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NSB KINGS BAY
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LETTER REGARDING NSB KINGS BAY GA REQUESTING PERMISSION TO DISCHARGE A GROUNDWATER STREAM TO THE CITY OF ST MARYS WASTEWATER TREATMENT SYSTEM
10/15/1993
NSB KINGS BAY

31547.000
13.01.00.0060

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Ser N56/3572

15 OCT 1993

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Mike Mahaney
City Manager
City of St. Marys
418 Osborne Street
St. Marys, Georgia 31558

Dear Mr. Mahaney:

Naval Submarine Base (SUBASE), Kings Bay requests permission to discharge a groundwater stream to the City of St. Marys wastewater treatment system on a continuous basis for a period of up to 8 months. The design flow rate for this discharge is 60 gallons per minute (86,400 gallons per day).

As you are aware, this discharge is part of a groundwater remediation pilot scale study that the Navy's consultant, ABB Environmental Services (ABB-ES), will conduct at the old county landfill, located on the western boundary of SUBASE. Work will include groundwater extraction, treatment and discharge, and is necessary to evaluate the effectiveness of measures to prevent further migration of groundwater contaminants away from the landfill.

Initially, we will perform a 45 to 60 day pilot scale test to gather data on the actual influent and effluent characteristics. Over the 8 month operation period we may want to change the parameters of our treatment and testing. If this occurs we will obtain your written approval prior to implementing any changes.

Enclosures (1) and (2) outline the proposed treatment system and information on expected influent and effluent concentrations. An EPA model of publicly owned treatment works (POTW) performance, enclosure (3), was used to substantiate that the treated groundwater will not adversely affect the City's wastewater treatment system operation or the quality of its effluent.

ABB-ES previously contacted Mr. Tom Bailey of Mayes, Sudderth & Etheredge, Inc., the City's consulting engineer. Based on these discussions and the results of our air stripper and POTW modeling, the City's wastewater treatment facility has the capacity to accept this additional flow, and the discharge will not affect the City's wastewater treatment system's operation or effluent quality.

We appreciate the efforts of the City of St. Marys and others in helping us conduct the studies made to date. We would appreciate your earliest review, consideration and approval of this request to ensure no delay in the beginning of the study and remediation of the

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contaminated groundwater. Construction activities on SUBASE have begun and we anticipate commencing actual discharge of effluent in early 1994.

Please call Mr. John Garner at 912-673-8845 if you have any questions on this issue.

Sincerely,

L.P. SCULLION
CAPTAIN, CEC, USN
PUBLIC WORKS OFFICER
BY DIRECTION OF THE
COMMANDING OFFICER

Encl:
(1) Information on Proposed Pilot Scale Test System
(2) Discharge Criteria
(3) Fate and Treatability Estimator

Copy to:
SOUTHNAVFACENGCOM (Code 1868)
Georgia EPD (Hazardous Waste Branch)
ABB-ES (Frank Cater)

Information on Proposed Pilot Scale Test System
Old County Landfill - Site 11
Submarine Base Kings Bay

SYSTEM DESCRIPTION

Groundwater will be extracted from recovery wells located along the western right-of-way of Georgia Spur 40 and the western boundary of the landfill. During initial operation of the pilot-scale system, groundwater from these locations will be extracted and processed to remove volatile organic compounds (VOCs). Following processing, the effluent could be discharged through a connection to a sewer manhole near the Crooked River Elementary School.

The initial pilot-scale test system will most likely consist of an air stripping technology (either air stripping tower or air sparger) to remove the volatile organics from the ground water. An air sparger is a diffused aeration system where air is released into the water through diffusers which produce air bubbles. Mass transfer of volatiles occurs across the air-water interface of the bubbles.

The pilot-scale system will initially operate 24 hours per day, 7 days per week, for up to 60 days. An evaluation will then be made to determine operating characteristics and times for the remaining 8 month operation period. Subsequent operations after the initial 60 day period could also occur 24 hours per day, 7 days a week.

