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14 October 1981

Hon. John Curtin
United States District Court
Western District of New York
U.S. Courthouse
Buffalo, New York

Dear Judge Curtin:

Re: U.S. v. Hooker et al.
Civil No. 79-989
(Hyde Park Landfill)

Enclosed please find a copy of the Post Hearing Submission by the amici.

Sincerely,
JAY, KLAIF & MORRISON

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UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA,
THE STATE OF NEW YORK,

Plaintiffs,

- vs -

HOOKEER CHEMICALS & PLASTICS CORP.;
OXY CHEMICAL CORPORATION; HOOKEER CHEMICAL
CORPORATION; OCCIDENTAL PETROLEUM INVESTMENT
CO.; OCCIDENTAL PETROLEUM CORPORATION;
THE TOWN OF LEWISTON; THE TOWN OF NIAGARA,
(HYDE PARK LANDFILL),

Defendants.

POST HEARING
SUBMISSION BY AMICI

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For Pollution Probe and
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Attorney for Ecumenical Task Force
of the Niagara Frontier, Inc.
Amicus Curiae

Dated: October 14, 1981

This post-hearing submission by amici Ecumenical Task Force of the Niagara Frontier, Pollution Probe, and Operation Clean-Niagara seeks to focus the Court's attention upon both fundamental and substantial defects in the proposed settlement agreement.

After evaluation of the data, exhibits, and testimony of expert witnesses for the parties, amici strongly urge the Court to disapprove the Agreement in its present form. It is our position that numerous modifications requiring at the minimum a major restructuring of the agreement should be required by the Court to at least ensure that the nature and scope of the contaminant problem will be accurately ascertained.

Amici have diligently evaluated all data as it was obtained, and have sought to synthesize information to facilitate a better hydrogeologic understanding of the Hyde Park Landfill site and surrounding area. Although data regarding well samples, boring logs, chemical (leachate) tests, and other related documents were requested by or prior to April of 1981, the parties were still releasing piecemeal data to amici as late as October 6, 1981, the last date of the hearing.

The parties, however, have apparently never fully utilized the data and analyses within their possession, since the proposed settlement agreement nowhere sets forth the actual scope of the containment problem which was known to exist from 1979. Although the parties were aware that contaminants had reached the deep lockport dolomite prior to submission of the Proposed Agreement for Judicial approval,

the extent and significance of the hazard was never presented to the Court or the public. In fact, the parties never advised the Court in any of their oral presentations or written responses that pursuant to the terms of Addendum I, in light of the data already obtained, Requisite Remedial Technology provisions would be per se triggered, and that the overburden and shallow bedrock (upper 15 feet) were not in fact the proper primary focus of concern.

While amici have always recognized that technical detail need not be included in a viable remediation plan, a well-designed conceptual strategy which pinpoints key areas of foreseeable concern, and which sets forth a minimum baseline performance standard is necessary. An agreement whose very bases are founded upon invalid or non-existent scientific, technical and legal assumptions, such as the agreement proposed for Hyde Park Landfill, should be disapproved for the reasons briefly set forth below.

- There is no adequate scientific basis to conclude an absence of groundwater flow through the Rochester Shale. Visual examination of rock core cannot support that assumption, since a pump test under the Rochester shale would be necessary to measure the flow (or detect leakage) through vertical fractures, and the hydraulic communication between strata.
- The scientific basis for selection of plume definition (and monitoring) levels as well as for selection of surrogates is invalid. The parties, when originally presenting the proposed agreement to the Court on February 10, 1981 represented the definition levels and use of surrogates as the most advanced state of the art. This misrepresented the capabilities of current technology.

- There is no scientific basis to consider only in situ remediation technology where the goal of the agreement is containment of the wastes from the surrounding environment. There is no scientific basis upon which one could conclude that environmental degradation of the Niagara River and Lake Ontario will not result from the proposal even in the unlikely event that a 90% effectiveness performance standard is met. The intolerable result of that assumption would be the eventual destruction of the Niagara River-Lake Ontario ecosystem.
- There was no consideration of that water system as a sole source of drinking water to over 5 million people and the irreparable damage which would result from legitimizing discharge of 10% of the toxins at the Hyde Park Landfill into the Niagara River. Also, the basis for authorizing termination of the bedrock barrier collection system, (that is, when concentrations of specific parameters in purge wells are present below monitoring levels), is wholly ill-conceived.

