REGION III, EPA
PHILADELPHIA, PA

EXPLANATION OF SIGNIFICANT DIFFERENCES
FOR THE TYBOUTS CORNER LANDFILL SITE
NEW CASTLE COUNTY, DELAWARE

MAY 1992

AR002937

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EXPLANATION OF SIGNIFICANT DIFFERENCES

Tybouts Corner Landfill Superfund Site
New Castle County, Delaware

I. Introduction

This Explanation of Significant Differences (ESD) is issued in accordance with section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9617(c), which requires the United States Environmental Protection Agency (EPA) to issue such a document where a remedial action will differ in any significant, but not fundamental, respect from that selected by EPA and described in the Record of Decision. This ESD relates to remedial action selected by EPA for implementation at the Tybouts Corner Landfill Superfund Site in New Castle County, Delaware (Site), in a Record of Decision issued on March 6, 1986. EPA issues this ESD after considering information gathered during predesign field explorations.

The Tybouts Corner Landfill Superfund Site is located in northern Delaware, New Castle County, approximately ten miles south of Wilmington and a few miles west of the Delaware River. The Site consists of two fill areas. The main fill (main landfill) is about 47 acres in size and is located near the confluence of Pigeon Run and Red Lion Creek, in a triangular area northeast of Pigeon Run, between U.S. Route 13 and State Route 71. A smaller fill area, estimated to be about four acres, is located just west of Pigeon Run. Figure 1 shows the approximate limits of the fill areas.

EPA Region III has served as the Lead Agency for both the Remedial Investigation/Feasibility Study (RI/FS) and the Remedial Design/Remedial Action (RD/RA). The Delaware Department of Natural Resources and Environmental Control (DNREC) has been the Support Agency. Two Records of Decision have been issued for this Site. The first Record of Decision (ROD) was signed on September 13, 1984. The second ROD was signed on March 6, 1986.

In April 1989, a mixed-funding settlement under which the remedy selected in the March 6, 1986 ROD would be implemented was entered in Federal District Court. In that settlement, New Castle County, Stauffer Chemical Company, and ICI Americas Inc. (Settlors) agreed to design and construct the remedial action and finance 79% of the project. Under the settlement, Budd Company, E.I. duPont de Nemours & Company, Witco Corporation, William C. Ward, and J.T. Ward & Son Contractors Inc. agreed to finance an additional 14.25% of the cost of the project. The Superfund Trust Fund will contribute the remaining 6.75% of the cost of the project.

EPA concludes that the remedy selected in the March 6, 1986 ROD, as modified by this ESD, can meet the objectives of the March 6, 1986 ROD and the performance objectives established in the settlement documents.

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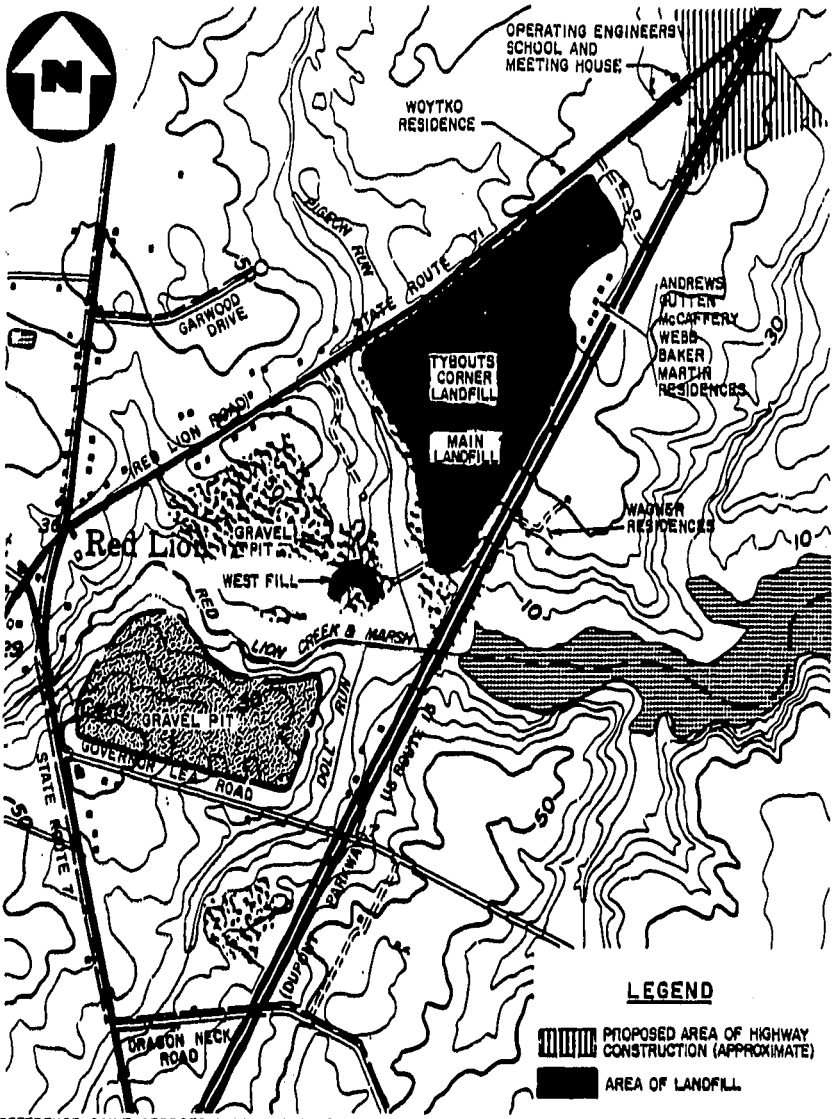

REFERENCE: SAINT GEORGES QUADRANGLE, DELAWARE - NEW CASTLE CO., 7.5 MINUTE SERIES, 1953, PHOTOREVISED 1970. U.S. GEOLOGICAL SURVEY.

FIGURE 1

SITE LOCATION MAP

TYBOUTS CORNER LANDFILL SITE, NEW CASTLE CO., DE

SCALE: 1"=1000'

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NUS CORPORATION

A Halliburton Company

This ESD is issued as a result of information obtained during predesign field explorations conducted by the Settlors. A copy of this ESD, together with information supporting the changes described herein, will be included in a supplemental Administrative Record File for the Site. An index of the documents contained within this supplemental Administrative Record is attached as Appendix I. The supplemental Administrative Record File, as well as the Administrative Record supporting the March 6, 1986 ROD, is available at the following locations:

U.S. EPA Region III Docket Room
c/o Anna Butch
841 Chestnut Bldg., 9th Floor
Philadelphia, PA 19107
215/597-3037

DNREC
Alejandro J. Gonzalez
715 Grantham Lane
New Castle, DE 19720
302/323-5317

Wilmington Public Library
Reference Area - 3rd Floor
Rodney Square
P.O. Box 2303
10th & Market Sts.
Wilmington, DE 19899
302/571-7406

II. Summary of Site History, Contamination Problems, and Selected Remedy

The Tybouts Corner Superfund Site was placed on the original CERCLA National Priorities List (NPL) in September 1983. The Site is ranked as the Number 2 Site on the NPL due to the threat of contamination of the regional aquifer, which is the primary source of water in this region of Delaware. The Tybouts Corner Landfill (Landfill) was used by the New Castle County Department of Public Works as a municipal landfill for the disposal of municipal and domestic refuse from approximately December 1968 through July 1971. Industrial wastes were disposed there during the active life of the Landfill. These industrial wastes included trichloroethylene, 1,2-dichloroethane, benzene, and various other organic and inorganic chemicals.

Two major geologic formations, the Columbia formation and the Potomac formation, exist beneath the Landfill. These formations are separated by the Merchantville formation. The Columbia formation contains the shallow aquifer. The Potomac formation, which is divided into the Potomac No. 1 Sand (PN-1 Sand) and the

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Potomac No. 2 Sand (PN-2 Sand), is a major regional aquifer serving municipalities in the area. Both the Columbia formation and the two sands in the Potomac formation were found to be contaminated. Two water supply wells in the vicinity of the Landfill were also found to be contaminated. On September 13, 1984, EPA issued a ROD calling for installation of a public water supply line for the residences that had contaminated wells, and for the residences whose wells were potentially threatened. Installation of this water supply line was completed in 1985.

The major potential impact from the Landfill on the ecology of the area is the impact of leachate contamination on Red Lion Creek Marsh and on the Pigeon Run Wetlands. Analyses conducted during the RI indicate, however, that organic contaminants in the creeks and wetlands at and downgradient from the leachate seeps are not at levels considered harmful to the ecology.

On March 6, 1986, EPA issued a second ROD calling for the construction of a Resource Conservation and Recovery Act (RCRA) type cap and implementation of groundwater controls designed to prevent further contamination from reaching the regional aquifer. EPA's remedial objectives were identified in the March 6, 1986 ROD as follows:

- Eliminate or appreciably reduce vertical infiltration of rainfall through the main and west fill areas;
- Eliminate or control lateral migration of groundwater into the main and west fill areas; and
- Eliminate or control the contaminated groundwater presently in the Columbia Aquifer and the PN-1 Sand of the Potomac.

