Landsburg /SIT 7.14

Responsiveness Summary for Public Comments on the Remedial Investigation and Feasibility Study for the Landsburg Mine Site

November 1996

November 18, 1996

The following responses have been preparec
received by the Washington State Departme
Remedial Investigation and Feasibility Study
Site dated February 1996.

The responses are numbered to correspond
contained in written correspondence and/or
Public Meeting held on March 27, 1996 at t
Maple Valley, Washington. These specific c
been indicated and numbered on the attach
correspondence and court reporter's transcr

No changes were made to the Remedial Inv
Study based on comments received and the
considered final.

Copies of the Remedial Investigation and Fe
documents related to the Landsburg Mine S
at the following locations:

Maple Valley Public Library
23730 Maple Valley Highway
Maple Valley, WA 98038

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If you have questions about this responsivenes
information about this site, please call Ecology
Specialist, Marianne Deppman, at (206) 649-7

ITEM #1
Letter from Mr. Terry Seaman
Corresponding Secretary
Greater Maple Valley Area Council
not dated/ received by Ecology on April 5, 1996

1 a. Immediately after concern regarding cancer cases in the vicinity of the Landsburg Mine Site was raised, Ecology reviewed the groundwater data for the site. This review concluded that the well serving the person who raised this issue was upgradient from the Landsburg Mine Site and could not be impacted by the site. The matter was referred to the Washington State Department of Health (WDOH). WDOH made several attempts to contact the person who raised the issue but was unable to reach him either by telephone or by certified mail.

The Department of Ecology has forwarded this comment (and other related comments) to the Washington State Department of Health (Mr. Lou Kittle) and the Seattle-King County Department of Public Health (Mr. David Hickock) for further evaluation.

1 b. The Feasibility Study presented a potential monitoring program to facilitate comparisons of the various remedial alternatives. A final decision has not yet been reached on the monitoring period for the remediated Landsburg Mine site. The final groundwater monitoring program will be presented as part of the Cleanup Action Plan (CAP). This document will be subject to future public review and comment prior to final approval by the Department of Ecology.

ITEM #2
Letter from Mr. Greg Wingard
Waste Action Project
not dated /received by Ecology on April 26, 1996

2 a. The Department of Ecology directed Palmer Coking Coal Company to analyze its historic records in detail. The records indicate surface coal mining was conducted on the southern end of the Landsburg coal seam, an approximate two-acre site, which is located approximately 650 feet southeast of the mining operations conducted on the Rogers coal seam. This surface mining was conducted by the Palmer Coking Coal Company during the period 1976 through 1977. Following surface coal extraction, a permit was obtained from the Washington State Department of Natural Resources to allow the placement of "land clearing debris and non-putrescible demolition material". Records of the Palmer Coking Coal Company indicate this surface excavation area was used for the disposal of stumps, brush and demolition debris during the period of June, 1978 through April 1980. This debris was off-loaded

from trucks adjacent to the surface excavation and was pushed by bulldozers into the excavation from the eastern or southern side of the excavation. Some of the debris was then covered with stockpiled overburden and coal spoil materials. Records indicate that the Landsburg surface mine accepted perhaps 10,000 cubic yards of material. On a percentage basis, approximately 85% of the material was stumps, brush and wood. About 10% was construction and demolition debris, and the other 5% was concrete, dirt, rubble, and other inert materials. No evidence has been found indicating waste falling under the authority of the Model Toxics Control Act is present. Should such evidence come to light in the future, Ecology will consider it at that time.

2 b. There appears to be some conflict and confusion with regard to this issue due to unclear earlier interviews of former mine workers conducted as part of the RI/FS. Because of the importance of this issue, additional interviews were conducted with the miners. Although, earlier interviews with a mine supervisor indicated second hand knowledge of some odors in the mine and a reference to some oil occurring in the southern sump located at the fourth level, subsequent interviews with the actual miners, and in particular miners responsible for sump operations at the southern end of the mine (Mr. Bob Morris, miner/[1]cager and Mr. Bud Simmons, mine superintendent and safety officer), indicate there is no first hand evidence that waste placed in the northern portion of the trench migrated to the southern portions of the mine. The only material noted in the southern sump on the fourth level of the mine was a limited quantity of hydraulic oil from leaking mining equipment that was operating in the vicinity of the sump. A small amount of this hydraulic oil as it mixed with mud and coal dust was skimmed from the sump and was stored in a 55-gallon drum. Mr. Bud Simmons, Landsburg Mine superintendent and health and safety officer, indicated that less than one 55-gallon drum of hydraulic oil mixed with mud and coal dust was collected from the sump over a several year period. Mr. Bob Morris was the cager at the south end of the fourth level and was responsible for the sump. Mr. Morris indicated that the sump was routinely cleaned out every day to clean the pump screens and remove wood debris and silt which was then hauled out of the mine in a coal car. Mr. Morris noticed only hydraulic oil in the south sump which has a distinctive milky appearance in water. He did not notice any solvent or fuel odor in the water or in the sediment removed from the sump. No "solvent", chemical or fuel odor was ever noticed by Mr. Bud Simmons who as the health and safety officer for the Landsburg Mine would have noticed and investigated any such odors. While it is possible that some miners may have smelled some odors that could have been carried throughout the operational portion of the mine by the active ventilation system, no evidence exists to indicate that any waste disposed in the mine surface trench to the north ever migrated to the southern portion of the Landsburg Mine during the subsurface mining when the mine was being actively dewatered.

[1] A cager is responsible for connecting and disconnecting coal cars at the bottom of the portal incline and for maintaining sump pumps.

As noted in the RI/FS, the vast majority of drums and liquid waste disposal occurred from 1969 - 1971. It should be noted that mining activities continued during this period and for approximately four to five years after the dumping had stopped (underground coal mining on the Rogers Seam continued until 1975), and throughout that time miners even at the lowest levels of the mine did not see evidence of waste materials migrating to the south.

2 c. The waste within the Landsburg trench is confined to the northern half of the trench. It is correct that waste may have escaped the northern half of the Landsburg trench in the past via groundwater discharge to the north, but no migration of waste is occurring now. With respect to the waste disposal area on the south end of the Landsburg seam, there are no records indicating that any hazardous materials were ever disposed there. Please see response to comment #2a.

2 d. The two accessible Rogers coal seam mine portals (portal #2 and portal # 3) were closed by blasting and grading. These closed portals were located by geodetic and geophysical surveying conducted during the RI. Sediment/soil, surface water discharge and groundwater in the vicinity of these portals was sampled as part of the RI and the results are presented in the Final RI/FS document.

2 e. No additional openings are available for sampling. Portal #1 does not exist because it was collapsed within the mine surface subsidence trench.

2 f / g. The Department of Ecology recognizes that it is often difficult to know the exact history of waste disposal at any site. However, both the Department of Ecology and the Landsburg PLP Group have gathered a significant amount of information about disposal activities at the Landsburg Mine site. The historic records of the Palmer Coking Coal Company and various government agencies provide a great amount of detail. (For example, review of the Pollution Control Hearings Board file revealed that the disposal incident in 1978 did not impact groundwater and the case was dismissed). Interviews of former employees of the site provided even more information. The Department of Ecology believes that enough information is available to allow a decision to be made about remedying the site.

Regardless of the information available, the remedy at the site will be protective because it conservatively assumes that waste remains in the mine workings. The remedy therefore will provide for a low-permeability cap to prevent precipitation from reaching any waste, and will include both a long-term monitoring plan and a contingency plan for actions to be taken should long-term monitoring indicate waste begins exiting the mine. These measures will protect against the release of hazardous substances off of the site, no matter what kinds of waste might remain in the mine.

2 h. While field operations conducted as part of the remedial investigation during the summer of 1994 observed a cessation of surface water flow through the culvert from the artificially created pond, it is accepted that during other summers the pond may have a continuous limited surface water flow. In any case, when the surface water flow reaches the glacial outwash soils at the bottom of the hill, the surface water flow regularly ceases for a long period of time during the summer and winter.

2 i. The hydrogeologic model formulated in the remedial investigation is sufficient to meet the objectives of the RI/FS and to determine potential pathways of exposure. Pathways have been identified and the monitoring system which will be proposed will detect potential future releases. Response to the groundwater divide issue is presented in the response to comment #6 w.

2 j. Please see response to comment #6 ee-hh.

2 k. Ecology believes that, while not every question that may be thought of is answered in the RI/FS, the RI/FS does present sufficient information to allow Ecology to make a decision regarding a site remedy. The majority of individual comments raised in this section have been addressed in the individual comment responses provided above. Seeps and discharges around the site are controlled by site geology and mine geometry and occur (related to the Landsburg Mine Site) where the Rogers coal seam subcrops or outcrops. Sampling from seeps is always difficult and subject to interpretation. The decision in the approved site Work Plan was to utilize more reliable groundwater monitoring wells to evaluate groundwater that is emanating from the seeps and springs.

2 m. See comment response #2 o, below.

2 n. Soil sampling conducted in waste staging areas adjacent to the Landsburg Mine trench has not detected chemicals above background concentrations. A discussion of the surface mining operation on the southern end of the Landsburg seam and subsequent disposal of stumps, brush and demolition debris is provided above in response # 2 a.

2 o. Public concerns related to the potential incidences of cancer have been addressed under comment #4e and #1a.

ITEM #3.
Letter from Ms. Kathleen J. Toensjost and Mr. Ralph F. Toensjost
Ravensdale, Washington
dated: April 6, 1996

3 a. Ecology will select a cleanup remedy according to criteria specified in regulation. While complete removal of any remaining waste would be the most permanent solution in the long-term, the difficulty of removal presents short-term hazards both with respect to a potentially rapid release of relatively large quantities of hazardous substances due to disturbance during recovery and with respect to hazards to cleanup workers. Complete removal is complicated by not knowing, and having no way of knowing, the nature and quantity of hazardous substances left to be removed. In light of not finding any contamination in groundwater leaving the site during the RI/FS, a major excavation and recovery operation is unlikely to be warranted. Ecology plans on approaching the site by monitoring all exposure pathways to ensure that, should any waste be detected, measures can be taken to prevent it from leaving the mine property. If waste is detected in the future, we will be in a much better position to design specific remedial actions.

3 b. Palmer Coking Coal Company's records are believed to be fairly reliable in terms of the quantities of material disposed in the trench.In any case, knowledge of the precise number of drums placed or gallons of waste deposited in the trench is not necessary because the pathways for potential chemical migration out of the mine have been adequately characterized and will be monitored during long-term monitoring of the site through a system of wells that will provide early detection of a release. In effect, Ecology does not plan on selecting a remedy which depends upon knowlege of past events.

With regard to the 162,600 gallons of liquid, there is no reference to solvents. It is believed that this liquid was primarily water with some mixed contaminants.

With regard to the 50,000 barrel figure cited in the Valley Daily News article of September 5, 1991, this was a very early estimate of the potential maximum amount of barrels made prior to reviewing records of operation. Record review indicates 4,563 barrels were disposed of in the trench. Again, while we can never be sure that review of old records account for every barrel, Ecology will select a remedy that does not depend upon past knowledge of the amount of waste disposed.

3 c. The geophysical work confirmed that zone 2 (the accessible northern portion of the trench used for waste disposal) contains a large concentration of magnetic anomalies. Based on the high density and magnitude of these anomalies, there is probably a significant concentration of ferrous debris located below the surface. This debris, based on the history of the site, probably consists principally of rusted and damaged steel 55-gallon drums.

However, household appliances and other metallic debris may also have been dumped in this area.

3 d. The geology of the site presented in the Landsburg Mine site RI/FS was thoroughly researched and is based on geologic mapping conducted by the U. S Geological Survey and the Washington State Department of Water Resources. The geology at the site was verified by an extensive field program, including drilling, surface backhoe trenching and geologic mapping. In addition, extensive mine records exist for several of the coal mines in the area. These mine records detail intercepted faults and other geologic structures encountered during the mining operations. Compilation of these sources of information has resulted in development of a comprehensive geohydrologic model of the site which is adequate for making protective decisions. In addition, groundwater monitoring of the site is an integral part of the recommended remedial option and is an integral part of any waste containment system under MTCA. Groundwater monitoring is not unique to this site. The groundwater monitoring system will provide for the early detection of any changes in the hydrogeologic system and the migration of contaminants from the containment system, if this should ever occur.

3 e. Rainwater is one of the major problems at the Landsburg Mine site and is the principal mechanism (driving force) that could move contaminants from their current position above the water table to the water table where they may be mobilized out of the trench area. The Landsburg Mine site is located on a hill and the source of recharge for the groundwater in the mine is primarily precipitation. Interviews with miners indicate that the amount of water that had to be pumped from the mine was directly related to seasonal precipitation patterns. Typically, only one pump was used to pump out groundwater (about 10 gpm) during the summer months but as much as three pumps were used to pump groundwater (about 30 gpm) during the wetter winter months. Although the actual trench (mine) is a highly conductive zone, by eliminating inflows of water through a cap and surface water diversions, very little water will enter the trench area. The cap and surface water diversion systems are key to eliminating the principle source of recharge to the Landsburg Mine site.

Note that pumping was done during mining operations to dewater the mine. Pumping has not been done since mining operations ceased in 1975. The mine has filled with groundwater which fluctuates with the seasons. Since waste exists above the water table in the mine, it is rainwater which has the potential to transport waste downward to the water table.

3 f. A groundwater monitoring program is an integral part of the proposed remedial alternative and will provide an early warning detection system that is protective of human health and the environment in the event of migration of contaminants out of the trench area. The groundwater monitoring program will monitor for hazardous substances at both the northern and southern end of the Landsburg Mine trench. A contingency plan will be in

place so that, if hazardous substances are detected, active measures will be taken to prevent them from leaving the mine property.

3 g. See answer 3a.

ITEM #4.
Letter from Ms. Sonia S. Preedy
Ravensdale, Washington
dated: April 12, 1996

4 a. The explosive potential of remaining material in the trench is currently considered to be extremely low. The likelihood that there are still intact drums with significant quantities of liquids after the length of burial, fires and the impact from falling and tumbling to the bottom of the trench is considered remote. The trench backfill and cap will minimize oxygen availability for combustion.

4 b. A specific operation and maintenance program will be conducted at the Landsburg Mine site to routinely remove larger vegetation that has the potential to penetrate the cap. This is a common and well established practice for landfills and waste containment sites throughout the country. The specific operation and maintenance program will be presented in the Operation and Maintenance report which is part of the Cleanup Action Plan required engineering reports. These documents will be subject to future public comment and final approval by the Department of Ecology before implementation. A simple but effective option may be to plant the vegetative cover on the cap with grasses, clovers and wildflowers and to regularly mow the resulting field to prevent trees or shrubs from growing.

4 c. Target shooting at the site would have no detrimental impact to the cover. The backfill, clean soil layers and vegetative cap will prevent substantial penetration of projectiles.

4 d. Soil sampling was only conducted in the immediate vicinity of the mine trench. If chemicals had been detected in this area of potentially highest concentration, the area would have been expanded in subsequent phases of the investigative program. Since undisturbed soils samples collected in the immediate vicinity of the trench showed no chemicals above natural background levels, there was no need to expand the soil sampling program. No soil sampling was conducted on any private property outside the immediate Landsburg mine property. The record of soil testing and analysis is presented in the Final RI/FS document.

4 e. As previously discussed, soil sampling in close proximity to the trench has not detected chemicals above background concentrations. Therefore, it is expected that potential contaminants from ash falling on private property in

the vicinity of the Landsburg Mine site would be non-detectable, especially after 20 years of rainfall. Also, surface soil samples of private property may exhibit chemicals from domestic sources such as gardening, vehicle maintenance, painting or other domestic activities using chemicals. For this reason, it would be very difficult to determine the source of contamination, if, in fact, contamination was detected.

ITEM #5.
Letter from Mr. James Holder
Hobart, Washington
dated: April 10, 1996

5 a. The large fires that burned in the Landsburg mine trench (Rogers coal seam) during the summer of 1971 undoubtedly consumed a large quantity of the waste material that had been disposed of into the trench. As discussed in the Final RI/FS, several other mechanisms or a combination of these mechanisms, including contaminants being flushed from the highly permeable trench/mine system and/or immobilized by adsorption to remaining carbon-rich and clay-rich materials in the mine, may have contributed to investigations finding no contaminants leaving the Landsburg Mine site at concentrations above background levels.

