as trichloroehtylene) which generally exhibits lower adsorptive affinity than does freon-113 does not show increasing effluent levels at this time. Perhaps the increasing freon-113 emission rate is the result of a combination of factors arising from exhausted activated carbon, competition between adsorbed species, and desorption of adsorbed species due to reduced influent concentrations. Whatever the specific reason may be for this phenomenon, please note that 26 µg/liter of freon-113 exhausted with a 700-standard cubic foot per minute throughput puts over 1.6 pounds per day of freon-113 into the atmosphere. We are not familiar with the specifics of the air emissions permit issued by the South Coast Air Quality Management District for the central treatment system, but we would like to confirm that such elevated emission levels continue to remain within the prescribed limits. If the current emissions are no longer within the limits, please take immediate steps to replace the existing carbon charge with fresh ones to reduce air emissions from the central treatment facility."	Monitoring data does indicate that very low concentrations of trichloroethene (TCE) and Freon-113 are being emitted into the atmosphere. The increasing trend of Freon-113 appears to be a result of competitive adsorption with the TCE concentrations displacing the Freon-113, this is consistent with your assessment. However, the concentrations of TCE and Freon-113 at the point of discharge are still in compliance with applicable South Coast Air Quality Management District's (SCAQMD) rules. To demonstrate that the central treatment system (CTS) is in compliance with SCAQMD Rules 212 and 1401, emission calculations and a risk assessment were performed. According to Rule 1401, New Source Review of Toxic Air Contaminants, TCE is the only compound for which an emission calculation is required. Freon-113 in not listed as a carcinogenic air contaminant therefore no evaluation of human health risk is required. Based on the monitoring data from December 1, 1999, which provided the highest discharge concentration of both TCE and Freon-113 to date. Risk assessment results for cancer and chronic/acute human health risk indicate the following: • Maximum Individual Cancer Risk (MICR) of 0.025×10^{-6} for a worker near the system • MICR of 4.2×10^{-10} for residential areas • Chronic/Acute Hazard Index (HI) of 1.4×10^{-8} for a worker near the system • Chronic/Acute HI of 3×10^{-7} for residential areas The assessment showed the MICR for both the worker and residential scenarios were below the 1×10^{-6} threshold value. The Chronic/Acute HI for both scenarios also below the threshold value of 1. The risk assessment calculations have been included as an attachment to this response Based on the risk assessment calculations, the treatment system is in compliance with the SCAQMD applicable rules. The discharge data will continue to be monitored to ensure that SCAQMD compliance requirements are met.

EMISSION CALCULATIONS:

Given:	!	Inlet vapor stream flow rate to the system (Q)	700 SCFM
	!	TCE emission (C_{TCE})	0.24 µg/L
	!	CFC-113 (Freon-113) emission ($C_{CFC\text{-}113}$)	23.0 µg/L
	!	VES Operation: 24 hours per day, 365 days per year.	

Note: Minor discrepancies between the following calculations and results shown are due to rounding.

TCE Emission:

$R2_{TCE}$ = controlled TCE emission
= (0.24 µg/L)*(1lb/453.59x10^6µg)*(28.316L/CF)*(700CFM)*(1,440 min/day)
= 0.015 lb/day
= (0.015 lb/day) * (365 days/yr) * (1 ton/2,000 lbs)
= 0.0027 ton/yr

CFC-113 Emission:

$R2_{CFC\text{-}113}$ = controlled CFC-113 emission
= (23.0 µg/L)*(1lb/453.59x10^6µg)*(28.316L/CF)*(700CFM)*(1,440 min/day)
= 1.45 lbs/day
= (1.45 lbs/day) * (365 days/yr) * (1 ton/2,000 lbs)
= 0.26 ton/yr

Based on the District Risk Assessment Procedures for Rules 1401 and 212 (amended September 1999), CFC-113 is not listed as a carcinogenic contaminant, therefore no assessment of human health risk is required.