See 1986 ROD, at 31. The 1986 ROD identified the following remedial actions selected by EPA to achieve the objectives listed above:

"1. The west fill will be excavated and consolidated with the main fill. Excavation will include all municipal and industrial wastes as well as contaminated subsoils. The amount of contaminated subsoil to be removed will be based on a site-specific chemical fate and transport analysis. This analysis will be conducted to ensure that no soil remains in place which could cause groundwater contamination to exceed the standards established in the ROD. The excavated area will be backfilled with suitable clean fill material.

"2. A multi-layered cap that complies with RCRA will be placed over the consolidated main fill area to

significantly reduce or eliminate the vertical infiltration of precipitation.

"3. A subsurface drain or trench system will be installed to prohibit continued lateral migration of groundwater through the fill and to collect existing leachate from the fill. The multi-layered cap and the subsurface drain/trench system together are intended to dewater the consolidated fill. This groundwater diversion system and multi-layered cap will be maintained until they are no longer needed.

"4. The offsite plume of contaminated groundwater in the Upper Hydrologic Zone (PN-1 Sand) of the Potomac will be pumped and treated or otherwise disposed of, either onsite or offsite. During the pumping, institutional controls to restrict use of the groundwater will be utilized.

The goal of the offsite groundwater pumping will be to reduce the level of contaminants to 100 ppb of total volatile organics with separate standards for the following cancer-causing contaminants where MCL's are available. The levels for these specific substances are listed here.

Vinyl chloride	1.0 ppb
Benzene	5.0 ppb
1,2-Dichloroethane	5.0 ppb

These standards are anticipated to meet the goal of a 10^{-4} cancer risk at the boundary of the landfill property.

Groundwater will be pumped for a minimum of three years, at which time pumping will be discontinued if contaminant levels have been reduced to standards set above. If the standards are not reached, pumping will continue for another three years. If after that time the standards have not been met but pumping has achieved substantial compliance with the standards and the levels of contaminants are constant in each well, pumping will be discontinued. If not, pumping will continue for another four years. If after the ten-year pumping period, standards have still not been met, EPA will evaluate the technical feasibility of meeting the standards and set new ones if necessary. Pumping may be terminated if it is shown that no reasonable modification of the pumping system or additional years of pumping would produce significant improvement.

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EPA will then examine the need for additional monitoring locations to assure that the influence of any off-site production well will not affect the remaining contaminated groundwater from Tybouts Corner Landfill.

The off-site contaminant plume in the Columbia Aquifer will be allowed to flush itself clean. Once the source control is in place, no further contamination will enter the Columbia Aquifer and EPA predicts that it could take between 10 to 15 years for all of the water that is contaminated to pass through the aquifer and seep into the Red Lion Creek Marsh. In the area of contaminated groundwater, the Columbia is not hydraulically connected to the Potomac and the pumping of the Potomac should not influence the path of the Columbia contaminant plume.

"5. Contaminated water generated by excavation, construction, subsurface drainage system collection and groundwater pumping will either be sent to a local sewage treatment plant offsite, or treated onsite. It is possible that a combination of these two treatment systems and locations will be used. All treated water will meet NPDES standards before disposal to surface waters, including any pretreatment requirements if a sewage treatment plant is utilized. All waters will be disposed of in compliance with local, state and federal law.

"6. A health and safety plan will be implemented for all activities described in the ROD. During excavation and construction activities, air monitoring will be conducted to ensure the safety of the onsite workers as well as to protect the residents living nearby the excavated areas.

"7. A monitoring program will be established to ensure that groundwater quality, surface water quality, the multi-layer cap and air quality are maintained."

1986 Record of Decision, at 49, 52-53.

The 1986 ROD calls for the installation of a cap and groundwater controls. The groundwater controls described in the 1986 ROD consist of upgradient (north) and downgradient (south) subsurface drains and a system of interceptor wells designed to pump contaminated groundwater emanating from the downgradient side of the Site and the offsite plume in the PN-1 Sand. The 1986 ROD specifies that contaminated groundwater will be treated prior to discharge into the local publicly owned treatment facility. The subsurface drains and interceptor well locations as conceptualized in the 1986 ROD are shown on Figure 2.

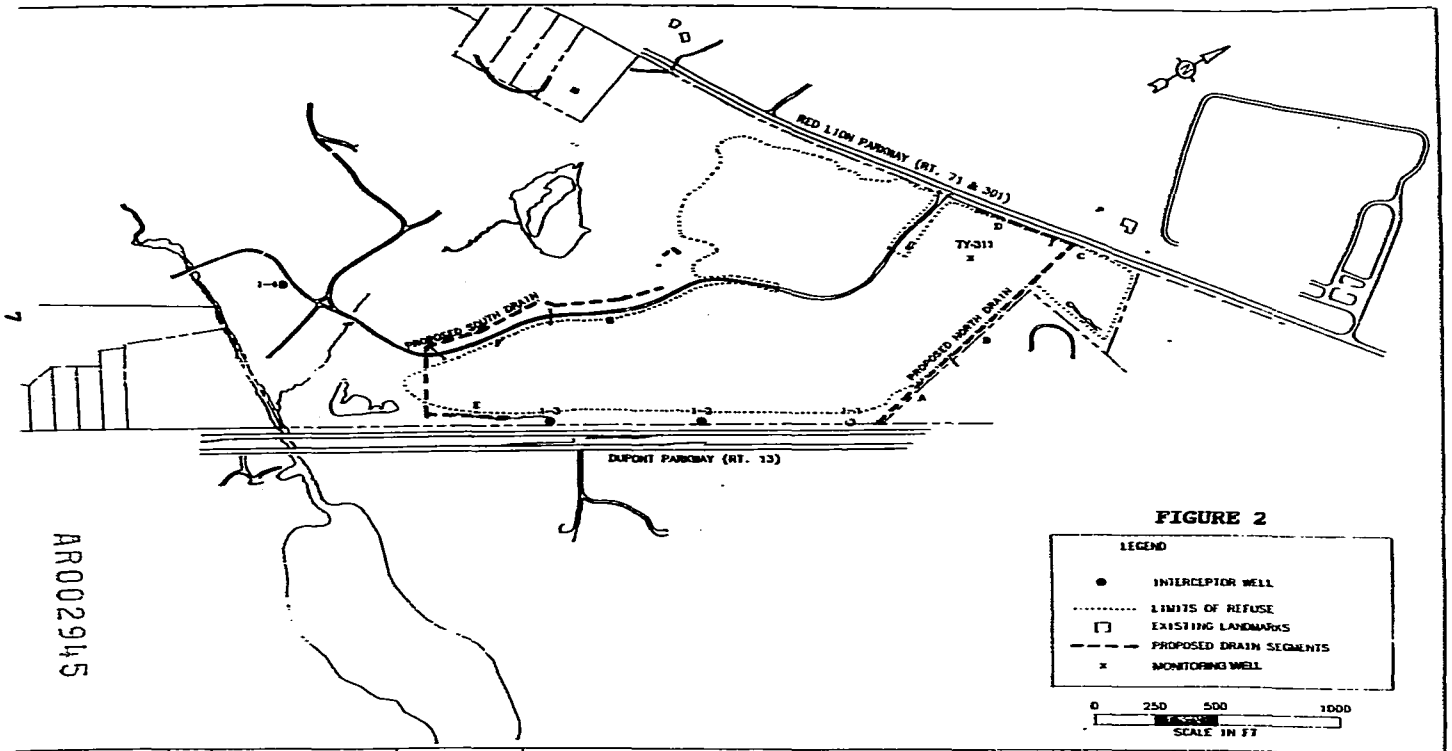

FIGURE 2

ROD DESIGN CONCEPT

TYBOUTS CORNER LANDFILL
NEW CASTLE COUNTY – DELAWARE

DPL Consultants

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III. Description of Significant Differences and the Basis for these Differences

A. Significant Differences - This section evaluates and selects significant, but not fundamental, changes to the remedy identified in the 1986 ROD, which changes are based on EPA's current understanding of Site conditions. The current information is derived from predesign (post-ROD) hydrogeologic explorations conducted by the Settlors (see ESD section I) in an effort to obtain supplemental information from which to develop plans and specifications for completion of the remedial design. Based on this information, EPA identifies significant changes to the remedy selected in the 1986 ROD as follows:

- Lateral migration of groundwater into the refuse will be controlled by use of a slurry trench rather than the north subsurface drain.

- Leachate emanating from the downgradient side of the Landfill will be collected by interceptor wells rather than the south subsurface drain. As required in the ROD, the interceptor wells will also be used to control migration of contaminated groundwater in the PN-1 Sand.

B. Summary of New Data - The following is a brief summary of the post-ROD data that was gathered during predesign activities. Detailed information supporting issuance of this ESD may be found in the Administrative Record for this Site. Information leading to the modifications specified in this ESD includes the following:

- Pre-ROD data indicated that an aquitard (confining layer) was present beneath the proposed location of the southern subsurface drain; however, post-ROD data has shown that the aquitard is missing in that location;

- Pre-ROD and post-ROD information have both indicated that lateral groundwater movement at the water table and in the PN-1 Sand is generally to the south;

- Post-ROD pump tests indicate that overlapping cones of influence can be achieved by using a system of interceptor wells; and

- Pre-ROD data indicated that the aquitard was missing in the vicinity of well TY-311 (see Figure 2). Post-ROD borings and geophysical logging has revealed that the aquitard is present throughout this area.