EFFLUENT

Seventeen volatile organic compounds (VOCs) have been previously identified in the groundwater. Accordingly, these VOCs may also be present in the groundwater extracted during the pilot scale test. Compounds present, and their estimated discharge concentrations, are listed in enclosure (2). The groundwater will be treated to meet drinking water standards, based on established Federal and State maximum contaminant levels (MCLs), prior to discharge to the City's treatment system. Typically, allowable discharge concentrations are higher than MCLs for land application and NPDES permits. However, in the absence of required discharge concentrations for the constituents of concern, MCLs will be used as a discharge goal for the Site 11 treatment system. These estimated discharge concentrations are based on computer models which predict treatment results using the maximum concentrations previously detected in the groundwater. Actual effluent concentrations could be less than shown. We are basing our calculations on worst case samples from previous investigations. We feel this is a more conservative approach.

PUBLICLY OWNED TREATMENT WORKS (POTW) CAPABILITY

The "Plan of Operation and Management Pre-Application Treatment Unit Overland Flow Treatment", by Camp Dresser & McKee, Inc. (June 1986) provided information on the St. Marys POTW which we input to the EPA Model "Fate and Treatability Estimator for Conventional Activated Sludge Treatment Plants". The FATE Model evaluates the fate and treatability of toxic pollutants discharged to POTW's by predicting the overall percent removal of the compounds due to volatilization, sorption and biodegradation. The results from the FATE model are provided in enclosure (3). The effluent from the POTW meets MCLs in all cases.

Even though the site effluent will meet MCLs before reaching the POTW, this model was run to estimate the POTW effluent for the individual constituents of concern to show the latitude the system has in meeting MCLs at the POTW discharge.

FEDERAL REGULATIONS

A discharge to a POTW is considered an "indirect discharge". The General Pretreatment Regulations (40 CFR 403) and categorical pretreatment standards, developed by U.S. EPA to control the discharge of pollutants into POTWs by nondomestic sources, apply to this site discharge. The purpose of the pretreatment regulations and standards is to prevent the discharge of pollutants which pass through, interfere with, or are otherwise incompatible with the POTW. If constituents to the POTW influent are below MCLs, no constituent will cause any biological interference, or be toxic to the system.

RCRA requirements may be applicable when discharging RCRA hazardous waste to a POTW. Although the groundwater at Kings Bay is not considered RCRA hazardous (40 CFR 261), it may be subject to RCRA Subtitle C regulations if the groundwater is defined to contain hazardous waste (i.e., if the constituents in the groundwater are due to hazardous waste leachate from the landfill). If, as a result of pretreatment, the groundwater no longer contains hazardous waste, the groundwater is no longer subject to hazardous waste rules. The determination of the treatment level for groundwater so as to "no longer contain" hazardous waste must be made on a case-by-case basis, depending on factors such as health-based levels and analytical detection limits. A contained-in waste does not have to be delisted; it only has to "no longer contain" the hazardous waste.

If the constituents in the groundwater are not attributable to the landfill, and the origin of the waste is unknown, a positive determination of its regulatory status cannot be made. It is not necessary to presume a substance is a RCRA hazardous waste unless there is affirmative evidence to support such a finding.

the landfill, and the origin of the waste is unknown, a positive determination of its regulatory status cannot be made. It is not necessary to presume a substance is a RCRA hazardous waste unless there is affirmative evidence to support such a finding.

The groundwater to be extracted has not been fully characterized. Even if the groundwater is defined to contain hazardous waste, the POTW is allowed to accept the water untreated based on the Domestic Sewage Exclusion, as long as the constituents do not pass through, interfere with, or are otherwise incompatible with the POTW. The exclusion excludes wastes that flow through a sewer system to a POTW for treatment from the definition of solid waste and, therefore, also excludes the waste from RCRA regulation.

MONITORING

During the initial 45 to 60 day operation, the effluent will be sampled and analyzed daily for volatile organic compounds. The analysis will be performed on site with a turn-around time of 2 hours or less. If the discharge is found to exceed maximum concentration limits, we will immediately discontinue discharge to the City's wastewater system until the problem is corrected.

After the initial 45 to 60 day operating, the effluent will be sampled and analyzed on a weekly basis for the presence of volatile organic compounds. The analysis will be provided by a subcontracted laboratory. Analytical results will be available within seven days. This second phase will be a check of system performance, since the initial 45 to 60 day period will set operation standards.