Amici believe that the following facts were established during the hearing through the testimony of E. Grant Adnerson and Dr. Douglas Hallett:

- rapid velocity of groundwater movement in the Lockport Dolomite (lateral);
- discovery of chemicals believed to be landfill-derived contaminants at the Gorge face after visual inspection and chemical analysis;
- vertical movement of most contaminants in the ground water through the Rochester Shale and below to the Niagara River;
- dilution of leachate migrating below the landfill site with large quantities of uncontaminated groundwater, precluding

- detection of contaminants under the proposed monitoring provisions;
- improbability of in situ bedrock remediation strategy to meet 90% interception performance standard by parties;
 - discharge of at least 8,000 tons of highly toxic chemicals into the Niagara River and Lake Ontario over time even if performance standard of 90% contaminant interception in Bedrock is met by the parties;
 - measurement of relative quantities of intercepted leachate and discharged leachate in the bedrock is scientifically impossible;
 - purge wells are only viable as a remediation technology in combination with removal of the primary contaminant source;
 - gamma isomer lindane, which was detected in water and sediment samples at the Niagara Gorge, is buried in substantial quantities in Hyde Park Landfill and is believed to have migrated through the groundwater in the bedrock;
 - gamma lindane would have decomposed into the alpha isomer in any natural environmental setting and is therefore believed to have come from a primary source;
 - given the predominant groundwater flow direction in the bedrock between the landfill and the Gorge, and the location from which samples were taken, and the specific selection of gamma lindane as an indicator unique to Hyde Park Landfill, there is no known alternative source;
 - current analytical technology has rendered extensive use of surrogate chemicals unnecessary since GC/MS prescans for multiple chemical combinations are now fast, inexpensive, and available.

While amici are aware of the advantages of settlement in environmental litigation, they firmly believe that any settlement must provide

a reasonable likelihood of meeting its goals. Since the Court has directed that extremely limited written submissions be filed, amici have briefly delineated the major areas where we believe the Agreement fails and requires alteration, and will address these issues in more detail upon oral argument.

The Shale Problem

There is a constant recharge of groundwater flowing from east of the Hyde Park site, pushing water westerly towards the Gorge, horizontally through the bedding planes in the Lockport Dolomite. If the Rochester Shale was truly impermeable, all of that water would have to move either laterally throughout the Lockport Dolomite to the Gorge face where it would flow out to the River in a substantial and continuous line of springs, or discharge at the interface between the Rochester Shale and the Lockport Dolomite, which would create a visually impressive mini-waterfall.

No such major continuous line of springs through the Lockport formation or from the interface between the Lockport Dolomite and the Rochester Shale exists at the Gorge. Rather, only two springs are present at this interface in the entire 3,000 foot zone spanning the Gorge southerly from the Power Authority. This hydrogeologic situation substantiates Mr. Anderson's evidence that the principal pathway for contaminated groundwater movement is vertically downward through the Rochester Shale before it reaches the Gorge.

The Talis (debris) which has accumulated at the Gorge face and behind which groundwater and contaminants may be flowing into the River is stratigraphically situated below the Lockport Dolomite

and specifically covers the Rochester Shale and all underlying strata to the Niagara River. Therefore, any groundwater seepages which could be discharging at the Gorge face hidden by the talis are discharging in the Rochester Shale or in the underlying intervening layers. Whatever the quantity discharging in this manner, Mr. Anderson's testimony that the preponderance of chemically contaminated groundwater is flowing below the Rochester Shale zone rather than laterally to the Gorge through the Lockport Dolomite is further reinforced.

Amici have carefully dissected the proposed containment program (Addendum I) in its entirety, to determine whether any reading of the agreement as it is now constituted would provide for testing or remediation of contaminants which have migrated through the Rochester Shale. Under the agreement, there is provision for certain tests and studies to be done in the overburden and Lockport Dolomite only - all such testing to end at the Rochester Shale.

Yet the monitoring studies undertaken under Paragraph C of Addendum I will ultimately determine:

- a. definition of the areal and vertical extent of the aqueous and non-aqueous phase contaminant plumes in the overburden and Lockport Dolomite;
- b. using data from said determination, if - aqueous phase liquids in overburden and Lockport Dolomite are not addressed by the Barrier collection systems (in Paragraph D)

OR

if non-aqueous phase liquids are anywhere in the overburden or Lockport Dolomite - the necessity for Hooker to use

requisite remedial technology (RRT).