During pre-design activities, groundwater flow under various conditions was evaluated by Settlors using a revised version of the U.S. Geological Survey finite-difference model (MODFLOW) used by

EPA during the RI/FS for this Site. This model is a time-dependent numerical model that simulates three dimensional groundwater flow patterns. The model used during the RI/FS simulated two geologic formations--the Columbia Formation and refuse (upper layer) and the PN-1 Sand (lower layer). The Merchantville Formation and associated silts were treated as an aquitard between the upper and lower layers. During the RI/FS, EPA used the MODFLOW model to evaluate the effectiveness of a slurry trench along the eastern and northern boundaries of the main landfill. The results prompted EPA to conclude that the slurry trench/surface cap would not eliminate the generation of leachate and could cause groundwater elevations in the Columbia formation outside the main landfill to increase substantially (simulated rise was over 10 feet in some places) over the present static water levels. EPA therefore eliminated the slurry trench from further consideration. Based on the results of the post-ROD MODFLOW modeling efforts, substantial rises in groundwater elevations (as previously predicted) are no longer expected to occur, therefore, the use of a slurry trench now merits further consideration.

In order to reevaluate the use of a slurry trench, the pre-ROD version of the MODFLOW model was revised using information obtained during predesign explorations. The current (post-ROD) MODFLOW model was set up to simulate three distinct hydraulic units--the Columbia/Refuse, the PN-1 Sand, and the PN-2 Sand (modeled as layers 1, 2, and 3, respectively). Aquitards were simulated where present between layers. The PN-2 Sand and the overlying clay unit (not simulated during the RI/FS) were added to the current model to better simulate existing hydraulic conditions at the Site. The areal extent of the model was increased in size from that used during the RI/FS. Input hydraulic parameters compiled from post-ROD field data were incorporated into the model. A river package now available for use in the MODFLOW model was incorporated to simulate the Pigeon Run and Red Lion Creek surface water bodies.

A major result of the revised (post-ROD) model was improved simulation of the aquitard. Post-ROD field explorations clarified that the Merchantville Formation is distinct from the various clayey silts located within the Columbia and PN-Sand formations. Post-ROD borings at the south end of the main landfill revealed areas with no aquitard. The pre-ROD model was revised to reflect contact in this southern area between refuse and the PN-1 Sand. In addition to this refined interpretation of the aquitard, vertical permeabilities used in the model were modified using information obtained during pre-design activities. All revisions to the MODFLOW model are discussed in the "Design Report on Alternative Groundwater Controls for Tybouts Corner Landfill" which has been included in the Administrative Record for this Site.

C. <u>Basis for Significant Differences</u> - The predesign (post-ROD) field explorations and evaluations provided information sup-

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porting the remedy modifications identified in this ESD. EPA expects that the remedial action, including these modifications, will achieve the requirements of the ROD. The following paragraphs summarize EPA's rationale for the changes identified in this ESD.

1. Slurry Trench in Lieu of Northern Subsurface Drain

The function of the northern drain identified in the 1986 ROD was to intercept ambient groundwater flow which might otherwise enter refuse and create new leachate. This drain, 30-40 feet deep and keyed into the confining layer, was to have been constructed along the property line, across the "dog leg," and along Route 71 for an unspecified distance (see Figure 2). Effluent from the drain was initially to have been treated prior to discharge to the county sewer system on the assumption that this effluent would be contaminated (because the drain would have been constructed within portions of the landfill refuse). The drain was expected at some unspecified future time to discharge ambient groundwater, the quality of which would be adequate to allow direct discharge to Pigeon Run.

The post-ROD exploration borings performed in 1990 provided additional data useful in understanding the configuration and structure of the upper surface of the aquitard. These borings revealed a high point in the aquitard along the north drain location which creates a groundwater divide. The aquitard's upper surface was shown to drop to a low point of approximately 25 feet (above MSL) midway along the northeast side of the main landfill and then rise to an elevation of nearly 35 feet midway across the "dog leg" of the main landfill. This configuration would have required a drain consisting of two segments--one segment running from Route 13 to the low point of the aquitard and on to the "dog leg" and a second segment running along Route 71. Two pumping stations would have been required--one for the northeast section and one for the Route 71 section. Discharge from each segment would have been pumped to the pretreatment facility, now proposed to be located at the south end of the main landfill.

Current design work has led to design modifications which include use of a passive slurry trench as opposed to the northern drain (see Figure 3). As opposed to the drain system, which would collect groundwater intercepted at this location, the slurry trench will block and divert groundwater away from the main landfill. Recent groundwater data obtained from the area to the north of Route 71 indicates that groundwater control on that parcel is influenced by a westward-flowing tributary to Pigeon Run. This tributary controls the water table elevation and hence ambient groundwater flow in the area. The revised MODFLOW model reflects that groundwater flow beneath Route 71 into the main landfill to the south would be minimal. A slurry trench can be as effective as the drain system in intercepting this groundwater.

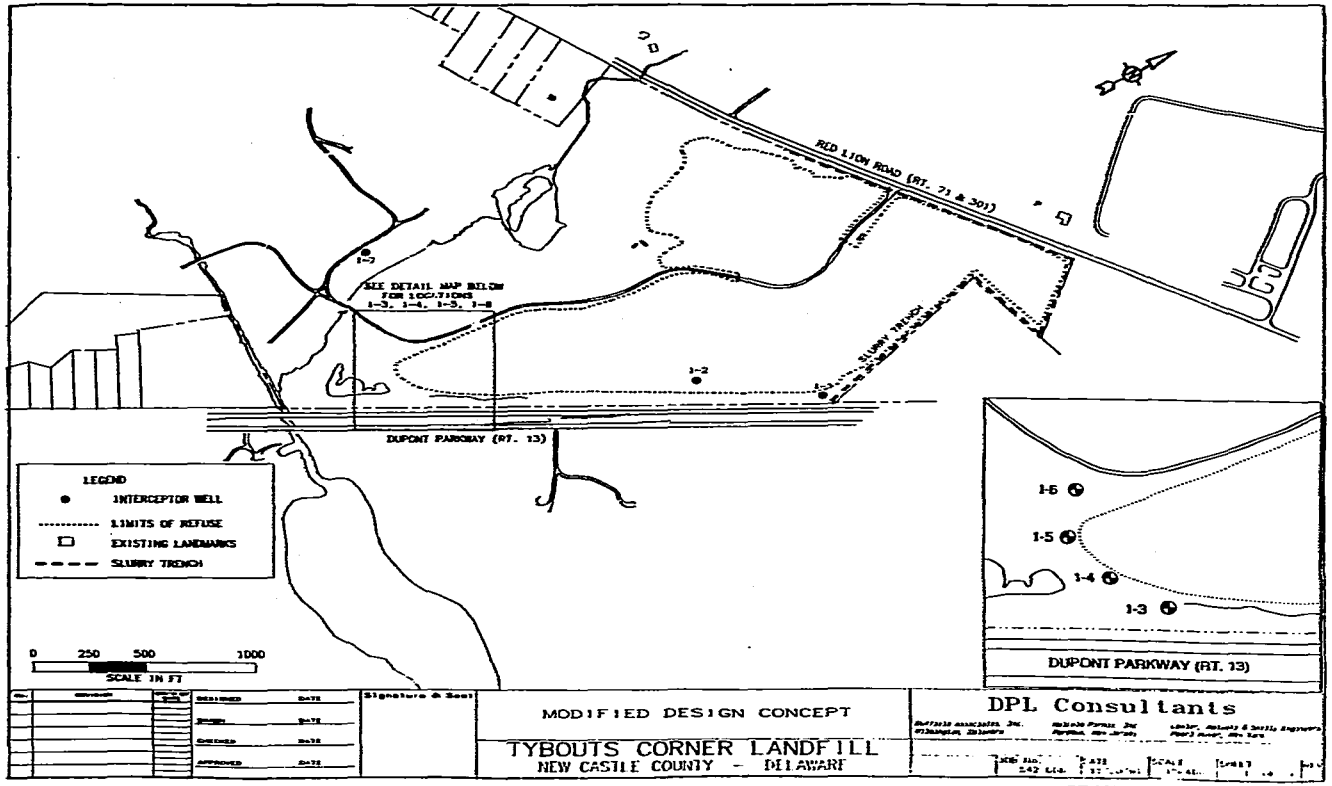

FIGURE 3

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The slurry trench shall be designed, constructed, operated, and maintained in a manner sufficient to block and divert all groundwater which would have been intercepted by the northern drain identified in the 1986 ROD away from the main landfill.

Section 300.435(e)(9)(iii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.435(e)(9)(iii), identifies nine criteria used to evaluate remedial alternatives presented in the FS (overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; state acceptance; and community acceptance). These decision criteria did not exist in the 1985 NCP and EPA was therefore not required to consider them in the 1986 ROD. While consideration of these criteria is similarly not required in this ESD, EPA has analyzed those criteria most likely affected by the remedy changes described in this document as follows:

(1) Overall Effectiveness - The projected effectiveness and reliability of the northern drain was good. Unless the drain clogged or its pumps failed, the drain would have reliably intercepted groundwater flow. This groundwater was to have been pumped away from the main landfill for treatment. The slurry trench will be as effective as the drain in preventing groundwater from entering the main landfill. The preliminary extent of the slurry trench concept is shown on Figure 3.

As stated in the Tybouts Corner Landfill RD/RA Statement of Work Plan, "[a] remedial phase monitoring program will be conducted to evaluate the effectiveness of the remedial measures taken on the site." This monitoring will continue to apply to all remedial measures taken on the Site, including changes identified in this ESD, to ensure that the remedy performs to meet the requirements of the ROD.