5 b. The utilization of the stockpiles of "coal slag" and clay material around the Landsburg Mine site for backfill and cap construction material is currently under evaluation by the PLP Group and their consultants. Preliminary designs for the containment system are evaluating the utilization of carbon-rich and clay-rich soils and materials as backfill placed directly above the existing base of the trench and as low-permeability capping source material. Additional geotechnical sampling of these materials will be conducted and presented as part of the Cleanup Action Plan engineering reports. Final design of the trench containment system and cap including potential utilization of the existing "coal slag" and other mine waste will be presented in these documents.

5 c. Ecology will seek to implement a remedy which fulfills regulatory requirements in a manner which makes sense for the site. We hope most people will find the final remedy selected a "common sense" solution. However, please keep in mind that individuals view what constitutes "common sense" in a given situation differently. What seems to be a "common sense" approach to one person may not seem so to another.

ITEM #6.
Letter from Mr. Don E. Wickstrom
Director of Public Works
City of Kent
dated: April 25, 1996

6 a. The Department of Ecology is sensitive to the City of Kent's concern for their water supply, as is the Landsburg Mine site PLP Group. This concern has expressed itself in the RI/FS through a conservative approach to the proposed remediation and monitoring programs at the Landsburg Mine site. Information collected to date indicates that waste was not placed in the southern portion of the trench and that the water flow in the trench (and certainly that portion of the trench overlain by waste) is primarily to the north. Despite this the monitoring program (the final version will be presented in the Cleanup Action Plan) will monitor both ends of the trench using existing wells and will provide for a contingency remediation plan in the event that contaminants are detected.

6 b-f. It is acknowledged there is waste in the source area. The methodology for conducting the RI, however, focused on characterizing potential pathways and the nature of chemicals exiting the mine rather than the specific contents of the mine itself. This approach was fundamental to the RI because, as discussed in the Work Plan, the waste materials present in the trench would be very difficlut to completely characterize due to dangers and hazards associated with drilling and sampling in the subsidence trench, the highly heterogeneous nature of "landfilled" material, and the complexity of the collapsed Landsburg Mine. As long as the relevant pathways of chemicals potentially exiting the mine are adequately characterized and monitored for early warning of a release, evaluation of remedial approach is not compromised by incomplete characterization of the waste.

6 g. Please see response to Comment #2 a (from Mr. Greg Wingard).

6 h, j-m. It is acknowledged that there are a number of possible scenarios and that other scenarios beyond those presented in the RI may also be applicable. The four which were postulated in the RI were presented as <u>potential</u> scenarios which may have contributed to the attenuation of wastes and to help explain the observed lack of chemicals in groundwater. The remedial measures evaluated in the FS, however, account for the possibility that waste may remain. In fact, the FS conservatively assumes that a significant volume of waste is present.

6 i. It is agreed that there are other possible scenarios, such as the contaminants not yet having migrated to the mine portal discharge points. However, based on the site hydrogeologic model developed from field investigations and discussions with former miners regarding water flow in the mine, the site's monitoring wells are located in the most direct pathways for early detection monitoring. It is possible at any site using a containment remedy

that there may be detectable releases in the future, and therefore long-term monitoring is a key part of the overall remedial approach for the site.

6 n. The presence of organic chemicals in groundwater always warrants attention. The compounds detected at PW-9 and PW-10 were observed at very low levels just above the method detection limits, and none of the compounds were detected more than a single time during the four monitoring events. Also, none of the detections exceeded any potential regulatory or risk-based criteria. Therefore, it is believed detection of the organic compounds do not represent true contamination, nor do they constitute a significant health risk.

In addition, well PW-9 is not located downgradient of the south portal of the Rogers seam. These compounds were not detected in the site's monitoring wells, which are located in the most direct pathways for detection of chemicals exiting the mine. With regards to the potential waste disposal area as a possible source, please see the response to comment #2a.

6 o. Please see Section 3.6.4 "Conceptual Model of Site Groundwater Flow". This section incorporates all observations into a single comprehensive discussion and descriptive model.

6 p. Both hydrogeologic and discussions with former miners indicates that water flow within the trench is primarily to the north, particularly for the northern portion of the trench where waste was placed. However, because site groundwater monitoring accounts for the possibility of discharge from either end of the mine, the performance of a water balance would not be expected to affect the decision made in the FS regarding a preferred remedy. It is intended that long-term monitoring account for all potential releases from the site. The monitoring plan will be developed as part of the Cleanup Action Plan.

6 q. See comment 6 p.

6 r. Comment is acknowledged. No response is necessary.

6 s. As stated earlier, the pathways of potential contaminant movement from the mine have been identified, and a site monitoring system will be developed which will provide for early detection of chemicals exiting the mine. Therefore, while some uncertainties remain, such as with regard to the nature or quantity of chemicals deposited in the trench or the precise location of the groundwater divide, a monitoring system which accounts for the possibility of discharge at either end of the mine can be developed. A specific ground water monitoring plan will be proposed in the Cleanup Action Plan, and will be subject to public comment.

6 t. Groundwater elevations at the south end of the mine are not considered anomalous. The south end of the mine is at a higher topographic elevation than the north end. Typically, groundwater flow occurs as a subdued

reflection of ground surface topography. Since the south end of the mine occurs at a higher topographic elevation than the north end, it is therefore not surprising that the groundwater elevation is also higher at the south end.

6 u. It is important to realize that the observance of a pressure response at LMW-1 during Baker tank water disposal is not evidence that flow occurred to the south from the north portal. Instead, the addition of water to the trench created a pressure gradient response. The water level increase at LMW-1 was simply a result of the fact that pressure is exerted in all directions, not that actual flow of water occurred towards LMW-1. Figure B-1 in Appendix B clearly shows that the groundwater elevation at LMW-1 was always higher than the elevation at the LMW-2 and -4 indicating that ground water occurring at the north portal did not flow to the south during the period over which measurements were taken .

Groundwater levels within the mine of the Rogers Seam are controlled by the elevation of the north and south portals. Groundwater flow has stabilized since the cessation of pumping at the completion of mining operations. Since the north portal is at a lower elevation than the south portal, groundwater flow within the northern portion of the mine is now and is anticipted to remain toward the north portal.

6 v. First, there is significant groundwater flow out of the Rogers coal seam and the Landsburg Mine to the north. The fact that water does not discharge at the ground surface at portal 2 does not indicate that subsurface discharge is not occurring from the north end of the mine. Discharge certainly does occur since there is a gradient (between LMW-1 and LMW-2/-4 for instance), and the trench is highly permeable and capable of conducting a significant quantity of water. The subsurface materials between the north portal (portal 2) and the road are highly permeable as the Rogers coal seam was surface mined to a depth of about 15 to 20 feet and backfilled with gravel. Additional evidence of this substantial discharge of groundwater to the north consists of the numerous seeps and springs which have been observed along the trace of the Rogers coal seam on the hillside going down to the Cedar River Valley.

Second, the south portal represents a shallow depression (resulting from blasting and bulldozing the portal closed) which also collects surface runoff from the surrounding area as well as subsurface flow which occurs in the gravel immediately underlying the ground surface. The flow of water measured at the south portal site therefore often represents a combination of mine portal outflows, as well as general surface runoff and shallow groundwater flow in the recessional gravel on the hillside above the south portal area.

6 w. The RI/FS report acknowledges some uncertainty with respect to the nature of the groundwater divide but it still makes a reasonable estimate of its location. Exploration for a more precise location of the groundwater divide is unnecessary. Given the hydrogeologic system at the Landsburg mine site,

an adequate and conservative approximation of the groundwater divide was made using the topographic high point of the hill. The precise location of the groundwater divide is unnecessary, however, since the preferred remedial alternative accounts for all possible migration scenarios. It should also be noted that because of the reduction in rainfall infiltration and diversion of surface water away from the northern portion of the trench which would result from remedial action, the groundwater divide is expected to change toward the south relative to its current position. The long-term monitoring of the trench is intended to address all potential releases.

6 x. See response to comment #2 b. The fact that miners working on a daily basis at the fourth level of the mine did not observe evidence of waste at the south end of the mine even after approximately five years is evidence that disposal in the northern portion of the trench did not migrate to the southern portion of the trench during the period in which mining operations were conducted. Again, the remedial alternative preferred in the FS conservatively assumes the possibility of discharge at either end. Long-term monitoring at both ends of the trench is a key part of the overall remedial approach for the site, and the site's monitoring wells are located in the most direct pathways for early detection monitoring.

6 y. No response is necessary. However, it is important to note that interviews with former miners did not indicate flow of contaminants to the southern portions of the mine even five years after dumping stopped.

6 z. The monitoring system which will be developed for the site will be effective at detecting releases at either end of the mine.

6 aa. As described in the response to comment #6 v, it is not correct that the absence of surficial discharge at the north portal is particularly significant in determining the magnitude of flow from the north end of the mine. The flow is merely occurring in the subsurface in the vicinity of the north portal and is well documented in the numerous springs and seeps along the Rogers coal seam in the Cedar River Valley. Also, it is not clear why the commenter considers the hydraulic conductivity for LMW-3, which is located at the south end of the mine, more representative of the north end than hydraulic conductivity values measured at wells LMW-2 and LMW-4, located at the north end. The values of hydraulic conductivity for LMW-2 and -4 are significantly higher than measured at LMW-3 and would result in significantly more discharge than the 0.5 gpm estimate indicated in the comment.

6 bb. Ecology believes the hydrogeologic model presented in the RI/FS is conceptually correct, although the relative magnitudes of flow at the north and south portals may not be known as accurately as the commenter wishes.

6 cc. It is acknowledged that flow through fractures or shear zones was an initial concern at this site. Work conducted under the RI specifically was aimed at evaluating whether such zones could serve as conduits for flow of chemicals

away from the mine. The preponderance of evidence collected during the RI, however, indicates that these zones do not play a significant role in transmitting water laterally away from the mine. Please see the discussion in Section 3.6.4.1. Most important in this conclusion were: (1) mine reports which indicated faults are tight and do not produce significant quantities of water, (2) geochemical analyses which indicated that private wells in the area display a significantly different geochemical signature, and (3) water level measurements throughout the Study Area.

Also, it should be noted that LMW-1 is not installed within intact sandstone as the commenter suggests, and the hydraulic conductivity reported for the well, while possibly representing an upper bound on the range of possible values, is not representative of undisturbed sandstone. The well was intended to be completed within or very near the rock tunnel connecting the two portions of the mine separated by a fault. During drilling, tremendous lost circulation was encountered as well as numerous fractures, and the well is installed in close proximity to the mine shaft. The hydraulic conductivity of intact sandstone, is expected to be much smaller than the value reported for LMW-1. The hydraulic conductivity of intact shale and siltstone would be smaller still.

6 dd. Ecology will consider the Clark Springs Wellhead Protection Plan during development of the Cleanup Action Plan.

6 ee-hh. MTCA sites are exempted from the procedural requirements of the *Dangerous Waste Regulations*, Chapter 173-303 WAC. Ecology may apply any requirements of the chapter which it deems appropriate. Ecology will review the *Dangerous Waste Regulations* during preparation of the Cleanup Action Plan, and incorporate any requirements deemed appropriate.

6 ii. Ecology will consider the necessary length of the cap during preparation of the Cleanup Action Plan.

6 jj. The definition of "Reduction in Toxicity, Mobility and Volume" is provided in Section 9.4.3. It consists of the degree to which a remediation alternative reduces the inherent toxicity, ability of contaminants to migrate in the environment, or the quantity of contaminated material. The relative reduction in infiltration was taken as an objective measure of the long-term effectiveness criterion. It would be redundant to also include it under the reduction in toxicity, mobility and volume criterion. Based on the definition for reduction in toxicity, mobility and volume, all of the capping alternatives should receive the same score.

Regarding the length of the cap, see response to comment #6 ii.

6 kk. Ecology uses analyses such as the incremental comparison presented in the RI/FS as a guide to selecting a cleanup action. In developing the Cleanup Action Plan, the adequacy of the PLP-preferred remedy presented in the FS will be re-evaluated with the information provided in the RI/FS.

6 ll. See response to comment #1 b. The groundwater monitoring program will be developed as part of the Cleanup Action Plan.

6 mm. The Monitoring Plan will be included as part of the Cleanup Action Plan document. These documents will be subject to public review and comment prior to final approval by Ecology.

6 nn. Ecology will consider whether additional monitoring wells are necessary when developing the Cleanup Action Plan.

6 oo. It is agreed that a contingent groundwater treatment system is an important element that should be included as part of the overall remedy for the site. This could consist of a pre-designed, off-the-shelf system which could be rapidly deployed to the site in the event of a release. The system could be modular so as to be capable of handling a variety of contaminants. The design of all contingency systems will be presented as part of the Cleanup Action Plan (CAP).

6 pp. Ecology believes the RI/FS contains sufficient information to make a remedial decision. As such, it constitutes the final RI/FS. We will work with the City of Kent and the Landsburg PLP Group to address issues of concern in the Cleanup Action Plan and the Consent Decree which will implement the CAP.

6 qq. It is not the aim of an RI to eliminate all uncertainty, only to gather sufficient information to support an informed risk-management decision. While some uncertainties remain, Ecology believes a remedy can be selected which takes these uncertainties into account.

6 rr. The Cleanup Action Plan, and particularly the monitoring program, will account for the possibility of contaminants eventually discharging from the Landsburg Mine at either end.

6 ss. In order to approach the site conservatively, groundwater monitoring will be at both ends of the mine.

6 tt. See response to comment #1 b.

6 uu. The Department of Ecology will make all monitoring results readily available to the public, and arrangements can be made with Ecology to provide results to the City of Kent in a timely manner.

6 vv. Please see response to comment #2 a.

6 ww. Please see responses to comments #6 ee-ii.

6 xx. Please see response to comment #6 dd.

6 yy. Please see response to comment #6 oo.

6 zz. Please see response to comment #6 pp.

6 aaa. No response necessary.

6 bbb. No response necessary.

ITEM #7.
Formal comment from Ms Wendy Melewski
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 62.
March 27, 1996

7 a. The monitoring program for the Landsburg Mine site is anticipated to utilize multiple monitoring wells at both the north and the south ends of the mine. These specially designed wells monitor groundwater at various depths within the hydrogeologic system. The wells provide the earliest detection of any potential contaminants migrating from the Landsburg Mine site and allow for rapid response to the groundwater contamination before contaminants are mobilized any significant distance off the Landsburg Mine site. Monitoring private wells provides very little if any additional benefit over utilizing properly installed monitoring wells specifically designed to monitor the Landsburg hydrogeologic system. The anticipated groundwater monitoring system will not use private wells for the ongoing groundwater monitoring; in the unlikely scenario that contaminants are detected at the monitoring wells, additional wells including some private wells may be sampled for additional data.

In particular, the well owned by Ms. Wendy Melewski is not located downgradient of the Landsburg Mine site and is not the recipient of groundwater from the Landsburg Mine. The elevation of groundwater within the Melewski well is higher than the groundwater within the Landsburg Mine site trench. In addition, the underground mine workings within the Landsburg coal seam (located between the Melewski's well and the waste disposal in the Rogers seam) act as a cutoff trench draining the surrounding bedrock. The groundwater flow at the Melewski's well is toward the Landsburg coal seam and not from the coal seam toward their well. Groundwater from the Landsburg Mine site (in the Rogers coal seam) does not reach the well owned by Ms. Wendy Melewski. There is no additional benefit to a groundwater monitoring system for the Landsburg Mine site gained by incorporating the Melewski well in the groundwater monitoring system.

ITEM #8.

Formal Comment by Mr. Bill Wolinski, City of Kent Public Works
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 64.
March 27, 1996

8 a. No formal response required. Specific comments from the City of Kent are presented in the letter from Mr. Don E. Wickstrom, Director of Public Works, City of Kent dated April 25, 1996 (comments # 6 a through 6 bbb).

