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UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA, THE STATE OF NEW YORK, Plaintiffs, v. HOOKER CHEMICALS & PLASTICS CORP.; OXY CHEMICAL CORPORATION; HOOKER CHEMICAL CORPORATION; OCCIDENTAL; PETROLEUM INVESTMENT CORPORATION; OCCIDENTAL PETROLEUM CORPORATION; THE TOWN OF LEWISTON; THE TOWN OF NIAGARA (Hyde Park Landfill), Defendants.	Civil Action No. 79-989

GOVERNMENTAL PARTIES RESPONSE TO COURT'S ORDER OF AUGUST 7, 1981 AND PREHEARING STATEMENT

Plaintiffs, United States of America and the State of New York (hereinafter referred to as the "governmental parties"), hereby submit the following Response and Pre-Hearing Statement of Proof pursuant to the August 7, 1981 Order of this Court.

I. INTRODUCTION

In its order of August 7, 1981, the Court has requested the parties "to present testimony in order to explain the various elements of the Settlement in the simplest language possible." Attached to the Court's order is an Appendix containing a number of questions concerning various aspects of the proposed Agreement. The Court has suggested that the parties utilize these questions as a framework for their written and oral submissions concerning the adequacy of the proposed Agreement. In this statement and at the evidentiary hearing scheduled for September 9-11, 1981, the governmental parties will endeavor to answer these questions and to provide other evidence that entry of the proposed Agreement at this time is in the public interest.

On the basis of the established record in this case, the testimony to be presented before the Court, and for the reasons discussed below, the governmental parties respectfully submit that the containment and treatment plans required by the proposed Agreement are the best means available at this time to protect human health and the environment from the impacts of chemical migration from the Hyde Park Landfill.

II. RESPONSE TO COURT'S ORDER OF AUGUST 7, 1981

A. Preliminary Matters

1. Q: Have all the parties shared with each other all geological, chemical, and other scientific data?

A: The United States, the State of New York, and Hooker Chemicals & Plastics Corporation ("Hooker") have shared all relevant geological, chemical, and other scientific data. The Towns of Lewiston and Niagara have not requested and have therefore not been provided with this data.

The governmental parties have, to the best of their knowledge, provided counsel for *Amici* and counsel for movant for intervention, the College Heights Homeowners Association, with all scientific data concerning the landfill. It should be noted that the *Amici* and movant for intervention have made numerous FOIL and FOIA requests regarding the Hyde Park Landfill to various agencies of the governmental parties, some as recently as this week. The governments have made and will continue to make every good faith effort to respond promptly to these requests. 1/

2. Q: What provisions have been made to make all protocols and scientific data freely available to the public and court? Is there provision to make such information publicly available at the same time it is made available to the parties?

A: The proposed Agreement specifically provides for public disclosure of all protocols and scientific data required by its terms and conditions. Paragraph (20) of the proposed Agreement specifically states that "[a]ll information and documents submitted by Hooker to EPA/State pursuant to this Judgment shall be subject to public inspection ...." This information will be made publicly available. Although not specifically required, copies of all data, protocols and other information required by the proposed Agreement will

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1/ The governmental parties have not and, absent a court order, will not release any information relating to private individuals (other than to the individuals themselves) in order to protect those persons' right to privacy. Additionally, the governmental parties have not released and do not intend to release any settlement agreement proposals exchanged by the parties or technical reports relating to such proposals. These are attorney-work product, prepared in anticipation of litigation. The Federal Rules of Civil Procedure do not require the discovery of consultant reports unless the party has substantial need for the material in preparation of his case and cannot without undue hardship obtain the substantial equivalent by other means. Rule 26(b)(3). It should be emphasized that these are interpretive and contain no raw scientific data which is unavailable to the *Amici* and movants for intervention.

be filed with the Court upon receipt by the governmental parties if the Court so requests. 2/

3. Q: What assurances can the United States give the court that they will remain an active participant in this lawsuit throught the at least 35-year term of this Settlement?

A: The United States reiterates the commitment it has made previously, to oversee and enforce the provisions of the proposed Agreement if entered by the Court. See Response to Public Comments at 50.

B. MAPPING

1. Q: What evidence is there that the "fingerprint" chemicals are in fact the correct identifiers of the landfill chemicals? What chemicals were rejected as fingerprints and why?

A: (a) Indicators of the Extent of Groundwater Contamination

The proposed Agreement requires that groundwater samples taken for plume definition purposes be analyzed for both general parameters (pH, conductivity, total organic carbon (TOC), and total organic halogen (TOH)) and specific "fingerprint" chemicals (e.g., tetrachlorbenzene, hexachlorocyclopentadiene, and 2,4,5-trichlorophenol) as indicators of the presence of chemicals which were deposited at the Hyde Park Landfill.

2/ Full public disclosure of the information generated under the proposed Agreement is required by the proposed Agreement. This reflects a commitment which the governmental parties have frequently reiterated in the course of these proceedings. See Transcript of Hearing of February 10, 1981 at 14; Transcript of Public Hearing held by the Department of Justice on February 19, 1981 at 18-19; Joint Response to Public Comments filed April 3, 1981 (hereinafter "Response to Public Comments"), at 40.

Using indicators to detect chemicals leaching from a disposal site is a common practice. See Attachment I: EPA, Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities, at 155; and 40 C.F.R. §265.92(b)(3).

Naturally occurring groundwater is generally within a few units of neutral pH 3/ and its level of conductivity is usually relatively low 4/. Therefore, an abnormally high or low pH or a high level of conductivity are indicators of groundwater contamination. Similarly, the presence of organic halogens (measured as Total Organic Hologens or TOH), which are man-made substances not naturally found in groundwater, and high levels of organic carbon (measured as Total Organic Carbon or TOC) 5/ are also indicators of contamination.

3/ Ph is expressed as a number in the range of 1-14 (7 is neutral). A pH with a value at the low end of the range is acidic and a value at the high end of the range is alkaline. Expressed in scientific terms, pH is the symbol for the negative logarithm of the hydrogen ion concentration in gram atoms per liter.

4/ Conductivity is the ability of a sample to transmit electricity. A measure of conductivity approximates the amount of inorganic dissolved solids in a sample.

5/ Total Organic Carbon (TOC) is a measure of all organic carbon found in a sample including man-made material. Carbon is an element that is usually found in low concentrations in groundwater. However, if a high level of TOC is found, indicating a high concentration of organic carbon, a distinct source of carbon can be suspected of contributing to the high concentrations.

Although general parameters are useful indicators of contamination, it is also necessary to use specific indicator chemicals in order to determine a unique source of contamination. The specific "fingerprint" chemicals used for the purposes of the proposed Agreement were chosen for several reasons. First, they include chemicals that Hooker is known to have deposited at the site in large quantities, e.g., 16,500 tons of chlorobenzenes wastes and 4,500 tons of hexachlorocyclopentadiene (C-56) wastes. Second, certain chemicals detected in groundwater samples taken from monitoring wells around the landfill were chosen. Third, some of the most soluble chemicals deposited at the landfill, e.g., monochlorotoluene and monochlorobenzene, were included because they will dissolve readily in water and are therefore the most mobile chemicals. Fourth, the chemicals least likely to break down or degrade in the environment were chosen. Finally, certain chemicals, e.g., hexachlorocyclohexanes, were selected as fingerprint chemicals because of their extreme toxicity.

In connection with the question of fingerprint chemicals, two points should be emphasized. First, if any of the specific fingerprint chemicals (except phenol) listed in the proposed Agreement are found at or above the specified plume definition levels, it shall be presumed, unless Hooker demonstrates otherwise, that chemicals disposed of at the landfill site are present in the plume. See proposed Agreement at I-10.

Second, the variety of chemicals chosen as fingerprints cover the field of chemical properties assocciated with the chemicals dumped in the landfill (such as water solubility and mobility). It is therefore extremely unlikely that a chemical for which we are not specifically monitoring will have migrated further or along different paths than one or more of the fingerprint chemicals. By detecting one or more of these fingerprints, we will be detecting the extent of migration of Hooker's chemicals in the aqueous phase. The use of general indicators, such as TOH and TOC, will provide even further protection in this regard.

Other chemicals such as liquid disulfides and dodecylmercaptans were considered and rejected as indicators because they react with water and are easily degraded over time.

(b.) <u>Indicators of the Extent of Soil Contamination</u>
Four chemicals are used as indicators of soil contamination: monochlorobenzene (MCB), monochlorotoluene (MCT), 2,4,5-trichlorophenol (TCP), hexachlorobenzene (HCB). Tetrachloro-dibenzo-p-dioxins (hereinafter referred to as "TCDD") are analyzed for confirmatory purposes.