(2) Implementability - The impacts on workers have been considered in the analysis of the implementability of the northern drain versus a slurry trench. Installation of the drain would have required placement of piping and bedding material by construction personnel within the landfill, thereby posing a potential hazard to workers. While there are health and safety precautions which would be taken for workers constructing the drain, this work would have involved potential hazards which would be avoided by installation of the slurry trench.

In addition to the hazards associated with construction of the drain within the landfill, space limitations

present a construction problem for drain installation. The edge of the refuse is so close to the property line that limited width is available for drain construction. This problem is most apparent along Route 71, where the refuse has been found within a few feet of the existing fence along the highway right-of-way. Even if access to the adjoining property were obtained, construction of the drain would likely interfere with traffic on Route 71. The width of the trench required for construction of a slurry wall is considerably less than that required for the installation of the northern drain. Thus, the construction of the slurry wall would be more easily implementable than a deep subsurface drain at the property boundaries.

(3) Costs - The cost estimates contained in the RI/FS (1985) did not reveal large differences in the cost between the slurry trench and the subsurface drain. Since the RI/FS was issued, a number of hazardous waste sites as well as non-hazardous landfills have successfully used slurry trench construction to economically and effectively control groundwater flow. The current capital cost estimate for the northern drain is approximately $2.4 million, assuming Level C or D personnel protection is needed. If Level B personnel protection is required, a 100% increase in this cost is projected. The slurry trench alternative is estimated to cost approximately $1.25 million, a savings of approximately $1.15 million at Levels C or D and of $3.55 million if Level B work is required for drain construction.

The operation and maintenance (O&M) costs for the northern drain were expected to be moderate with considerable variation depending on conditions. Though minor clogging within the drain system or its piping could be minimized through periodic cleaning with standard mechanical methods, major clogging within the drain or the formation would require expensive repair. In addition, a system employing subsurface drains will require maintenance to service lift station(s) to remove sediment. The slurry trench, however, is expected to require less maintenance since there are no operational elements for this passive system.

For the above-described reasons, the slurry trench will be as effective, more readily implementable, and more economical than the northern drain in meeting the requirements of the 1986 ROD.

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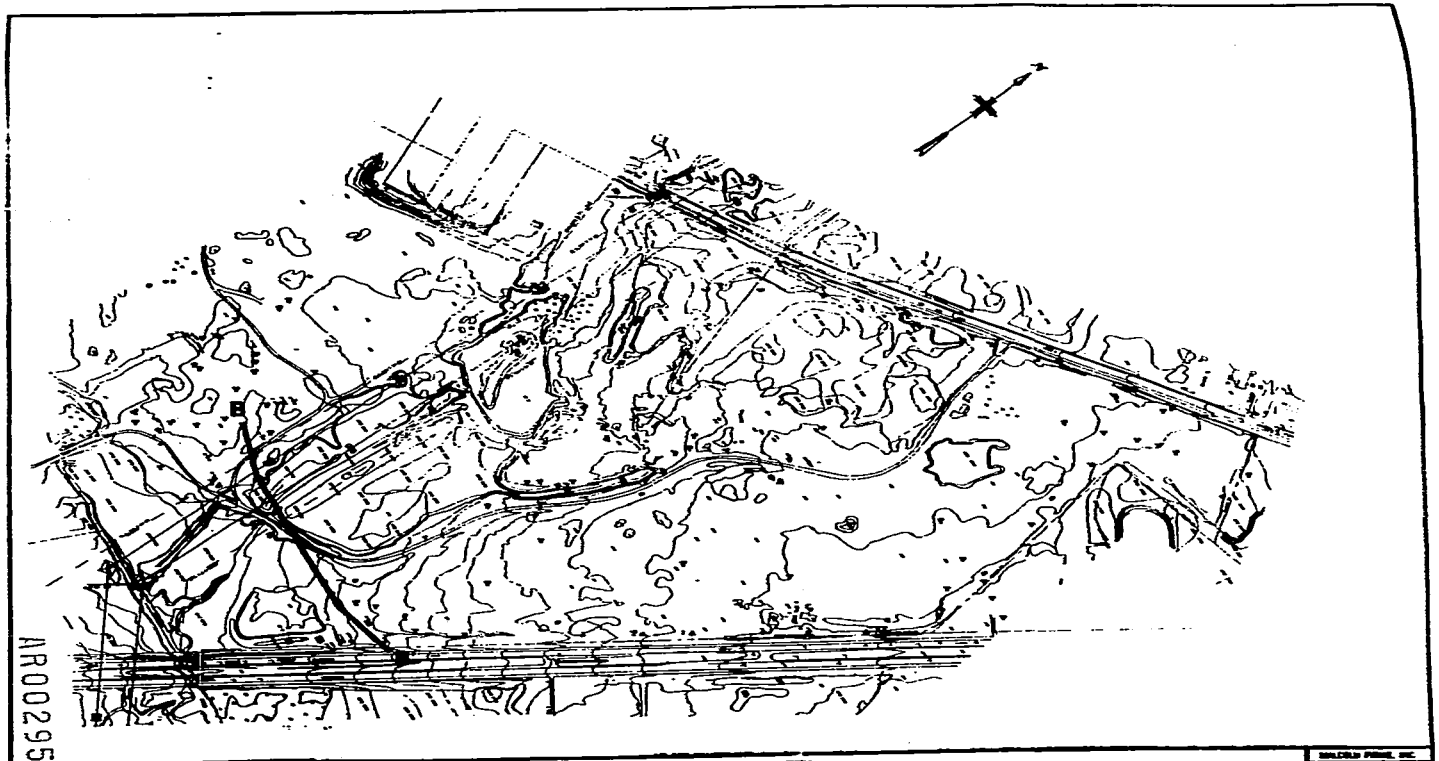
2. Interceptor Wells in Lieu of Southern Subsurface Drain

The function of the southern drain identified in the 1986 ROD was to intercept effluent from the main landfill to prevent the spread of a contaminant plume. Effluent collected from this 10-20 foot deep drain was to have been pretreated at an onsite treatment plant prior to discharge to the county sewer system. Further treatment of the contaminated groundwater would be provided at the local publicly-owned treatment plant. The alignment of the southern drain as conceptualized in the 1986 ROD is shown in Figure 2. The drain was positioned to collect shallow leachate evidenced along the banks of the swale and present in the subsurface at the southwest end of the main landfill. While EPA recognized that leachate formation would essentially cease after the water level is lowered in the refuse, EPA assumed that minor infiltration through the cap might occur over time and that, as a result, provisions for continued collection of leachate were necessary. The southern drain was planned to intercept or "skim" the top of the Columbia Formation, assist in dewatering refuse at the south end of the main landfill, and collect any long-term leachate that might be released. The southern drain segments were planned to operate to control water levels 3-5 feet below the present water table.

According to the RI/FS, the aquitard in the southern portion of the Site was believed to be shallow (less than 20 feet below grade). Saturated refuse was believed to rest on top of this aquitard. During the predesign exploration (borings drilled in 1990), the aquitard was found to be missing at the southern edge of the main landfill where the downgradient drain was to have been constructed. See Figures 4 and 5 for a geologic cross-section through the southern section of the main landfill.

As stated above, the southern drain was conceptualized in the ROD to collect existing leachate perched at the south end of the main landfill <u>on the aquitard</u>. Information obtained during predesign hydrogeologic explorations suggests that the effectiveness of the drain in skimming leachate as it leaves the main landfill is reduced since the aquitard is missing beneath the proposed southern drain. In addition, pump tests at the southern-most test interceptor well along Route 13 (see Figure 3) indicate that the operation of this interceptor well would likely prevent effluent from reaching the southern drain.