ITEM #9.
Formal comment from Mr. Richard Melewski
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 65.
March 27, 1996

9 a. See comment 1 a.

ITEM #10.
Formal comment from Mr. William Beck, Chairman-Greater Maple Valley Area Council
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 66.
March 27, 1996

10 a. See response to comment # 9 a

ITEM #11.
Formal comment from Mr. Edward Woodriff
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 70.
March 27, 1996

11 a. Mr. Edward Woodriff is correct; groundwater from the Landsburg Mine site does not reach his well. His well is a shallow (aprox. 20 ft), hand dug well located to the southeast of monitoring well LMW-7. His well is not located downgradient of the Landsburg Mine site and is not the recipient of groundwater from the Landsburg Mine site. The elevation of groundwater within the Woodriff well is higher than the groundwater within the Landsburg Mine site trench. In addition, the underground mine workings within the Landsburg coal seam located between Mr. Woodriff's well and the waste disposal in the Rogers seam act as a cutoff trench draining the surrounding bedrock. The groundwater flow at Mr. Woodriff's well is similar to that at

the Melewski's well in that it is toward the Landsburg coal seam and not from the coal seam toward their well.

End of Responses

Greater Maple Valley Area Council
P.O. Box 101
Maple Valley, WA 98038-0101
April 3, 1996

David L. South
Department of Ecology
3190 160th Avenue Southeast
Bellevue, WA 98008-5452

These comments relate to the Remedial Investigation/Feasibility Study Report on the Landsburg Mine Site.

At the public meeting on Wednesday, March 27, 1996 at Tahoma Junior. High School, one of the citizens living in the vicinity of the site, Richard Melewski, stated that there were seven cases of cancer within a one mile radius of the site. One of these cases is his daughter.(These data were also reported in the *Valley Daily News*, April 1, 1996, page A4.) David South's response was that health investigations were the responsibility of Washington State's Department of Health, not the Department of Ecology. He also stated that, in his opinion, it was unlikely that a health investigation would be initiated.

The Area Council believes that this unusual concentration of cancer cases should be investigated by the Washington State Department of Health and if necessary, an epidemiological study be conducted to compare the health histories of children living close to the site with those living sufficiently far removed that they would not be subject to effects of the site.

We do not presume to understand the cause or causes of what appears to be a serious health concern but we do believe it warrants a through investigation by competent health professionals. a

The Area Council is also concerned that the DOE plans call for terminating the monitoring of the groundwater test wells after only 20 years. Recognizing that in some cases contaminants migrate very slowly, tens of feet or even feet per year, we believe that monitoring, perhaps at a reduced rate, should continue for at least 50 years. b

The Greater Maple Valley Area Council is a 15 member elected group of citizens representing this community in Southeast King County for over 20 years. The Landsburg Mine Site is within the area we represent.

Very truly yours,

W. G. Beck

for Terry Seaman
Corresponding Secretary

c.c.
State Senator Kathleen Drew
State Representatives Phil Dyer and Brian Thomas
US Senators Slade Gorton and Patty Murray
US Representative Jennifer Dunn
Washington State Department of Health
Metro King County Health Department
Richard Melewski

WASTE ACTION PROJECT

RECEIVED
APR 26 1996
DEPT. OF ECOLOGY

David South
Department of Ecology
Delivered by fax 649-7098
(Hard copy)

Re: Landsburg Mine Site RI/FS comment

Dear Mr. South:

To start with I would like to state my appreciation for the effort by yourself, Ecology and the many others who worked on developing this RI/FS.

The first part of my comments is a preamble of sorts. Waste disposal at this site was an operation carried out for many years as part of the active mining operation. Waste was sampled/recovered out of drums as late as 1991. Waste product was reported by a mine worker in the south mine sump, shortly after disposal of oily waste at the north end of the trench. A major irreplaceable water supply (City of Kent) is located a short distance from the south portal of the mine. Disposal of wastes, including drums has taken place outside of the north trench, including drums that are still visible just east of the south portal. When I discovered these drums in the mid to late 1970s, at least one was labeled as containing solvents.

On the conclusions of the RI as presented on page iii, of the RI/FS, Vol. I:

On the nature and extent of contaminants, the assumption that contaminants do not appear to be exiting the mine appear to be based on the assumption that all the wastes were deposited in the mine trench. As stated above, this is not true, as waste drums and other materials are deposited just north of Kent Kangley Road, east of the south portal. From all indications and appearances, these drums were part of the mining/disposal operation during the 1960-1975 time frame. As such these waste must be characterized and removed as part of the actions contemplated by the RI/FS. It is not acceptable these wastes continue to sit at the surface, exposed to weather across the street from the City of Kent's water supply.	a
As stated above, reports from miners indicate that waste migrated from the north end of the trench where disposal was occurring to the south mine sump. The south mine sump was not "within that portion of the trench known to have been used for prior waste disposal". Please revise and correct this error and correct any conclusions and recommendations based on the errors detailed above.	b
On source characteristics, as stated above, the statement that wastes are confined to the northern half of the trench in the context of information sources given is false. Historical information in the form of mine reports shows this in fact is not the case and waste did escape the north end of the trench.	c
Have all mine openings that were closed by blasting (section 3.2.1), been field located and sampled for the presence of waste?	d
If the answer to this question is no, all such opening need to be identified and sampled for waste, as soon as possible. This information is necessary for the RI/FS to be deemed complete.	e

(206) 622-7803 / P.O. Box 4832, Seattle Washington 98104

Section 3.2.1, discusses the variety of wastes disposed of at the mine site. A waste category not mentioned is solvent still bottoms. This waste was received from Chem-Pro, and generated by the Boeing Airplane Company. I received this information from Ron West, former owner of Chem-Pro. The history portion of this section also fails to mention the case Ecology had before the Pollution Control Hearings Board related to disposal of waste at the Landsburg site. The papers filed in the case include field observations on the nature and migration of waste by Ecology personnel. This information needs to be included in and considered as part of the RI/FS. f

The information given for 1983 in this section is incorrect. As I am the person who reported this disposal, I can from first hand knowledge state that oil and or tar sludge was also disposed of in 1983. This information was provided to EPA, Ecology, the City of Kent and others. g

Section 3.5.1.3, in the final paragraph deals with a pond located on the southwest side of the hill located east of the trench. The text states that the pond discharge via a culvert ceases during summer months. I have checked this discharge periodically since the mid 1970s, and frequently noted it discharging in the summer months. h

On potential future pathways of chemicals exiting the mine, waste is not limited to the north end of the mine. The text appears to state that groundwater flow from the north half of the trench flows to the north. There does not appear to be solid data justifying this conclusion. No evidence of the placement of a groundwater divide is presented. No water balance for the trench or the site has been performed. Deeper groundwater in the mine has yet to be monitored at all. The statement that "The chance that such a discharge could occur at the southern end is unlikely given the direction of flow and the absence of waste in this portions of the mine.", does not appear to be based on facts as noted in comments above or data collected to date. Please indicate where the groundwater divide that separates north trending flow from south trending flow is located. Please indicate how this divide is affected with depth. i

The section on ARARs does not seem complete. The site was operated (illegally) as a hazardous waste disposal site. The two major regulations cited relate to MTCA and the Minimum Functional Standards for Solid Waste, minor lip service is given to the dangerous waste regulations. Where is mention of the Resource Conservation Recovery Act and appropriate regulations related to the operation and closure of a hazardous waste disposal facility. The MTCA closure must be able to demonstrate that the remediation selected is consistent, or substantially equivalent with the federal requirements of the delegated federal program. j

The section on the adequacy of the RI/FS is inaccurate. As stated above, there are inadequacies in the document that would render a decision by Ecology incomplete or in error unless the document is corrected. k

In summary, wastes disposed of outside of the trench such as the drums adjacent to Kent Kangley Road need to be identified and removed now. Historical information on the location and migration of wastes such as the mine sump report and papers filed by Ecology with the PCHB need to be included in the RI/FS and to the extent the information conflicts with the results, conclusion or assumptions in the report, the report needs to be changed. Investigation of seeps and discharges from around the site do not appear to be adequate to address potential pathways of released. The model presented of the trench sealed on both sides with all discharge of contaminants going north is simplistic and based on inadequate data. While there may be financial reasons for not wanting to extensively investigate and define all chemical and flow characteristics related to this site, for assumptions made based on inadequate data, there need to be safe guards instituted to assure the lack of information is not going to allow unexpected migration of contaminants impose serious harm. The critical and sensitive nature of the City of Kent's drinking water supply is understated and undervalued by the document. The document fails to consider or explain how actions contemplated in the FS will be consistent with federal requirements for hazardous waste disposal sites (such as the requirements of RCRA). The RI data is inadequate as previously noted. l

Another troubling lack of information relates to community health risks. There is no mention of the numerous fires that occurred in the trench or how this would have transported hazardous wastes outside the trench and deposited them in the surrounding area. m

The Remedial Action Objectives are inadequate as they do not consider the waste known to be (but not sampled or characterized) outside the trench. The alternatives as defined are inadequate as they do not address waste known to be placed outside the trench, allowing those waste to continue to be in contact with weather, with the resulting risks of migration via surface water and groundwater. The selected alternative must address the wastes outside the trench to adequately protect public health, the environment and meet community concerns. There is no mention of public concerns related to incidence of cancer in the area immediately surrounding the site, or that there may be a connection between the fires that took place and cancers in the surrounding community. The chosen FS alternative must include health monitoring for nearby residents, especially those who were exposed or whose birth parents were exposed to the fires that occurred at the site.

n

o

I have run out of time to comment. I look forward to providing additional comments as work on this site continues.

Greg Wingard, President

24735 Summit Landsburg Rd.
Ravensdale, WA. 98051
(206) 432-4053
April 6, 1996

David South, Landsburg Mine Site Manager
Department of Ecology
N.W. Regional Office
3190 160th Ave. S.E.
Bellevue, WA. 98008-5452

Dear Mr. South:

This letter is in response to the proposed alternative cleanup plan for the Landsburg Mine Site. Cleanup alternative 5: backfill and cap, is not an acceptable plan for the Landsburg Site. The nature and quantity of the chemicals, metals and VOCs, dumped at the mine makes it a potential "time bomb". Human health and the environment would be severly impacted if the waste migrates off site. a

Palmer Coking Coal Co. records indicate that between April of 1969 and August of 1971, 162,600 gallons of solvent was pumped into the mine directly from tanker trucks. During the same two year period Palmer records show that 4,563 55 gallon barrels were deposited at the site. The figures are based on Palmer Coking Coal records. It is quite possible that all of the dumping was not documented. There is some speculation the site may contain as many as 50,000 55 gallon barrels (Valley Daily News, September 5, 1991). b

Cleanup alternative 5 was chosen after extensive testing. In one of the testing procedures an instrument called a magnetometer was used. This instrument tests for the presence of ferrous materials. According to the RI/FS for the Landsburg Mine, Zone 2 registered extremely high levels of ferrous material. It is a known fact the trench was used as a dump for old household appliances, but is difficult to believe that the majority of the ferrous material is old refrigerators and stoves. c

Another argument for cleanup alternative 5 seems to be based on a description of the geology in the area. A description of the geology is just that, a description. There is no concrete scientific evidence to guarantee that toxic waste will not migrate off the site. d

Proposed cleanup alternative 5 calls for the installation of a "cap" which is suppose to minimize the amount of rain water permeating the mine surface. Rainwater is not the major problem at the Landsburg Mine. Past records indicate that between 1972 and 1975 several power outages occured for a duration of 24 hours or more. When that happened the mine would fill with up 5 feet of water. This was caused by pump failure. The problem of water in e

the trench was addressed during the RI/FS. The following statement is based on the results of the investigation: "these observed results generally support the contention that the Rogers coal seam is highly conductive and capable of rapidly transmitting large quantities of water (1.5 cm/s)".

It is difficult to believe, given the nature and quantity of the toxic waste at the Landsburg Site, that cleanup alternative 5 was chosen. There is a possibility that hazardous waste could leach out of the mine and into the groundwater. In that case, risk to human health and the environment would be extensive. The risk of ingestion through drinking water would be a real fact. Most organics do not dissolve in water. However, some such as toluene and benzene are slightly soluable in water (The Merck Index). f

In the January Journal Of Occupational and Environmental Medicine, researchers reported that ingesting VOCs, via drinking water, is not as harmful as inhaling them, via bathing or showering. Ingested VOCs are metabolized rapidly by the liver. VOCs inhaled or absorbed through the skin can remain in the blood for up to 4 hours or more. This would allow distribution through the body.

The only reasonable cleanup alternative for The Landsburg Site is alternative 9: excavation and off-site disposal of all waste and affected soil. This alternative would offer a permanent solution to the maximum extent possibe (MTCA regulations). Contaminated groundwater would have the potential to impact the Ravensdale/Maple Valley area, and, the cities Kent (Clark Springs), Renton and Seattle (Cedar River). Any other plan would be in direct violation of MTCAs directives: "to acomplish effective and expeditious cleanups in a manner that protects human health and the environment". g

Sincerely,

Kathleen J. Toensjost

Ralph F. Toensjost

Kathleen J. Toensjost
Ralph F. Toensjost

(4)

RECEIVED
APR 15 1996
DEPT. OF ECOLOGY

April 12, 1996

Marie L. South
Site Manager
Department of Ecology
3190 160th Avenue S.E.
Bellevue WA 98008-5452

Re: Comments Landsburg Mine

Dear Sir:

In reference to the Landsburg Mine site Cleanup Update:

a. Could the "cap" prevent the venting of barrel contents making it possible for a force to build up that could cause an explosion?

b. If not would present natural vegetation from permeating the cap allowing water to permeate the dump trench?

c. If not will present target shooting at the cap?

d. I quote from your paper "Chemicals associated with the waste were found, but only in the soils in the area where waste disposal occurred". If someone took property samples from us - why weren't we notified & if not why not? Our property is located at the 900' level directly east of the Landsburg mine site & drops with the surrounding terrain. Our property should have been tested and we would like a record of the tests, dates, and results... for our records. We have lived here since 1961. Our Lots are 25-22-06 Block 9014, 25-22-06 Block 9119, Lot 8, Lots 9 & 10 - totaling over 53 acres.
& Herbert Uppers Addition to Ravensdale (Unrecorded)

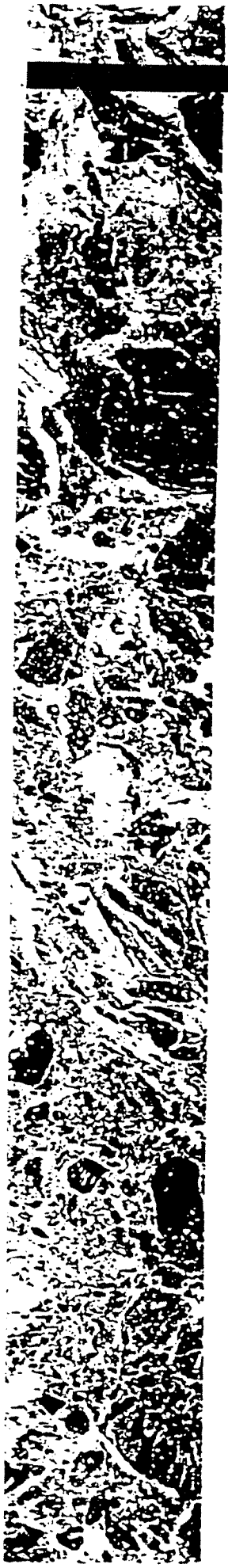
Please contact me about these concerns and include them in your public input of the clean up process.

Sincerely,

Sonia S. Preedy
P.O. Box 174
Ravensdale WA. 98051

phone 206 432 0402

e P.S. We personally observed ash falling around our home during previous Mt. St. Helens eruptions and burnings and want to know if the soil around our home contains elements that would be dangerous for gardening or personal contact.



April 10 1996

David South
Department of Ecology
3190 160th Ave. S.E.
Bellevue, Wash. 98008-5452

Concerning: Landsburg Mine

Dear David South.

