

CEER-X-034

CONFERENCE PROCEEDINGS

?THE IMPACT ON INDUSTRY
OF THE CLEAN WATER ACT OF 1977
and
(COST EFFECTIVE WASTEWATER TREATMENT
TECHNOLOGIES IN PUERTO RICO

January 26, 1979

?Sponsored by
INSTITUTE OF CHEMICAL ENGINEERS

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?Legal Aspects of NPDES Permits", Mr, Antonio Fscudero-Viera,

Beq.t McConnell, Valdés, Kelly, et. al.

"The NPDES Program and the Water Quality Certificate in Puerto Rico?.

Mr. Carlos O'Neill, Environmental Quality Board,

The Clean Water Act", Mr. John Frisco, Environmental Protection

Agency.

"Pretreatment Program in Puerto Rico", Mr. Rafael Andreu Villeg:

Environmental Protection Agency.

"Land Treatment of Industrial Wastes", Dr. Rafael Rfos Dévila,

Water Research Institute, University of Puerto Rico.

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Presentation made by Dr. Rafael Muffoz Candelario and Mr. A. Heres

were not included becat

are not authorized to be published at this

moment. If you interested, please contact them at 832-4040 and

725-9030 reapectively for specific information to when are going

to be available to the public.

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INTRODUGCION

El programa de permisos bajo el sistema nacional de eliminación de descarga contaminantes ("NPDES") establecido bajo la Sección 402 de la Ley Federal de Agua Limpia es el mecanismo mediante el cual en toda la nación se hacen aplicables las limitaciones y los estándares de calidad de agua a los puntos

individuales de descarga, Todos los puntos de descarga bien fueran federales,

municipales o industriales, tienen por ley que obtener un permiso NPDES en

efecto antes del 31 de diciembre de 1974 (Sección 402 (k)). (Las referencias en paréntesis son las secciones de la Ley Federal de Agua Limpia.)

Debido a que los permisos NPDES no son válidos por más de cinco (5) años, la gran mayoría de las fuentes están al presente envueltas en el proceso de

renovar la segunda generación de permisos:

Y la reglamentación que cubre

este proceso se encuentra codificada en el Título 40 del Código de Reglamentos

Federaly

Part

126 y 125 (1977).

Gabe sottalar, sin embargo, antes de entrar en materia, que el 10 de agosto del 1978, l Agencia Federal para la Proteceión Ambiental (EPA) pro-

puso revisiones extensas la reglamentaci3n existente que gobierna el mecaniamo de permisos y la misma ae public3 el 21 de agosto de 1978 en el

Federal Register, Tomo 43, pagina 37,078,

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PROCEEDINGS OF CONFERENCE ON THE IMPACT OF INDUSTRY OF

?THE CLEAN WATER ACT OF 1977 COST-EFFECTIVE

WASTEWATER TREATMENT TECHNOLOGIES IN PUERTO RICO

LEGAL ASPECTS OF NPDES PERMITS

ANTONIO ESCUDERO-VIERA, ESQ.

PARTNER

McCONNEL, VALDES, KELLY, SIFRE, ET.AL.

HATO REY, PUERTO RICO

JANUARY 26, 1979

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CONTENIDO ≠ CONDICIONES DE UN PERMISO

?Un permiso NPDES incorpora las limitaciones de descargas y estándares

Prescritos bajo las secciones 301, 304, 306 y 307, así como las limitaciones

sobre calidad de agua establecidas bajo la sección 302 a las fuentes individuales:

¿A pesar de que el Congreso contempló como cuestión general que las limita-

ciones de descargas se pusiesen en vigor antes de que se emitieran permisos:

la Ley provee para la situación inversa, Es decir, los permisos NPDES pueden

ser expedidos "sujetos a la condición que dicha descarga cumpla, bien sea con

todos los requisitos aplicables bajo las secciones 301, 302, 306, 307, 308 y

403 de la Ley o antes de que se tomen las acciones de implementación necesi-

rias relativas a todos dichos requerimientos a aquellas condiciones que el

Administrador determine sean necesarias para llevar a cabo las disposiciones

a

ta Ley. "(Sección 402 (a) (1))e

Por lo tanto, antes de la adopción de limitaciones de descargas para la industria, EPA puede emitir permisos individuales conteniendo "aquellas condiciones que el Administrador determine sean necesarias para llevar a cabo las disposiciones de" esta Ley.

Un permiso normalmente contiene un sinnúmero de otras condiciones en adición a indicar que cantidad de un contaminante puede ser descargada, Contiene, por ejemplo, fechas finales para cumplir con limitaciones y

estándares, fechas interinas para la sumisión de planos a la Agencia, fechas

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de comienzo de construcción y aquellos otros pasos relacionados con la

instalación de equipo para

3 control de 1a contaminación (40 CFR 124.44, 128.23 (1977)). En adición, en virtud de la sección 308 (a), el permiso puede requerir que la industria que instale equipo de muestreo, tome muestras de las descargas, mantenga récords y ofrezca información a EPA

> al Estado (40 CFR 124, Subparte g (1977), 40 CFR 125.27 (1977)).

PROCEDIMIENTO PARA OBTENER UN PERMISO NPDES

El procedimiento mediante el cual se obtiene un permiso NPDES puede dividirse en varios pasos cada uno de los cuales describo a continuación:

(a) Solicitud: El proceso comienza con la solicitud para un permiso NPDES, bien sea en su forma standard o en su forma corta (40 CFR 125.2 (1977)). La solicitud que se someta por una corporación debe de estar firmada por el principal oficial ejecutivo, al menos a nivel de vice-presidente o su representante autorizado (40 CFR 125.12 (i) (1977)). El tenedor de un permiso que desea continuar descargando luego que expira el permiso debe de solicitar su reexpedición no menos de 180 días antes de su fecha de expiración (40 CFR 125.12 (j) (1977)). Finalmente, en cuanto a la solicitud se refiere, deben tener presente que recientemente el asesor legal de la EPA en Washington determinó que la información que se somete en una solicitud o aquella que forma parte de un permiso NPDES no es confidencial (General Counsel's

Clans Determination 1 = 78).

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Para el caso de Puerto Rico, hay que solicitar de la Junta de Calidad Ambiental un Certificado de Calidad de Agua. La Sección 401 (a) (1) de 1a Ley de Agua Limpia requiere que el estado, en este caso Puerto Rico certifique que la descarga propuesta no viola el Reglamento de Estándares de Calidad de Agua de Puerto Rico, aprobados en 1973 y subsiguientemente enmendados en 1976, (Nota: Standard de Calidad de Agua - En la declaración de política pública contenida por la Sección 101 (b) de 1a Ley, el Congreso reconoció la responsabilidad y el derecho en primera instancia de los estados para prevenir, reducir y eliminar la contaminación, Antes de 1972 la gran mayoría de los estados habían adoptado normas de calidad de agua basadas en el impacto de la descarga en aguas navegables. El Congreso decidió conservar el derecho de los estados a establecer dichos estándares de calidad de agua y

en 1972 requirió que cualquier permiso incluyese limitaciones a las descargas suficientes para asegurar el cumplimiento con dichos estándares. (Sección 301 (b) (1) (c) y 402 (a) (1)). Los estándares de calidad de agua se derivan del nivel de descarga de contaminantes que pueda ser asimilados por un cuerpo de agua

sin que se deteriore su uso designado, La disponibilidad de tecnología de control

no es un factor relevante a pesar de que los factor

tecnológicos se consideran

en determinar los requerimientos mínimos necesarios para conservar el uso deseado de un cuerpo de agua. Normalmente los estándares de calidad de agua para cualquier cuerpo de agua contienen dos elementos. Un uso o usos designados y una concentración máxima para un contaminante específico.