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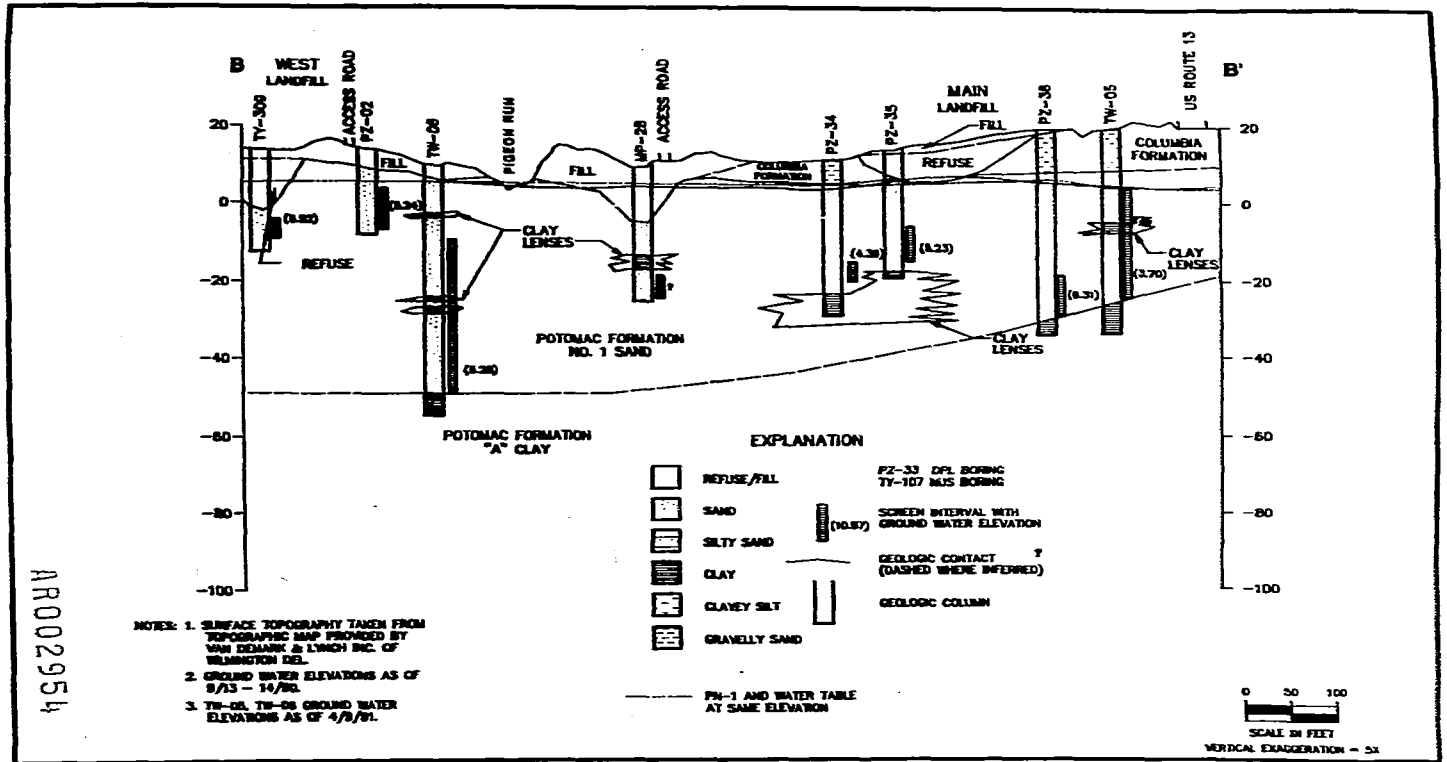
GEOLOGIC CROSS SECTION

FIGURE 4



DPL CONSULTANTS

TYBOUTS CORNER MAIN LANDFILL
GEOLOGIC CROSS SECTION
SOUTHERN DRAIN

SEE SHEET OF FOR LOCATION OF THIS SECTION

DPL CONSULTANTS
FIGURE 5

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As part of the supplemental predesign field explorations, pump tests were also conducted in the southern and northern portions of the main landfill. Information obtained from these pump tests and from the revised groundwater model (all results are post-ROD information) indicate the following:

- A system of interceptor wells screened in the PN-1 Sand will be effective in capturing the offsite plume of contaminated groundwater in the PN-1 Sand as well as in controlling any further contaminated groundwater moving offsite.

- Due to the absence of an aquitard in the southern portion of the Site between the Columbia Formation and the PN-1 Sand, the capture zones created by the interceptor wells will overlap in the PN-1 Sand and collect any leachate emanating from the main landfill from the Columbia Formation, thereby eliminating the need for the southern subsurface drain.

The interceptor wells shall be designed, constructed, operated, and maintained in a manner sufficient to capture the offsite plume of contaminated groundwater in the PN-1 Sand and to prevent the further spread of the contaminant plume by intercepting and collecting effluent from the main landfill.

An analysis of the NCP decision criteria identified at 40 C.F.R. § 300.435(e)(9)(iii) most likely affected by the remedy changes described in this document is as follows:

(1) Overall Effectiveness - Due to the absence of the aquitard at the southern edge of the main landfill, the effectiveness of the southern drain contemplated by the 1986 ROD is reduced. Pump tests at the southern-most test interceptor well along Route 13 have shown that operation of this well would dewater the southern drain, which is located in the Columbia formation. In lieu of the southern drain, a system of wells to collect leachate emanating from the main landfill will be designed to have overlapping zones of withdrawal and operated to complement the interceptor wells specified in the ROD. In the long term, pumping from multiple wells with overlapping zones of withdrawal provides better control of groundwater flow in the PN-1 Sand and will also collect any leachate emanating from the main landfill in the Columbia formation. Conceptual locations of the proposed interceptor wells are shown in Figure 3.

As stated in the Tybouts Corner Landfill RD/RA Statement of Work Plan, "[a] remedial phase monitoring program will be conducted to evaluate the effectiveness of the

remedial measures taken on the site." This monitoring will apply to all remedial measures taken on the Site, including changes identified in this ESD, to ensure that the remedy performs to meet the requirements of the ROD.

(2) Implementability - The impacts on workers have been considered in the analysis of the implementability of the northern drain versus a slurry trench. Installation of the drain would have required placement of piping and bedding material by construction personnel within the landfill, thereby posing a potential hazard to workers. While there are health and safety precautions which would be taken for workers constructing the drain, this work would have involved potential hazards which would be avoided through use of the wells.

(3) Costs - With an overall length of approximately 1,600 feet, construction costs for the southern drain would have totalled approximately $1.5 million, assuming Level C or D personnel protection was needed. Incremental costs for installation and operation of up to three additional interceptor wells has been estimated at $200,000. Use of wells instead of the southern drain presents savings of about $1.3 million in construction costs.

The operation and maintenance (O&M) costs for the southern drain, like the northern drain, were expected to be moderate with considerable variation depending on conditions. Though minor clogging within the drain system or its piping could be minimized through periodic cleaning with standard mechanical methods, major clogging within the drain would require expensive repair. In addition, a system employing subsurface drains would have required maintenance to service lift station(s) to remove sediment. Maintenance costs of the wells, however, are expected to be lower than O&M associated with a drain system subject to serious clogging or other physical damage. A well damaged beyond repair can be replaced with another well drilled at a nearby location at relatively low cost. In addition, wells can be more quickly replaced than the drains.

For the above-described reasons, EPA concludes that use of additional interceptor wells is more effective, more readily implementable, and more economical than the southern subsurface drain for collecting leachate emanating from the landfill.

IV. Support Agency Comments

DNREC has been involved as the Support Agency for this project and has reviewed and concurred on the changes described in this ESD.

V. Affirmation of Statutory Determinations

Upon review of the changes to the original remedy described in this ESD, EPA and DNREC believe that the remedy remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

VI. Public Participation

A notice of the availability of this ESD and a brief explanation of its contents will be published in local newspapers following execution of this ESD.

UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY

5/14/92
Date

for Edwin B. Erickson
Regional Administrator

APPENDIX I

INDEX OF DOCUMENTS PROVIDED IN THE SUPPLEMENTAL ADMINISTRATIVE RECORD IN SUPPORT OF THIS ESD

TYBOUT'S CORNER LANDFILL
EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD)
ADDENDUM TO THE ADMINISTRATIVE RECORD FILE *
INDEX OF DOCUMENTS

1. Report: Tybout's Corner Landfill Remedial Design/Remedial Action Site Health and Safety Plan, prepared by DPL Consultants, 2/90. P. 1-54.

2. Report: Tybout's Corner Landfill Remedial Design/Remedial Action Field Sampling Plan, prepared by DPL Consultants, 2/90. P. 55-153.

3. Report: Quality Assurance Project Plan, prepared by DPL Consultants, 2/90. P. 154-644.

4. Letter to Mr. Peter Ludzia, U.S. EPA, from Mr. S.A. LaRocca, Tybouts Corner Landfill Site Trust Fund, re: Annual Monitoring Reports, 4/19/90. P. 645-652. The following are attached:

    a) a letter regarding Annual Monitoring Report data;

    b) a memorandum regarding site reconnaissance for establishing health and safety concerns;

    c) a Daily Health and Safety Report Data Sheet;

    d) an HNu Calibration Log;

    e) an Explosimeter Field Calibration Data Sheet.

5. Memorandum to Mr. Thomas Voltaggio, U.S. EPA, from Mr. John J. Humphries, U.S. EPA, re: Proper design of a cap, 5/23/90. P. 653-654.

6. Letter to Mr. S. Andrew Sochanski, U.S. EPA, from Mr. John A. Dziubek, NUS Corporation, re: Transmittal of Trip Reports, 6/25/90. P. 655-670. The following are attached:

    a) a Trip Report FOR May 29, 1990 to June 1, 1990,

    b) a Chain of Custody Record;

    c) a Sample Shipping Log;

* Administrative Record File available 1/4/90, updated with the Explanation of Significant Differences Addendum on 5/8/92 and 5/15/92.

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d) a Standard Calculation Sheet;

e) a Trip Report for May 14, 1990 to May 18, 1990;

f) a Trip Report for April 30, 1990 to May 2, 1990;

g) a letter regarding a meeting report.

7. Memorandum to Mr. Peter Ludzia, U.S. EPA, from Mr. Daniel K. Donnelly, U.S. EPA, re: Transmittal of a Volatile Organics Analysis (VOA) Report, 7/12/90. P. 671-705. The following are attached:

   a) the VOA Report;
   b) Appendix A: Glossary of Data Qualifier Codes;
   c) Appendix B: Data Summary;
   d) Appendix C: Support Documentation.

8. Map: Site Topography and Property Plan, prepared by DPL Consultants, 7/18/90. P. 706-706.

9. Letter to Mr. S. Andrew Sochanski, U.S. EPA, from Mr. S.A. LaRocca, Tybouts Corner Landfill Site Trust Fund, re: Transmittal of Remedial Design/Remedial Action (RD/RA) Field Evaluation Deliverables, 8/1/90. P. 707-708.