I wish to provide my public comment onthe Remideal Investigation - Feasability Study of which I was informed. I have lived in this area all of my life and was around when they were dumping material into the big trench. As far as I'm concerned most of the material burned up in the huge fires they had up there the summer of '71. I remember you could see flames for a long distance. The best thing to do with this trench is to fill it in and plant grass on. Then the elk and deer could come out of the woods and have a good place to graze. a

And while you're filling up the trench, why not use the old stockpiles of coal slag that are all around this area. I understand that the carbon in the coal makes a good filter anyway. b

I think a common sense approach is the best approach. Thank you. c

Cordially Yours

James Holder

James Holder
P.O. Box 62
Hobart, WA 98025

CITY OF KENT

Jim White, Mayor

April 25, 1996

Mr. David South
Site Manger
Washington Department of Ecology
3190 160th Avenue S.E.
Bellevue, Washington 98998-5452

RE: Landsburg Mine Site RI/FS Comments

Dear Mr. South:

The City of Kent appreciates the opportunity to comment on the Remedial Investigation and Feasibility Study for the Landsburg Mine Site. In conjunction with our consultants, we have reviewed the documents in some depth and have a number of concerns and comments. As you may recall, the City responded with input to the RI/FS Workplan in July of 1993. At that time we expressed concern regarding the potential for contaminants to escape the Landsburg Mine trench and seam. Several questions and comments on this front remain and are not resolved by the RI/FS. These issues are further addressed in our comments, which are provided in the following sections of this letter.

Significance of the Landsburg Mine Hazardous Waste Site to the City of Kent.

As you know this remediation project is of great concern to the City as a result of its proximity to the Clark Springs wellfield. The City of Kent's Clark Springs wells produce 4 to 6 million gallons of water per day, about half the total municipal supply for the City. Approximately 40,000 people rely on this safe source of drinking water which the City has utilized since the early 1940s. These wells have an enormous present and future economic value to the City.

The Clark Springs are located about 1/2 mile downgradient of the south portal of the Landsburg Mine (see Figure 1). The proximity of the City of Kent's water supply wells to the mine necessitates a high level of caution in evaluating potential hazards posed by contaminants within the mine. The recently completed Wellhead Protection Plan of the City of Kent identifies the Capture Zone for each of the City's water supply sources. We have attached a copy for your use and information in moving ahead at the Landsburg site. Unfortunately, a major portion of the Landsburg mine seam falls within the 1 year Capture Zone, with the south portal several hundred feet within it, approximately 2000 feet from the wellfield. The Landsburg Mine site is ranked as the top priority risk for the Clark Springs watershed.

a

Source Characterization.

The RI/FS reports (page 3-3) that the mine received about 4,500 drums of waste and 200,000 gallons of oily waste water and sludge. Chlorinated solvents (methylene chloride, TCA, and TCE), petroleum hydrocarbons, PCB's, and cyanide are among the toxic contaminants found in residual drums and sludge at the site. The actual waste characteristics and/or content of the drums were not well documented. If there is additional information in the possession of any PLPs in this regard it should be provided. It is known what the sources were for some of the drums, and it is likely that some discussion could be presented to document the range of potential contaminants. b

It is documented in the RI/FS that samples of material taken from the drums removed from the trench and from soils sampled during the Ecology and Environment Investigation would probably be designated as Dangerous Waste (DW) or Extremely Hazardous Waste (EHW) under state and federal hazardous waste laws. This in turn implies that significant volumes of material likely EHW or DW, will remain in the trench under the proposed remediation. This material could potentially have generated a much larger volume of contaminated soils than the volume of the originally dumped wastes. No effort has been documented to characterize the full nature or extent of this material in the RI/FS. c

It is further postulated in the RI/FS that many of the drums could have been only partly full, but there is no documentation of this in a manner which allows any reliable estimate to be made regarding the volume of the waste material on site, past or present. It could also be postulated that many of the drums were full. If each drum contained on the average 45 gallons of liquid wastes, this would amount to a total of about 400,000 gallons of liquid and semi-liquid waste disposed to the mine. It is unlikely that all the wastes dumped there are accounted for, and as a result we believe that there could well be additional quantities of wastes dumped for which no record has been found. d

Based on information in the RI/FS (page 3-23), approximately 780,000 cubic yards of raw coal was removed from the mine. The mine was dewatered by pumping during its operation. The volume of water and earth materials removed in mining corresponds generally to the amount of void space created underground by the mining process (the amount of caving or "infall" from above is roughly balanced by the voids created by dewatering of the unmined material and adjacent sidewalls). Probably 85 to 90 percent of this void space (based on Figure 3-9), or about 700,000 cubic yards, is now below the water table, the abandoned mine having been mostly filled by inflows of surface water and ground water. The unknown distribution of contaminants throughout the mine is a question of concern as discussed under migration pathways below. e

The volume of liquid wastes (400,000 gallons) estimated above, based on the information in the RI/FS, represents a potential maximum concentration of 2,800 parts per million in the water now occupying the total estimated void space (700,000 cubic yards). Given that the threshold of concern for some of the toxic substances in water is measured in a few parts per billion, there is justifiable apprehension that potential future discharges from the mine, as discussed in later sections of this comment letter, potentially threaten adjacent water resources, such as the Clark Springs watershed. f

In addition, during our site visit on the 16th of April, we were made aware of a potentially contaminated area in the immediate vicinity of Mine Portal 3, where drums are reported to have been disposed. Mr. Greg Wingard reported he had personally observed drums at this location. He also reported solvent like odors, prior to the earth work which has apparently taken place there since. One drum was observed in the brush during our visit.

According to Golder staff, this location is not currently on any of the site lists which were relied upon in this RI/FS, and therefore it was not evaluated. However, the City of Kent believes that this site needs to be evaluated and remedied if necessary in conjunction with this remediation effort, based on the site location, the potential for contaminants, the spatial relationship to the Landsburg mine and the Clark Springs wells (see Figure 1), and the observed elevated organic analysis results at two private wells located down gradient (samples at PW-9 and PW-10). g

Fate and Transport of the Wastes.

To date, contaminants have not been detected consistently or in significant concentrations in either monitoring wells or in surface water discharge from the mine. The RI/FS (page 6-16) presents four possible factors explaining of the non-detection of contaminants. While each of these factors may have contributed to attenuation of the wastes, we believe they are unlikely to have resulted in complete absence, removal or destruction of all the toxic waste constituents. No data have been provided in the RI/FS to support reliance on any of these processes as predominant mechanisms at this site. There are two other important possibilities listed below, which have been omitted but must also be considered: h

- The monitoring wells are not located in the current ground water contaminant flow paths, and/or i
- The contaminants have not yet migrated to the mine portal discharge points but will eventually appear at those or other locations.

The second of these possibilities is of particular concern in the context of the discussion under migration pathways below. The four possible scenarios presented on page 6-16 of the RI/FS, are paraphrased below with discussion on each:

1. *Wastes disposed of are no longer present due to consumption by fires or being already discharged.* As reported in the RI/FS (section 3) the known major fires occurred in 1972, but the dumping took place over a period of time from 1969 to 1983, with observed dumping of liquid wastes in the trench as recently as 1978. It is not known what proportion of the wastes were located in the areas where the fires occurred, and no related estimates are provided. We do not believe that the hypothesis that a major portion of the wastes discharged have already been destroyed by this mechanism can be considered a reliable conclusion, based on the information presented in the RI/FS. j

2. *Residual coal in the mine has immobilized the wastes in place.* While it is likely that to some extent this is a mechanism in effect at the mine, no quantitative analysis or evaluation is presented in the RI/FS. The mine trench will not operate in the same manner as a filtration k

process where rigorous controls exist in such aspects as the overall process, filter media and filtration rates. It is not reasonable to rely on a possible but unsubstantiated and unquantified mechanism such as this in decision making on this site.

3. *Some of the drums were either empty or filled with innocuous or inert substances, and much of the liquid wastes dumped were low in concentrations of contaminants.* As discussed above, no discussion is presented on the contents of the drums in any quantitative manner, except statements that the contents sampled may be DW or EHW under state and federal hazardous waste regulations. The information may be available but not presented. In any event, based on the information presented to date, this is a very speculative point to rely on in light of the potential DW and EHW classifications for both wastes and contaminated soils left on site. l

4. *Wastes are contained in drums and not yet released.* This is a possibility, however we would agree with the expectation expressed in the RI/FS that most of the drum contents have already been released. m

It is also of concern that two groundwater analyses showed elevated organics at private wells PW-9 and PW-10, located downgradient from the south portal and the potential waste disposal area identified during our site visit. n

Migration Pathways.

This area of discussion is complex and is therefore presented in the following subcategories: Overview, Migration Potential Within The Mine Seam, and Lateral Flow Potential.

Overview.

There is no comprehensive discussion presented of the groundwater flow system as a whole for the site. As a result, pieces of relevant flow information are fragmented throughout the document, with the potential for conclusions to be made inaccurately or prematurely. In order to properly evaluate the migration pathways, we believe the flow system needs to be viewed more comprehensively incorporating all of the observations in one section of the RI/FS. o

The limited water balance discussion performed in the RI/FS does not support the conclusion stated on page 6-9 that, "The majority of the flow from the mine, and in particular for that portion of the trench utilized for waste disposal is therefore to the north." A more comprehensive water balance for the site is needed. p

In fact, as discussed below there is a significant amount of information in the RI which implies discharge is to the south. Golder staff have stated verbally that their best estimate is that flow is probably split evenly in both directions; however, even this conclusion is not supported based on information reported in the RI/FS. In fact the observations reported in the RI/FS document more of the mine drainage leaves to the south. This in turn leads us to disagree with the disproportionate emphasis for continued monitoring on the north end of the mine. We believe that more emphasis, or at the very least equal emphasis, is appropriate to the south, based on the proximity of the City of Kent's water supply and the observed flows leaving the mine. q

We do not believe it is possible with existing data to comprehensively model the flow system within the mine. We agree in principal with the black box concept described in the RI/FS workplan and the empirical approach of monitoring what comes out of the black box. r

As discussed below, examining the limited data empirically does not lead us to the conclusion that the majority of the groundwater flow and potential contaminants are leaving to the north. Moreover, we believe the major uncertainties remaining require more stringent monitoring and remedial measures than have been proposed. s

Migration Potential Within The Mine Seam.

Ground water flow within the mined out coal seam presents some unusual factors to consider. For a highly permeable rubble zone, which is generally symmetrical lengthwise, it is anomalous that apparent ground water elevations are so much higher at the south end than the north. t Also of concern regarding this site are the observations that:

1. Water clearly flows south from the north portal at least seasonally, as indicated by the appearance of the Baker tank releases near the north portal at well LMW-1 (page 3-35 and Figure B-12), relative to the observations made at the north portal. A much greater response was observed at LMW-1, thus documenting flow at that point to the south. u

2. Perennial and significant surface discharge occurs at the south portal, while no measurable discharge has been recorded at the north end. This south portal discharge appears to be of the same approximate magnitude as the average annual recharge to the coal seam flow system, based on the estimates reported in the RI/FS of average annual recharge to the trench of 10 to 20 gpm (page 3-36), and the hydrograph of measured flow from the south portal (figure B-9) which shows measured annual discharge averaging 15 to 20 gpm. v

3. There is no documentation of the location of the north-south ground water flow divide or divides within the mined out seam. Its location without data is speculative. The possibilities of a) multiple vertical flow cells within the seam, or b) lateral subsurface discharges cannot be discounted. The unknown geometry of the Rogers seam flow system significantly constrains analysis and meaningful conclusions regarding the migration of contaminants. The divide could be located almost anywhere within the trench. w

The waste was disposed on the ground surface at locations which were and still are above the water table. Wastes were disposed in the surface subsidence trench for several years when mining of the deepest level was still in progress and the workings were fully dewatered. Although wastes were reported to be dumped mainly in the northern section of the trench, liquid wastes would have migrated downward and then southward along the lowest workings of the mine. In fact, miners smelled fumes and noted oil in the fourth level sump, located at the mine's deepest point at the south end of the mine (see Figure 3-9), after tankers had discharged material at the surface (page A-7). x

The RI/FS (page 3-36) estimates an average annual inflow rate to the mined out Rogers seam of 10 to 20 gpm. The south portal discharge averaged about 15 and 21 gpm for the periods 12/93-12/94 and 5/94-5/95, respectively (Figure B-9). Some subsurface discharge (or possibly storage) is likely to account for the difference between this inflow and south portal discharge. Using 20 gpm net inflow, the time required to fill the 700,000 cubic yards of artificially created void space would be about 13 years, following mine closure in 1975. Liquid wastes disposed or released between 1969 and mine closure would generally have migrated toward the lowest point in the mine, over 600 feet below ground surface and near the south end of the workings. Contaminants released before and after 1975 would have mostly migrated to depths below the current ground water levels. y

Given the large volume available for dispersal of wastes, most non-aqueous liquids remaining today are probably immobilized at residual saturation levels. These materials could, however, provide an ongoing source for dissolved contaminants. Within the coal seam, contaminants residing at depths considerably below the current water table within the old workings can only be brought to portal discharge points by vertical flow cells, and may thus be considerably delayed in reaching the portals. Given the great heterogeneity of the collapsed mine workings, it is possible that different sections of the mine behave as discrete but interconnecting aquifer zones or flow cells. Portal discharge probably represents primarily shallower, faster flow. z

No surface discharge is observed at the North portal. Subsurface discharge via the coal seam at the north end of the mine can be estimated at about 1/2 gpm, based on the hydraulic conductivity reported for coal in LMW-3 and the hydraulic gradient between portal No. 2 and wells LMW-2/4.

At the south portal, surface flows approximating the estimated recharge estimated for the seam (reported on page 3-36) have been observed, and a component of groundwater discharge as discussed above for the north portal area, should also be expected to occur there. aa

These observations, as reported in the RI/FS do not lead to the conclusion that most of the discharge or contaminant transport is occurring to the north. They actually imply the opposite conclusion, that most of the flow and potential contaminant transport is occurring to the south. bb

Lateral Flow Potential.

According to the RI/FS, ground water migrates predominantly along the mined out coal seam because of much higher hydraulic conductivities in the open mine workings and collapsed rubble, as compared to the intact bedrock sidewalls. This is undoubtedly true; however, significant (relative to this flow system) lateral migration is also possible.

Very little information is available in the RI/FS to evaluate ground water flow in the intact sedimentary bedrock. The little information presented suggests such flow can be significant, especially in the coal seams or in occasional fracture zones. For example, most private wells reported in the RI/FS to be completed in bedrock have low yields, but a few produce in the tens of gallons per minute (gpm). The higher yields correspond to zones of higher hydraulic conductivity such as a shear or fracture zone. Such a zone could represent a conduit for ground water flow, with potential impact regarding this remediation project. cc

The hydraulic conductivity reported in the RI/FS for intact sandstone in monitoring well LMW-1 is $1x10^{-4}$ cm/sec (Figure F-11). If flow across the bedding planes is assumed to be only $1/100^{th}$ as great ($1x10^{-6}$ cm/sec), if this permeability existed over the 4000-foot length of the coal seam, and if the hydraulic gradient between the Rogers and Landsburg seams remained constant, as it is observed between wells LMW-1 and LMW-7, easterly lateral flow out of the Rogers seam would be 5 gpm or greater, a significant fraction of the total recharge. Fracture zones with higher hydraulic conductivity could form more defined flow paths.

Applicable Relevant and Appropriate Requirements (ARAR's).

With respect to the ARAR's discussion we have two main areas of concern. The first is regarding the Wellhead Protection Requirements under the Federal Safe Drinking Water Act. This program is implemented through the rules of the Washington State Department of Health regarding Group A and Group B Water Systems under WAC 246-290 and 291. These rules should be included as ARAR's; they require planning for protection of groundwater supplies including springs. WDOE is a primary source of assistance necessary in providing source protection under this program.

The City of Kent has recently completed its Wellhead Protection Plan, and a copy is enclosed with this letter. Figure 1, attached to this letter provides a visual summary of the locations of the Clark Springs wells, the Landsburg Mine Site and the coal seam in question, and the potential waste disposal site observed during our site visit. In implementing Wellhead Protection Plans, the utilities are required to inform the state and local governmental agencies regarding potential sources of contamination and implementation of appropriate controls and corrective actions. dd

The Landsburg mine site is particularly significant in this regard because it lies well within the 1 year capture zone (CZ) for the Clark Springs wells. This in turn implies that if significant contamination was found to discharge at some future date into the shallow aquifer supplying the wells, response time will be extremely short. More discussion follows on this subject under the topics of monitoring and contingency planning.