La Sección 303 (a) conserva los estándares de calidad de agua que estaban

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En efecto antes de 1972, El procedimiento para cambiar los estándares que no eran consistentes con la Ley se dispuso en la Sección 303 (a). En adición cualquier estado que no había adoptado estándares de calidad de agua antes de las enmiendas del 1972 se le concedió seis meses para adoptar y someter dichos estándares.

La agencia estatal (en nuestro caso la Junta de Calidad Ambiental) tiene

tres alternativas: aprobar, denegar o renunciar a la certificación. La propia

ey impone una renuncia si no se expide el Certificado de Calidad de Agua dentro de un "período razonable (que no excederé de un año)", Desde el punto de vista de ingeniería o m&s bien desde el punto de vista que concierne a los ingenieros, deben tener presente que los reglamentos de standards de calidad de agua de Puerto Rico recogen unos estándares sumamente estrictos, Desde

?el punto de ta

sta legal, deben tener presentes dos aspectos: (1) que agencia estatal deniega el permiso, la agencia federal está impedida de expe-

air un permiso NPDES y (2) que la negociación y 1a re\

6a judicial de un

Certificado de Calidad de Agua tiene que hacerse en las cortes estatales.

Be decir, que a pesar de que más adelante en el procedimiento pueden hacerse comentarios sobre el Certificado de Calidad de Agua, si una fuente

no esté cont

ste con el contenido del Certificado de Calidad de Agua, el foro apropiado para dilucidar dicha controversia es el tribunal local y no la

agencia federal.

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preliminar sobre ai va a expedir o va denegar el permiso. Si decide expedir

wminaci6n Preliminar: EPA hace entonces una determinacin

el permiso, se prepara un borrador de permiso que contiene las limitaciones: Propuestas, los schedules de cumplimiento y cualquier otra condición (40 CFR 125.31 (1977)).

(c) Aviso y Participación del Público: Se publica un aviso sobre la determinación preliminar a las agencias de gobierno (40 CFR 125.14 (1977)) ya todas las personas interesadas (40 CFR 125.32 (a) (1977)). El público

tiene entonces 30 días siguientes a la publicación del aviso para someter

comentarios por escrito sobre el permiso preliminar o para solicitar que se celebre una vista (40 CFR 125.32 (b) (1977)). La vista pública tiene por obligación que celebre si la agencia determina que existe un grado significativo de interés público sobre el permiso propuesto (40 CFR 125.34 (a) (1977))

(a) Otorgamiento del Permiso: El Administrador Regional está facultado para hacer una determinación final sobre la solicitud no menos de 30 días luego de publicado el aviso de su decisión preliminar (40 CFR 125.35 (1977)). El otorgamiento del permiso constituye una determinación administrativa final a menos que se solicite y se conceda una vista adjudicativa (40 CFR 125.35 (c) (1977)).

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(c) Vista Adjudicativa Cuando el otorgamiento del permiso

de EPA, como es el caso de Puerto Rico, cualquier persona con interés

puede solicitar del Administrador Regional que se celebre una vista adjudicativa o se solicite dentro de los diez (10) días siguientes a la de 1a determi-

partida Cinal para amitiy n damaaaee nn nevmen (40 CFR 128.26 (hd (19779).

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La solicitud tiene por obligación que ser concedida si se hace en la forma

apropiada y si contiene hechos materiales relevantes a si el permiso debe

ser expedido, denegado o modificado (40 CFR 125.36 (c) (1977). Si la

solicitud se concede, el efecto de aquellas partes del permiso que son objeto

de la vista se pospone hasta que haya una determinación final de la EPA

(40 GER 125.35 (4) (2) (1977).

La vista adjudicativa es presidida por un oficial examinador quien es

nombrado por EPA. Y se recibe testimonio oral y escrito. Se permite el

contrainterrogatorio y se Neva un récord (40 CFR 125.36 (i) (1977)).

Al finalizar la vista el oficial examinador certifica el récord conjuntamente con sus determinaciones de hecho propuestas al administrador Regional.

Si existen cuestiones de derecho planteadas, el Examinador las certifica al

Sub-Administrador a cargo de "enforcement" y al Asesor Legal General.

El Sub-Administrador Regional entonces considera el récord y emite una decisión inicial sobre los puntos objeto de disputa que no sean cuestiones de derecho. Las cuestiones de derecho se deciden por el Sub-Administrador a cargo de "enforcement" y el Asesor Legal General (40 CFR 125.36 (1) (2), (1977), La decisión del Sub-Administrador a cargo de "enforcement" y del Asesor Legal General sobre cuestiones de derecho se convierte en final después de haberlas comunicado al Administrador Regional, al oficial examinador y a las partes, La decisión inicial del Administrador Regional es final

a menos que dentro de los 10 días de su emisión una de las partes en la vista

apele la decisión al Admis

trador. Dicha apelación es un pre-requisito

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para la revisión judicial de la decisión final del Administrador (40 CFR. 125.36 (a) (6) (1977). El Administrador puede confirmar, modificar, dejar sin efecto o devolver para procedimientos ulteriores la decisión inicial del Administrador Regional.

RASGOS SOBRESALIENTES DE LA REGLAMENTACION

Os PROPUESTA SOBRE EL PROGRAMA NPDES

Como mencioné anteriormente, EPA ha propuesto revisiones sustanciales a la reglamentación existente con miras a facilitar el trámite

para obtener permisos NPDES. Los cambios más significativos propuestos son como siguen:

1, Definición de Aguas Navegables - El término se redefiniría en su forma más amplia para incluir cualquier cuerpo de agua o aguas

que afectaran o pudieran afectar el comercio interestatal". 40

CFR 122.3 (8) (4).

2, Definición de "money

fuentes" - Una fuente de descarga que
comienza a construirse antes de la adopción de un nuevo standard
?bajo la Sección 306 se consideraría una nueva fuente si (1) la
construcción continúa luego de propuesto dicho standard; y (2)

propuesta (40 CFR 122.3 (t)).

Relación con la Sección 404 - Descargas de materiales de dragado
y relleno estarían cubiertos por el programa NPDES en vez del

programa bajo la Sección 404 si su fin primordial es "la disposi

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ción de material de desperdicio más bien que el cambio de 1a

elevación o de 1a profundidad de un cuerpo de agua (40 CFR 122.4).