MCB and MCT were chosen as general indicators of soil contamination resulting from the migration of chemicals from the landfill not only because they are representative of a large portion of the kinds of chemicals Hooker dumped at Hyde Park, but because their relative water solubility and mobility suggest they would be likely to have migrated farthest. By picking up these chemicals, the "leading edge" of migration will be determined.

TCP and HCB were selected as indicators of TCDD for several reasons. First, it was recognized that HCB and TCDD possess similar physical characteristics (e.g., they are relatively insoluble in water). Second, it is known that TCDD was a contaminant in wastes generated from the manufacture of TCP. See Attachment II: EPA, Dioxins (1980) at 89-93, 113. It is therefore likely that TCDD detected at or near the Hyde Park Landfill was transported to the site as a contaminant of the approximately 3,000 tons of TCP wastes believed to have been deposited at the Landfill. As a result, there is a correlation between the presence of the TCP and the presence of TCDD. Third, it was observed that the levels of HCB, TCP and TCDD found in soil samples collected from the Bloody Run basin indicate a relatively good correlation between the three chemicals. (e.g., where TCDD was detected, TCP, or HCB, or both, were also found at high levels.)

Tetrachlorobenzene (TCB) was considered as a possible indicator of TCDD because it is used to manufacture TCP. See Attachment II at 28. Moreover, like HCB, TCB was disposed of at the landfill over the same period of time as TCP and it also is relatively insoluble. EPA and the State determined, however, that a third TCDD indicator would be redundant at this site because of the utilization of HCB and TCP and because the final boundary for capping is to be confirmed by actual TCDD analysis. Proposed Agreement at I-3.

The proposed Agreement requires analysis of TCDD because of its extreme toxicity and persistence in the environment (i.e., it does not readily degrade or break down over time), EPA, Dioxins, at 23. TCDD is relatively insoluble and thus is more likely to be found in soil than in groundwater. Generally, it is "tightly bound to soils having relatively higher organic content ... [and] would pose no threat to groundwater supplies because they [TCDDs] would not be mobilized deep into the soils by rainfall or irrigation." Id. at 41.

– solubility of TCDD compare to Halelt

Because of their chemical properties, TCP and HCB will also serve as useful indicators of the extent of other chemical migration from the landfill. 6/

One additional consideration regarding the selection of MCB, MCT, TCP and HCB is that they are easy to measure analytically and test results are obtained quickly. TCDD analysis, on the other hand, is extremely time consuming. This is due to the fact that there is limited nation-wide laboratory capability to analyze for TCDD in accordance with approved federal government laboratory practices. Thus, if all samples collected for the purposes of the proposed Agreement were to be analyzed for TCDD, there would be lengthy delays in implementation of the remedial programs.

6/ The chemically laden soil in Bloody Run is addressed separately. See Paragraphs G and H of Addendum I.

2. Q: How close do the experts estimate is the closest point of chemical contamination of soil, bedrock, or water table to the Niagara River, its tributaries, or other avenues, such as the conduits of the Power Authority of the State of New York to the river?

A: Chemicals have been detected in the soil at the sampling locations indicated on Figure 1. Chemicals, including TCDD in the low parts per billion range, have also been found in the soil at the toe of the Niagara Gorge Face.

Aqueous phase chemicals have been detected in the groundwater at the well locations indicated on Figure 2. EPA personnel inspected the Niagara Gorge Face during the summer of 1979 and did not find evidence of groundwater contamination. Figure 3 shows those well locations where non-aqueous phase chemicals have been found in the bedrock. Non-aqueous chemicals have been found at a depth of fifty (50) feet into the bedrock at a distance of 700 feet from the landfill. The full extent of chemical migration will be determined by the survey program to be undertaken in accordance with the proposed Agreement.

3. Q: At what rate of speed have the chemicals moved from the landfill? What is the best estimate of the experts? In which direction has the migration occurred? How quickly is it likely to continue?

A: It is impossible to accurately determine the rate of chemical migration in the absence of the field data required by the proposed Agreement. Moreover, the difficulty with any attempt to calculate the rate and direction of chemical migration is compounded by the fact that aqueous chemicals (soluble in water) move with groundwater while non-aqueous chemicals do not always move with groundwater. Therefore, aqueous and non-aqueous phase chemicals will not necessarily migrate in the same direction or at the same rate.

The complexity of the geohydrology of the area around and underlying the landfill further compounds the difficulty. Because of the many variables involved, no "best estimate" of the experts as to rate of flow can be given at this time. We can conclude that chemicals have migrated to certain points (See answer to question 2, at 10) but we cannot determine at this time when they left the landfill or their rate of migration from the landfill to the sampling point. The additional data to be obtained under the proposed agreement should enable us to determine the rate of migration of chemicals from the landfill.

4. Q: What relevance do the general observations contained in the Johnston Study have for the specific problems associated with containment of the landfill?

A. The relevance of the Johnston Study to the site-specific containment problems of the Hyde Park landfill is best stated by Mr. Johnston himself:

> In summary, my report is useful to someone wishing to understand the general principles of groundwater movement in the area. However, I do not believe the report can be used to make accurate site-specific evaluations of complex problems such as leachate migration via groundwater. See Johnston Affidavit at 2.

The Johnston Study (attached hereto as Attachment III) was performed mainly to identify groundwater resources in the Niagara Falls region. Id. It was used extensively by the EPA/State negotiators, in that it provides a general characterization of the region. 10/

10/ In considering the relevance of the Johnston Study to the Hyde Park Landfill, it should be noted that none of the monitoring wells relied upon by Mr. Johnston were located near the Landfill Site. See Johnston Study, Plate I.

As Johnston notes, the upper 10 to 15 feet of the Lockport Dolomite in the region consists of moderately permeable highly fractured rock, containing a large number of horizontal cracks (bedding planes) and vertical cracks (joints). Groundwater was found to occur in the upper 10 to 15 feet of the Lockport Dolomite in the horizontal and vertical cracks and in small solution cavities (i.e., openings in the rock caused by minerals in the rock dissolving into groundwater over long periods of time). Id. at 17, 22 and Figure 8. The remainder of the Lockport Dolomite is characterized by several permeable zones (known as water-bearing zones) separated by relatively impermeable rock. Id. at 27-29. The well logs from the construction of monitoring wells upon which the parties relied in formulating remedial measures for this portion of the bedrock confirm Johnston's more general characterizations of the bedrock.

Given existing information, it is not known whether any portion of the Lockport Dolomite acts as a barrier to the vertical migration of non-aqueous phase chemicals. This is one of the reasons why the proposed Agreement does not specify a technology which addresses non-aqueous phase chemicals. The Johnston Study supports the belief of the governmental experts that the Rochester Shale will act as a barrier to the downward migration of chemicals. As Johnston notes, the "~~Rochester~~ Shale at the top is almost impermeable and acts as a confining bed . . ." Id. at 19.

5. Q: What is a "piezometric head" in the Lockport Formation. Explain what this is and what its significance is. Also, what is a piezometer? Addendum II-2.

The piezometric head in groundwater is the elevation to which water from a point in a given water-bearing formation (sometimes called an aquifer) will rise if it is allowed to seek its own level. A piezometer is a monitoring well which is carefully installed at a point into a water-bearing formation so that it does not leak and can be used to accurately measure the level to which water rises (i.e., the distance from the bottom of the well to the surface of the water in the well.)

The measurements of piezometric head in the Lockport Formation were factors used by the governmental experts in determining the direction of groundwater flow 11/ and in identifying the locations of water-bearing formations beneath the landfill.

C. CONTAINMENT

1. Q: On page I-17 of the Settlement and on page 5 of the Reply Brief of the United States, there is a list of specific technologies. There is a reference to possibly building a "grout curtain wall," using a technology of "controlled fractures and installing a "purge well" system, etc.. What do these terms mean, how do they work, and what are the advantages and disadvantages of each (with respect to safety to people and the environment, effectiveness, and cost)?

A: Each technology disscussed below could be used to contain and/or collect chemicals to a certain extent.

11/ Flow occurs from an area of high pressure (higher head) to an area of lower pressure (lower head).

However, a combination of two or more of these technologies may be necessary to provide an effective system for a given site. In addition, it is important to note that the design and implementation of any one or a combination of these technologies must be preceeded by the development of site-specific geologic and hydrologic data. Although the discussion below sets forth generalized advantages and disadvantages for each technology, conditions at a specific site will affect the degree to which these advantages and disadvantages are applicable. The studies required for Requisite Remedial Technology will more thoroughly evaluate these and other technologies as they apply to the Hyde Park site.