It is absolutely clear that the RRT study will only evaluate potential remediation technologies designed to address the contaminants discovered pursuant to the studies undertaken in C(2)(6) of Addendum I - all of which clearly and unequivocally exclude study, chemical sampling or monitoring below "the top of the Rochester Shale". If no studies are undertaken which ascertain contaminant plumes below the Lockport Dolomite, migration in the shale would never then be subject to remediation or evaluation.

Mr. Anderson's testimony describing the velocity and vertical movement of groundwater flow from the Lockport Dolomite under the site through the Shale signifies that - if no testing is required in the Shale the Agreement provisions upon which the parties generally rely to argue that potential remediation of the Shale is not per se excluded from consideration, have been cited out of context and incorrectly as a matter of reasonable basic contract interpretation.

In Paragraph (C) where in C(8)(f) at I-19 where RRT studies must include descriptions of additional monitoring..., and measures proposed to obtain and continue to define plumes...the section specifically refers to the content of an RRT study triggered under (C)(7)(b) at I-17 - which study addresses potential technologies to be applied to remedy aqueous phase liquid contamination (above plume definition limits) in the overburden and in the Lockport Dolomite zone, or non-aqueous phase liquids anywhere in the Lockport Dolomite (excluding the Rochester Shale).

In addition, I-10(C)(1) specifically provides that (with respect to overburden and Lockport Dolomite) "no water sample shall be taken...where a waterbearing zone...is not found" (as defined in Paragraph 6).

See Paragraph 6 - defines waterbearing zone as "open joint or layer of rock (I-16) up to 15 feet thick...which yields or could yield (as defined by observed hydrogeologic characteristics) groundwater at 0.5 gpm or more to a 5 inch diameter well." By that definition, one would never have to sample in the Shale even if the Shale studies were required in the agreement, since the vertical migration into the shale is caused by the large areal availability of vertical conduits - not high permeability as is associated with Lockport Dolomite. The waterbearing zone definition which was used in connection with the Lockport Dolomite zone is appropriate only to rock strata of equal or greater permeability than the Lockport formation (such as the Irondequoit limestone).

In addition, the Court should be aware that pump test protocols are completely different for strata of low permeability than for those of higher permeability, both in method and duration. These variances in protocols do not create difficulty and should merely be understood to include positioning of wells and duration of pumping.

The Gorge Problem

The only provision in the proposed agreement providing for Gorge remediation is Paragraph C-I (at I-46) which merely contemplates limited surficial cleanup of overflow materials from the landfill

which moved down Bloody Run Creek to the Gorge face and into the River. A surface cleaning of 4 feet on either side of the centre line of Bloody Run where it intersects the Gorge face and 10 feet on either side at the shore area where Bloody Run flows into the Niagara River constitutes the entire focus of the parties on the Gorge.

The proper focal point of concern at the Gorge is clearly the continuous and dynamic movement of contaminants through groundwater within bedrock which to some extent discharge on the Gorge face, and to a larger extent flow down below the Rochester Shale into the Niagara River through the intervening rock layers.

The parties have contended that movement through the bedrock, even if contaminants have reached and continue to reach the Gorge, will be discovered in the vector drilling program set forth in Paragraph C of Addendum I. Amici warn that the vector drilling program as constituted will fail to provide even discovery of containment flow to the Gorge through the bedrock since:

- a. most of the contaminants will flow through the Rochester Shale (below the Lockport Dolomite) and underlying bedrock layers with direct discharge into the Niagara River. Since drilling extends only to the Rochester Shale this will be missed.
- b. Groundwater discharge on top of the Rochester Shale at the Gorge face is intermittent in both flow (seasonally flow stops in places and springs actually become dry at the Rochester Shale - Lockport Dolomite interface since contaminated water all flows through the Rochester Shale before it arrives at the Gorge face); and aerial extent (only two springs exist on top of the Rochester

at the Gorge face in the 3,000 foot zone south of the Power Authority and none of the vector lines of drilling intersect the Gorge face in the area of these two springs, as described by Mr. Anderson).

- c. Dilution of landfill derived contaminants leaking from the bottom of the site with large volumes of laterally flowing uncontaminated groundwater in the Lockport Dolomite will render the plume undetectable. This is due in part to the containment program requiring only remediation and further study if the listed parameters exceed the plume definition levels (at C-(1)(a)-I-10) which are in the 10 ug/l (ppb) range).