CANCER RISK ASSESSMENT:

In accordance with District Rule 212, and based on the Maximum Individual Cancer Risk (MICR) model guidelines, the following relationship was used:

$$MICR = Q_{ton} * (X/Q) * U * MP * MET * LEA$$

Where,

Q	=	emission rate for the carcinogenic air contaminant, (ton/yr)
U	=	unit risk factor, added lifetime cancer risk per microgram per cubic meter
(X/Q)	=	carcinogenic air contaminant concentration, micrograms per cubic meter per ton/yr
MP	=	multi-pathway adjustment factor
MET	=	meteorological correction factor
LEA	=	Lifetime exposure adjustment factor

Table 3A of the District guideline provides the (X/Q) quotients 49.68 for off-site worker at a stack height of 14 to 24 feet range, distance to fence-line of less than 25 meters, and operation at 24 hrs/day, 365

days/year, and the X/Q value is 0.12 for residential distance of greater than 1,000 meters away. From Table 8, the unit risk factor (U) for TCE is 2.0×10^{-6}. The MP is 1 for the constituents reference above. From Table 5B, the MET is 0.65 for Marine Corps Air Station (MCAS) El Toro. From Table 9, the LEA factors are 0.14 for off-site worker and 1.0 for residential.

Residential Boundary Line Risk Assessment:
The MICR for TCE:

$MICR_{TCE}$ = (0.0027 ton/yr) (0.12 $(\mu g/m^3)/(ton/yr)$) (2.0×10^{-6} $(\mu g/m^3)^{-1}$) (1.0) (0.65) (1.0)
= 4.2×10^{-10}

Total MICR Calculation:

$MICR_{total}$ = $MICR_{TCE}$
= 4.2×10^{-10}

Worker Receptor Risk Assessment:
The MICR for TCE:

$MICR_{TCE}$ = (0.0027 ton/yr) (49.68 $(\mu g/m^3)/(ton/yr)$) (2.0×10^{-6} $(\mu g/m^3)^{-1}$) (1.0) (0.65) (0.14)
= 2.5×10^{-8}

Total MICR Calculation:

$MICR_{total}$ = $MICR_{TCE}$
= 2.5×10^{-8}

CHRONIC AND ACUTE HEALTH RISK ASSESSMENT:

In accordance with the District=s Risk Assessment Procedures for Rule 212 and 1401, the chronic and acute health risk assessments for the air toxic emissions are presented below:

Chronic Health Risk Assessments
MEL = (Q_{ton}) (X/Q) (MET) (MP)
HI = MEL / REL

Where,
MEL = Maximum Exposure Level

Residential Boundary Line Risk Assessment:

TCE Chronic Hazard Index (HI) Calculation:

MEL_{TCE} = (0.0027 ton/yr) (0.12 ($\mu g/m^3$)/(ton/yr)) (0.65) (1.0)
= 0.00021 $\mu g/m^3$

Reference Exposure Level (REL) for TCE = 640 $\mu g/m^3$

HI_{TCE} = (0.00021 $\mu g/m^3$) / (640 $\mu g/m^3$)
= 3.3×10^{-7}

Total Chronic HI_{total} Calculation:

HI_{total} = HI_{TCE}
= 3.3×10^{-7}

Worker Receptor Risk Assessment:

TCE Chronic Hazard Index (HI) Calculation:

MEL_{TCE} = (0.00027 ton/yr) (49.68 ($\mu g/m^3$)/(ton/yr)) (0.65) (1.0)
= 0.0087 $\mu g/m^3$

Reference Exposure Level (REL) for TCE = 640 $\mu g/m^3$

HI_{TCE} = (0.0087 $\mu g/m^3$) / (640 $\mu g/m^3$)
= 1.4×10^{-5}

Total Chronic HI_{total} Calculation:

HI_{total} = HI_{TCE}
= 1.4×10^{-5}

RISK ASSESSMENT SUMMARY:

Compounds Allowable Risk	Location	MICR (1×10^{-6})	Chronic HI (1)
TCE	Residential	4.2×10^{-10}	3.3×10^{-7}
TCE	Worker	2.5×10^{-8}	1.4×10^{-5}

As summarized in the table above, the calculated human health risk is below the allowable thresholds for both the cancer risk of 1×10^{-6} and for the chronic health risk hazard index of 1.

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TRANSMITTAL

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From: Lynn Marie Hornecker
MCAS El Toro

To: Diane Silva
Administrative Record Code 011S.DS

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Marine Corps Air Station, El Toro

Installation: MCAS El Toro

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