(i) <u>Grout Curtain Wall</u>

The term "grout" as used in the proposed Agreement is usually a cement substance that can be pumped into a geologic formation such as the Lockport Dolomite, filling the horizontal and vertical cracks and cavities within the rock. As the grout sets or hardens it seals off all voids within the rock and forms an underground "curtain wall." The thickness and extent of the curtain wall and the composition of the grout is dependent upon the material to be contained and the time period over which containment is required.

The advantages of a grout curtain wall are:

- Construction methods are well established;

- Use of a grout curtain wall does not require excavation of the buried wastes so that exposure to workers, nearby residents and the environment is minimized. In addition since the wastes do not have to be moved, the risk of accidents which can occur during transport of any excavated material is avoided.

- A grout curtain wall can be installed outside the boundaries of the Landfill Site, avoiding any direct disturbance of the buried wastes.

The disadvantages of a grout curtain wall are:

- There are no grout curtain walls nor any geologic formations which are absolutely impermeable. However, certain geologic materials and certain types of grout are relatively more impermeable than others. In other words, although migration of liquids will occur in any material, the period of time over which migration occurs is proportional to the permeability of the material. Although it is possible to conduct certain compatibility tests of the waste and potential grout materials, it is unknown at this time what effect the chemicals would have on a grout curtain wall over long periods of time.

- It is possible that the grout will not fill in every crack or cavity in the rock; however, through the use of a well designed engineering plan, this problem can be minimized.

(ii) Controlled Fractures

Grouting is more effective if the rock can be cracked or fractured to insure a more complete grout penetration into the rock formation. This is usually done by injecting grout under high pressure. In a geologic formation such as the Lockport Dolomite, where all existing cracks and cavities are not directly interconnected, the pressure is necessary to induce fracturing thus ensuring that a solid grout curtain wall can be formed. The advantage of controlled fracturing is that it would increase the opportunity for cracks and cavities to be fully grouted.

(iii) Purge Well Systems

A "purge" well or "drawdown" well system consists of a series of individually pumped wells and is designed to withdraw groundwater and aqueous phase liquids.

Pumping of a well will result in the lowering of the piezometric head (See answer to question 5, at 13) in a specific area of influence around the well, and will cause both water and aqueous phase liquids and some non-aqueous phase liquids within that area to flow towards the well; the liquids can then be pumped out of the well and properly treated. A purge well system can be designed so that a hydraulic barrier is created which prevents the further migration of chemically-laden groundwater.

The advantages of a purge well system are:

- Construction methods are established and they are relatively simple;

- Chemicals are removed and treated;

- The withdrawal of groundwater reduces the potential for further migration of chemicals;

- Installation of a purge well system requires minimal excavation of soil and rock and therefore minimizes exposure to workers and the environment.

The disadvantages of a purge well system are:

- It requires continued maintenance over a long period of time;

- Purge wells may not be effective to collect or contain liquids which are more dense than water such as the non-aqueous phase chemicals.

- It may be necessary to collect and treat large volumes of water.

(iv) Tile Drain System

A tile drain is usually constructed by excavating a trench, placing permeable material such as sand or gravel around a perforated pipe, and then backfilling the trench usually with additional pervious material. This drain is installed at a grade so that it slopes towards a "wet" well. Liquids are collected in the drain, flow to the wet well, and are subsequently pumped out, stored and treated. The drain is placed at a depth which maximizes the collection of groundwater and chemicals.

The advantages of a tile drain system are:

- Construction methods are well established;

- The effectiveness of a tile drain system has been proven;

- It removes both aqueous and non-aqueous phase liquids for treatment;

- It prevents further migration of chemicals.

The disadvantages of a tile drain system are:

- Installation of a tile drain system requires some excavation of soil and rock and will therefore present a potential risk of exposure to people and the environment, unless adequate safety precautions are taken.

- A tile drain system will not collect chemicals which have migrated beyond or below the point of the hydraulic zone of influence.

- There are practical problems associated with the depth to which a tile drain system can be installed.

(v) <u>Removal of Pooled Non-Aqueous Chemicals</u>

Under this technology, a purge well would be sunk directly into a pool of non-aqueous phase liquids and the chemicals would be extracted and treated. This would be effective only if there are non-aqueous phase chemicals which have collected in large pools at this site.

The advantages of such removal are:

- It involves a single procedure which does not have to be maintained over a period of time;

- It removes chemicals for treatment;

The disadvantages of such removal are:

- It requires drilling directly into the Landfill Site which is a risky procedure.

- It is an effective technology only if non-aqueous phase liquids are found in large pools and are recoverable by pumping.

Several additional general observations regarding these five technologies are appropriate.

The governmental parties are unable to provide site-specific cost estimates at this time. The costs of each potential technology cannot be determined until sufficient data is available to assess the actual scope and detail of the technologies to be implemented. Moreover, the governmental parties have not considered cost as primary factor in their considerations with respect to the selection of a technology which will most effectively contain and clean-up the site.

(a) As the governmental parties have attempted to emphasize throughout these proceedings, it is premature to select a technology in the absence of the data and study required by the proposed Agreement. These are only some of the technologies Hooker must consider under Requisite Remedial Technology. Whether any one of these technologies or some other unspecified technology is accepted, Requisite Remedial Technology will depend upon a number of factors including the geohydrologic characteristics of the site and the extent of chemical migration.

(b) The Proposed Agreement sets forth a comprehensive Environmental Health and Safety Plan, Proposed Settlement at V-1-22, to provide extraordinary precautions to protect the health and safety of on-site workers and visitors as well as the health of the public and the environment. Addendum V requires Hooker among other things to:

(i) Observe all requirements of the Occupational and Safety and Health Act (OSHA), 29 C.F.R. 1910. 12/

(ii) Conduct periodic medical examinations of on-site personnel. 13/

(iii) Provide on-site personnel and visitors with appropriate personal safety equipment and protective clothing 14/ including, where required, breathing apparatus.

(iv) Construct a fence and provide security to prevent non-authorized access to the site. 15/

(v) Decontaminate all equipment and vehicles prior to removal from the site. 16/

(vi) Control dispersion of airborne particles. 17/

12/ Proposed Settlement at V-1.

13/ *Id.* at V-4-6.

14/ *Id.* at V-6-7, 11.

15/ Id. at V-7.

16/ *Id.* at V-8.

17/ *Id.* at V-8-10.

(vii) Prepare an emergency plan and provide for appropriate emergency equipment, including medical and fire fighting equipment. 18/.

(viii) Monitor for organic vapors (*e.g.*, benzene and trichloroethylene), flammability and particulate levels, and to cease construction activity and evacuate and temporarily relocate residences and commercial establishments where excessive levels are detected. 19/

In short, none of the remedial technologies discussed above will be approved by EPA/State unless the rigorous health and safety provisions of Addendum V are observed.

It should also be noted that the most important consideration with respect to the safety of people is to eliminate or reduce exposure to the Hyde Park chemicals.

(c) EPA/State's on-site containment, collection and treatment strategy is designed to minimize the type of adverse environmental impact which can be associated with large scale excavation. Moreover, any technology approved by EPA/State must meet the goal of the proposed Agreement concerning protection of human health and the environment.

18/ *Id.* at V-12.

19/ *Id.* at V-12-20.

2. Q. Is incineration one of the technologies under consideration? If not, why not? If so, explain under what circumstances it might be employed?

Total excavation and incineration of the Hyde Park chemicals and contaminated soils, rock and other material was carefully considered in the course of the negotiations. Incineration is required in some instances. 20/ Incineration of all the Hyde Park chemical-laden materials is not presently feasible because incinerator capacity in the United States is currently extremely limited. Furthermore, the time required to construct new incinerator facilities in accordance with all governmental requirements is lengthy and the massive quantities of materials requiring incineration would involve the construction of many incinerators to handle material solely from the Hyde Park Landfill.

3. Q. What other technologies not listed might be contemplated? Why were they not listed? When would they be used? Without undertaking any irrevocable commitments, under what circumstances would each technology be used? What considerations would cause the selection of one technology over another? What are the major strengths and weaknesses associated with each technology?

20/ Incineration is required for all non-aqueous phase liquids collected pursuant to the proposed Agreement and all non-aqueous chemicals currently in the lagoons at the site. Paragraph E(5) of Addendum I. Spent media (used carbon from the activated carbon treatment system) and any chemical-laden soils or other solids may also be incinerated. Paragraph E(3) of Addendum I.

The governmental parties decided to include in the proposed Agreement a short list of specific technologies which they considered to be potentially feasible for the Hyde Park Landfill. The proposed Agreement does not preclude Hooker from considering other technologies. Although there are other known technologies available, those listed in the proposed Agreement are representative of certain categories of technologies. For example, in lieu of a grout curtain wall, other materials such as a steel sheet piling cutoff wall or a bentonite (a relatively impermeable clay) slurry trench cutoff wall can be used to restrict the migration of chemicals in the overburden. 21/

There are, however, at least two other major types of known technologies which were not listed in the proposed Agreement.