Regarding the requirements for capping of the site, it is stated in Table 4-2, that the MFS (under WAC 173-304) represents the primary capping criteria to be considered in this FS. We believe that the guidance for closure of hazardous waste landfills is a more appropriate set of criteria to apply, and is more consistent with the intent of MTCA. This site is not a municipal sanitary landfill. The problem here is clearly a hazardous waste issue with, according to the RI/FS, materials being left on site which could designate as DW or EHW under state or federal regulations.

As a result it is more appropriate to utilize the federal guidance for closure of landfills under RCRA (implemented in WAC 173-303) and discussed in "Requirements for Hazardous Waste Landfill Design, Construction and Closure", (EPA /625/4-89/022). This standard includes a combination cap with both an FML and minimum of 2 feet of soil with a saturated hydraulic conductivity of less than or equal to $1x10^{-7}$. If a combination cap of this type is not technically feasible, we believe at least the lower permeability requirement should be retained for the cap. ee

In this situation, there is no other proactive corrective action proposed, and clearly eliminating or reducing the leaching potential to the maximum extent possible can most easily be obtained through effective capping. In situations where no leachate collection capability exists, emphasis on the capping element is extremely important; we therefore believe that every reasonable effort should be made to comply with this standard. ff

The cap maintenance and monitoring period for post closure is stated as 20 years. This is not a routine site closure, and monitoring should be continued for a minimum of 30 years and terminated only after assurance that there is no further need. gg

Feasibility analysis.

Consistent with the comments above, an additional low permeability capping option should be evaluated in the context of the final feasibility determination. This should be the lower soil permeability standard referenced above of a minimum of 2 feet of $1x10^{-7}$ permeability soil. It is noted that the option of an FML cap is retained as a contingency. This is done based on the potential cost differential in a situation where a satisfactory source of low permeability capping material is not available at low cost. In the final decision making process, the following caps should be retained for comparison: low permeability soil at $1x10^{-6}$, low permeability soil at $1x10^{-7}$, FML, and RCRA composite cap. hh

In addition to its function of reducing potential leaching of contaminants, the cap serves the important function of reducing the driving force potentially causing contaminants to migrate within the coal seam. The extent of the cap should be expanded to encompass the entire length of the trench, based on the uncertainties of the groundwater flow system, the unknown location of the groundwater flow divide and its impact on that system. ii

In the comparison of caps in the evaluation of alternatives, all the capping options are given the same rating of 2, under the reduction, mobility and volume scoring category. As the only proactive action being recommended is capping, we would recommend that a greater distinction is appropriate between alternatives. For instance it does not seem reasonable to consider a soil cap providing between 54% and 62% infiltration reduction (based on the estimated infiltration HELP analysis comparison presented in Table 9-1) equally protective in this category as an FML/GCL cap providing over 99% infiltration reduction. As stated above the cap should extend the entire length of the subsidence trench. jj

With respect to the application of cost factors to the final selection step, we believe that an incremental comparison of the type presented would be more meaningful if it was incremental from a common point of reference. In the analysis presented, relatively small differences in overall rankings and costs result in relatively large percentage distinctions. This issue is especially important in evaluating what may be "substantial and disproportionate" costs of remediation under MTCA. kk

Although there is no formal guidance under MTCA or resulting policy on this issue, the WDOE has recognized a number of potential approaches to this question (WDOE Memo September 9th, 1993). Included in this memo are 5 alternative approaches none of which are quite the same as the approach taken here. We believe that application of these methodologies would produce a result more reflective of the intent of MTCA. The approach taken here results in a selected alternative indicative of the perceived most cost effective solution (Page 9-7). It does not seem possible to make the most effective distinction between alternatives using this approach, when relatively small incremental costs exist (relative to the range for all alternatives) for alternatives that are not separated based their level of protectiveness.

The monitoring period for post closure is stated as 20 years. This is not a routine site closure and monitoring should be continued for a minimum of 30 years and terminated only after assurance that there is no further need. If reasonable certainty regarding groundwater flow regimes and contaminant fate and transport cannot be achieved by expanded monitoring and analysis, then indefinite cap maintenance and monitoring will be required. ll

We recommend monitoring include, at a minimum, monthly sampling of the south portal surface discharge and quarterly sampling of monitoring wells LMW-3 and LMW-5. Analyses should include all compounds of concern. The portal discharge should be channeled and fenced for consistency of sampling conditions and security. Measurements of flow or water level should be recorded at each sampling. mm

Although the City is more concerned with potential discharge of contaminants to the south, uncertainty with respect to flow regimes and contaminant migration also exists at the north portal and at intermediate locations. Due to its proximity to the Clark Springs wells, the south portal area is of particular concern to the City of Kent. Knowledge of dissolved contaminant concentrations and vertical gradients between the fourth level sump and the water table would provide much more confidence in the City of Kent's well security and/or early warning of contaminant breakthrough.

Additional monitoring that might allow better characterization would include, at a minimum, three monitoring wells at the fourth level sump location and screened at the water table, at the fourth level, and at an intermediate depth. In addition, a monitoring well located about 300 feet north of the LMW-3/5 pair would provide better assurance of intercepting the potential contaminant flow path at the south end. The current wells are outside of, or at the extreme blind end of the old mine workings. The additional monitoring wells could be drilled as angle holes to avoid taking drilling equipment into the subsidence trench. The above additional monitoring wells would provide important information on the degree of risk and potential timing of impacts to the Clark Springs wells. Without such information, maintenance and monitoring of the site should be assumed for practical purposes, to be required in perpetuity. nn

Without a more detailed knowledge of the groundwater flow system and contaminant transport, additional contingency planning is also appropriate, specifically, to pre-design a ground water extraction and treatment system to be implemented upon any significant detection of contaminants in the south portal area. This system should be capable of intercepting and treating the total flow from the south portal. Particular treatment technologies could be selected when specific chemical oo

contaminants are identified. Contingency planning for alternative water supply should also be performed in the event breakthrough of contaminants occurs at some point in the future.

After discussion with Golder staff on site we believe that many of our concerns may be anticipated as being addressed in the final remedy selection and CAP process. However, the issues addressed above are not in our opinion adequately addressed in the RI/FS and must ultimately be addressed formally. Responses should be implemented through an appropriate administrative vehicle in order to provide assurances acceptable to the City of Kent. We are anticipating that this will occur either in development of a final RI/FS or in the CAP process. pp

Summary.

Based on our review of the RI/FS and the resulting comments above, the City of Kent's primary comments can be summarized as follows:

1. Based on the RI/FS, there are a number of major uncertainties and unknowns at the site. In our opinion these include: the nature and extent of the wastes deposited and remaining on site, the nature of the groundwater flow system and related contaminant transport, and the risk of future releases. qq

2. The ground water flow regime within the collapsed mine workings, is essentially unknown and is likely considerably more complex than portrayed. We believe there is a substantial possibility that contaminated ground water may yet emerge at the portals or elsewhere. The possibility of contaminants eventually discharging from the Landsburg Mine is substantial and has not been fully addressed or quantified by the RI/FS. rr

3. Based on the information presented in the RI/FS (section 6.6.2, page 6-17), we disagree the statement that "the primary pathway for chemicals potentially exiting the mine is to the north". ss

4. We strongly disagree with the statement that "Future ground water monitoring activities should therefore focus on detecting potential releases at the northern end." We believe the information gathered to date, and presented in the RI/FS does not support this conclusion and recommendation. In our opinion, more extensive monitoring attention should be focused on the south end of the mine. The period of monitoring should be a minimum of 30 years, and not discontinued until an adequate understanding of the flow system and its behavior exists. There is a possibility that monitoring will be necessary in perpetuity. tt

5. Monitoring results are of great interest to the city, and should be routinely provided on a monthly basis, unless otherwise mutually agreed to in the future. uu

6. The potential waste discharge site identified on Figure 1, should also be evaluated in the context of this remediation effort. vv

7. A more conservative cap should be considered as consistent with the more appropriately used hazardous waste site capping and closure requirements for hazardous waste facilities under RCRA. The extent of the cap should be expanded to include the entire length of the trench unless a better understanding of the groundwater flow system and flow divide can be established. ww

8. Wellhead Protection requirements under state and federal requirements should be addressed as an ARAR for this site. xx

9. Greater emphasis is necessary in the area of contingency planning, specifically addressing the potential need for alternative water supply, water source treatment at the Clark Springs facility, and groundwater pump and treat mechanisms to provide hydraulic control of trench discharge. yy

10. The final resolution of the concerns addressed in this letter should be implemented through specific language in a revised RI/FS, the CAP, or inclusion in the Consent Decree (or other administrative vehicle utilized) for the site. zz

If the City of Kent receives acceptable responses to the comments and concerns expressed above, we could concur with the overall approach for the Landsburg site, of controlling leachate and contaminant discharges to the maximum reasonable extent through capping, continued intensive monitoring, and effective contingency planning, as generally appropriate. The final solution must contain assurance to the City of Kent that its water supply will be adequately protected from this source of contamination. This in turn requires that the PLP's have a demonstrated capability to implement whatever actions result as potentially required under the contingency planning discussed above. aaa

As you can see from the discussion above, the City of Kent is very concerned that any potential for contamination of the springs be fully and adequately addressed through this process. These comments were prepared with assistance from John Littler of Littler Environmental Consulting, Inc. and Mark Shaffer of Associated Earth Sciences, Inc. On April 16th we had the opportunity to visit the site with Bob Pancost and Rob Long of Golder, representing the PLPs. This visit was arranged on very short notice, was very helpful to us in developing our comments and very much appreciated. We would very much like to meet with you in the near future to discuss any questions you have with respect to our comments and your response. bbb

Very Truly Yours,

Don E. Wickstrom, P.E.
Director of Public Works

Enclosure
cc: Jim White, Mayor
Brent McFall, Chief of Staff
Members of Kent City Council

landsb.jl

PUBLIC MEETING
Department of Ecology
Remedial Investigation/Feasibility Study Report
for the Landsburg Mine Site

Tahoma Junior High
Maple Valley, Washington
March 27, 1996 - 7:00 p.m.

INTRODUCTIONS and MEETING AGENDA

By: Marianne Deppman, Public Involvement Specialist
Department of Ecology

OVERVIEW OF THE CLEANUP PROCESS AND PUBLIC INVOLVEMENT OPPORTUNITIES

By: David L. South, Site Manager
Department of Ecology

SUMMARY OF REMEDIAL INVESTIGATION/FEASIBILITY STUDY FINDINGS

By: Bob Pancoast, Project Manager
Golder Associates, Inc.

Reported by:

Lori K. Haworth, Court Reporter

MS. DEPPMAN: Welcome. Thank you all for coming. It's always interesting to see how many people we'll get coming to this. Apparently, there was some confusion in the newspaper. I hope that didn't detract too many people. I'm Marianne Deppman, and I work for the Department of Ecology. And it sounds like there is plenty of echo in here. I hope you can hear fine with the mike. I'm going to facilitate and moderate this evening's meeting.

As I'm sure you're probably aware, the reason we're here is because the environmental study at the Landsburg Mine site in Ravensdale has been concluded, and a report of the findings has been issued to the Department of Ecology. Ecology is currently accepting comments from the public on that report. And in fact,

before we can complete the report, we do need to have a public comment period. So we're in that period right now.

What we're hoping to accomplish tonight is a couple of things. One is to share with you the findings of the report. And also, you're allowed to ask questions. And then if you would like, we'd like to give you an opportunity to comment formally for the record, on the document. So -- and it sounds like there is a couple of people who would like to do that.

So the agenda over here on the overhead is pretty straightforward. I'll introduce a few people. David South over here is the site manager for the Department of Ecology. He's going to talk about the model toxic control lab and the cleanup process and additional public involvement activities and give you a bit more detail about it, and comment.

Bob Pancoast will be here in just a second. He's with Golder Associates, who was the environmental consulting firm hired by the Potential Liable Parties to conduct the investigation, so he's probably the most familiar person with the site study, and he'll be giving a 25- or 30-minute slide presentation detailing the findings of the report.

And then we would just like to open it up to questions. And I'd like to keep the time on the question-and-answer period and the formal comment period flexible. It looks like we have two people right now who know they want to comment formally; is that right? Okay. You can certainly choose, at any time, to comment, but we'll take all your questions because we don't have a large crowd. We'll take any questions there are. And then we'll leave a half-an-hour where we can maybe take formal comment. And so we'll adjourn at 9:00 p.m.

If you'll notice, on the back of your agenda, there is a few more details. The comment period for the report is running March 13 to April 12. That means you have until April 12 to get formal comments to Ecology if you'd like to submit those. The documents are available at Maple Valley Library and at Department of Ecology Regional Office in Bellevue. You can send the written comments to David South at the address. And if you have any questions, please feel free to call me.

MR. SOUTH: As Marianne said, I'm Dave South. I'm with the Department of Ecology Toxic Cleanup Program, and I am the Ecology Site Manager for the Landsburg Mine site. The way this process basically works is, once you have a site reported and a site discovered -- that is, there are environmental issues that need to be addressed -- the site is assessed, a preliminary assessment, to provide that we have resources to work on. And obviously the Landsburg Mine is one of the chosen to go ahead with an investigation of environmental conditions.

As you're probably aware, the issue at Landsburg Mine is that in the '60s and '70s, industrial waste was dumped in the site trenches above an underground coal mine. We work with the Potentially Liable Persons, which are the corporations that have

leased or have ownership or operation or that have placed waste there. They have wound up, under law, for liability for addressing the site. And these are Palmer Coking Coal Company, PACCAR, Burlington Environmental -- what is it now?

UNIDENTIFIED SPEAKER: "Philip."

MR. SOUTH: Philip Environmental, Browning-Ferris -- I'm leaving one out. Burlington Northern Railroad. So they have worked together as a group called "Landsburg Steering Committee" to do the work and identify what the environmental conditions are for each mine, that kind of thing. That's what their consultants, or associates, will be talking about.

Ecology, I worked with them to develop a work plan to conduct the Remedial Investigation/Feasibility Studies. That's some jargon that you'll hear in this. To keep it short, "RI/FS." That year-around monitoring, so that's taking some time. We had public comment on that work plan when it was done, which was some time ago. I can't remember the exact date. Of course many of the RI/FS had to be conducted, as well as drill water samples; a host of things that Bob Pancoast will be talking about. And we are now in a comment period. You'll see public comment a lot.

The results of the investigation, which also include a listing of what are called alternatives to cleanup, in the -- and the way this works, once you identify the environmental issues, several alternatives are proposed to clean up and evaluate a number of arriving criteria.

The Potentially Liable Persons develop these and present them, as well as their preferred alternatives. Ecology will take your comment and, in consideration of your comment, will select an alternative. So your comment is very important to us. Although you will probably hear the preferred alternative tonight, that is the PLP's -- the Potentially Liable Persons' -- preferred alternative. And Ecology has not made any decision on the site.

We will take your comments and work with the PLP group and Landsburg Steering Committee to develop a Cleanup Action Plan which actually selects what will be done on the site. And once that's developed, we will come back out to you and get your comments again on the selection. Hopefully, by the time we'll get your comments, we'll know enough that the selection is acceptable and does not have to be modified. But we do retain the ability to modify it, based on public comment period, on the Cleanup Action Plan.

One of the things that's happening tonight, the original work plan was conducted under a thing called the Agreed Order. It's a legal agreement between us and the Ellensburg Steering Committee -- Ecology and the Landsburg Steering Committee -- that provides that the work be phased. And we would do further work if we needed to, to identify conditions to select an alternative.

The PLPs believe and we agree that we have sufficient information to select an alternative. So also, we're seeking comment tonight on a Consent Decree that sufficient investigatory

work be done, and we are now ready to proceed with a Cleanup Action Plan.