CHEMICALS AT GORGE

Analysis of the hydrogeological setting by Mr. Anderson indicated:

- a. landfill derived chemicals move south, west and north from the site through the bedrock;
- b. landfill derived chemicals entering the Lockport Dolomite reach the Gorge within one year of leaking through the bottom of the site;
- c. these chemicals reach the Gorge in very dilute concentrations and accumulate in the sediments at the Gorge face;
- d. landfill derived chemicals move vertically through the Rochester Shale to the underlying rock strata and into the Niagara River.

Testing of water samples and sediments (see Ex102) at the Gorge face confirmed Mr. Anderson's analysis since:

- a. lindane, PCBs and chlorobenzenes were all detected in sediments at the Gorge near seepages from the Lockport Dolomite - Rochester Shale interface) and from the Irondequoit Limestone

below the Rochester Shale. Concentrations varied between 75 ppt to 10,000 ppt.

- b. Water samples contained gamma BHC (lindane) and alpha BHC at concentrations less than 3 ppt.

Although many of the chemicals were not detected in the water seepages given the detection limits used (5ppt), they were found at significantly higher concentrations in the sediment samples. This supports Mr. Anderson's testimony that chemicals from Hyde Park Landfill will be diluted by large volumes of uncontaminated groundwater to below the plume definition limits of 10,000 ppt (10 ppb).

The presence of the chemicals on the Gorge face reflects an absolute necessity to modify the agreement to include studies and remediation north and south of the Bloody Run creek along the Gorge face. This study should consider the aerial extent of contaminance, its environmental significance, and proposed remediation for the entire Gorge area.

The Monitoring Problem

Addendum II (at pp.6-7) at Paragraph J(1) specifies that the Bedrock barrier collection system shall be deemed effective (emphasis supplied) if the monitoring wells downgradient of the purge wells measure less than 10% of chemical loading calculated to be present in the upgradient wells. This standard apparently assumes that 90% of the wastes migrating from the Landfill will be collected, and that 10% at most will be discharged through

the bedrock into the Niagara River.

The standard is ridiculous in that it ignores the conceptual inability of the parties to determine what percentage of the total mass of wastes leaking from the site will be intercepted by the system as a whole (or by any one well). In other words, it is hydrogeologically impossible, given the unpredictability of contaminant plume movement in the fractured rock, to determine whether 90% or 100% of the wastes leaking from the landfill bottom will be intercepted, or whether, for example, 90% of 20% of the leaching contaminants will be intercepted. Mr. Anderson also explained that it is hydrogeologically improbable that 90% chemical isolation will be achieved because of the way in which groundwater moves in fractured bedrock.

Over a long period of time, at least 10% of the 80,000 tons of highly poisonous chemicals (i.e. 8,000 tons) will enter the Niagara River and Lake Ontario. Even if remediation as set forth in the agreement is completely implemented, irreparable damage to the water quality and ecosystems for the Niagara River and Lake Ontario will inevitably result.

Since the adequacy of the Bedrock Barrier Collection System will be presumed on the basis of apparent concentration (of chemicals in downgradient wells) as opposed to actual loading of toxic wastes from the Landfill into the bedrock, an erroneous finding of adequacy will preclude the need for additional remediation, while a significant segment of contaminants will flow unobstructed to

the Niagara River.

The remainder of the monitoring system is not addressed herein since it serves no useful function in assessing containment capability of the purge well system.

The Indicator Problem

The rate at which different chemicals leach out into the environment from Hyde Park Landfill will not be determined by their solubility in water, but rather their solubility in the solvent mixture of liquids forming within the site.

Dr. Mason acknowledged under cross-examination that many factors affect migration characteristics of landfilled chemicals, including alterations in their solubility potential in solvents, their location within the landfill, and how and where water is moving within the site at any time.

Use of surrogate chemicals is only justified when a reliable constant ratio with respect to identification and quantification of both surrogate and those chemicals the surrogate represents has been established.

When the Ecumenical Task Force in its initial comments attacked use of HCB and TCP as TCDD surrogates, the State and Federal Governments' advised the Court in their "Joint Response to Public Comments" that field data had clearly established such a constant ratio.

A review of the chemical testing data compiled by A.D. Little (exhibit) and discussed by Dr. Levins, indicates that not only is there a total absence of constant ratio data, but clear evidence that the chemicals are intermixing in completely heterogeneous and unpredictable combinations, to wit:

- leachate composition varies markedly from sample to sample
- the relative concentrations of various chemicals contained measured in leachate samples bear no relation to their solubility characteristics in water
- the relative concentrations of chemicals tested in leachate samples cannot be explained by quantity disposed.