(a) The first technology is bottom sealing. This is a process which involves the injection of grout (or a similar material(s) under pressure into tubes which extend through the landfill. As with a grout curtain wall, the grout fills in voids within the soil or rock, sets, and forms a bottom underneath a landfill. Conceptually bottom sealing can be an effective technology to contain wastes and prevent vertical migration of wastes from a landfill. It does not address or clean up chemicals which have already migrated away from the landfill.

21/ See EPA, Guidance Manual for Minimizing Pollution from Waste Disposal Sites, 1978, attached hereto as Attachment IV, and Neely, Nancy S., *et al.*, "Remedial Actions at Uncontrolled Hazardous Waste Sites," published in *Land Disposal: Hazardous Waste Proceedings of the Seventh Annaul Research Symposium* at 312 (1981), attached hereto as Attachment V

Secondly, in order to determine the placement of grout injection tubes, it is necessary to conduct exploratory drilling through the landfill to accurately locate the bottom of the buried wastes; drilling through a hazardous waste landfill poses severe dangers. Thirdly, it is very difficult to guarantee that all voids will be filled in due to variability of soil or rock material. Furthermore, once a bottom seal is installed it is very difficult to locate any voids which were not filled in with the grout.

(b) The second technology is total excavation of wastes. As is more fully set forth in the responses of the United States and the State of New York to Amici's Response of June 30, 1981, total excavation is not now deemed to be an appropriate or desirable remedy for the Hyde Park Landfill.

Generally, the advantages of excavation are:

- The chemicals are removed from the subject site thereby protecting people and the environment in that area from further exposure.
- Placement of the excavated material in another landfill will slow down the migration of chemicals because all new and existing landfills are subject to federal, state and local permitting requirements (e.g., Landfills must have a relatively impermeable liner etc.).

Generally, the disadvantages of excavation are:

- There is an increased risk of exposure to the on-site workers and to persons living or working nearby because excavation requires direct contact with the concentrated buried wastes.
- There is a risk of exposure to people and the environment due to potential traffic accidents while the excavated wastes are being transported to a new site.
- There is an additional risk of exposure to the on - site workers at the new landfill site, to the environment and to any persons living or working near the new facility as the wastes are reburied.
- All contaminated rock and soil around a site must be removed for excavation to be an effective remedy. If chemicals from a landfill have already migrated great distances both vertically and horizontally, the amount of contaminated rock and soil which must be removed can be enormous. Generally, as the amount of material requiring excavation increases, the exposure risks increase, the time required to excavate the site increases and the costs increase.

The Court is respectfully referred to the Responses of the United States and the State of New York to Amici's Response of June 30, 1981 for a fuller discussion of the issue of excavation.

4. Q: There are several references in the list of technologies to migration of non-aqueous phase liquids from the landfill "up to 15 feet below the top of the Lockport Bedrock Zone." What is the significance of the 15 feet figure? How was it arrived at?

A. As discussed previously in this document, at 13, both the Johnston Study and existing site specific data indicate that the upper 15 feet of the bedrock is highly fractured. As a result, preferential migration of groundwater and chemicals would be expected in this zone.

5. Q: Dr. Mason's affidavit, at paragraph 15, refers to a French Drain effect. What does this term mean? How is it significant?

A: A French Drain is a device that is used to collect groundwater and thus lower the water table. It consists of a trench which is filled with permeable materials such as gravel, stones or broken pieces of tile. This permeable material allows water to flow freely to a point where it can then be collected. This term was used by Dr. Mason as a conceptual analogy to describe how the highly fractured upper 15 feet of the Lockport Dolomite would roughly act as a drain for liquids in the Overburden.

6. Q: Explain what a "leachate collection system" is and how it works.

A: Leachate is generated when precipitation or groundwater passes through a landfill and its associated wastes. Two of the most common techniques used to collect leachate are drain tile systems and purge well systems discussed above, at 16-18.

7. Q: What is a "recharge area"? What is its significance? Mason affidavit, at ¶24.

A: Precipitation or surface water (such as lakes or streams) are the sources of water which is found below the surface of the earth (<u>i.e.</u>, groundwater). The area of the earth's surface which feeds the groundwater is called a recharge area.

The significance of this fact is that the location of recharge areas helps to determine the direction of groundwater flow.

8. Q: The Mason affidavit refers to "additional purge wells" Will these provide an effective containment system?

A: The proposed Agreement does not specify the number or the locations of the purge wells, it only requires that they "be designed to be capable of collecting aqueous phase liquids... which have migrated from the landfill site to the same extent as a tile drain collection system." Paragraph D(3) of Addendum I at, I-22. The purge wells referred to by Dr. Mason may be used only if the tests required by Paragraph C(6) of Addendum I, at I-15 through I-16, indicate that they satisfy this design criteria, at I-22.

9. Q: Why was a tile drain selected for the Overburden Barrier-Collection System? What alternative technologies were rejected? Why were they rejected?

A: A tile drain was selected for the Overburden because it is a technology which is known to be effective in containing and collecting groundwater as well as groundwater contaminated with chemicals.

Installation of a barrier wall (such as a bentonite slurry trench) was briefly considered. It was rejected because it will not remove chemicals (chemically contaminated groundwater) from the area outside of the landfill. Additionally, some means of controlling liquids within the landfill would still be necessary to prevent build-up of a hydraulic head. This increased head would likely increase the flow rate from the landfill into the bedrock below the site.

Installation of purge wells was also considered. They were rejected because while the soils in the upper soil horizons are relatively permeable, these soils are not pervious enough for a purge well system to be effective. Additionally, a purge well system in the overburden would not be nearly as effective as a tile drain system in containing and removing the non-aqueous phase.

10. Q: The Overburden Barrier-Collection System is to be installed at least 10 feet below ground level, but in no event below the top of the Weathered Zone. What is the significance of the 10 feet figure? How was it arrived at? What is the weathered zone? Why must the drain be below it?

A: The ten foot minimum was specified for a number of reasons. Permeable fill material lies above this ten foot depth in the area in which the tile system is to be constructed. In order for the tile system to be fully effective, it must be placed below these permeable soils. Additionally, at this depth, the tile system would be below the hydraulic zone of influence of the adjacent TAM Industries sewer lines. This is necessary to assure that groundwater from the landfill flows into the overburden tile system and not into these sewer lines.

While the weathered zone, as defined on page 4 of the Judgment, may be relatively permeable in very localized spots, generally it is considered to be a bottom for the overburden groundwater flow outside of the landfill. (In areas where the weathered zone below the overburden tile drain is found to be pervious, an impervious base is required to be constructed). The overburden tile system, for this reason, is to be placed no deeper than the weathered zone.

It is important to note that the exact depth of the overburden tile system, within these upper and lower limits, will be dependant upon additional site specific soil information that would have to be collected in order to design the overburden tile system.

11. Q: To the best of the knowledge of each party, is the Rochester Shale Zone permeable? Explain the basis for the conclusions reached. How reliable is the current evidence? Have any test borings thus far cut into the Rochester Shale Zone?

A: Shale is a rock type which is comprised primarily of clay particles. As discussed previously in this document, at page 14, it is the opinion of the governmental experts that the Rochester Shale will act as a barrier to the downward migration of chemicals. This opinion is based on the Johnston Study and the personal experience of Dr. David Twedell and Mr. Kernan Davis who have visually examined various rock cores from the Rochester Shale.

12. Q: Is there any evidence that the landfill contents may contain corrosives which would damage the Rochester Shale Zone?

A: There is no evidence to date that chemicals found within the Hyde Park Landfill would have any damaging effect on the Rochester Shale. If a Requisite Remedial Technology relied upon the permeability of the Rochester Shale, additional tests and monitoring would be required. See Paragraph C(8)(f) of Addendum I, at I-19.

13. Q: What is split-spoon sampling?

A: A split-spoon is a device which soil scientists and geologists use to take a core of soil out of the ground. Soil cores are taken, for example, when it is necessary to examine the structure of the soil or when soil is to be analyzed for the presence of chemicals. The soil sampling is done with a length of pipe (usually one to two feet long) that is machined into matching halves. These halves are screwed together so that the pipe can be opened up with a minimum amount of disturbance to the soil sample. A sharpened and tempered cutter is used on the leading edge of the pipe to allow the tube to penetrate the soil. The tube is pushed or driven into the soil, extracted, unscrewed, and opened. The soil core can then be examined or sampled as needed.

14. Q: Distinguish "survey wells", "observation wells," and monitoring wells". When are each used?

A: While these terms do not have unique meanings outside of the context of this proposed Agreement, they do have different meanings for the purpose of this proposed Agreement. These differences are functional differences more than design differences.