So there are comments in that regard, as well, and we will certainly accept those tonight. We will not talk about that, probably, any more tonight because as part of the comment period, the proposed RI/FS and Amendment Order is in the public repository, the library, and I have a copy here. That's about all I have to say. If there are any quick questions, I'll take them now. And if not, I will turn it over to Bob Pancoast. We have a little bit of shift in scenery to do, so bear with me.

MR. PANCOAST: Thank you very much. It's been a very long process to see where it's been going. Finally its results let us move on here. And so I'd like to present just a quick summary of what we found out during the investigation and the feasibility study conducted.

I first would like to introduce several people from Golder that are here. Myself, Bob Pancoast, who is the Project Manager for the Landsburg site for Golder Associates, Bob Long, Doug Morell, and Lee Holder are also here, and these are four of the key people that are involved in the Landsburg project for Golder. So this is an excellent opportunity, if you do have questions, to be able to talk to some people that actually produced the report that many of you are looking at.

Golder has been retained by the Landsburg PLPs about 1992 to develop the work plan for the RI/FS, Investigation/Feasibility Study, and then to actually conduct the RI/FS out at the site. The Landsburg site, as many of you are aware, is located in this part of the state and is located, basically, north of the -- this is the little Summit area here, the Kent-Kangley Road, and the Summit-Landsburg Road goes to the north of the project site. The mine site, the Landsburg Mine site, actually cuts through this little hill that's here, and comes up to -- very close to the road, the Summit-Landsburg Road, on the north side, and basically stops at about the power lines that cut through here, for many of you who are familiar with the area.

To understand the Landsburg project, to really understand what we found about this site, you have to understand a little bit about geology. It's a very unique setting. We have, essentially, Eocene, about 55-million-year-old coal deposits that are going down into the coastal area here, and goes down Washington, that have been uplifted and, basically, folded in a series of folds as the continental margin, as additional material came on, and as the Cascade Range lifted.

What's very unique about this site is that the sediments really remain in kind of a layer cake, as many of you are familiar with kind of the sedimentary type rock deposits. These have been, essentially, lifted, so they are obviously occurring like the pages that are vertically standing up. And in fact, at the south side of the mine, it gets to about 63 degrees. But when we get to

the north end, they are about 88 degrees, almost 90 degrees vertically standing. So very, very unique geology for this area.

If we look at the site, looking at the surface, at the geology, there essentially is a series of three coal seams that outcrop in this area: The Frasier, the Rogers, and then the Landsburg. And we can see the surface outcrop -- or, the subsurface outcrop, through here. The Landsburg mine actually operated on two of these pole seams. The Landsburg mine starting in, I guess, the '40s and running to about '59, and then from '59 into the '70s, then on the Rogers Seam once that was discovered.

The mining on the Rogers Seam -- and you can see, this is the extent of the underground operations that ran from the portal to the portal -- resulted in a series of these little depressions; this, essentially, subsidence trench, which you can see on the surface above the Rogers Seam.

The history of the Rogers Seam mining basically started in 1959 or slightly before and consisted of a mine that, basically, was developed down to about 700, 750 feet in depth. And in December of '75 -- or, in '75, they completed the mining. And then in December of 1975, they basically abandoned the Rogers No. 3 mine, and this was done by blasting the airways and running bulldozers and, basically, restoring the contoured surfaces.

The mining was done kind of in an interesting way. They would, basically, drive at a decline down to the coal and then some -- cross hallways, and then the coal was extracted by driving up little shot holes and, basically, springing this block of coal out into the hallway and then pushing it down a gangway, if you haul by pine cars, out of the mine. So it's -- given the very vertical orientation of this coal seam, it was a very unique style of mining that's called booming, that is somewhat particular to this area. And it's also because there is some hard rock type mining. But this is, as far as I know, one of the only places that's used for coal mining.

As I say, this resulted in, basically, a mine that extended to about 750 feet in depth, which it exceeded -- was pretty close to sea level here. And it ran close to the Cedar River on this end, and down pretty close to the power lines. In fact, this is the -- the decline that comes from that power line portal.

As the coal was mined, it, basically, resulted in several voids. And as this material was removed down here, and even with some of the backfilling of debris rock and stuff, there was a settlement in this coal seam, and this resulted in a trench that was expressed at the surface as the rock underneath, basically, consolidated, or collapsed, and allowed the surface to, basically, drop into the position.

As many of you have seen on the aerial photo we have up here -- and feel free to look at that. This is an aerial photo running from the Cedar River up here on the north end, and the Pipeline Road, Summit-Landsburg Road through here. This is the Kent-Kangley Road down here at the bottom, and you can see this

expression of this trench that runs right through here. And this is the trench of the Rogers Seam right here.

In real life, this is kind of what it looks like, for some of you that haven't been up to that area. It's fairly narrow. You can see this is from side-to-side here in some spots. It runs 75 to maybe 125, 130 feet across at the wide points, and gets to be on the order of about 50 to 75, 80 feet in depth at the deep spots. One side has some shale and stuff, and the other wall is pretty much a hanging wall of this sandstone material. Some of these slabs have broken off from time to time. These slabs basically accumulate at the bottom and bridge certain locations.

Well, like anything, there is a hole in the ground. And way back in the '60s and the '70s, most holes in the ground were used for disposing of waste. And so this is, basically, a history of waste disposal that started in 1969 with a lot of industrial debris, including some drum waste and land-clearing debris. In 1971, there was a series of fires. It was about five fires that occurred during that year. Some of them multi-day fires that burned for an extensive period of time. And the flames were visible from quite a distance, from what I understand.

Basically, in '72, King County issued a permit allowing disposal of land-clearing debris. And trees, stumps, various types of materials -- branches, this type of thing -- was placed in the trench. In '78, some additional oily sludge was disposed, and then the operations were halted.

As Dave mentioned, Ecology has gotten involved in the project, basically, through modular -- the model toxic control lab. I'm sure many of you remember that was passed by a ballot in '88. Basically, the model toxic control lab established the standards of liability and provides that the Potentially Liable Parties from the investigation reimburse Ecology for some of their oversight.

As part of the mock process, this is, basically, the steps, as David alliterated. We look at site discovery and assessment which has occurred, the site investigation and evaluation of cleanup options, and this has occurred through the Agreed Order and the work plan and then the RI/FS report. So right now, we're at this point. We're looking at public comment on the final RI/FS report, to then look at the site cleanup, which is the next phase of the operation. And this starts with a Consent Decree with the PLP party, and the development of a Cleanup Action Plan, usually abbreviated "CAP." And this is, basically, a document that is prepared by Ecology that dictates how the cleanup will be performed at the site, various remedial design documents and construction activities that obviously occur in the cleanup.

And then following the actual machinery and working of the site, once everything is restored and cleaned up and remediation performed, we look at some sort of long-term performance monitoring. In other words, have things been done successfully, are there any emission problems, do we have a good, you know,

monitoring system in effect to provide a long-term performance of the selected remedial option.

Several previous investigations have been done at the site prior to Golder being involved and doing the RI/FS. This consisted of soil gas surveys; some surface water sampling that was done in the trench and the portals. The Department of Health did a private well sampling in the vicinity of the mine site to see if there was any impact. There has been a site hazard assessment. And then in 1991, the PLP group, basically, under an Expedited Response Action, ERA, removed 116 drums from the trench, and these were the drums that were pretty much readily accessible down at the bottom of the trench. It was a fairly significant operation with a tarp and a lot of operations and storage and overpacking of these drums. So a lot of the drums were, basically, removed -- that were easy to get to, were removed in this process. One-hundred-sixteen.

Basically, the conclusion of the previous investigations said that there were no chemicals detected above what's considered background in any of the ground water or surface water that left the site, and that the contamination seems to be confined to the mine within the trench, itself.

Based on this, we developed a remedial investigation. A remedial investigation, basically, defines the nature and the extent of the contamination -- where is it, what is it, how much is there, what's the quantity, where might it go -- and it evaluates, essentially, what is the potential risks posed by this contamination at the site.

The Landsburg Mine RI approach is a little bit unique in that we utilized the Black Box concept for evaluating the mine. The mine is just all very complex. It goes down 750 feet. There is all sorts of little passageways and things. And so the focus, in cooperation with Ecology and looking at this thing is, how could we really ascertain what's the effect of this previous waste disposal at the site. We, basically, went with the Black Box approach, which takes a mine and looks at what's potentially coming out, so that we can see if there is any exposure pathways of contaminants leaving the mine that may affect Ecology or human receptors.

The focus was on identifying potential chemicals migrating out of the mine. And it became readily apparent during the development of the work plan, the conceptual model of the Landsburg Mine site, that really, the primary pathway, the contaminants were going to get from the mine site and past the waste disposal site, to any kind of human receptors, mainly ground water, so the remedial investigation concentrates very heavily on determining if there is impacts to ground water within the area.

Key issues for the remedial investigation include the location of drums, near-surface hot spots. We looked at, was there potential for soil contamination from the interim action; Expedited Response Action. We wanted to understand the ground

water flow systems and the nature of contamination. We talked about, this was viewed as the major potential exposure pathway from the mine, to determine whether the ground water exiting the site poses a risk, and then we also had to consider mine stability issues. For whatever we're going to do with the site in terms of remediating it, obviously this mine, and potential subsidence, and instability issues become a major concern, and what can people do effectively to do something as a remedial action at the Landsburg site.

Summary of issues to be resolved: Does the site pose a risk. This is obviously a major factor, or the major piece of data that comes out of an RI. Is there a risk to the site. And we evaluate the risk by comparing to MTCA standards. The state, basically, has published and has a formula for evaluating the levels of various contaminants, various compounds, chemicals that exist. And so we know if we have something that's above background level, or we know if we're getting some sort of exposure concentration that perhaps poses a risk. What pathways pose a risk, and what are the preferred alternatives to meet the cleanup standards.

A key concept in any RI/FS is to gather sufficient information to meet the data needs that we've talked about, while recognizing that removing all uncertainty is not necessarily achievable. And this is a very important fact that's been set out in the EPA guidance document, that we really have to do things to the best of our abilities, to evaluate. And we have a very comprehensive program that does that. But obviously, removing all uncertainty is something that's, really, not achievable.

The RI activities that were conducted as part of this remedial investigation were quite extensive. The PLP group decided to go in the first phase and do a very extensive investigation of this site. The tasks that were done include surface geophysics within the trench. We also used a lot of geophysics to determine where the coal seams were, for placing monitoring wells, to be able to intersect these coal seams. Air monitoring was conducted within the trench at various times during the year. We conducted a survey of all the wells, all the private wells that were located within the study area and, actually, on the periphery of the study area. And of these private wells, we selected 14 that were involved in a -- basically, a year-long monitoring program of the ground water.

We installed seven monitoring wells. These were also included in the yearly monitoring program. And we collected surface soil samples outside the trench. As you recall, a lot of the early actions concentrated on what was in the trench. Sampling drums; sampling soils in the trench. We want to see if there is any spread of initial contamination maybe outside of the trench in terms of violating the remedial options.

Surface water samples from mine portals; a fairly extensive geologic investigation. Backhoes obviously to drill data. Geologic vacuum deposits were performed on the site. The whole

area was flown for stereo aerial photography and photogrammetry work. And we, basically, had developed a graphic map of about two-foot contours for the site. That's been used as a tool in designing the remedial option. And everything -- all the sample locations, all the bore holes, everything was tied together in a geo -- grid with the surveyors.

We also looked at ecological and social data for the area, meteorological data, flows in the Cedar River, endangered species, various types of ecological and social data that you, basically, have to take into account under SEPA and under the development of remedial options for this site.

The surface geophysics and the air monitoring was actually performed down the trench once air monitoring data indicated that it was safe. The geophysics was done with electromagnetics which allowed us to, basically, boom the entire length of the trench with a magnetometer, electromagnetic setups that detect ferrous materials. And they literally would get a hit and then kind of look around a little bit, and they would find a piece of metal or a washer and dryer or things that would cause a disturbance in these magnetic fields. It's a very sensitive instrument. This was used, basically, to plot the profile of the entire trench, and it was to look for, where was all this ferrous materials; i.e., where were all those drums placed. So through the geophysics, we were able to determine the areas within the trench where there was high magnetic anomalies that were due to the placement of the 55-gallon drums.

As we talked about, the study area also included evaluating all the private wells. This is the study area for the site. You can see this is the trench area right here; the old mine subsidence. And this was the study area that was developed in the work plan, this really large dotted line area around that you see.

We did a survey. We went through Ecology's files, finding all the private water wells and actually drove around and interviewed people and talked with people and, basically, determined all the private water wells which are shown by these black dots up here within the area. Fourteen of these wells then were designated to be involved in the sampling program, and these are indicated by these little symbols right here, the little "pull-out" signs.

We also installed seven monitoring wells. There is a pair of deep and a shallow -- a deep pair of wells that are installed in the north end of the mine, intersecting the coal seam, there is a pair of wells, deep and shallow, that are installed within the coal seam at the south end of the mine, there is an additional well that's installed right here over this little rock bridge that crosses the trench, and then we installed a monitoring well in each of the two adjacent coal seams, in the Frasier and then in the Landsburg Seam, to see if there is anything migrating cross-strata into -- very highly conductive, these old mine workings.

The monitoring wells we installed were kind of unique because we're aiming for a vertical target in any case. So instead of going out and drilling a vertical well and intercepting on the way, sandstone or something, like we do in many projects, we had to back off and drill the bore holes, and many of them at an angle, to be able to intercept this coal seam. So some of the wells you'll see, the shallow and the deep ones and also the one that was constructed on the Landsburg Seam, were drilled at an angle to be able to intercept these vertical coal seams. Kind of unique drilling.

Well, we aimed for summer, and that's what we got. The monitoring wells were installed during late 1993 and early 1994, as many of you know. The weather did improve a little bit as we went along.

This shows one of the angle bore holes being constructed. I know many of you that are from this area saw the operations as we were going, and we certainly appreciate your patience. Some of them went a little bit longer than we anticipated. This was the one by the Landsburg Summit Road up at the north end of the mine site, and this is the angle bore hole being done. Some of them went a little late in the night, and we apologize if it was an inconvenience to anyone. No, this wasn't hit by a truck. That's what the mines looked like for an angle bore hole. And this is, basically, what the monitoring wells look like when they are done.

As we talked about, here is the actual mine. LMW-3 and 4 by the portals, by the power line, were drilled in this area to intercept the working here in the shallow coal. LMW-1 was drilled to intercept some fractured rock adjacent to this gangway that crosses here, to provide a good sampling point here mid-mine. And then LMW-2 and 4 were installed deep within the coal seam, down here at the north end, above the Cedar River on this little terrace, right at the very north end of the mine operations. Two additional wells we talked about were installed in the adjacent seam to the east and to the west. So a total of seven monitoring wells were installed.

This shows a cross-section. And here it's kind of hard to see, but you can see the angle that LMW-4 intercepted the coal seam here. These were kind of fun to put in. We ran inclinometer surveys. It required quite a bit of geophysics to actually find the spot and start drilling and make sure that you hit the coal seam where you thought it would. But our shooting was pretty good, and we managed to place the monitoring well screens where we needed to within the coal seams.

So we, basically, performed four quarters -- one year -- ground water monitoring on 14 private wells -- actually, three quarters on 14, the fourth quarter, only seven private wells. And then seven installed monitoring wells, which were very precisely located to be able to see if there was any contamination coming into the mine.

So what were the results of the ground water sampling? Basically, no federal maximum contaminant levels were exceeded. Some secondary contaminant levels, basically, for aluminum, iron, manganese and total dissolved solids were exceeded sporadically throughout the study area. They exceeded in areas that had no relevance to the mine, that were thought to be background wells, either wells that were high on the hill; you know, up -- gradient, potentially, from the mine. So they tend to represent, really, background situations for the area. No indication of any organic contamination in the ground water at the mine site, and the ground water quality that was found was, basically, consistent with coal mine drainage water. In other words, there is some minor organic materials that come out from coal mines. And besides these, we really did not seem to get --

MR. SOUTH: What is a secondary?

MR. PANCOAST: A secondary MCL tends to be things like iron and manganese that are more of a quality; for example, like manganese --

MR. SOUTH: Is that a nonorganic --

MR. PANCOAST: It's more aesthetic. In other words, they set iron and manganese levels so your toilet doesn't turn black. They don't really pose so much of a health risk as their aesthetic quality to water. Thanks, Dave. That's a good point.