4, Firmantes de las Solicitudes

Las solicitudes de permisos sometida

por una corporación tendrán que ser firmadas por el oficial ejecutivo

principal o al menos a nivel de vice-presidente. Por tanto, las

solicitudes no podrán ser firmadas por los representantes autorizados

de oficina:

En adición, el que firma debe certificar que la infor-

mación es correcta, (40 CFR 122.5).

5. Condiciones que son de Aplicación a Todos los Permisos - La reglamentación existente requiere que estos términos y condiciones ("boiler plate") se incorporen expresamente en cualquier permiso

tas condi-

NPDES. Sin embargo, bajo la Sección 122.14 propuesta condiciones ya establecidas, así como cuatro nuevas y significativas condiciones serían obligatorias a todos los tenedores de permisos independientes de que se incluyeran o no en el permiso. Las nuevas

propuestas son las siguientes:

(a) El tenedor del permiso estaría limitado a niveles de descarga de contaminantes informados en la solicitud si el contaminante

no se limita en otra forma en el permiso.

(b) El tenedor del permiso estaría impedido de descargar

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cualquier contaminante para el cual se solicite información en la solicitud a menos que expresamente lo autorizase el permiso.

(c) El tenedor del permiso estaría impedido de "by-pass" de

Las facilidades de tratamiento a menos que el "by-pa:

fuese necesario para impedir pérdida de vida, daños

serios o graves daños a la propiedad y en el caso donde

no existan alternativas viables y aviso sobre dicho "by-pas

0a dado con anterioridad.

(d) El tenedor del permiso podría justificar un incumplimiento a las condiciones del permiso si dicho incumplimiento se causa por un "upset"; o8 decir, factores que estén más allá del control razonable del tenedor del permiso a pesar de tener diseños, operación y prácticas de mantenimiento adecuados.

6, Limitaciones y Condiciones - La reglamentación y los requerimientos aplicables al permiso NPDES serían aquellos que estuviesen en vigor antes de la expedición del permiso por EPA. Las reglas propuestas clarifican las condiciones que deben incluirse en un permiso si fuese necesario, incluyendo limitaciones más estrictas que aquellas basadas en guías tecnológicas; la opción de las mejor

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Prácticas de administración bajo la Sección 304 (e) y los estándares de pretratamiento bajo la Sección 307 EPA además requeriría que

Las limitaciones

y condiciones de un nuevo permiso:

serían estrictas como aquellas que contiene el permiso que expiró

además cuando dichas condiciones

serían más estrictas que las reglas

de descargas subsiguientemente promulgadas (40 CFR 122.15 (i)).

7. EL Cálculo

Es

EPA propone que las limitaciones o los standards a ser incluidos en un permiso se calculen en base a producción real de la facultad más bien que en base a la capacidad y diseño de la facultad,

(40 CFR 122.16 (a)), Adicionalmente, las limitaciones de descarga, serán calculadas para cada punto de descarga y se concederá crédito por contaminantes que se encontraran en las aguas

servidas a las plantas bajo ciertas condiciones. (40 CFR 122.16 (s)).

VIOLACIONES

Finalmente, los poseedores de permisos NPDES deben estar conscientes de que dicho permiso se trata de un contrato entre el poseedor del permiso y EPA y que para hacer cumplir dicho contrato, la Ley de Agua Limpia en su Sección 309 recoge un sinnúmero de mecanismos para hacer que

se cumpla con sus condiciones y dichos mecanismos pueden tomar la forma de una orden administrativa notificando una violación, así como de una acción civil en corte con penalidades de \$10,000 diarios por cada día de

violación, Finalmente. 1a Sección 200 (1 (1) de Ta Tew permite a me eo,

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adiquen acciones criminales por violaciones "willful" o negligentes de 1a Ley y que pueden resultar en prisión por un año o multas de \$25,000 diarios para primeras violaciones y de hasta \$50,000 y dos años de prisión para

violaciones subsiguientes

El otro mecanismo que existe es el de incluir a 1a entidad en una lista negra ("black listing") cuyo resultado sería el excluir a la entidad que está violando de recibir contratos del gobierno

federal.

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?THE CLEAN WATER ACT OF 1977 AND COST-EFFECTIVE

WASTEWATER TREATMENT TECHNOLOGIES IN PUERTO RICO

?THE NPDES PROGRAM AND THE WATER QUALITY CERTIFICATE.

IN PUERTO RICO

ENG, CARLOS O'NEILL

WATER QUALITY BUREAU

ENVIRONMENTAL QUALITY BOARD

JANUARY 26, 1979

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?The National Discharge Elimination System (NPDES) is a permit program to control the discharge of pollutants into surface and coastal waters; and

nd cons

coastalwater:

itutes the legal mechanism in which state and

federal agencies rest upon for the abatement of water pollution, This permit

Program replaces and improves the old permit system under the 1899 Refuse Act administrated by the U, S, Corps of Engineers. Today this program

is administrated by the federal government throught the U. S, Environmental Protection Agency (EPA) and co-administrated by the corresponding state environmental agency the Environmental Quality Board (EQB), ?The NPDES permit is implemented as a mechanism to assure that effluent limits are met, the necessary technology is applied, and that all requirements of the Clean Water Act and applicable Water Quality Standards are met on schedule, Under this law i is tlegal to discharge any pollatant into the nation's water without an approved NPDES permit.

?Many people have identified the NPDES permit as a license to pollute, bat on the contrary, the permit regulates qualitatively and quantitatively what may be discharged, Such permit sets specific limits on the effluent

from each point source. It commits each discharger to comply with all applicable provisions of the Federal Clean Water Act and Water Quality Standards Regulation. If an existing discharger cannot comply immediately, the permit sets target dates to achieve compliance. The permit commits such discharger to reduce or eliminate its discharges in an orderly fashion, in specified steps at specified dates. The commitments are legally enforceable.

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If a permit contains a compliance schedule, each step can be enforced without waiting for final compliance, and clear limits are put on discharges while the polluter is moving toward compliance.

[A guarantee that a permit is not a license to pollute is that the entire process must be carried out in the glare of public scrutiny. Under the Clean Water Act, the permit applications and the proposed permits are available to the public. There is an opportunity for a public hearing

before a permit is issued or denied. The permit itself, with all conditions

and requirements, is also a public document, The monitoring information

?that permit holders must report is also available to the public.

?The NPDES permit, ine:

fence, is a contract between a discharger and

the government, If a discharger violates the conditions of the permit or

makes illegal discharges without a permit, such discharger i

subject to

be fined and may even be subject to prison.

Both, EPA and EOB can require compliance with permit conditions

by issuing administrative orders, that are enforceable in State and Federal

courts or by seeking administrative or court actions.

After receiving the permit application, both agencies evaluate it.