Survey wells are those wells which are located and designed to find the spatial distribution of contamination from the landfill - to survey the areal extents of contamination. Water samples will be taken from these wells and water table evaluations or potentiometric surface measurements, as appropriate, will also be taken.

Observation wells, as used on page I-16, are wells which are located and designed to measure the effects of pumping the test purge wells as required in this paragraph. Measuring water table elevations in the observation wells in conjuction with pumping the test purge wells will allow for the determination of site specific hydrologic data such as water conductivity, flow etc.

Monitoring wells are wells which are permanently installed and are used for taking water samples and for measuring water table elevations. They are used to monitor the effectiveness of the remedial technologies.

D. TREATMENT

1. Q: What is an activated carbon waste water treatment system? What are examples of performance equivalents?

A: An activated carbon waste water treatment system is one which removes organic chemicals which are dissolved in water. Activated carbon is prepared from select types of coal, wood or other organic materials which are specially processed. The molecules of organic chemicals are attracted to the surface of the activated carbon and are adsorbed onto the carbon.

An activated carbon waste water treatment system generally consists of two containers or units containing activated carbon which are usually set up in series; this means that contaminated water which is to be treated is passed through the first unit and is subsequently passed through the second unit. As the treated liquid emerges from the second unit, it is analyzed to determine whether a sufficient amount of the organic chemicals are being removed. An activated carbon unit is most effective in removing chemicals when it is new; in other words, the activated carbon is used up over time and has to be replaced. The used activated carbon is referred to as "spent media."

The activated carbon waste water treatment system contained in the proposed Agreement requires three activated carbon units. In this way, if the liquid which emerges from the second unit approaches the treatment levels listed in Paragraph E(2) of Addendum I at I-27, the third unit or back-up unit will begin operating and will replace the unit containing the used activated carbon.

A performance equivalent of an activated carbon waste water treatment system is simply any other technology which will remove organic chemicals as well as activiated carbon. Depending upon factors such as the composition and quantity of contaminated liquid requiring treatment, any one of the following technologies or a combination of them could be considered a performance equivalent for a given chemical: 25/

a. solvent extraction
b. catalysis
c. hydrolysis
d. microwave discharge
e. distillation
f. photolysis
g. steam distillation
h. air stripping
i. molecular sieves
j. centrifuging
k. dialysis
l. biological treatment

None of these technologies are as effective in removing a broad range of organic chemicals as activiated carbon.

2. Q: On page I-27 there is a list of tests to be performed on effluents and the intervals during which they are to be performed. How was the sampling frequency determined? How were the treatment levels generated? Given the severe health danger posed by some of these chemicals, particularly dioxin, are the sampling frequencies adequate to protect the public safety?

A: Activated carbon works by adsorption, a process affected by the affinity and solubility of the chemicals. That is, the smaller and more water soluble molecules, having a low adsorption coefficient, will pass through the activated carbon unit before larger and less soluble molecules, having high adsorption coefficients. Complex organic chemicals pass through the unit very slowly. As increased levels of

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25/ For a more complete discussion of these technologies, See Attachment VI, Hazardous Waste Concentration Technologies published in EPA, Treatment of Hazardous Waste-Proceedings of the Sixth Annual Research Symposium at 50, 52 (1980); and Attachment VII, Rensselaer Polytechnic Institute, Technology for Managing Hazardous Wastes, prepared for the New York State Environmental Facilities Corporation at 111-1 through 111-18 (1979).

poorly retained organics are found in the effluent (discharge) from a carbon unit it is assumed that those with a higher adsorption coefficient will follow eventually and the unit must be replaced before treatment levels are reached. Fortunately, the most troublesome chemicals, like TCDD, BHC, etc., have high adsorption coefficients and are not likely to pass through the units.

Under the proposed Agreement, phenol, TOC and TOH are measured on a daily basis. Phenol is present at the disposal site in high concentrations and quantities, and is present in the aqueous phase. Phenol also has a relatively low absorption coefficient compared to many of the chlorinated organics and, thus, a breakthrough of phenols signals a coming breakthrough for other organics and alerts the operator that the carbon unit needs to be changed.

Total organic carbon (TOC) analysis is a measurement of the total amount of organic carbon present in a water sample and thus gives a fast and simple reading on how effectively a carbon unit is functioning. The TOC measurement does not, however, differentiate specific chemical compounds.

The pH is monitored because the effectiveness of the carbon system is influenced by pH.

The chemicals to be monitored on a weekly basis will provide further verification that the carbon unit is functioning properly. The chemicals were selected on the basis of their presence and concentration in the landfill and in leachate, and the ability of activated carbon to adsorb them (e.g., these chemicals are those which are less readily adsorbed than the chemicals monitored on a monthly basis.)

The chemicals to be sampled on a monthly basis represent those chemicals which, because of their toxicity, quantities, and concentrations, are of most concern at the site. While these chemicals are generally highly absorbed by activated carbon, they are required to be monitored on a monthly basis to provide a final check that the treatment system is properly functioning.

The treatment level concentrations for the chemicals monitored on a weekly or monthly basis were selected on the basis of commonly achievable detection levels, and toxicological concerns. Discharges to the City of Niagara Falls Waste Water Treatment Plant at these concentrations would not have a significant environmental impact. Also, these concentrations, as a whole, represent commonly achievable detection levels using gas chromatography and mass spectrometry analysis.

The semi-annual tetrachlorodibenzo-p-dioxins (TCDD) analysis was required to verify that TCDD was not being discharged into the environment.

It must also be pointed out that mid-point samples (samples taken between the first activated carbon unit and the second unit) are to be taken on a daily basis. While the agreement does not specify the exact parameters, the parameters are to be selected so as to determine when the first unit is to be replaced in order to achieve the required effluent levels.

The effluent from the activated carbon waste water treatment system will be discharged to publicly owned treatment works. Therefore, federal and state regulations regarding direct industrial discharges to navigable waters are not applicable.

Additionally, the Permit requirement and standards of 40 CFR 264 and 265 and 6 NYCRR 360 apply to all aspects of the treatment system not specifically addressed in Addendum I, Paragraph E(2).

The parameters, frequency of sampling and treatment levels described in Addendum I, Paragraph E(2) will be modified to reflect future changes in applicable federal and state statutes and regulations and to meet the federal and state permit requirements for discharges other than to the City of Niagara Falls Waste Water Treatment Plant.

For the reasons stated above, these chemical species, treatment levels, and monitoring frequencies are adequate to protect public safety.

3. Q: What is "spent media"? How can it be regenerated?

A: Spent media is most commonly activated carbon which is used up and can no longer adsorb chemicals; it can also be other adsorption materials or filter media such as sand. Spent carbon is regenerated by thermal reactivation, *i.e.*, heating the carbon to high temperatures so that the chemicals decompose and burn off the carbon. There are limited commercial facilities available which regenerate spent carbon. This is why the proposed Agreement requires that the spent carbon be incinerated or landfilled.

4. Q: There are several forms of treatment proposed for the residue materials. These include: incineration, disposal, or treatment which is the "performance equivalent." How were these chosen? Under what circumstances would each be used? What are the strengths and weaknesses of each? Are there any available technologies not listed? Why not?

A: Incineration and landfilling were chosen because they are effective technologies that are legally permissible. The third category was included so that any technology which can be shown to be a performance equivalent could be utilized. In this case, while other technologies are not specified, it is EPA's policy to encourage private industry to develop innovative technologies to help solve hazardous waste problems. Until a particular technology is proposed, it is impossible to predict when or under what circumstances it might be employed.

5. Q: On page 23 of the Reply Brief of the United States, the government acknowledges that it has chosen to "contain this landfill and treat wastes as they are collected." Have the parties drawn any conclusion yet how waste will be treated? What considerations will influence the decision? If a decision has been made, will it be done on site or transported for treatment elsewhere? Who will perform the treatment? Where will the residue be stored?

A: The wastes collected will be primarily a mixture of the aqueous phase and the non-aqueous phase liquids. These two phases will be separated. Paragraph E(1) of Addendum I specifies that the aqueous phase liquids have to be treated in an activated carbon treatment system or its performance equivalent. Hooker does have the option of discharging directly to the City of Niagara Falls Waste Water Treatment Plant if Hooker can demonstrate that the aqueous phase liquids will not pass through the Waste Water Treatment Plant untreated and further, that there would not be any interference with the disposal of sludges or spent media from the Waste Water Treatment Plant. Treatment levels and monitoring frequencies are specified in the proposed Agreement for the treated effluent if the City of Niagara Falls Waste Water Treatment Plant is utilized. If this facility is not utilized, these levels and frequencies can be modified.