10. Report: Task Item II.B, Hydrogeologic Investigation Report for the Predesign Evaluation of the West Landfill, prepared by DPL Consultants, 8/12/90. P. 709-779.

11. Report: Task Item II.C, Subsurface Evaluation "Ward Clay" Borrow Source Prequalification, prepared by DPL Consultants, 8/2/90. P. 780-964.

12. Memorandum to Technical Support Section from Mr. S. Andrew Sochanski, U.S. EPA, re: Review of the RD/RA Work Plan documents and request for comments, 8/6/90. P. 965-965.

13. Trip Report for July 31, 1990 to August 1, 1990 prepared by Rocco J. Giampaolo, 8/6/90. P. 966-971. Two Chain of Custody Records are attached.

14. Telephone conversation record of Mr. S. Andrew Sochanski, U.S. EPA, re: Air quality review for effluent disposal systems, 8/7/90. P. 972-972.

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15. Letter to Mr. Andy Sochanski, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Transmittal of a field trip report and problems encountered with the field sampling contractor, 8/8/90. P. 973-979. The Trip Report for July 31, 1990 to August 1, 1990 and two Chain of Custody Records are attached.

16. Memorandum to Mr. Andy Sochanski, U.S. EPA, from Mr. Daniel K. Donnelly, U.S. EPA, re: Transmittal of the VOA report, 8/17/90. P. 980-1010. The following are attached:

    a) a memorandum regarding sampling;
    b) Appendix A: Glossary of Data Qualifier Codes;
    c) Appendix B: Data Summary;
    d) Appendix C: Support Documentation;
    e) a Chain of Custody Record.

17. Memorandum to Mr. S. Andrew Sochanski, U.S. EPA, from Ms. Lorraine Hanlon, U.S. EPA, re: Review of a Tybout's Corner Landfill report, 8/17/90. P. 1011-1011.

18. Telephone conversation record of Ms. Annette Lage, U.S. EPA, with Mr. David Beshirs, Orlando Laboratories, re: Chain of Custody Record for samples shipped to the laboratory, 8/20/90. P. 1012-1012.

19. Letter to Mr. David Beshirs, Orlando Laboratories, from Mr. Rocco J. Giampaolo, Gannett Fleming, Inc., re: Samples sent an information that was excluded from the second header column on a Chain of Custody Record, 8/20/90. P. 1013-1014. A Chain of Custody Record is attached.

20. Memorandum to Ms. Paula Retzler and Mr. Andy Sochanski, U.S. EPA, from Ms. Diane E. Wehner, U.S. EPA, re: Review and recommendations regarding of Task Item II.D, 8/24/90. P. 1015-1016. A memorandum regarding comments on the Statement of Work is attached.

21. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Review of Task Items II.B and II.C for technical and environmental qualities, 8/29/90. P. 1017-1020. Comments on Task Item II.C are attached.

22. Trip Report for August 17, 1990 prepared by Gannett Fleming, Inc., 8/29/90. P. 1021-1026. A transmittal letter, two Chain of Custody Records, and a letter regarding a Chain of Custody Record are attached.

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23. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Review of Task Items II.B and II.C and comments to these reports, 8/29/90. P. 1027-1035. The following are attached:

    a) Review Comments on Task Item II.B;

    b) Attachment 1: Calculation of Refuse Volume in West Landfill;

    c) Table 1: Volume Information;

    d) a volume consumptions table;

    e) a diagram of the volume of refuse;

    f) a volume computations table;

    g) a diagram of volume saturated refuse.

24. Memorandum to Ms. Paula Retzler, U.S. EPA, from Mr. Philip Rotstein, U.S. EPA, re: Comments on the Hydrogeologic Investigation Report and Subsurface Evaluation of Ward Clay, 9/10/90. P. 1036-1038.

25. Letter to Mr. John Hammond, Roy F. Weston, Inc., from Ms. Paula Retzler, U.S. EPA, re: Review of various reports for the site, 9/11/90. P. 1039-1077. The following are attached:

    a) EPA comments;

    b) Gannett Fleming, Inc. comments;

    c) an excerpt from Task Item II.B;

    d) review comments on Task Item II.B;

    e) Attachment 1: Calculation of Refuse Volume in West Landfill;

    f) Table 1: Volume Information;

    g) a volume consumptions table;

    h) a diagram of the volume of refuse;

    i) a volume computations table;

    j) a diagram of volume saturated refuse;

    k) an excerpt form Task Item II.C.

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26. Memorandum to Mr. Andy Sochanski, U.S. EPA, from Mr. Orterio Villa, U.S. EPA, re: Transmittal of analytical reports, 9/14/90. P. 1078-1129. The following are attached:

a) a memorandum regarding TOC analysis results, 9/15/90;

b) a memorandum regarding NH_3N analysis results, 9/12/90;

c) a memorandum regarding total dissolved solids analysis results, 9/7/90;

d) a memorandum regarding TOC analysis results, 9/7/90;

e) a memorandum regarding mercury analysis results, 9/7/90;

f) a memorandum regarding NH_3N analysis results, 9/7/90;

g) a memorandum regarding metals analysis results, 8/29/90;

h) a memorandum regarding total dissolved solid analysis results, 9/7/90;

i) a memorandum regarding volatile gas chromatography/mass spectrometry analysis results, 9/12/90;

j) Appendix A: Glossary of Data Qualifier Codes;

k) Appendix B: Data and TIC Summary;

l) Appendix C: Supporting Documentation;

m) three Chain of Custody Records.

27. Trip Report for August 22 to 24, 1990, prepared by Gannett Fleming, Inc., 9/12/90. P. 1130-1136. A transmittal letter and three Chain of Custody Records are attached.

28. Letter to Ms. Colleen Walling, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Transmittal of shipping logs, 9/14/90. P. 1137-1139. Two shipping logs are attached.

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29. Letter to Ms. Paula L. Retzler, U.S. EPA, from Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, re: Response to review comments submitted by EPA and EPA's oversight contractor on various reports, 9/28/90. P. 1140-1151. A letter regarding comments on the Hydrogeologic Report, a letter regarding comments on the Borrow Source Prequalification, and a letter regarding EPA comments on six month deliverables are attached.

30. Memorandum to Ms. Lorraine Hanlon from Ms. Paula Retzler, U.S. EPA, re: Transmittal of responses to comments on six month deliverables, 10/1/90. P. 1152-1154. A letter regarding EPA comments on six month deliverables is attached.

31. Memorandum to Mr. Phillip Rotstein, U.S. EPA, from Ms. Paula Retzler, U.S. EPA, re: Transmittal of responses regarding the West Landfill Hydrogeologic Report, Borrow Source Prequalifications Report, and on six month deliverables, 10/1/90. P. 1155-1168. The following are attached:

    a) a facsimile transmittal sheet;

    b) a transmittal memorandum;

    c) a letter responding to comments received on the West Landfill Hydrogeologic Report;

    d) a letter responding to the comments received on the Borrow Source Prequalification Report;

    e) a letter regarding EPA comments on six month deliverables.

32. Telephone conversation record of Mr. John Hammond, Weston, Inc., with Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Potentially Responsible Party (PRP) comments on the Task Item II.B and II.C Reports, 10/5/90. P. 1169-1170. A transmittal sheet is attached.

33. Letter of Transmittal to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Transmittal of a VOA report, 10/9/90. P. 1171-1206. The following are attached:

    a) a memorandum regarding transmittal of the VOA Report;

    b) the VOA Report;

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c) Appendix A: Glossary of Data Qualifier Codes;

d) Appendix B: Data and TIC Summary;

e) Appendix C: Support Documentation.

34. Telephone conversation record of Ms. Annette Lage, U.S. EPA, with Mr. David Beshirs, Orlando Laboratories, re: An error on a Chain of Custody Record corrected by a later memorandum to file, 10/11/90. P. 1207-1207.

35. Trip Report for October 1 to 5, 1990 prepared by Gannett Fleming, Inc., 10/10/90. P. 1208-1216. The following are attached:

a) a transmittal letter;
b) a sample interval chart;
c) three Chain of Custody Records;
d) a Borrow Source diagram.

36. Memorandum to Mr. John J. Humphries, U.S. EPA, from Ms. Paula Retzler, U.S. EPA, re: Transmittal of review comments, 10/15/90. P. 1217-1233. EPA comments, Gannett Fleming, Inc. comments, and PRP responses to comments are attached.

37. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Transmittal of assessments to the responses on Task Items II.B.1 and II.C, 10/16/90. P. 1234-1237. A facsimile transmittal sheet, a memorandum regarding construction of a test fill section, and a memorandum regarding placement moisture content are attached.

38. Telephone conversation record of Ms. Paula Retzler, U.S. EPA, from Mr. John Hammond, Roy F. Weston, Inc., re: Borings for clay quality, 10/19/90. P. 1238-1238.

39. Memorandum to Mr. John Hammond, Roy F. Weston, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Transmittal of Gannett Fleming's review of response to comments on the Ward Clay report, 10/19/90. P. 1239-1245. The following are attached:

a) a facsimile transmittal sheet;

b) comments on the Task II.B.1 Report;

c) a memorandum regarding placement moisture content;

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d) a memorandum regarding construction of a test fill section.