To comply with section 401 of the Act, before EPA can issue an NPDES permit a Water Quality Certification must be received from the state in which the discharge takes place, so that such discharge will not violate national effluent limitations and to assure that applicable water quality standards applied to the receiving body of water may not be exceed as

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consequence of the discharge.

In order to comply with this section, EPA proposes a draft permit and request from EQB a Water Quality Certificate (WQC), In the Commonwealth of Puerto Rico, the Environmental Quality Board is the agency responsible to issue such certification, As a first limitation is reviewed, The limitations imposed in the draft permit are compared with applicable Water Quality Standards Regulations, and then EQB modifies such Limitations to insure compliance with local regulations.

Jk also sets special conditions to assure compliance with the state

continuous planning proce

and state strategy to abate water pollutiont

(Ge, 205b and 208), In the analysis and development of the draft water quality certificate, EQB utilizes the most recently technics of mathematical modeling in order to impose the discharge limitations in such a wat that

the applicable Water Quality Standards of the? receiving waters can be reasonable assured and maintained, At the end of the analysis, the Board

prepares a draft Water Quality Certificate, a draft NPDES permit,

preliminary determinations, and intent to issue a Water Quality Certificat

and a Public Notice.

+ 3c ?The Comprehensive Water Quality Management Plan for Puerto

Rico --- 1970-2020

208b Goals and Progress of Statewide Water Quality Management

Planning

208 Water Quality Management Plan for the Island of Puerto Rico

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In some cases there is reasonable

assurance that the discharge will

not comply with applicable Water Quality Standards, in such cases the

certification is denied, The intent to issue or deny a certification is published after due evaluation of the information concerning the discharge and through field inspections to the sites.

To insure public participation in the process of issuing the Water Quality Certification, the appropriate public notice is published in the local news media, and allow 30 days to receive comments from the general public and/or from the applicant, After such period of public participation,

if no comments or opposition is received, the Board automatically i

ues

the final Water Quality Certificate to the applicant and to EPA, During the public participation period a public hearing may be requested, EQB would consider the reasons for such request and upon EQB discretion such hearing is granted to consider the draft Water Quality Certificate, EOD designates the hearing panel and notifies the general public with 30 days in advance by publishing in the news media the appropriate public notice, After the public hearing is held, the hearing panel submits its recommendations to the Board for the final determination. The Board then issues the final Water Quality Certification to the applicant and EPA,

As soon as the federal agency receives the final Water Quality

Certificate, EPA is in the position to finalize their procedure to issue

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the final permit to the applicant. Some of the powers that the permit system bring to the state in the case of Puerto Rico are the right of

?entry to permittee's premi

, inspect, and monitor sources of pollution

and the authority to require polluters to install monitoring equipment, keep records, and file reports, In addition this Board has the right to immediately stop discharges that represent imminent or substantial danger to public health,

?As part of the permit, discharges are required to continuously monitor their waste and to report the amount and nature of all waste components. The report is known as discharge monitoring reports. These reports are evaluated upon submittal by EQB and EPA staff to secure that reported values are within the Limits of the permit, If any violation is reported in the discharge monitoring report, the permit holder should include @ non-compliance notice to explain the reasons

for the non-compliance, This non-compliance notification {s evaluated to determine farther action. If any discharger continuously violate the conditions of the permit, EQB or EPA may require to stop said discharge

until nec

ary changes or adjustments are made in order to achieve compliance with the limits specified in the permit. EQB also performs compliance and sampling inspections to those industries of facilities that have NPDES permits, in order to determine if the information

submitted to EQB in the self-monitoring report is correct and if the

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discharger ia in compliance with the conditions of the permit.

At present, as stated before, the NPDES permit is issued by EPA ut through the Water Quality Certification process the participation of EQB is guaranteed in the development of all permits within the Jurisdiction of Puerto Rico, In the near future, EQB intends to apply

and receive delegation of NPDES permit program to issue and

administrate the whole program. Toward such delegation in thi:

comprehensive Water Quality Standard Regulations to assure proper
mechanism to implement such program in accordance with EPA's
requirements.

?As a conclusion, the NPDES permit program has the objective to
restore and maintain the chemical physical and biological integrity of
the surface and coastal waters of Puerto Rico. Both, the federal and
state laws provides us with formidable tools to reach that objective.

The Board needs

ind looks foward to the support and cooperation of
industry, other government agencies and of the general public to help
tus to apply those tools and implement the permit program and to carry
out our responsibilities to protect our public health and our environment.

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?THE CLEAN WATER ACT

ENG, JOHN FRISCO

WATER FACILITIES BRANCH

REGION It

ENVIRONMENTAL PROTECTION AGENCY

JANUARY 26, 1979

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Tam here to talk to you about the 1977 Amendments to the Federal Water Pollutant Control Act or - = as we now know it~ - the Clean Water Act Most of our discussions today will focus on new industrial requirements. With the amendments - - Congress has made some very significant changes to the original Act. One of the most important is the emphasis now placed on the control of toxic substances . Another 4s the elimination of the requirement that industry build treatment systems when there is

.pparently no environmental benefit for doing 80.

?The Act establishes new classes of pollutant limitations for industrial

discharges and - - in addition

= extends the deadlines for meeting

those Limit:

It also provides an incentive for industry to develop innovative technology to treat its wastewater discharges.

Now - let's discuss these changes in more detail. The new Act

establishes three classes of pollutants - - conventional - - non-conventional - - and toxic, Conventional pollutants are those that have commonly been regulated in the past, ?These are BOD, TSS, fecal coliforms and pH. I believe COD and Oil & Grease have recently been

added to the conventional list, Under the old Act - - effluent limits

for conventional pollutants were to be met in two steps The first step required the installation of best practical treatment systems - -

or BPT - - no later than July 1, 1977. The second step involved a higher level of treatment - - which we have termed BAT - - for

best available treatment, Compliance with BAT standards was required

by July 1, 1983.

---Page Break---

-2-

The new Act creates a new level of treatment for the control of

conventional pollutants - - namely - - best conventional treatment -

or BOT.

Compliance with this new standard has been extended until July 1,

1984, In terms of comparison with BPT and BAT - - BCT is likely to

lie somewhere in between. BCT was established so that industries

which have already complied with BPT standards would not have to

unnecessarily install additional treatment facilities. The way in which

this necessity is determined is simply based on economics. Specifically - -

the cost for industry to go from BPT to BAT is compared with municipal treatment cost to achieve a similar reduction in pollutants. If the industrial cost is higher - - the BAT standard is eliminated - ~ and the industry is only required to comply with the first step BPT standard.

At the current time -

EPA is re - evaluating almost all of its previously issued effluent guidelines. New BPT standars are expected to be published in the Federal Register momentarily.