The treatment of aqueous phase chemicals will result in spent media (usually activated carbon), and other semi-solid or solid residues. These wastes may be incinerated or disposed in a secure landfill, or disposed or treated using a performance equivalent of either of these. In addition, the spent media may be regenerated.

Specific standards that any incinerator used to treat these residues must meet are specified (Addendum I, Paragraph E (6)). These exceed the standards necessary to comply with 40 C.F.R. 264, Subpart O, and State approved incinerator standards and permit requirements.

The proposed Agreement does not specify where any storage, treatment, incineration or disposal will take place. As long as federal, state and local requirements are met, Hooker has the option to decide where and by whom such storage, treatment and disposal will occur.

6. Q. What interim steps have already been taken to contain the landfill and its contents?

A. The following steps were taken by Hooker during 1979 and 1980:

1. The existing overburden tile drain system was installed.

2. A cap was placed over the site.

3. A security fence was constructed around the site and the Bloody Run basin.

4. The lagoons were drained, reconstructed, and relined with three feet of clay. A plastic cover has also been placed over the chemicals in the lagoons.

7. Q. Is there any evidence to date of particulate migration? If so, how concentrated? Is there any danger to human life? What remedies have been undertaken?

A. NIOSH has sampled the dust in Grief Bros. and TAM (formerly NL) Industries and has detected quantities of dioxins, mirex, and lindane (one isomer of BHC) in the parts per billion (ppb) range in settled dust samples taken from the rafters. NIOSH, Health Evaluation Report No. 79-022-789 at 1, 9 (1981) (hereinafter referred to as the "NIOSH Report"). The report concluded that the sampling results suggest that airborne exposures have occurred in the past, but that the "extent, degree or timing of possible worker exposure is, however, well beyond conjecture and cannot be determined from the sample results." Id. at Appendix C: Document 1 at 1. The dust from the rafters in the factories has been removed and properly disposed of.

The NIOSH evaluation was based on several factors (1) the concentration of chemicals in the soil is relatively low; (2) the prevailing wind patterns generally blow away from the homes; (3) generally, the concentration of dust decreases as the distance from the source increases; (4) the nearest home is approximately 800 feet away from the landfill; and (5) dust is continually being removed from the homes as a result of cleaning.

It is the judgment of the Federal and State governments that the existing data does not warrant permanent relocation of the residents of the Hyde Park - Bloody Run area. The only way to determine with absolute certainty whether there is chemical-laden dust from the Hyde Park landfill in the home is to actually sample. To fully address the concerns about migration of chemical-laden dust to the residential areas, the State will initiate within 60 days after approval of the proposed Agreement, a program to determine past migration of particulates. Paragraph M of Addendum I also provides for a method to remedy such contamination if it is found. See Response to Public Comments, at 9.

8. Q: Hooker may store spent media and residue in existing lagoons. Is likely to exacerbate the contamination? e.g., how will the chemicals be kept from the air, sinking anew, creating new plumes? How safe is the proposal to store this material for up to a year without significant monitoring or containment precautions?

A: The governmental parties believe that it is safe to continue storing aqueous and non-aqueous phase liquids for up to a year in the existing lagoons without further testing. This belief is based on the following facts:

(1) The existing lagoons were completely reconstructed in 1979 with a three foot thick clay liner on their bottoms and sides. This liner effectively contains the contents of the lagoons.

(2) The new clay liner should not be degraded or destroyed by the contents of the lagoon in the time period of concern. The old lagoons had contained the same liquids for about four years without losing their integrity (this fact is based on visual observations made of the old clay liner during reconstruction).

(3) The plastic sheet which presently serves as a cover for the lagoons has been found to be an effective barrier to the dispersion of airborne emissions from the site during the approximately two years in which it has been used. However, this plastic sheet must be frequently inspected for tears etc., and has required replacement.

The court should note that spent media is not and will not be stored in these lagoons.

9. Q: What considerations will be taken into account in deciding whether to cap or excavate Bloody Run Creek? Why does the determination of the final boundary of the containment area only depend on the detection of TCDD and not other chemicals?

A: The relative risks and benefits of capping versus excavation will be determined by the Bloody Run options evaluation required by Addendum I, Paragraph F.

The detection of TCDD is used as a confirmatory measure to determine the final boundary. The indicator chemicals (MCT, MCB, TCP and HCB) are used to determine the outer limit of migration, but due to the extreme toxicity of TCDD at low levels and the fact that it binds to the soil, the governmental parties included TCDD analysis.

E. MONITORING

1. Q: If the purge well system is used and at some time in the next 35 years there is a change in the geological structure of the landfill area-- whether by tremors, shifts, changing soil and rock formations, or by non-natural forces such as pipe-bursts, explosions or construction--such that the existing technology will no longer meet specifications, who will install new technology? Who will pay for such an eventuality?

A: Hooker is obligated by the proposed Agreement to install and maintain the remedial technologies as long as necessary to protect against an endangerment to the public health and the environment. Paragraphs B, F, and G of Addendum III (at III- 1,2); Response to Court Order of February 12, 1981 at 23. There is no qualification or limit except for the type of natural or man-made disaster described in this question. In this instance, the force majeure provision, Paragraph 8(b) of

Addendum I (at 13) would undoubtedly apply.

2. Q: Who will monitor the site after the maintenance period is terminated?

A: Paragraph Q of Addendum II, at II- 12, requires Hooker to monitor the site for three years after maintenance is terminated. However, the Maintenance Program, Paragraph B of Addendum III, at 1, includes the maintenance of all monitoring facilities. The court may extend this time beyond the 3 year period if necessary, to effectuate the purposes and goals of this Judgment.

3. Q: How long are the containment technologies likely to last without replacement? Who has the obligation to effect repairs?

A: Various components of the specified containment technologies will last different lengths of time without requiring replacement. Some components, such as pumps, will only last on the order of years without needing to be replaced or rebuilt. Other components such as purge wells could last on the order of 35 years or longer. Hooker is obligated, as part of the Maintenance Program, Addendum III, to make any and all repairs as necessary.

4. Q: Is it possible that the direction of migration could change after a four-year hiatus?

A: Groundwater generally does not change direction unless there is a substantial change in the amount and location of the source of water entering or being withdrawn from the ground.

5. Q: What is the possibility of the chemicals drifting downward to the Rochester Shale?

A: The governmental experts believe that the aqueous phase chemicals have and will continue to migrate into the Lockport Dolomite. Most of this migration is believed to be in the upper 10 to 15 feet of the Lockport Dolomite.

The flow of non-aqeous phase chemicals in the Lockport Dolomite is analogous to the flow of molasses if poured over a stack of bricks. The non-aqueous phase chemicals will flow through the cracks in the fractured rock; they will flow under the force of gravity, but will preferentially move in the same direction as the dip or slant of the bedding planes of the rock. (In the area of the Hyde Park Landfill, the rock dips in a southerly direction). It is unknown at this time whether the lower portion of the Lockport Dolomite would prevent the migration of non-aqueous phase chemicals; however, it is unlikely that non-aqueous phase chemicals would migrate below the top of the Rochester Shale.

6. Q: How likely is it that such a drift would not be detected using current technology?

A: It is expected that the downward migration of chemicals will be detected by the survey wells to be installed in accordance with subparagraphs C(4) and C(5) of Addendum I, at I-14.

7. Q: How likely is it that these chemicals will change direction? How likely is it that such a change will be detected? It is possible that the chemicals could migrate downward without detection, then change direction for the Niagara River?

A: Aqueous phase chemicals flow with the groundwater and therefore will only change directions if the groundwater does.

As described above, the survey wells ring the perimeter of the site and are expected to detect the migration of non-aqueous phase chemicals where it has occurred. It should also be emphasized that the proposed Agreement was designed so that additional monitoring wells could be added, if necessary, as part of the Requisite Remedial Technology study. It is therefore not likely that chemicals could migrate to the Niagara River without being detected.

8. Q: How impermeable is the Rochester Shale? Once the chemicals are in contact with or corrode the bedrock, is there any possibility of stopping or channeling the migration?

A: As indicated above, at 29, the Rochester Shale is believed to be relatively impermeable.

9. Q: Under what specific factual circumstances is it contemplated the Barrier-Collection Systems may be suspended?

A: Paragraph E(9) of Addendum I, at I-35 specifies three circumstances which allow suspension of the operation of one or more of the Barrier Collection Systems.