Extracted groundwater (influent) will also be monitored with the same frequency as the effluent. The results of the initial 45 to 60 day monitoring period will be compiled and reviewed for comparison and this data will be used to monitor the treatment system efficiency and develop design criteria for continued operations.

TABLE 1
DISCHARGE CRITERIA

Constituent of Concern	Est. Influent Conc. (µg/l)	Est. Discharge Conc. (µg/l)	MCLs Discharge Criteria (µg/l)
Benzene	5	0.12	5
2-Butanone	580	580	
Chlorobenzene	10	0.35	
1,4-Dichlorobenzene	12	0.55	75
1,1-Dichloroethane	24	0.61	
1,2-Dichloroethane	9	0.80	5
cis-1,2-Dichloroethene	3,600	63.28	70
trans-1,2-Dichloroethene	23	23	100
1,2-Dichloropropane	6	0.34	5
Ethylbenzene	41	0.85	70
2-Hexanone	70	70	
4-Methyl-2-pentanone	110	110	
Tetrachloroethene	3	0.03	5
Toluene	840	24.57	1,000
Trichloroethene	45	0.67	5
Xylenes (total)	120	2.05	10,000
Vinyl Chloride	310	0.40	2

ENCL (2)

Fate And Treatability Estimator
for Conventional Activated Sludge
Publicly Owned Treatment Works

Version 2.00
06/18/90

ABB Environmental Services, Inc.
Portland, Maine

U. S. Environmental Protection Agency
Industrial Technology Division, Washington, DC

FACILITY: ST MARYS

plant flow	Q =	1	MGD
primary sludge flow rate	Qp =	2300	gpd
primary sludge concentration	Xp =	4.0	%
total volume of aeration tanks	V =	280000	gal
temperature of aeration basins	T =	20	C
mixed liquor suspended solids	Xl =	4000	mg/l
total gas volumetric flow rate	G =	4392000	ft3/d
secondary wasted sludge flow rate	Qw =	7040	gpd
concentration of wasted sec. sludge	Xv =	1	%

Influent Conc. mg/l	Effluent Conc. mg/l	Percent Removals: Total	Sorption	Volatilization	Biodegradation
1,2-Dichloroethane					
0.0090	0.0050	44.8	1.6 / 4.5	35.0	3.8
1,2-Dichloropropane					
0.0060	0.0021	64.2	2.3 / 6.0	53.5	2.4
1,4-Dichlorobenzene					
0.0120	0.0022	81.1	7.9 / 37.0	35.0	1.3
2-Butanone					
0.5800	0.0734	87.1	0.6 / 0.1	0.2	86.2
2-Hexanone					
0.0700	0.0393	43.7	1.4 / 3.6	0.5	38.2
4-Methyl-2-pentanone					
0.1100	0.0873	20.6	1.7 / 7.4	6.0	5.4
Benzene					
0.0050	0.0009	82.0	2.6 / 3.7	63.6	12.1
Chlorobenzene					
0.0100	0.0020	79.5	4.4 / 12.4	48.9	13.8
Ethylbenzene					
0.0410	0.0040	89.9	5.6 / 9.7	41.1	33.5
Tetrachloroethene					
0.0030	0.0002	94.5	3.7 / 2.2	88.2	0.4
Toluene					
0.8400	0.0866	89.4	4.1 / 5.3	44.8	35.2
Total xylenes					
0.1200	0.0170	85.6	7.6 / 26.1	47.0	4.8
trans-1,2-Dichloroethene					
0.0230	0.0042	81.3	0.7 / 0.3	79.1	1.3
Trichloroethene					
0.0450	0.0060	86.5	3.1 / 4.0	78.5	0.9
Vinyl chloride					
0.3100	0.0056	97.9	1.4 / 0.1	96.3	0.1

ENCLOSURE (3)

Fate And Treatability Estimator
for Conventional Activated Sludge
Publicly Owned Treatment Works

Version 2.00
06/18/90

ABB Environmental Services, Inc.
Portland, Maine

U. S. Environmental Protection Agency
Industrial Technology Division, Washington, DC

MODEL ASSUMPTIONS:

1) The model is for conventional diffused aeration activated sludge treatment plants only.

2) No significant volatilization or biodegradation occurs in the primary clarifier.

3) All reactors are completely mixed.