As one example, a review of exhibit , Dr. Mason's "Indicators" Chart lists chemical parameters, quantity disposed, leachate concentration, and solubility characteristics in water (we will ignore adsorption coefficients which pertain to soil since amici are concerned with flow of contaminants in groundwater through the Bedrock). In that chart, TCP has a solubility of 238 ppm. TCDD has a solubility of .0002 ppm, yet TCDD is present in the leachate at 1.5 ppb which far exceeds its solubility in water. The TCDD is 1 million times less soluble than TCP, yet it is present in the leachate at only 1 thousand times less.

The significance of this phenomenon is that:

1. either the leachate does not contain a pure aqueous system and other solvents in the landfill are creating new solubilities by entire orders of magnitude and/or
2. mobilization of these chemicals in a mixed waste stream bears little relationship to pure water solubility of any single chemical.

A review of other leachate samples contained in the A.D. Little compendium reveals

- the presence of gamma lindane in leachate
- gamma lindane at a much higher concentration relative to, for example TCP, than what the relative solubilities of the respective chemicals can account for
- gamma lindane present in concentrations far exceeding its solubility in water and in at least one sampling where TCP was not detectable.

The same review can be completed with respect to chlorobenzenes, and many other chemicals present in the leachate, with similar result.

This phenomenon is not solely explainable by solvent enhancement of movement, but rather substantiates the conclusion that the movement of these chemicals into leachate does not occur in heterogeneous fashion.

An analogous review of water samples compels the same conclusion.

The justifications set forth by experts for the Parties specifically contradicts the data which they have compiled. In addition, since analytical equipment capable of scanning the entire spectrum of contaminants in the Landfill is available , broad prescans should be required by the Court.

If sole reliance on surrogate parameters is permitted by the Court, many chemicals present in Hyde Park Landfill which may have migrated

and continue to migrate through groundwater in the bedrock site, such as PCBs, Lindane, and mirex, will never be detected, and no remedial action undertaken.

The Termination Problem

The conditions under which termination of any of the barrier collection systems is set forth in Addendum II (Q) (at p.12), under the terms and conditions specified in Addendum III (Paragraph F) (at III-I-2). There is absolutely no scientific or hydrogeologic basis upon which to shut off any component of the Barrier Collection System simply because sampling water pumped from any purge well fails to detect specific indicator parameters at more than 10 ppb. First, it is patently absurd to analyze for the presence of chemicals in large quantities of water drawn up from a radial sphere of influence (i.e. active Purge wells), under conditions where extreme dilution will inevitably mask any actual plume which may be randomly intercepted by the wells. In addition, the plume may well not be intercepted by any system or component because of the fractured nature of the bedrock and the resultant unpredictability of the plume movement.

Further, Mason admitted in cross-examination that leachate would have to be collected in perpetuity from Hyde Park site. Rovers on cross-examination, when asked for how long chemicals would continue to leach, indicated an inability to conceptualize such a duration.

Amici, in their initial brief and in the original public comments of the Ecumenical Task Force, always recognized that if chemical

wastes are left in situ, those bedrock purge wells must pump wastes until all the chemicals contained in the Landfill leach out into the surrounding environment. If the primary contaminant source remains in place and those purge wells are ever shut off, the approximate loading (i.e. total mass of waste) now escaping from the bottom of the site will continue to leak into the River. In other words, the same hazard to the environment (the Niagara River and Lake Ontario) cited in the complaint as one jurisdictional basis upon which the action was predicated will not be abated.

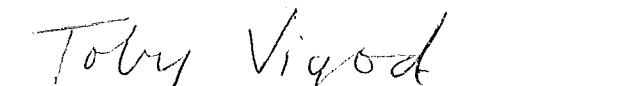
Conclusions

Amici respectfully submit that the Court should disapprove the agreement as it is currently proposed. In addition the Court should require the problems set forth herein above to be adequately addressed by modification or alteration of said agreement. Finally the court should require inclusion of the recommendations set forth by Mr. Anderson at the close of his testimony (Volume Vii pp.1540-1545) at the hearing upon this matter.

Respectfully submitted,


Barbara Morrison

Date:
October 14, 1981


Toby Vigod