The first circumstance can occur when Hooker has attempted to obtain a federal, state or local permit or authorization, the permit or authorization has not been issued, and Hooker has notified the federal and state governments of the inability to obtain the permit or authorization. Under this circumstance, if the failure to obtain the permit or authorization effectively prevents compliance with the proposed

Agreement, Hooker can suspend operation of the Barrier Collection Systems. An example of this type of situation would be if the lagoons or bulk containers used to store collected liquids become filled and Hooker must obtain a permit or authorization to remove the chemicals for treatment purposes. The failure to obtain the permit or authorization expeditiously would prevent legally permissible treatment of the chemicals. Given this situation, Hooker could temporarily suspend operation of the Barrier Collection Systems.

The second circumstance can occur when a permit or authorization is issued but contains terms or conditions that are not specifically required by a federal or state statute or regulation or by the proposed Agreement such that the condition or terms effectively prevent compliance with the proposed Agreement. An example of this situation is a permit which requires the payment of substantial fees or inconsistent technical requirements.

The third circumstance can occur when Hooker is required in accordance with the proposed Agreement to cease incineration or activated carbon treatment. Since the lagoons or bulk containers have limited storage capacity, Hooker would have to suspend operation of the Barrier Collection System.

Paragraph F of Addendum III sets forth the criteria upon which the Barrier Collection Systems may be suspended in the future. The factual circumstances which might invoke this provision cannot now be entirely predicted. However, one example might well be as follows. The purge well system, as implemented, may be overdesigned, that is, more wells may be put in place than are actually necessary to effectively operate the system. If Hooker can demonstrate to EPA/State that the shutdown of a well or wells will not affect the proper operation of the rest of the system, the proposed Agreement permits them to do so.

10. Q: What is a "porcupine or a sponge pig"?

A: A "porcupine" is a cylindrical brush with stiff wire bristles which is used to scrape out the interiors of storm sewers. A "sponge pig" is composed of absorbent material which fits snugly into a sewer pipe and is used to swab out any debris or sediment off the walls of the pipe.

11. Q: There appear to be no plans to monitor immediately below the landfill. Can sinkage and downward seepage be adequately detected without a monitoring well or the like? What evidence is there for this conclusion? Is there a safety or containment consideration arguing against such a well?

A: There will be monitoring wells along the perimeter of the landfill which are expected to detect the migration of chemicals from below the site. By drilling additional holes into the landfill, new pathways for the migration of chemicals may be created. Sufficient information as to the extent of migration can be obtained by the surveys required under the decree, without the risks which drilling through the landfill would entail.

In addition, drilling wells into hazardous waste landfills is a dangerous procedure because there is a risk of exposure to toxic fumes and and particulate matter as the interior of the landfill is exposed. There is also a risk of explosions (when drilling equipment hits explosive material). It is the policy of the Environmental Protection Agency that "[d]rilling in HWS [hazardous waste site] investigations and ES [emergency spill] responses should be confined to the periphery of the sites, with the objective of characterizing the leachate that may be moving away from the site." See Attachment VIII, Appendix 5 of Draft Safety Manual for Hazardous Waste Site Investigation (Aug. 29, 1980).

12. Q: In the event that migration beyond the parameters is detected by the periodic monitoring called for at Addendum II-3, will monitoring be stepped up?

A: Yes, monitoring is stepped up. If the effectiveness criteria specified in Paragraphs J(2)(a) and P of Addendum II, at II-7 and II-11, respectively, are not met, Hooker must commence quarterly rather than annual sampling.

13. Q: What is the significance of "stabilization".

A: Once the remedial technologies have been installed at the site, the chemical and hydrologic flow patterns will be altered. The tile drain and purge well systems will be withdrawing larger quantities of groundwater (and therefore the chemicals dissolved in that groundwater). The existing flow patterns will be altered over time. However, the installation of the tile drain, purge wells or cap does not mean that the system will instantaneously contain the site. It will take time for each purge well to establish its area of influence. This time between the commencement of operation of the remedial system and the point when the new groundwater flow patterns become regular or stable is called the time to "stabilization."

The point at which stabilization will be achieved cannot be accurately predicted at this time because it is determined by statistical analysis of actual filed measurements. However, it is important to note that the system will be evaluated for effectiveness no later than the first day of the sixth year after installation regardless of whether stabilization has occurred. Thus, in the event that a particular technology is not working (which would prevent stabilization from being achieved), appropriate actions can be taken to remedy the situation.

III. CONCLUSION

The United States and the State of New York believe that the entry of this proposed Agreement will serve the public interests by protecting against endangerment to human health and the environment in the Hyde Park - Bloody Run area. This is the stated goal of the proposed Agreement and of the governmental parties to this suit. For all the reasons set forth herein and based on the entire record in this case, the United States and the State of New York respectfully urge the prompt entry of this proposed Agreement.

Respectfully submitted,

UNITED STATES OF AMERICA

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Dated: September 4, 1981

By: Mary Ellen Burns/MK
Mary Ellen Burns
Assistant Attorney General of the State of New York

By: Lorelei Joy Borland/MF
Lorelei Joy Borland
Assistant Attorney General of the State of New York