Now that we've discussed conventional pollutants - - lets talk a little about another of the three classes of pollutants established by the new Act - = namely toxic pollutants. Toxic pollutants are defined

in Section 307 of the Clean Water Act At the present time

= they

include the 65 classes of pollutants listed in the NRDC consent

agreement. For those of you not familiar with NRDC consent agreement - ~

it resulted from a suit against EPA by the Natural Resources Defense

---Page Break---

Council. The suit involved EPA's failure to establish standards for the discharge of toxic pollutants - - both into waterways directly - - and also into municipal sewage treatment plants, An agreement was eventually reached whereby EPA would develop standards for 65 toxic

?These 21 industries - - which

pollutants as discharged by 21 industries

we refer to as primary industries - - were selected due to the nature

of their operations and their high potential to discharge one or more of the 65 toxic pollutants. EPA does have the responsibility to periodically review the list of pollutants and industries and make changes when appropriate.

When Congress amended the Act -

it virtually incorporated the

entire NRDG consent agreement into the new amendments. ?The new

?Act also established that BAT or best available treatment would form

the basis for effluent limitations for toxic pollutants, It did however

extend the date for compliance with BAT standards from July 1, 1983,

to July 1, 1984, One added point - - EPA will be developing standards

for the 65 toxic pollutants and 21 primary industries - - both for direct

dischargers - - or those that need NPDES permits - - and also for those

industries that discharge wastes into municipal sewage treatment plants

In this latter case ~ - the limits will be expressed in terms of concentration

and will be designated pretreatment standards.

As usual for direct dischargers - - effluent limits will be expressed:

in terms of mass

loading per unit of production. Pretreatment standards

will be expressed in concentration terms to make enforcement by local

---Page Break---

-4-

authorities easier. How

the same BAT technology will be the

basis for both

2 of effluent requirements. As you know - - EPA's

pretreatment strategy places primary responsibility for enforcement of

industrial standards at the local level with federal backup when necessary.

?The final clas: re

of pollutants established by the new amendments

nonconventional. Nonconventional pollutants include everything but conventional and toxic pollutante, While thie may seem like a lot of pollutants to be regulated - - I don't believe that EPA will be devoting very much time to the development of effluent limits for follutants in thie class - - except in some very rare or specific cases, As T

initially stated - - the major focus of the new amendments is on the

control of toxic pollutants. When limits are developed for nonconventional

pollutants - - they will be based on a consideration of a BAT level of

technology - = similar to the technology employed for toxic pollutants.

Again =

I do not believe that there will be much Agency activity in this

area, And - - if standards are developed - - there are all kinds of

environmental and economic variances.

In summary - - I think the new amendments are both significant and beneficial. By placing the emphasis on the control of toxic substances

and eliminating the need for unnecessary waste treatment facilities

the new Act is more compatible with today's problems.

---Page Break---

Now what does it all mean to you? We've discussed:

1d the types of,

pollutant

= = levels of treatment - - and deadlines for compliance: The

+ ae usual - - thru the

mechanism for achieving treatment objectives i

NPDES permit program.

If you represent an industry which discharges wastes directly into
some waterway - - you very likely already have a NPDES permit. In
fact ~- that permit was probably issued some time ago and will be
expiring soon. You are required to submit a renewal application at
least 180 days or 6 months before your current permit expires - -
although - - I would suggest that you not wait that long We do want to
be sure that a new permit is issued before the old one expires.

?The type of permit that EPA will rei:

jue will depend on the nature

6f your business - - or specifically - - whether or non you represent

one of the 21 primary industries. If 90- + a short term permit of
approximately 2 years duration will be issued. During the next 2
years - - EPA will be developing guidelines for the 21 primary industries,

?Until these new guidelines are published - - we will simply be extending

the terms of your present permit. When appropriate - - we will adjust
some of the limits to more accurately reflect cursive operating
conditions In approximately 2 yeara - - a new permit of 5 years
duration will be issued base on the new guidelines and requiring

compliance by 1984.

---Page Break---

If your business is not included in the 21 primary industry categories

then we would -

in general -

not expect to be concerned about

toxic pollutants. In these cases - - EPA would not be developing BAT

Pe

standards for toxic pollutants. However

= these so called secondary

industries would be required to comply with BCT standards no later than

July 1, 1984, If you will recall - - BCT or best conventional treatment

is the new level of technology established for the control of conventional

pollutants, A secondary industry would be expected to discharge conven-

tional pollutants and - - therefore - - would be required to comply with BOT standards. In this case - + a 5 year permit will be issued with BGT requirements as soon as your old permit expires.

As a final case - - if - - you represent an industry discharges all wastes,

to a municipal sewage treatment plant - - you are subject to pretreatment standards. While general pretreatment standards will apply to all industries in municipal systems - - specific numerical limitations will only be developed for 65 toxic pollutants and 21 primary industries. If

you are included in this primary industry category -

a pretreatment

standard will be established which must be complied with - - within 3

years of the date it

published - - but in no event =

later than July

1, 1984 If you represent a secondary industry and are currently

complying with your sewer use ordinance ~ - it is likely that additional requirements will not be imposed by EPA. This -

of course = = is

---Page Break---

left to the discretion of the local authority. To repeat one point - - it

is our intention that the responsibility for the enforcement of pretreatment

standards be placed at the local level. All efforts will be made to a

that local authorities have the capability to administer pretreatment programs to the thousands of industries in their systems. This will

minimize the resource requirements on EPA - - and at the same

time - - allow the Agency to provide backup to local authorities when necessary.

This, - - in general - - summarizes the amendments to the Act--
particular as it relates to the industrial sector - - and also gives you
some idea on how the Region II office intends to proceed with permit

tivities. If you have any questions at this time - - I shall

be happy to try to answer them,

---Page Break---

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SCHEDULE FOR NEW PRETREATMENT AND BAT GUIDELINES

INDUSTRY? PROPOSAL DATE

- 1, Timber Products Processing 9/30/78
2. Steam Electric Power Plants 8/31/79
3. Leather Tanning & Finishing 12/30/78
- 4, Tzon and Steel Manufacturing 6/30/79
- 5, Petroleum Refining 4/9/79
- 6, Nonferrous Metals Manufacturing 5/7/79
- 7, Paving and Roofing (Tars and Asphalt) 12/31/78
- 8, Paint and Ink Formulation and Printing 5/31/79 ~ 5/1/80%
9. Coal Mining 8/31/79
10. Ore Mining and Dressing 12/31/78
- LL, Inorganic Chemical Manufacturing : 5/31/79
- 12, Organic Chemical Manufacturing 9/30/79

13, Textile Mill 3/31/79

14, Plastic and Synthetic Materials Manufacturing 9/30/79

15. Pulp and Paperboard Mills and Converted Paper Products 6/30/79

16. Rubber Processing 6/30/79

17. Auto and Other Laundries 6/30/79

18. Soap and Detergent Manufacturing 9/30/79

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INDUSTRY*

19, Machinery and Mechanical Products Manufacturing

20. Miscellaneous Chemicals

21. Electroplating

?Each industry is defined by SIC at 43 Federal Register 22160

(May 23, 1978).

?eDate depends on industrial sub-category.

PROPOSAL DATE.