4) Steady state exists in all reactions (i.e., aeration basin and clarifiers) which implies that pollutant concentrations in a reactor do not change over time. (The model may therefore not be accurate for plants with pulse inputs of pollutants.)

5) Liquid inflow equals liquid outflow.

6) For volatilization, the concentration of the organic compound of interest is assumed to be negligible in the inlet gas used for aeration.

7) For volatilization, the partial pressure of an individual compound in the gas exiting the aeration basin is in equilibrium with the individual compound concentration in the aeration basin liquid.

8) Sorption partitioning follows a linear relationship between concentrations in the liquid and solid phases.

9) Biodegradation follows Monod kinetics and the organic compound influent concentration is assumed to be much less than the Monod half-saturation coefficient (i.e., influent concentrations are at relatively low levels).

10) For the biodegradation model step, it is assumed that a compound is removed by secondary utilization.

11) The fate of a compound is not affected by the presence of other compounds except as may be inherent in the data used for model calibration.

12) The POTW is operating effectively and no inhibition of the biological process is occurring (i.e., the POTW is acclimated to the compounds and concentrations present in the influent).

13) For model calibration, measured effluent concentrations reported as not detected were assumed to equal half the reported detection limit.

14) The organic model was calibrated with all compounds grouped together rather than by individual compound.

15) Removal mechanisms (volatilization, biodegradation, and sorption in the primary and secondary clarifiers) were estimated using final effluent concentration data and best engineering judgement.

16) Data for bis(2-ethylhexyl)phthalate, di-n-octylphthalate, aldrin, and alpha-BHC were not used for final calibration due to inconsistencies in the analytical data compared to other compounds within similar classes.

17) Total removal of compounds primarily removed by sorption may be slightly overpredicted while compounds primarily removed by volatilization and biodegradation may be slightly underpredicted.

Project Name: NSB KINGSBAY INTERIM CORRECTIVE MEASURE DESIGN CALCULATIONS

ABB-ES Project No.: 8503.52
Designed By: V. Rule
Date: 13 Sept 93

TABLE 1
DISCHARGE CRITERIA

Source Identification: Site 11 Landfill
Source Location: NSB Kingsbay, GA

Max Influent Flow Rate (gpm):	60
Max Air Flow Rate (cfm):	500
Emission Point Hieght (ft):	17
Max Hrs Operation (hrs/wk):	168
Air/Water Ratio:	80
Packing Depth (ft):	12.5
Tower Diameter (ft):	2

Contaminant Name	Max Infl Conc (ug/l)	Est Effl Conc (ug/l)	% Removed	Federal MCL (ug/l)	% Removed by POTW	Est Eff Conc (ug/l)
Benzene	5	0.0	100.0	5.0	82.0	0.0
2-Butanone (MEK)	580	513.2	11.5	(3)	(1)	513.2
Chlorobenzene	10	0.2	98.0	100.0	79.5	0.0
1,4-Dichlorobenzene	12	0.4	96.7	75.0	81.1	0.1
1,1-Dichloroethane	24	0.2	99.2	(3)	45.8	0.1
1,2-Dichloroethane	9	0.8	91.1	5.0	44.8	0.4
cis-1,2-Dichloroethene	3600	15.5	99.6	70.0	81.3	2.9
trans-1,2-Dichloroethene	23	0.1	99.6	100.0	81.3	0.0
1,2-Dichloropropane	6	0.3	95.0	5.0	64.2	0.1
Ethylbenzene	41	0.5	98.8	700.0	89.9	0.1
2-Hexanone (MBK)	70	53.0	24.3	(3)	(1)	53.0
MIBK	110	8.1	92.6	(3)	(1)	8.1
Tetrachloroethene	3	0.0	100.0	5.0	94.5	0.0
Toluene	840	12.0	98.6	1000.0	89.4	1.3
Trichloroethene	45	0.2	99.6	5.0	86.5	0.0
Total Xylenes	120	1.2	99.0	10000.0	(1)	1.2
Vinyl chloride	310	0.2	99.9	2.0	97.9	0.0

(1) No POTW data available
(2) POTW removal rates for cis-1,2-DCE are assumed to be similar to removal rates for trans-1,2-DCE. This is a conservative assumption since cis-1,2-DCE has a higher Henry's Law Constant.
(3) No MCL defined