40. Letter to Mr. David Beshirs, Orlando Laboratories, from Mr. Rocco J. Giampaolo, Gannett Fleming Inc., re: Sampling identification, 10/19/90. P. 1246-1250. Two Data Summary Forms for Inorganics and an Inorganic Traffic Report are attached.

41. Letter to Mr. John Hammond, Roy F. Weston, Inc., from Ms. Paula Retzler, U.S. EPA, re: Six month pre-design deliverables, 10/22/90. P. 1251-1256. The following are attached:

    a) Task II.B.1 report comments;

    b) Task II.C report comments;

    c) a memorandum regarding moisture content;

    d) a memorandum regarding test fill section construction.

42. Letter to Mr. John Hammond, Roy F. Weston, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Sample specification, 10/24/90. P. 1257-1263. Information concerning the Army Creek Landfill cap design is attached.

43. Letter to Mrs. Paula L. Retzler, U.S. EPA, from Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, re: Transmittal of ground water monitoring data summary, 11/9/90. P. 1264-1264.

44. Memorandum to Mr. Chen-yu Yen, Gannett Fleming, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Transmittal of the pre-design ground water monitoring data summary, 11/16/90. P. 1265-1265.

45. Memorandum to Mr. Dilip Hansalia, Delaware Department of Natural Resources and Environmental Control (DNREC), from Ms. Paula L. Retzler, U.S. EPA, re: Transmittal of pre-design ground water monitoring data summary, 11/16/90. P. 1266-1266.

46. Letter to Ms. Janet Robertson, U.S. EPA, from Mr. Rocco Giampaolo, Gannett Fleming, Inc., re: Errors of sample preservation for TOC and Ammonia samples, 12/10/90. P. 1267-1269. A Chain of Custody Record is attached.

47. Facsimile transmittal notice to Ms. Deborah Buniski, Clean Technologies, from Ms. Paula Retzler, U.S. EPA, 12/11/90. P. 1270-1272. A map and an excerpt from a report regarding geophysical information are attached.

48. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc. re: Ground water split samples, 12/12/90. P. 1273-1331. The following are attached:

    a) a memorandum regarding split sampling;

    b) Table 1: Groundwater Quality Target Compound List Analysis;

    c) Table 2: Groundwater Quality Target Analyte List Analysis;

    d) Table 3: Groundwater Quality Indicator Parameters Analysis;

    e) Attachment 1: Selected Pages of Data Summary from DPL Report Title "Groundwater Monitoring Data Summary;"

    f) Attachment 2: Data Summary for A Samples.

49. Letter to Mr. John Hammond, Roy F. Weston, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Ground water monitoring data summary report, 1/16/91. P. 1332-1390. The following are attached:

    a) a memorandum regarding split sampling;

    b) Table 1: Groundwater Quality Target Compound List Analysis:

    c) Table 2: Groundwater Quality Target Analyte List Analysis;

    d) Table 3: Groundwater Quality Indicator Parameters Analysis;

    e) Attachment 1: Selected Pages of Data Summary from DPL Report Title "Groundwater Monitoring Data Summary;"

    f) Attachment 2: Data Summary for A Samples.

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50. Memorandum to Ms. Paula Retzler, U.S. EPA, from Mr. Joseph L. Slayton, U.S. EPA, re: Transmittal of analytical reports, 1/31/91. P. 1391-1398. The following are attached:

    a) a memorandum regarding total Suspended Solids and Total Volatile Suspend Solids results;

    b) a memorandum regarding NH_3N determinations;

    c) a memorandum regarding Total Organic Carbon and BOD_5 determinations;

    d) a memorandum regarding Total Dissolved Solids determinations;

    e) two Chain of Custody Records.

51. Trip Report for January 23, 1991 prepared by Gannett Fleming, Inc., 1/28/91. P. 1399-1400. A transmittal letter is attached.

52. Facsimile transmittal memorandum to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Transmittal of a memorandum regarding an evaluation of Ward Clay, 2/8/91. P. 1401-1405. The memorandum is attached.

53. Memorandum to Mr. Chen-yu Yen, Gannett Fleming, Inc., from Mr. David B. Wilson, Gannett Fleming, Inc., re: Evaluation of Ward Clay, 2/8/91. P. 1406-1409.

54. Memorandum to Mr. Chen Yen [sic], Gannett Fleming, Inc., from Mr. David B. Wilson, Gannett Fleming, Inc., re: Ward Clay samples, 2/22/91. P. 1410-1411.

55. Trip Report for February 19, 1991 prepared by Gannett Fleming, Inc., 2/20/91. P. 1412-1414. A transmittal letter is attached.

56. Transmittal memorandum to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Transmittal of information on clay properties, 2/25/91. P. 1415-1417. A memorandum regarding clay properties is attached.

57. Letter to Mr. John Hammond, Roy F. Weston, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Comments on the use of Ward Clay, 3/13/91. P. 1418-1424. A facsimile transmittal sheet is attached.

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58. Trip Report for October 1 to 5, 1990 prepared by Gannett Fleming, Inc., 3/8/91. P. 1425-1429. A transmittal letter and the Chain of Custody Records are attached.

59. Letter of transmittal to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Transmittal of information on Ward Clay and sampling, 3/19/91. P. 1430-1437. Two memorandums regarding Ward Clay and a copy of Mr. Chen-yu Yen's Certified Hazardous Materials Manager certificate are attached.

60. Memorandum to Ms. Paula Retzler, U.S. EPA, re: TDS report for sampling, 4/17/91. P. 1438-1443. The following are attached.

    a) a memorandum regarding TDS determinations;

    b) a memorandum regarding a report being supplied to make Central Regional Laboratory information easier to understand;

    c) sampling results;

    d) a Chain of Custody Record.

61. Letter to Mr. John Hammond, Roy F. Weston, Inc, from Ms. Paula L. Retzler, U.S. EPA, re: Mini-test to evaluate Ward Clay, 5/8/91. P. 1444-1445.

62. Report: RD/RA Statement of Work Plan Task Item III.A. 1.c; Identification of Permits and Site Access Requirements, prepared by DPL Consultants, 5/29/91. P. 1446-1467.

63. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, re: Annual Monitoring Report, 5/31/91. P. 1468-1469.

64. Report: Draft RD/RA Statement of Work Plan Task Item III A.1.a, Subsurface Drain Design Testing, Data Submittal, Volume I, prepared by DPL Consultants 6/91. P. 1470-1778.

65. Report: Draft RD/RA Statement of Work Plan Task Item III A.1.a, Subsurface Drain Design Testing, Data Submittal, Volume 2, prepared by DPL Consultants, 6/91. P. 1779-1797.

66. Report: Remedial Design/Remedial Action Groundwater Monitoring Data Summary (Volume 1 of 2), prepared by DPL Consultants, 6/4/91. P. 1798-1932.

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67. Report: Remedial Design/Remedial Action Groundwater Monitoring Data Summary (Volume 2 of 2), prepared by DPL Consultants, 6/9/91. P. 1933-2387.

68. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, re: Transmittal of the Permits and Access Requirements Report, 6/6/91. P. 2388-2388.

69. Report: RD/RA Statement of Work Plan, Task Item III, B.5, Main Landfill Grading and Cap Design Alternatives Conceptual Evaluation, prepared by DPL Consultants, 6/10/91. P. 2389-2433. A transmittal letter is attached.

70. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, re: Transmittal of the Predesign Ground Water Quality Report, 6/10/91. P. 2434-2441. The following are attached:

    a) a letter regarding transmittal of two letters from DPL Consultants;

    b) a letter regarding work conducted in January;

    c) a letter regarding the Quality Assurance Review of Analytical Data for Well T4-214;

    d) a letter regarding well information;

    e) a memo regarding monitoring data summary.

71. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, re: Transmittal of the Subsurface Drain Design Testing Report, 6/11/91. P. 2442-2442.

72. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, re: Transmittal of the Main Landfill Grading and Cap Design Report, 6/13/91. P. 2443-2443.

73. Memorandum to Mr. Dave Kargbo and Ms. Mary Beck, U.S. EPA, from Ms. Paula Retzler, U.S. EPA, re: Transmittal of three reports to be reviewed and notice of a July meeting, 6/26/91. P. 2444-2444.

74. Memorandum to Ms. Diane Whener [sic], U.S. EPA, from Ms. Paula Retzler, U.S. EPA, re: Transmittal of the Permit and Site Access Requirements for review, 6/26/91. P. 2445-2445.

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75. Letter to Mr. Chen-yu Yen, Gannett Fleming, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Provision of documents for review, 1/26/91. P. 2446-2447.

76. Report: RD/RA Statement of Work Plan, Design Report on Alternative Groundwater Controls for Tybouts Corner Landfill, prepared by DPL Consultants, 7/91/. P. 2448-2490.

77. Letter to Mr. Dilip Hansalia, DNREC, from Ms. Paula L. Retzler, U.S. EPA, re: Transmittal of three reports to be reviewed and notice of a July meeting, 7/9/91. P. 2491-2492.

78. Letter of transmittal to Ms. Paula Retzler, U.S. EPA, from Ms. Deirdre S. Smith, DPL Consultants, re: Transmittal of Task Item II.B.5, 7/10/91. P. 2493-2493.

79. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Review of various three pre-design reports, 7/26/91. P. 2494-2501. A memorandum regarding review comments on Task Item III. B.5, a memorandum regarding review comments on Task Item III.A.1.c, and a memorandum regarding review comments on the Predesign Groundwater Quality Report are attached.

80. Report: Phase I Archeological Survey, prepared by Cultural Heritage Research Services, Inc., 8/91. P. 2502-2556.

81. Memorandum to Ms. Paula Retzler, U.S. EPA, from Mr. Dave Kargbo, U.S. EPA, re: Review of documents relating to the RD/RA, 8/5/91. P. 2557-2559.

82. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Transmittal of the draft meeting record, 8/5/91. P. 2560-2571. The following are attached:

    a) the meeting record;

    b) Attachment 1: Sign-in Roster;

    c) Attachment 2: Outline for Presentation on Alternative Remedial Designs;

    d) Attachment 3: Main Landfill Cap information.

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83. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Review of information submitted by PRP's, 8/8/91. P. 2572-2581. The following are attached:

    a) a memorandum regarding supplemental review comments on two reports;

    b) a memorandum regarding supplemental review comments on two reports;

    c) a memorandum regarding preliminary review comments on the Design Report on Alternative Groundwater Controls for Tybout's Corner Landfill;

    d) a graph of boring elevations.

84. Memorandum to Ms. Paula Retzler, U.S. EPA, from Ms. Mary F. Beck, U.S. EPA, re: Cap design, 8/14/91. P. 2582-2584.

85. Letter to Mr. John Hammond, Roy F. Weston, Inc, from Ms. Paula L. Retzler, U.S. EPA, re: Review of three pre-design documents, 8/14/91. P. 2585-2610. The following are attached:

    a) a memorandum regarding cap design;

    b) a memorandum regarding comments on several documents;

    c) a memorandum regarding proper design of an EPA Cap;

    d) a letter regarding review of PRP submittals;

    e) a memorandum regarding review comments on Task Item III.B.5;

    f) a memorandum regarding review comments on Task Item III.A.1.C;

    g) a memorandum regarding review of the Predesign Groundwater Quality Report;

    h) a letter regarding review of PRP Submittals;

    i) a memorandum regarding supplemental review comments on various reports;

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j) a memorandum regarding supplemental review comments on various reports;

k) A memorandum regarding review comments on the Design Report on Alternative Groundwater Controls for Tybout's Corner Landfill.

86. Letter to Ms. Faye Stocum, Delaware Bureau of Archaeology and Historic Preservation, from Ms. Paula L. Retzler, U.S. EPA, re: Request for a cultural resource survey to be conducted to find potential historical sites near Tybout's Corner Landfill, 8/20/91. P. 2611-2614. A letter regarding the review of a request for federal funding and a letter regarding review of the revised budget for the site are attached.

87. Letter to Mr. Joseph Giannell, Lawler, Matusky & Skelly Engineers, from Mr. Mark C. Mummert, Gannett Fleming, Inc., re: Ground water modeling, 8/21/91. P. 2615-2621. A memorandum regarding comments on a ground water design report, and a boring elevation diagram are attached.

88. Letter to Ms. Paula L. Retzler, U.S. EPA, from Mr. Dilip Hansalia, DNREC, re: Confirmation of the submittal of DNREC's comments on various reports, 8/21/91. P. 2622-2631. The following are attached:

a) a memorandum regarding the review of a cap design document;

b) a memorandum regarding an RD/RA Appropriate and Relevant or Applicable Requirements (ARARs) review;

c) a memorandum regarding Task Item III.A.1.c;

c) a memorandum regarding the review of the Archeological Survey.

89. Letter to Mr. John Hammond, Roy F. Weston, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Comments made by DNREC on various reports, 8/26/91. P. 2632-2642. The following are attached:

a) a memorandum regarding the review of a cap design document;

b) a memorandum regarding an RD/RA ARAR review;

c) a memorandum regarding Task Item III.A.1.c;

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c) a memorandum regarding the review of the Archeological Survey.

90. Report: Gannett Fleming Final Comments on "Design Report on Alternative Groundwater Controls for Tybouts Corner Landfill," prepared by Gannett Fleming, Inc., 9/6/91. P. 2643-2650.

91. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Review of PRP's predesign submittals, 9/6/91. P. 2651-2657. A memorandum regarding RD/RA oversight review comments and a diagram of refuse and water distribution are attached.

92. Letter to Ms. Paula L. Retzler, U.S. EPA, from Ms. Faye L. Stocum, Delaware Division of Historical and Cultural Affairs, re: The site activities having no affect on historical archeological sites in the vicinity, 9/10/91. P. 2658-2662.

93. Diagram, Table 2: Clay and Drainage Alternatives, prepared by DPL Consultants, 9/19/91. P. 2663-2665. A diagram of Conceptual Grading Plans and a Proposed Gas Vent Concept Sketch are attached.

94. Report: Draft Tybouts Corner Landfill Preconstruction "Design" Test Strip for the Ward Clay Borrow Material; Contract Specifications, prepared by DPL Consultants, 9/23/91. P. 2666-2682. A transmittal letter is attached.

95. Memorandum to Ms. Mary Beck and Mr. Dave Kargbo, U.S. EPA, from Ms. Paula L. Retzler, U.S. EPA, re: Transmittal of two documents for review, 9/25/91. P. 2683-2683.

96. Letter to Dr. Chen-yu Yen, Gannett Fleming, Inc., from Ms. Paula Retzler, U.S. EPA, re: PRP response to comments concerning the completion of 50% of the RD, 10/1/91. P. 2684-2687. The response is attached.

97. Trip Report for October 1 to 5, 1990 prepared by Gannett Fleming, Inc., 10/9/91. P. 2688-2690. A cover letter is attached.

98. Letter to Ms. Faye Stocum, Delaware Bureau of Archeology and Historical Preservation, from Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, re: Transmittal of the Archeological Survey Final Report, 11/12/91. P. 2691-2691.

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99. Letter to Dr. Chen-yu Yen, Gannett Fleming, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Review of the Alternative Groundwater Controls for Tybout's Corner Landfill Revised Report, 1/10/92. P. 2692-2692.

100. Letter to Mr. Dilip Hansalia, DNREC, from Ms. Paula L. Retzler, U.S. EPA, re: Review of the Alternative Groundwater Controls for Tybout's Corner Landfill Revised Report, 1/10/92. P. 2693-2693.

101. Memorandum to Mr. Dave Kargbo, U.S. EPA, from Ms. Paula Retzler, U.S. EPA, re: Review of the Alternative Groundwater Controls for Tybout's Corner Landfill Revised Report, 1/10/92. P. 2694-2694.

102. Letter to Mr. John W. Hammond, Tybouts Corner Landfill Site Trust Fund, from Ms. Faye L. Stocum, Delaware Division of Historical and Cultural Affairs, re: Completion of a review of the Phase I Archeological Survey, 1/17/92. P. 2695-2695.

103. Report: Oversight of Remedial Design, Tybouts Corner Landfill Alternative Groundwater Controls, prepared by Gannett Fleming, Inc., 2/21/92. P. 2696-2780. A cover letter is attached.

104. Letter to Mr. Dilip Hansalia, DNREC, from Ms. Paula L. Retzler, U.S. EPA, re: Responses to comments on the revised design report on alternative ground water controls, 3/31/92. P. 2781-2784. A letter regarding comments and suggestions on the revised design report and a site design are attached.

105. Report: Final Design Report on Alternative Groundwater Controls for Tybouts Corner Landfill, prepared by DPL Consultants, 4/92. P. 2785-2858.

106. Facsimile transmittal sheet to Ms. Paula Retzler, U.S. EPA, from Mr. Dave Shellman, Gannett Fleming, Inc., re: Plot for the predicted ground water elevations at one foot contours for the slurry trench designs, 4/6/92. P. 2859-2860. The plot is attached.

107. Letter to Mr. Alex J. Gonzalez, DNREC, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Additional information on the Explanation of Significant Differences (ESD), 4/9/92. P. 2861-2862.

108. Letter to Ms. Paula Retzler, U.S. EPA, from Mr. Chen-yu Yen, Gannett Fleming, Inc., re: Review of DPL Consultants' Final Design Report on Alternative Ground Water Controls, 4/29/92. P. 2863-2864.

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109. Letter to Mr. John Hammond, Roy F. Weston, Inc., from Ms. Paula L. Retzler, U.S. EPA, re: Approval of the Final Design Report, 4/30/92. P. 2865-2866.

110. U.S. EPA Sample Shipping Log for All Samples Sent Through the Contract Laboratory Program, (undated). P. 2867-2867.

111. Letter of Transmittal to Mr. Alejandro Gonzales, DNREC, from Mr. David Shellman, Gannett Fleming, Inc., re: Transmittal of the modflow output data, 5/7/92. P. 2868-2933. The data is attached.

112. Memorandum to Mr. Edwin B. Erickson, U.S. EPA, from Mr. Thomas Voltaggio, U.S. EPA, re: Transmittal of the ESD and identification of significant changes, 5/8/92. P. 2934-2935.

113. Letter to Mr. Peter Schaul, U.S. EPA, from Mr. Phillip Retallick, DNREC, re: Review of and concurrence by the State of Delaware with the ESD, 5/8/92. P. 2936-2936.

114. Explanation of Significant Differences for the Tybout's Corner Landfill Site, New Castle County, Delaware, prepared by U.S. EPA, 5/14/92. P. 2937-2976.