6/22/79 ~ 11/30/808%

6/30/79 - 10/31/79"

12/15/79

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INSTITUTE OF CHEMICAL ENGINEERS

SAN JUAN, PUERTO RICO

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CENTER FOR ENERGY AND ENVIRONMENT RESEARCH

University of Puerto Rico

PROCEEDINGS OF CONFERENCE ON THE IMPACT OF INDUSTRY
OF THE CLEAN WATER ACT OF 1977 AND COST-EFFECTIVE
WASTEWATER TREATMENT TECHNOLOGIES IN PUERTO RICO

PRETREATMENT PROGRAM IN PUERTO RICO

ENG, RAFAEL ANDREU VILLEGAS

ENVIRONMENTAL PROTECTION AGENCY

SAN JUAN FIELD OFFICE

JANUARY 26, 1979

---Page Break---

?As many of you are aware EPA has been working on a national pretreatment policy for several years. Because of concern over the environmental problems caused by industrial discharges to POTW'S

{in addition to the large number of industries that would be affected by

pretreatment standards the Agency has devoted a great deal of time and

effort in developing a national policy. More than in any other cat EPA encouraged a maximum degree of public involvement.

In February 1977 the Agency proposed four pretreatment strategy ?options to the public for consideration and comment, Four public hearings and a number of public meetings were held on the four proposals and

over 375 sets of written comments were received.

In addition to the public's input there was major congressional

consideration of pretreatment in the 1977 amendments to the Water

Pollution Control Act the Clean Water Act

it is now known. On June

26 of last year, EPA put it all together and published general pretreatment regulations establishing the mechanisms and procedures for controlling

the discharge of industrial waste into POTW'S,

Delivered at the Impact on Industry of the Clean Water Act of 1977 and Cost-Effective Wastewater Treatment Technologies in Puerto Rico, Colegio de Ingenieros y Agrimensores de P, R., January 26, 1979, Caribe Hilton Hotel, San Juan, Puerto Rico,

---Page Break---

?The objectives of the National Pretreatment Regulation are:

1, To prevent the discharge of pollution which will interfere with the operation of POTW'S by upsetting the biological treatment process, damaging plant equipment and sewers, or in extreme

cases endangering plant employees.

2. To prevent the discharge of pollutions which are not susceptible to treatment in sewage treatment plants and can pass right through the plant into the environment in quantities which would be unacceptable if discharged directly.

3. To prevent the discharge of pollutants which contaminate the POWT's sludge and make it unfit for such beneficial uses as application to exop land.

The final strategy selected by EPA involves the establishment of national pretreatment standards for 65 toxic pollutants which may be discharged by 21 industrial categories. Standards on these toxic pollutants will be set on

an industry by industry basis

Although the initial focus will be on coverage of the 65 pollutants and 21 industries additional pollutants and industries may be added at a later date, In other cases where incompatible pollutants are discharged EPA will issue guidance to state and local governments on how best to control

th

pollutants.

---Page Break---

et for

Where national standards are

specific pollutant discharge

limits will reflect the application of best available treatment,

Pretreatment standards will express discharge limits in easier

to enforce concentration limits but where possible will provide an
equivalent mass limit which may be used by enforcement authority if it

desires

Compliance dates for pretreatment standards will normally be three years after promulgation.

The agency will initially encourage POTW'S to enforce National Pretreatment standards and POTW'S receiving new construction grants will have to develop enforcement programs as part of their grant

The costs of developing local pretreatment programs are grant eligible in PRASA,

Municipalities with flows of over 5 MGD which receive industrial waste will be required to have a pretreatment program in effect within

3 years of the NPDES permit reissuance or modification but in no case

later than July 1, 1983, Since we are in the process of modifying the Permits to these municipalities we expect many local pretreatment Programs to be developed well before the 1983 deadline.

Where POTW'S Authorities have not established local pretreatment Programs EPA will enforce violations of pretreatment standards directly against industry. Where local program was required but not A developed enforcement actions will be taken against the owner as well as against the industry.

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In order to prevent industry from having to install unnecessary treatment for regulated pollutants the regulation provides for modification of the national standards to reflect the capability of the POTW

to remove the:

pollutants,

To obtain such a modification the POTW must develop an approved

local pretreatment program. Secondly the POTW must cons!

tently

remove the pollutants at the level claimed and thirdly show that the modification of the standards will not create problems for disposal of the sludge.

En Puerto Rico, por suerte, no existen las Autoridades por

municipio que hay en los estados. De forma que, aquí, el programa

de pretratamiento será la "obra y arte" de la AAA; a desarrollar:

con la asistencia de la JCA y la EPA. En estos días hemos recibido el plan para desarrollar el programa de pre-tratamiento en Puerto Rico.

El mismo está basado en la reglamentación federal del 26 de junio de 1978, efectiva el 25 de agosto del mismo año y propone la estrategia para desarrollar, implementar y mantener en efecto el programa de pre-tratamiento en toda la isla, Actualmente estamos revisándolo y comentaremos próximamente a la AAA, de forma que esperamos tener para las próximas semanas un plan de trabajo con la participación federal de 75% de los fondos necesarios para desarrollar el programa en Puerto Rico.

Pero, ¿qué significa todo esto para las industrias y establecimientos

comerciales que descargan efluentes a las plantas de tratamiento de

---Page Break---

de la AAA ahora? ¿ para las que podrfan escoger hacerlo en el futuro utilizando las nuevas facilidades que se construyen actualmente bajo el Programa de Construcción de Plantas de Tratamiento con fondos EPA?

Bfsicamente significa que cualquier descarga de algún "contaminante", industrial o comercial, a plantas de tratamiento de AAA que (1) interfiera con la operación de la planta (ii) o pase "de largo"

y pueda salir al ambiente en cantidades no aceptables por los límites de calidad de agua o (iii) que de alguna forma interfiera con la posible utilización y/o disposición de los suelos, tendrá, la industria, que proveer el pre-tratamiento necesario para evitar dicha consecuencia.

En cuanto al estudio para desarrollar el programa de pre-trata-

miento se contemplan entre otras las siguientes actividades:

1, La identificación de las áreas de estudio.

2, Preparación de un inventario de industrias, incluyendo

Jas que no descargan actualmente a plantas de AAA.

3. Identificación de aquellas industrias que requieren

monitoría.

4, Identificación de los parámetros a estudiarse.

Desarrollo y estudio de los resultados del programa de
monitoría,

6. Delineación de las regiones y

Desarrollo del programa de pre-tratamiento por regiones.

---Page Break---

Algunas actividades que se desarrollarán concurrentemente

incluyen: evaluar la autoridad legal existente en la AAA para contro:

Jaz y poner en vigor este programa, evaluar las fuentes de financiamiento para su fase operacional, determinar los niveles de tolerancia y de remoción de las plantas existentes y futuras, cambios en los

requisitos de los permisos NPDES y analizar los recursos nec

arios

para implementar y mantener en vigor el programa,

Todo esto no es nada más que la implementación de un requisito federal indispensable para lograr una eficiente operación de nuestras plantas y así mejorar la calidad de las aguas de Puerto Rico.