The results of the soil sampling that was conducted around the trench basically indicated that the levels of chemicals detected in soils outside the trench are consistent with background levels. In other words, we didn't see any type of contamination. Chemicals associated with any prior waste disposal appear to be confined primarily to within the northern portion of the trench.

The contaminants of concern for ground water; basically, there were none. For surface water, there were no contaminants of concern. For air, we did not find anything on any of the air monitoring conducted within the trench in the close proximity of the waste disposal. In the soils outside of the trench -- in other words, outside on the periphery of the actual trench, on the rim -- there were no contaminants of concern detected. And basically, inside the trench, from a previous study of actually sampling some of the contaminated soils, the contaminants of concern were chromium, lead, PCBs, total petroleum hydrocarbons, bisphthalate, which is a plasticizer, methylene chloride, and trichloroethylene. And again, these were within the trench.

So the key conclusions that came out of the RI, the Remedial Investigation, is that, basically, the potential buried waste is confined to the northern half of the trench, subsidence trench. From the geophysics and studying that was done, there were no waste constituents that were exiting the mine, surface water, water flowing out of the portals, or the ground water. That the contamination appears to be confined totally to soils and buried waste that are down in the bottom of the trench.

So the other significant question is, what happened to the waste. Well, again, it's a very unique site, and so we have to get back to, what is the geology, and what's been the history of the site. As you recall, there was a series of very large, multi-day fires that occurred back in '72. These were huge -- you know, 100-foot flames -- and burned for days. So obviously, we have to figure that a lot of the waste was consumed that was there at that time. It was consumed in those fires. There also was probably a fairly rapid movement of liquids that may have been dumped from tanker trucks and that sort of thing, out of this really highly conductive mine slot. And this is what is so unique about the Landsburg Mine, is, instead of having a flat, layered geology system that we're used to where we drop some little contaminant, and it sinks down to the ground, and it flows in the plume, kind of based on which way the ground water is flowing. In the Landsburg site, it tends to be a vertical slot. Instead of radiating out in different directions, the flow at Landsburg is confined. We have all those layers of soil and layers of rock, and it's very hard for the water to pass through these layers. It much prefers to flow down this localized slot of this little mine. So the water tends to flow along the preferential pathway, and it's a very rapid movement. It's almost like having a trench dug into the ground that's filled with gravel. We dump some water in this end, and it flows out very rapidly. So there probably was a fairly rapid movement of what liquid was disposed, out of the system.

There is also a very unique case here in Landsburg. For years, many of these disposal sites that we look at were put in locations that were probably not the best, to put it mildly. A lot of the old gravel pits, places with sand quarries, this sort of thing, is very highly conductive. Waste gets in, flows with the ground water system, and moves very rapidly through the system. Here we have preferential pathways we talked about, which tend to flow one direction out of the system. And the system it's flowing through is carbonation. A carbon system. So we have very interesting phenomena occurring in the Landsburg Mine; that we probably have some absorption of the various organic contaminants to coal and perhaps some of the different metals. So we have some absorbent qualities, kind of like activating carbon that we use, doing a lot of the remedial cleanups. We have a little bit of carbon in place which is acting like an absorbent agent. And also, there probably was a fairly unknown quantity of the contaminants. Were the drums full, were they just sludges, were they water; you know, really, what was the volume. That's hard to determine. Probably none of the drums were full when they were placed.

Well, after we get the Remedial Investigation done, the next phase of this thing, the FS, is, where do we go from here? How do we clean this up? What do we do? Remediation alternatives must meet certain criteria under MTCA. They have to be protective of

human health and the environment, they have to comply with cleanup standards, they have to comply with applicable --

UNIDENTIFIED SPEAKER: Relevant and appropriate --

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: -- laws.

MR. PANCOAST: They are, basically, laws. So we have to comply with all the local laws and state laws and federal laws. We also have to have a provision in the remedial alternative that provides for compliance monitoring. Did we do something, has it been effective, is there any other laws of concern. So compliance monitoring is a very important aspect of remedial alternatives.

The Feasibility Study, basically, evaluates alternatives for site remediation -- how do we clean it up -- and as applicable, considers reusing, recycling, destroying, detoxifying the material, separating it, or volume reduction, immobilizing the waste in place, on- or off-site disposal at engineering facilities -- that's going to be like Arlington, which is an engineering facility with multiple liners and detection systems -- containment of the contamination, and institutional controls and monitoring.

For the Landsburg site, we basically selected for the initial screening, nine alternatives that were evaluated, and I'll go through these in a little detail here as we go through the slides. But basically, they ranged from no action, to institutional controls and just monitoring, which is usually putting up a fence and checking the monitoring wells, to backfilling the trench, to putting a soil cap on it, to putting a better low-permeability soil cap on it, to putting a flexible membrane liner, which is like a big thick, plastic over it, to putting a flexible membrane liner and a geosynthetic clay liner, which is a kind of fabric that has a clay material in it that expands, to excavation and off-site disposal of surficial soils, capping it, and then excavation and off-site disposal of all the waste and all the soils.

So you can see it runs, basically, the gamut from doing virtually nothing, no action, all the way to a fairly extensive operation that would be excavating an off-site disposal of the materials.

The "no action" is, basically, the current site conditions. "No monitoring," as we talked about. Institutional controls usually involves deep restrictions: Fencing, warning signs, you check one every now and then, and you monitor it. We looked at trench backfilling. Could we just backfill the trench and grade it to get the water out, and would that work. And over here in the far right column, you basically see the remedial alternatives that were carried forward to the next phase, that we actually do some engineering analyses of the preferred alternative. Really, the trench backfilling wouldn't give us what we needed here. It was not a real improvement over doing some various other alternatives, so it was not carried forward in the evaluation process.

Soil caps. Soil caps -- basically, backfilling the trench and placing a clean soil cap over the trench, doing the storm water control, and maintaining the cap. A low-permeability soil cap is a little bit of an improvement on this. We backfill and grade the trench as we did under a soil cap. Now we place a low-permeability soil cap over the trench backfill to keep the water from infiltrating into the materials that is placed within the trench.

Basically, we look at different alternatives to this. We look at a flexible membrane cap. Can we use a plastic material to get away from using so much low-permeability soils, and then we looked at a fairly extensive, kind of double system here. We have flexible membrane liner, and then a geosynthetic clay liner here to get kind of a double effect on the cap. So we're looking at all the ranges of potentially capping.

Basically, these things we talked about -- backfilling, placing various types of caps -- are containment concepts where the waste is left here in place, probably surrounded by some coal refuse. The trench is partially backfilled by scraping in the sides and any material that might be up on top, just as an additional safety factor; make sure we get everything. It's backfilled, covered with some sort of cap, a vegetated cover is placed over it, and then there is various types of drainage, or surface water control, so that we prevent infiltration of rain coming down and going through this waste and carrying contaminants down to the ground water. And any surface water that comes in from the side is, basically, caught in some sort of drainage collection system and carried off the site before it has a chance to infiltrate. So that the major design constraint on this containment thing is to prevent any additional water leading into the system.

Here are the cap designs that we evaluated. And as you can see, they range from a soil cap where we have the trench backfilled, about 18 inches of clean soil, and six inches of vegetation, to the low-permeability soil cap where we have now two feet of very compacted, low-permeability, 10 to minus-six soil on top of the trench backfill, then our vegetation cover.

An FML cover is, basically, a little geotextile with the synthetic flexible membrane liner. It's like a very thick plastic, black plastic layer that prevents water from infiltrating. And kind of a double system we looked at was flexible membrane liner and a geosynthetic clay liner like we talked about. So basically, we have a double liner system here incorporated above the trench backfill.

We also looked at two other options, which were excavation and off-site disposal of surficial affected soils, and then doing some capping. This one was not retained because it was -- basically, parts of it were carried forward under other alternatives, and it really was not just -- not as effective. We had to look at the actual engineering behind it.

The one we did carry forward, though, was the excavation and off-site disposal of all waste and all affected soil. This, basically, involves excavating the trench, which is no minor feat. I'm sure most of you can understand that. You have to lay back the walls of the trench. It involves putting operators and workers down in a fairly -- fairly hazardous environment. You, basically, treat the excavated material on-site or off-site depending on what the material is and how much you want to stage to the area. And then, basically, you're hauling the excavated waste out on the roads to another disposal facility such as Arlington. So, really, we're taking the waste from here and relocating it to a land disposal.

Under the MTCA evaluation criteria, we have to look at several different criteria that are important in determining a remedial selection. What's the long-term, short-term effect, and what's the reliability of the system, what's the reduction in toxicity, mobility, and volume of the contaminants, how implementable is it, how readily can we really do it, what's the cost factors involved in the remediation, and what's the community acceptance.

And so what's done in the evaluation of these alternatives as it begins to enter into an engineering study where we -- we take, basically, these other criteria up here, everything but cost, and it's used to generate a net benefit that we compare to the cost.

So it's like everything in life. If we bought kind of a net benefit -- say, if you were going to buy a car, you could plot over here, you know, net benefit; you know, what does the car give me, and then what's the cost of the car. And so we have a curve that would go up, and we'd be getting a lot better car as we spend more money. But somewhere, at some point, it would kind of level off. We're really not getting much of a car. One with a fancy name, or whatever. It's going to do the same thing. And it's just, we're not getting much more, but the cost seems to go up here. Lexus, BMW, so forth. And so most curves have to go up. You get a pretty good benefit/cost for awhile, and then they tend to level off.

And so this is a good way of comparing this. This, basically, just shows the different comparisons of the -- up here we have the low-permeability soil cap, FML cap, FML/GCL cap, soil cap, clustered up here. We show that very low cost, very low benefit down here for institutional controls, no action, and excavation and disposal. And this is -- obviously shows at a very high cost but, also, kind of a low net benefit because there is -- as you're opening up this trench, and you're kind of spreading stuff around -- so there are some impacts, both ecological, and to workers, and to communities. You have to haul this stuff out. So when you begin to look at, really, what are the benefits, this is how the things plot out.

And so if we look at, really, this cluster up here -- I'll expand this out a little bit so you can see. When we plotted

these things up and began to look at comparing these various caps and containment alternatives, Alternative 5, which is the low-permeability soil cap, became the preferred alternative. The low-permeability soil cap, if you remember, is the one where we place about two feet of very low-permeable soil in the area and then control the surface water; control the runoff that's going into the trench. When we began to look at what is the effective cost, essentially, of adding plastic layers and adding more clay, the amount of additional water that was prevented from entering the system really didn't result in any net benefit. So we have kind of achieved our goal by using very low-permeability soils. And adding additional systems on top of that did not result in any increased benefit.

Alternative 5, the low-permeability soil cap, meets all the MTCA criteria: Protecting human health and environment, it complies with the cleanup standards and ARARS, and it provides for compliance monitoring. And Alternative 5, the low-permeability soil cap, is permanent to the maximum extent practical and provided the best net benefit.

The low-permeability soil cap provides an optimum combination of short-term effectiveness, long-term effectiveness. It's a very reliable system. It's easy to repair. If there is any type of additional subsidence or movement from the trench, it's very easy to take that minimum amount of equipment back up there and repair the cap. Whereas, if we have plastics with more complex systems, and other things, that becomes -- becomes much more of an ordeal, and more involved to try and repair these systems. So it has a very good reliability. It's very implementable, it has minimal impacts to community, and again, it's permanent to the maximum extent practical.

So basically, what this looks like -- and I apologize again for the slide. But the original grade on the trench would be scraped off a little bit. We would scrape off this material which was the roadway where the old trucks used to back up and dump the drums down, what was the staging area for some of the actions that have occurred. All this material would be pushed in the trench, along with additional backfilled material. And then, basically, on top of this backfilled material, we would place some sort of cap mechanism, and this would, again, prevent any type of infiltration -- or, significantly reduce any amount of infiltration that would act to drive contaminants from these drums, lower down to the water table.

We would also have surface water control so that any water flowing down the hill toward the trench would be diverted. So it looks a little bit like this when it's done. This was the area where the waste was disposed. This was the old haul road that came in over the rock bridge; the areas where the waste was placed. These would be filled, a low-permeability soil cap would be placed, a vegetative cover would be put on top of it that would be planted usually with grass, and then a series of

channelizations would be placed around the trench to, basically, collect and divert water that would be flowing in from little side creeks and flowing down the hill, from entering into the landfill mass. So basically, we've significantly reduced what is the current state of affairs, which is water running downhill and into the trench.

Right now, all the rainwater that flows, goes into the trench. And even with this massive amount of water flowing in the trench right now, we see no effect to the ground water. So the effect of doing this is, we remove the drying mechanism to dry any future contamination that may lead to whatever in getting down to ground water and preventing, basically, containing the waste in place.

So what's the community impact of, kind of, this preferred alternative? Well, one of the benefits of this preferred alternative is that this is one of the least disruptive. It's going to be relatively short-term. The contractor is out at a fairly remote site. It's going to be up on top of the hill over there. It will be almost identical to a golf club project. It would be, basically, scraping dirt. They will be -- the activities will strictly be normal working hours, and there will be some minimal additional truck traffic bringing massive low-permeability soils, along with backfilled material. We hope to be able to get into -- find sources directly on the site. So they probably would be bringing minimal additional truck traffic.

The long-term impacts are very, very minor. Every now and then, there are some periodic routine monitoring of the cap. This is a guy in a pickup truck, basically, going up there, checking to make sure everything is fine. On a quarterly or semiannual basis, people are going to be going up and sampling the wells. And then if something happened where we get a little settling or something, there may be some infrequent cap maintenance, going up there with a little dozer for something that's affecting or occurring in the cap. So really, the long-term impacts on the community are pretty minor.

So how soon? What's the next step? Where do we go from here? Well, as David talked about, the next step in the process is this CAP; this Cleanup Action Plan. Basically, after we receive public comment from you and from others in the report that we prepared, we take that report, and in consultation with Ecology, and talking to Ecology, they prepare a Cleanup Action Plan; CAP. This comes back to the PLP group under, usually, a Consent Decree, an Agreed Order. And after the CAP is selected through some public hearings, and finalized, we begin to prepare the various engineering design reports that are required. Obviously, if you're going to be building something, you got to design it, so we'll have cross-sections and profiles. And where does the soil come from; how many trucks. The whole thing will be laid out in very -- very engineering-quality reports, and there is

a whole series of other things. Monitoring wells; how you do operation and maintenance on the finalized cap design.

As part of this package, a contractor bid document would be prepared and a contractor selected. And currently, we're anticipating, if we can meet all the windows that we've got, probably, the contract to actually start moving dirt and cleaning up the site -- we could be out there performing the work during the summer of 1997. This looks like the best window of opportunity. That's a good construction season. And this seems like a target that we can meet.

And then following construction of the remedial option, we go into confirmatory ground water monitoring and operation and maintenance. And this, basically, would go on indefinitely for 20 years or better and involve routine monitoring and maintenance of the selected remedial option. That's all I have. It was pretty quick. I didn't get a lot of time here. But I want to encourage you, if you have any questions, there will be a question-and-answer period. There are four of us from Golder here, and four of the principal authors of the document. We'll be more than happy to explain anything, or if there are any questions, to try and answer them.

MS. DEPPMAN: I'd like to ask the people, at the end of the meeting, to come and sign in so we are sure to have a record of who was here, and also make sure that you leave your mailing on the project.

MR. SOUTH: I'd also like to mention, we have representatives from Landsburg Steering Committee here. Palmer Coking Coal is here. So certainly representatives of the Landsburg Steering Committee have come to the meeting.

MS. DEPPMAN: We'll open up for questions. We do want to make sure that we get to the comments; that folks who have come to make oral comments, they do so. We were going to leave time in the end, and I think we'll have enough time. Are there questions?

UNIDENTIFIED SPEAKER: In the Remedial Investigation, a number of tests were drilled to see whether or not there was any migration of contaminants. These test wells are, what, several hundred feet from the trench? They were in-between the trench and the water wells that were of concern.