Dated: September 4, 1981

Soil

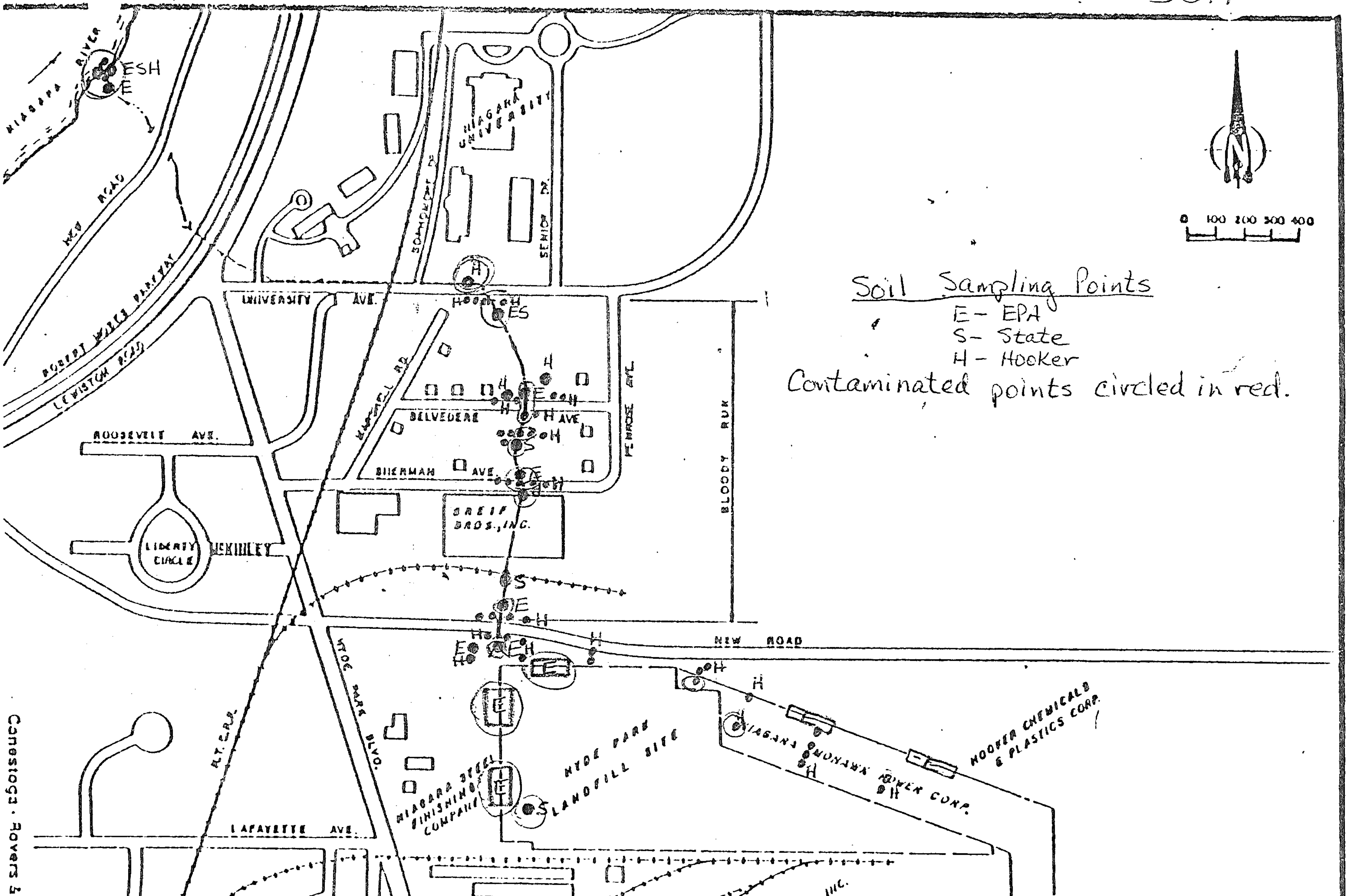
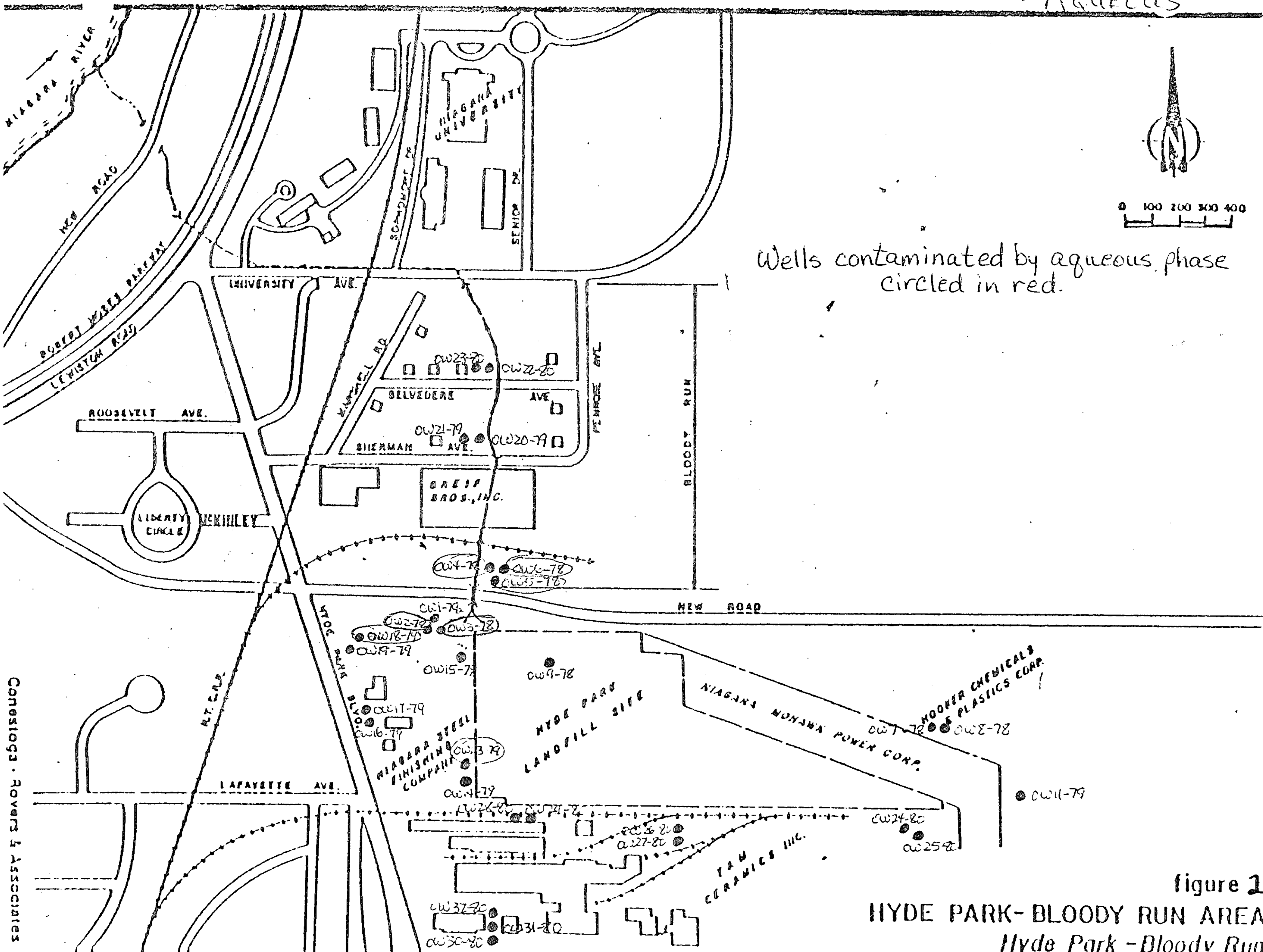


figure 1
HYDE PARK-BLOODY RUN AREA
Hyde Park - Bloody Run

879-608

Aqueous

Wells contaminated by aqueous phase circled in red.



Conestoga - Rovers & Associates

figure 1
HYDE PARK- BLOODY RUN AREA
Hyde Park - Bloody Run

979-608

Federal Witness List and Statements of Proof

Dr. W. Lamar Miller- Technical Director,
Waste Programs Enforcement
Environmental Protection Agency

Statement of Proof

Dr. Miller will describe the structure of EPA's hazardous waste enforcement effort and the strategies ~~and policies~~ adopted by EPA to address hazardous waste ~~problems, particularly~~ as they relate to the present case. Dr. Miller will also describe the physical properties of aqueous and non-aqueous phase chemicals. He will provide the ~~technical rationale~~ for the choice of indicator chemicals and the levels used for these chemicals. He will provide assurances that EPA will provide adequate resources to implement the proposed Agreement.

Dep

where + in what circum. have they prop. total removal

* vol. reason for total removal ie site more + not less dangerous

R. Charles Morgan- Environmental Health Scientist,
Chief Technical Negotiator
for all Hooker Cases,
Waste Programs Enforcement
Environmental Protection Agency

Statement of Proof

Mr. Morgan will generally describe the complexities involved in the investigation of a hazardous waste site and the ~~need for an inter-disciplinary~~ approach with respect to the design of a total remedial program. He will describe the various expertise represented on the negotiating team and consultations with experts within the Federal government that were used during the negotiations and will be used during the implementation of the proposed Agreement. He will also provide a geographical orientation of where the site is located, where contamination has been found, and other relevant facts.

Is there some kind of risk-benefit analysis is standard techniques

Risk Assessment analysis for various options

Dep

Richard Johnston- Chief Geologist,
United States Geological Survey

Grant

Statement of Proof

Mr. Johnston will testify as to the contents and meaning of his report on the water-bearing zones in the Niagara Falls region. He will also describe the inadvisability

what type what filters

How did your approach turn out to be less than removal

Pop. at risk mat. giving use #s. of pathways

how many people

shd have determined redundant safety zone quantified of using regional data and reports for site specific determinations.

Dr. David Twedell- Geologist,
EPA Consultant,
JRB Associates

Statement of Proof

Dr. Twedell will describe on a conceptual basis, how a tile drain system, purge wells, grout curtain walls, and possibly other technologies work. Dr. Twedell will indicate whether the systems required by the proposed Agreement are feasible and how the technologies cited in the proposed Agreement may be feasible in and around the specific geology around the landfill site.

Donald Oberacker- Senior Mechanical Engineer,
Incineration Research Branch,
Industrial Environmental Research Laboratory,
Environmental Protection Agency

Statement of Proof

Mr. Oberacker will testify generally concerning how incinerators work, what generally is burned in them, and what special conditions are necessary to incinerate hazardous waste. He will describe whether and how soil and rock can be incinerated. He will also describe the incineration capacity in the United States and how long it would take to incinerate large quantities of soil and rock.

Dr. Ben Mason- Soil Scientist,
EPA Consultant
Ethura, Inc.

Statement of Proof

Dr. Mason will testify concerning the practical problems of excavating large quantities of soil and rock. He will also describe the factors that must be considered in balancing the risks versus the benefits of excavation, particularly the health and safety concerns. He will explain that one of the primary concerns is exposure of the surrounding population to contaminated dust.

The State Witness List and Statements of Proof

Kernan Davis- Engineering Geologist,
New York Department of Environmental Conservation

Statement of Proof

Mr. Davis will provide testimony relating to the geology in immediate vicinity of the Hyde Park landfill. He will discuss both the geology and the hydrology in the area, including his interpretation of the available geologic data obtained at the Hyde Park landfill. Mr. Davis will also testify about the methods of obtaining data necessary to perform a site investigation.

Paul Richard Counterman- Physical Engineer,
Chief of the Chemical Technology Section
New York Department of Environmental Conservation

Statement of Proof

Idept Green

Mr. Counterman will testify about issues relating to the selection of specific containment technologies provided in the proposed Agreement. His testimony will encompass the rationale for the selection of those technologies, and a description of the technologies which were considered, but not specified. Mr. Counterman will also testify about the methods of waste treatment and disposal specified in the proposed Agreement.

William N. Stasiuk, Jr.- Physical Engineer, Ph.D.
Associate Director,
Division of Environmental Health
New York Department of Health

Klep + Rickles

Statement of Proof

Dr. Stasiuk's testimony will focus on the provisions in the proposed Agreement which relate to air monitoring during the remedial construction activity.

The resumes or curricula vitae of most of the Federal and State witnesses are contained in Exhibit B of the Response to the Court Order of February 12, 1981. Mr. Oberacker's resume is attached.