Por su parte la AAA ha estado implementando su Reglamentación para el Uso del Servicio Sanitario Doméstico e Industrial, mediante el cual se requieren algunas medidas de pre-tratamiento.

Ejemplos de industrias que actualmente estén prestando sus

efluentes son la Du Pont, la Digital de San Germén que ha bajado la

descarga de Cu, y la Pamco de Rfo Piedras dedicada al "electroplating

Ahora bien, quiero presentarles en

?2 mañana un caso de lo

que algunas veces significa en "dólares y centavos" el control de
contaminación. Según la primera ley de masa en ingeniería química

?todo lo que entre

sale o se acumula, Lo que sucede es que en

muchos casos estamos dejando "voluntariamente" que se nos salgan

Las ganancias por el efluente. Es el caso de una fábrica de

tintes de Aguas Buens

que al recibir notificación de AAA que le

impondrían un sobre cargo por el "Color" decidí neutralizar el mismo

---Page Break---

con más químicos y así conseguí aumentar el BOD a más de 20,000 mg/l. Cuando AAA se dió cuenta decidí imponerle un sobre cargo de 49 por lo normal, Esto precipité un estudio de Procesos y producción, encontrándose que se estaba saliendo inerte por la descarga, De forma que con una pequeña inversión y algunas medidas correctivas de operación lograron economizar considerablemente y a largo plazo en materia prima y sobre cargos. La moraleja es clara, busquemos primero la solución al control de contaminación donde se produce, en los procesos y en la operación.

Podría seguir e intentar presentarles los requisitos y peculiaridades de la 1a reglamentación del programa de pre-tratamiento, pero solo lograría confundirlos. Y como todo esté escrito, los invito

® solicitar copia de la reglamentación a nuestra oficina en Puerta

de Tierra y así nos podrán brindar la cooperación que necesitamos,

---Page Break---

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PROCEEDINGS OF CONFERENCE ON THE IMPACT OF INDUSTRY OF

?THE CLEAN WATER ACT OF 1977 COST-EFFECTIVE

WASTEWATER TREATMENT TECHNOLOGIES IN PUERTO RICO

LAND TREATMENT OF INDUSTRIAL WASTES

ENG, RAFAEL A. RIOS

DIRECTOR, WATER RESOURCES RESEARCH INSTITUTE

UNIVERSITY OF PUERTO RICO

MAYAGUEZ, PUERTO RICO

JANUARY 26, 1979

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Introduction

Land treatment systems involve the use of plants and the soil to remove previously unwanted contaminants from wastewaters. This treatment is capable of achieving removal levels comparable to the best available advanced wastewater treatment technologies while achieving some additional benefits, ?The recovery and beneficial reuse of wastewater and its nutrient resources through crop production, as well as wastewater treatment and reclamation, allow land treatment systems to accomplish far more than most conventional

treatment and

discharge alternatives.

EPA's policy on the treatment of municipal wastewaters by land applica-

tion i

ol

#1 land treatment processes should be preferentially considered as an alternative wastewater management technology, The advantages are . obvious:

1, There will be a significant improvement in the quality

of the re

ving waters,

2, Nutrients such as nitrogen and phosphorus will be recirculated for a beneficial use,

3. A new water source for the agricultural sector is created.

S4, Land treatment has favorable characteristics in

terms of

-gy use and co!

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It is then likely that an increase in land treatment systems will take place in Puerto Rico.

The discussion that follows is of importance to the industrial sector

because of two reasons:

1, An industry currently using or planning to use a publicly owned treatment work (POTW) for disposal of its wastewaters might find that its pretreatment standards are different if the POTW has a land treatment system.

2. An industry with available land or with a high strength waste will probably find a land treatment system as the most economical alternative, This will also result in being exempted from the NPDES system since no discharge is made to navigable waters.

Land Treatment System:

?There are three types of land application systems commonly in us

slow rate, rapid infiltration, and overland flow, The emphasis in the

discussion that follows will be on slow rate processes, commonly known,

as irrigation , since these systems are most likely to be used in Puerto Rico.

1, Slow rate processes

Commonly known as irrigation, these processes refer to the application

of treated wastewaters to land in order to both apply further treatment and

---Page Break---

to grow crops. The applied wastewater is treated as it flows through

?the soil matrix and a portion of the flow percolates to the groundwater.

Surface runoff is not allowed, since its discharge into a surface water would require an NPDES permit. Both surface and sprinkler application techniques can be used, Surface application can be done by either ridge-and-furrow or border strip flooding techniques. Impact sprinklers or fixed spray heads can be used for sprinkler application.

Slow rate systems can be operated to achieve a number of objectives.

When wastewater treatment is the primary objective, the hydraulic loading is limited either by the infiltration capacity of the soil or the nitrogen removal capacity of the soil-vegetation system, If the hydraulic capacity

of the

is limited by a relatively impermeable subsurface layer or by a high groundwater table, an underdrain system can be installed to increase the allowable loading. This again brings in the problem of disposal of an effluent, but since this water is of good quality, it should not present a serious problem. The nitrogen removal capacity of the system can be

increased by using grasses as vegetation, since they have a high nitrogen uptake capacity. If this is not a problem, a crop with a higher values is

Ukely to be

lected, In Puerto Rico @ good compromise is sugar cane.

?Treatment performance of slow rate systems is the best of all land treatment systems, Table 1 below shows the results that can be obtained with a well designed and well operated slow rate system, assuming percolation of a municipal primary or secondary treated effluent through 5ft of

---Page Break---

TABLE |

?Trested water quality

Concentration (ma/1

Parameter Average Maximum

BOD z 5

ss 1 5

NHy-N 0.5, 2

N (total) 3 8

P (total) 0.1 0.3

Performance at Muskegon, Michigan, where 5350 acres of corn are grow:

9 given in Table 2.

Organics, expressed as either BOD of COD, are substantially reduced by

TABLE 2

Muskegon_ treatment performance

Parameter Applied wastewater (mgl. Treated_ water (mg,

BOD 13 3

cop us 28

ss 20 7

P (total) La 0.05

NH) 2 0.6

NON La 1g

---Page Break---

PARAMETER Applied wastewater (mg/l) Treated water (mg/l)

Zn 0.07

2

Fecal coliform 10³/100 ml 10⁰/100 ml

slow rate land treatment, Filtration and adsorption are the initial mechanisms in BOD removals, but biological oxidation is the ultimate treatment system. The system is so efficient for BOD removal that application rates of up to 5000 lb/ acre/d have been reported in the case of a vegetable processing industry. As a comparison, Muskegon's application

2 is about 0.5 lb/acre/day.

Data on SS removal is not as well documented as BOD removals, but

effluents down to 1 mg/l can generally be obtained. Physical removal by
Ailtration is the mechanism to act, and then biological oxidation takes
place. Once fixed, the mineral solids become part of the soil matrix.

Nitrogen removal from the wastewater is dependent on the type of

crop grown and the crop yield. An effective removal requires

crop

whose portion containing the nitrogen is physically removed from the
field during harvesting. In some cases denitrification can be an effective
removal mechanism, but this generally requires a high organic loading
that would cause anaerobic conditions in the soil. In some cases where
anaerobic conditions have not prevailed at all times, removals by
denitrification of up to 32% of the applied nitrogen have been reported.

?Adsorption and chemical precipitation are the main phosphorus
removal mechanisms in the soil. Irrigation systems usually give high

removal rates, independent of the crop used (which takes 15-30% of the

---Page Break---

zi

phosphorus) or the phoephorus concentration applied. Soil properties

are the important parameters for this removal.

Rapid infiltration

?This land treatment process refers to the application of wastewaters to rapidly permeable soils such as sands by spreading in basins or sprinkling. Most of the applied flow percolates through the soil to the groundwater. Treatment takes place during travel through the soil matrix, Vegetation is not normally required, but its presence is not harmful.

Although treatment is the primary purpose of this system, other secondary benefits such as groundwater recharge and recovery of renovated water by wells or underdrains can readily be accomplished.

?Treatment performance for this system is shown in Table 3, assuming the percolation of a primary or secondary municipal

effluent through 15%

Concentration mg /l)

Average ?Maximum

BOD 2 5

ss 2 5

NH₄-N 0.5 2

---Page Break---

Average Maximam

NN (total) 10 20

P (total) 1 5

of soil.

Removal of most pollutants is excellent, The filtering and straining action of the soil is excellent in removing BOD, SS and fecal coliforms.

However, nitrogen removals are generally poor unless specific operating procedures are established to maximize denitrification, This can be done by adjusting application cycles, supplying an additional carbon source such as methanol for the denitrifiers, using a crop with high nitrogen requirement reducing application rates, Although total

nitrogen removals may be low if these measures are not applied, rapid infiltration is an excellent method for achieving a nitrified effluent,

Phosphorus removal with this system are generally high, again

depending on the physical properties

of the soil. The long term

capacity is only limited by the mass of soil in contact with the wastewater.

3, Overland flow

Overland flow as a wastewater treatment process refers to the

application of the waters over the upper reaches of sloped terraces and its subsequent flow across the vegetated surface to runoff collection

ditches. The wastewater is treated by physical, chemical and biological

---Page Break---

means as it flows in a thin film down the relatively impermeable slope

unequally covered with gra

?This system is relatively new in the United States

Its objectives are

treated water treatment, and to a minor extent, crop production. ?Treatment objectives may be to achieve secondary or better quality from primary treated effluents, or to achieve high BOD and nitrogen removals comparable to advanced treatment systems, Treated water must be collected at the end of the slope and either reused or discharged to a surface water, This again brings up the problem of having to comply with NPDES regulations and paperwork.

There is very little data on treatment performance for this type of

system. A pilot scale facility operated by EPA at its Ada Laboratories, and

with an overland flow of about 150ft, gives the results shown in Table 4.

TABLE 4

?Treated water quality

Parameter Average

BOD 10 1s

ss 10 20

NH₃-N 0.8 2

N (total) 3 5

P (total) 4 6

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?Organic matter and suspended solids are removed by biological

oxidation, sedimentation, and grass filtration. Nitrogen removal is

due mainly to denitrification and phosphorus is removed by adsorption

and precipitation in

?The specific design of a land treatment system begins with the selection of the site and treatment process and then calculation of the required field area, ?The field area is calculated based on the required final effluent quality, This can be either the quality of the percolate that will reach groundwater in a slow rate system, or the quality of the water that will end up in a river or lake if an overland flow system is used. The critical loading rates to be determined are the hydraulic and nitrogen rates. Once the area corresponding to the most critical of these two rates is selected, the loadings and removals of BOD, SS,

Phosphorus, trace elements and microorganisms usually fall into

generally accepted rang

An excellent, detailed discussion on process design for the three

systems mentioned here is give in Chapter 5 of Process Design Manual

for Land Treatment of Municipal Wastewater, EPA 625/1-77-008. Although

?aimed at the municipal sector, the procedure is applicable to the

treatment of industrial wastes.

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?The factore given below can be used as a general guide to design

or for determining feasibility of a land treatment system for industrial

purposes. They apply to a slow rate system and are obviously dependent on the type of crop used.

1. Wastewater quality

The quality of water used for irrigation can have significant

weather conditions, and

variations depending on soil type, crop w

agricultural practices used. However, the following table gives values

of parameters generally accepted as reasonable for irrigation in general.

In the case of water quality of the percolate reaching the aquifer,

EPA recommends that the quality of a wastewater that does not contain

microbial contamination should be such that the contaminant levels given

in Table 6 should not be exceeded in the groundwater.

TABLE 5

Water quality for irrigation

Ds 1000

aL 5.0

Ae 0.10

Be 0.10

B 0.75

ca 0.0n

---Page Break---

u

Mo

Ni

Se

zn

ar

asp?

sane JE

?ue

0.20

5.0

5.0

20 meq/l in the soil

8-18

4,5-9.0

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Parameter Concentration (mg/1

?Turbidity, 1 unit

As 0.05

Ba 1.0

ca

cr

r

Pb

Hg

No, 10

Se 0.01

Ag 0.05

?Total coliforms 1/100 mt

Endrin 0, 0002

Lindane 0, 004

Methoxychlor on

?Toxaphene 0,005

4D on

2,4,5 TP 0.01

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?This table assumes that the groundwater can potentially be used for

drinking water supply. In Puerto Rico all groundwater is at least a

potencial source of potable water.

2. General design parameter

a. application: surface of sprinklers

b. application rate (hydraulic): 2-20 ft/year, depending on
crop. Sugarcane requires from 4-6 ft depending on
location.

cs area: 56-560 acres/MGD, without including buffer areas

or roads, Sugarcane requires 186-280 acres/MGD.

4, weekly application rate: 0.54 in

e. pretreatment: wastewater quality roughly equivalent to that from a municipal primary treatment facility or better

{, terrain slope: less than 20%, as flat as possible

g» permeability: ranging from moderately slow to moderately fast.

depth to groundwater: 2-3ft minimum

for treating

industrial wastewaters, particularly those with a high organic content, Problems can be caused by the presence of heavy

metale or other toxics, Pretreatment would be required in this

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2, Cost effectiveness:

of the process depends on the price of
land and the magnitude of the problem. If the land is
already available or cheap to acquire, the cash value of

the crop is normally sufficient to off

most, if not all,
of the treatment costs.

3. Exemption from the NPDES aystem is a major advantage of
Jand treatment systems,

4, There is significant experience in the United States with
land application of industrial wastewaters, There are
several cases in Puerto Rico, including land application of
wastes from a hotel, application of a very high organic
strength offluent, adn a pilot etdy using domestic effluent

for eugarcane grownth.

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