MR. PANCOAST: Right. Basically, two nesting pairs were placed right at the end of the mines, right where we -- right at the end of the mine workings. So we made a very highly conductive environment. So we had kind of, basically, a pipe, or a slot, at a trench, right at the end of that trench, and they will be moving up and down the trench to do a test.

And when we placed one well that was actually up, right in the middle between the two major waste deposit areas -- that was placed between them. And then because there was a full-type fault that runs between them, we want to make sure that there was no cross-strata -- across the rock -- later migration out of this mine.

When we confirmed our model, we placed a well in the Frasier Seam and the Landsburg Seam that -- basically, to the east and to the west of the mine, that had contamination placed in it. And this was to see if replacing the mine workings made a fracture, or a hole, so that migration of contaminants had occurred. In a very highly conductive environment, we should be able to detect something with very low detection levels. We're looking at part-per-billion detection levels for compounds. But it takes very minor amounts. We should be able to see something in our screening process.

So the wells were placed, essentially, to be right in the periphery of this Black Box that we talked about, in this recent mine; how close can we set the wells around this so we can see if anything is coming out of that box, that Black Box.

UNIDENTIFIED SPEAKER: The Black Box, as I have heard you describe it, it was quite large?

MR. PANCOAST: The mine is fairly large. It's about a mile in length. And the seam down there, the workings, are about 12 to 15 feet wide, and they go down about 750 feet. So it's -- it's fairly large; you know, kind of tabular kind of shape.

UNIDENTIFIED SPEAKER: Well, I guess the question I'm leading up to is, you haven't had any evidence of migration outside the Black Box?

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: But do you have any information on the rate that migration is occurring within the Black Box, and, over a period of time, five years, 10 years downstream, if it would reach the perimeter of the Black Box and possibly --

MR. PANCOAST: Right. Right. This is something that we had to look at; in other words, if there is something in motion within the Black Box. And so we had to look at ground water; what's the effect of, essentially, rainwater hitting the top of this thing, going down through there, getting into the ground water, and then flowing out.

And the ground water movement through the mine is very, very rapid. We put electronic instruments in the various wells, that allow us to monitor the water level changes. And we see almost instantaneous water level change with rain events. We did some infiltration studies where we dumped a massive quantity of water. We see a very fast response in the wells -- evaporating from that -- where that water is the cause of it. So anything that has gotten to ground water would move very rapidly, a matter of hours to days, you know, no more than weeks, out of the entire system.

And so that's, really, one of the things that begs what happened to the contamination. A lot of this flowed -- it's flowed out of the system. And if you have a lot of rain, it's just basically washing out, on its way to be absorbed into coal. So a lot of these things -- tanker trucks probably dump there. They flow very rapidly out the system. Most of the other material that's there, there is probably very little in the way of liquids.

And these things are dumped, you know, 40, 50 feet down the hill where they are busting open. They are into now, somewhat, a sitting environment for a period of time; 20, 30 years. You know, pin holes develop very rapidly. And if you have them out in the backyard five, 10 years, it starts leaking. So there was probably not much in the way of any type of liquids that are going to flow out.

What our concern was, if we had some sort of sludge or materials there, that we want to make sure we don't have anything with the ground water -- with the rainwater flowing down through there that would carry something into the ground water that we'd have to take out. And so that we prevent the driving force of the rainwater, and we should not, really, experience anything immediately going to a water tank. And with monitoring, we have the ability to see, you know, how the system is performing and if there are any changes in the system over time. Does that answer your question?

UNIDENTIFIED SPEAKER: Yes.

MS. MELEWSKI: The same wells that we were just talking about, the shallow and the deep, how often are they monitored? How often did you test them? Is it a one-year period? And how?

MR. PANCOAST: We tested for four quarters during that. And the quarters were picked to look at different water levels. When it was kind of summer, you know, what spring rain events, the fall, the winter, and the spring. So we're looking at seasonal variations within the hydrogeologic system.

So we look at four quarters. It allows us to see if there is any variance due to a lot of rain falling, to drive anything down that we don't see later on. Was there any change when we get to the dry season, and the water levels drop. So four quarters were done on most of the private wells and on the sediments along there.

MS. MELEWSKI: So basically, the same. On Alternative No. 5 where you have the drainpipes and the diverted water, where does that go?

MR. PANCOAST: That would be referred to the engineering design area. They probably would go with some sort of infiltration area. That's, basically, clean rainwater that's coming off the side of the hill, and so we would redirect that. Right now, it flows in and flows back a-ways and in creeks and out the Cedar River. Probably, through tide-line pipes and through ditches, we just have to divert the water to come out --

MS. MELEWSKI: So this is clean water?

MR. PANCOAST: This is clean water. Spring water is coming down. We just didn't want rainwater coming down the side of the hill and into the trench, which is a --

MS. MELEWSKI: And on No. 5, I notice it said the cap would be maintained for 20 years. Well, after 20 years, what's going to happen? Is a housing development going to go in, or you

grow trees and new timber, or -- you know, 20 years, to me, doesn't sound very long.

MR. PANCOAST: Yeah. I understand. Twenty years is a good number in terms of being able to see if there is any changes, because we're going to apply some loads, we're going to be doing some earth work and stuff, so we want to see if there is changes.

In terms of houses being built, there is not going to be houses ever built in the cap. There is some deep restrictions going with it. There also is, just simply, laws in King County now that prevent you from building structures and developing land over the top of coal mines. So it's -- it, basically -- and we can direct this to Bill Kombol, as far as land. But it probably would be in that state for perpetuity -- I mean, the laws.

UNIDENTIFIED SPEAKER: One of the advantages of the soil cap, and one of the reasons we recommended that over the effort now, is that, soil being a natural material, it's going to -- well, the FML will stay around, too. But soil is going to stay around. The cap is not going to disappear at the end of 20 years. It's going to stay there. So you're going to have this protection and perpetuity. What ends at 20 years is someone going out, looking at it, and saying that it's still there. There is no reason to believe that it's going to be gone in a couple of years.

MS. MELEWSKI: Bill, what did you say on -- what is the future use for the property? What do you see happening? Would you use it for --

MR. KOMBOL: Future use for the property? Given the 750-foot trench with voids in it, I can't think of a lot of great uses for it.

MS. MELEWSKI: How deep will the trench be after it's capped?

MR. KOMBOL: The trench would be zero, but the grass would stay 750 feet.

MR. SOUTH: My grass is -- he should have said "750-foot trench."

MR. KOMBOL: Above the filter.

MR. SOUTH: The trench, itself, is open. It's only eight feet.

MR. PANCOAST: Yeah. The trench now, it looks like it's about seven to eight feet deep. Some of the steep sides, the walls will be knocked down. I don't know that the trench would come all the way up towards the old surface, but we might knock down some of those steep sides and kind of build that up and be crowned. But it'll certainly have a much more general aspect to it rather than a very steep hill and trench that goes down.

MR. SOUTH: And so there are no surprises, we're talking about that portion of the trench in which waste disposal occurs, which is the subject of this investigation. I don't believe that there are plans to do that for the entire three-quarter-mile length of trench.

MR. PANCOAST: That's correct. There simply is no waste --

MR. SOUTH: There is no waste placed there, and addressing the abandoned mine lands outside of the waste areas would have to come through the office of surface mining and various other sources, not including what we're doing in Ecology.

UNIDENTIFIED SPEAKER: There is at least one benefit for the community, and that is removing the safety hazard that's there. That would be, essentially, minimized.

MR. PANCOAST: Yeah. Although it is fenced.

UNIDENTIFIED SPEAKER: I don't understand why you're going to excavate it down and then put a cap. Why not just fill it up?

MR. PANCOAST: Well, we -- it's an engineering thing. It's just a matter of, what's the cost of the material we have to place in there, and how high do we bring it up. We should maybe knock down some of the side walls and that sort of thing to achieve that fill. It's simply, some engineering studies have to be done, and how many truckloads you have to bring and dump in --

UNIDENTIFIED SPEAKER: Well, I know. I'm an engineer, and I own a construction company. So I load my share of dirt. I'm just thinking from the standpoint of keeping the water out of it rather than sloping it down and then trying to put the operation in place. Rather than systems in it, it would make more sense to put it up above the ground and put a clay cap on top. For crying out loud. We're out there in Ravensdale. There is a sand mine that has got a mountain of clay in it.

MR. PANCOAST: Right. And there is also some down underneath the power lines. There is also some there.

UNIDENTIFIED SPEAKER: Right. Build it up above the ground. It seems like it would be a better plan, to me.

MR. PANCOAST: We have designs in all different aspects. I'm sure that will come up in the engineering design report. Many of our designs do show a slight crown effect to what is there now, so it's just a matter of what looks the best when engineers get ahold of it.

UNIDENTIFIED SPEAKER: We simply haven't designed the storm water system in detail yet. There is two or three -- you know, there is a half-a-dozen ways to do it, and we just need to look at the various ways of what seems to be the best of accomplishing the purpose. And we simply haven't picked a detailed design.

MR. PANCOAST: Right. These are conceptual designs.

UNIDENTIFIED SPEAKER: That's exactly what we're going to do. We're going to keep surface water from getting in -- into the cap. But the details, we haven't picked out.

MR. PANCOAST: Once we get a detailed decision and final on something, then we do the detailing of engineering designs. So something will be different, I'm sure.

UNIDENTIFIED SPEAKER: Okay. Your plan, then, is, basically, to try to encapsulate the demolition, and then 20 years to monitor migration off-site. What's your contingency plan if migration occurs?

MR. PANCOAST: Well, we've developed several of them, and those are the ultimate goals. Part of them. But with the flows that we've got, and the position of the wells, we're in a position where we need to do some recycling systems to, basically, pump the material back up and recycle the water through the system slightly; buy us some time. And now our wells are also positioned to do treatment if required. So we could look at, potentially, some ground water treatment out of the system if necessary.

So we've got some short-term impressions to allow us to probably recycle -- you know, get some sort of system in place. We also have the ability to do some treating.

UNIDENTIFIED SPEAKER: So if you did detect some PCBs and some metals --

MR. PANCOAST: PCBs is probably one of those that just loves sticking to carbon.

UNIDENTIFIED SPEAKER: I know it is. I know it is. And if some of it did migrate out and get into your well, then you are in the position to apply remediation on it.

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: Is there anything like that, that you can do underground now? Is there technology that you can put something down there like that?

MR. PANCOAST: Well, the best thing that everybody uses is --

UNIDENTIFIED SPEAKER: Charcoal. I know.

MR. PANCOAST: And you're sitting in a mine full of it. So really, for PCBs, I don't think you're going to see much migration of PCBs, you know. If anything, it would be maybe -- some solvents are other things you might see. But maybe -- you know, we haven't seen any of those.

UNIDENTIFIED SPEAKER: But you talked about the flow rate of fairly fine liquids that go in there, other than tars or something. And say you pour water in. And within a few hours, it's run out the bottom. So it's pretty logical to assume that any liquid that's going to run out of there has already run out of there.

MR. PANCOAST: Sure.

UNIDENTIFIED SPEAKER: In evaluating the different alternatives, did you assume that the soil that would have to be excavated and disposed of was contaminated?

MR. PANCOAST: We looked at several different volumes when we were digging up the material in the bottom, because to really get down in the trench and work -- you know, things have kind of fallen down this very narrow slot. So you're looking at probably, you know, a back hoe kind of operation -- or, not a back hoe, but a drag line -- or, clam shells. So you would have to

boom and throw this thing down and scoop it up. The effect of that is -- scooping it up, is, things tend to rupture. It's very difficult to move things in place. So we did look at a fairly good volume of soil that would be affected. So you're looking at, eventually, things could collapse and rupture and squeeze and kind of mess this stuff up along the trench. You would, essentially, generate more contaminated soils.

UNIDENTIFIED SPEAKER: I'm kind of reacting to what I heard. And it appears as if your ground water monitoring isn't showing any migration. You're not finding the contaminants. But on the other hand, you know, from what you're saying, you suspect they are there, you know, because you would create contamination in the process of removing, excavating, and disposing. And I'm just wondering how you know you've reconciled --

MR. PANCOAST: Right. We know there is contamination there. Some form of it.

UNIDENTIFIED SPEAKER: Plus, the ground water system appears to be a rapid-moving system.

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: So when these vessels, or drums, rupture, then there is a high potential of this material, you know, being moved rapidly through the soil system, you know, into the ground water.

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: So I mean, does the report address all that?

MR. PANCOAST: We discussed it in there. I mean, typically, if you're talking about a liquid within the drum, a typical model in a landfill -- we've used a model extensively, and massive studies have been done. We start to pinpoint. So it's not an analogy like someone squeezed a drum or something, and a gush of stuff came out and went down. We start with very small pinpricks. And so over time, you get, basically, an increase; more and more drips out of the drums as liquids. You begin to pick it up fairly early in the system; the monitoring system. It's telling you something is happening.

The other side of the coin is, probably most of the material locally is less liquid than a lot of sludges and stuff. Most of the drums, when they did the excavation, or removal activity, a vast majority of the drums just became sludges and things. And many of the drums -- most of the drums had holes and were damaged, and bullet holes, and everything else that was there.

The number of intact drums that probably contained some sort of liquid is relatively minor now. They probably are squished, banged-up, bunged-up drums that have a bunch of sludge and debris. That is probably the model thing that's in there.

UNIDENTIFIED SPEAKER: I'm just thinking in terms of, the material hasn't moved much, and that it's a matter of a localized soil mass being contaminated. It would seem like it would be timely to attempt, at least on some type of scale, to try

a pilot project of excavating and removing that; you know, to ascertain whether or not that's an effective method.

MR. PANCOAST: Well, that is probably what they did when they removed 116 drums, because it was looking at, you know, how easy is this to get these drums out of here. And they found it was fairly extensive. It's very steep slopes. Things have to be hauled up. They had workers down there. They, basically, got the drums that were easy to get to, sampling soils that were in those drums.

A lot of those drums were placed, and then they took bulldozers and pushed soil over them and had logs on top of them. As they set down in the mine, another batch of drums, a little bunch of dirt. So it's not like they were all sitting there, and go in and get them and get the soil around them; get a few drums and get eight or 10 feet of dirt or three feet of dirt, five feet of dirt, or whatever it is, get a few more, dig some more. And in the process of digging down in there, with people down there -- you have to use, again, some sort of clam shells -- you would generate a lot more contaminated soil. You have to lay back the mine. You're going to have to have staging areas to process the soil and that sort of stuff. So the ecological impacts are fairly significant, of trying to go in there and get things.

UNIDENTIFIED SPEAKER: Safety is very key. It's just like, that I have heard that it's probably close to collapse. It's very dangerous. And the possibility of accidents or injury or death is definitely there.

UNIDENTIFIED SPEAKER: What alarms me is, from what's said now, the materials there, potentially it's going to move, you know. You know, where it goes, the ultimate fate is something of concern, you know, because it's sitting there, and it's movable, you know, over time, and it's going to move through the system. The system is not --

MR. PANCOAST: It's not going to move through the system very much. The sludge is the driving force.

UNIDENTIFIED SPEAKER: That's the key thing about the cap, is, if it were really mobile, we would have expected -- this thing has been unprotected for, what, 20-some years now. And we haven't seen something going out, so there is nothing terribly mobile in there.

If you look, at the time -- you know, if you look over time, drum failures, rusting out, so forth, after 10 years, you don't expect to see any intact drums. So if there was something really mobile in there, we would have expected to see evidence of it by now. That says that what's left the mine is not overly mobile, or maybe it is already immobilized either by the coal or because of its own nature.

And a lot of sludges don't tend to go anywhere. PCBs aren't very water-soluble. They are almost insoluble. So the mechanism for some contaminant getting out of that would be rainwater coming through it and dragging it out. But if you remove that driving

force, we have, essentially, eliminated the mobility. That's the whole rationale behind this low-permeability cap, is, keep out the driving force that's not really mobile to begin with.

MR. PANCOAST: A lot of these were, probably, the waste TPH, or it was petroleum and that stuff, and that -- that, basically, over time, gets processed by nature. It's broken down. So this is some aspect of this system, also. But it's a-ways -- a little ways to the water table. There is a lot of absorbent capacity there. Remove the driving force by not having wind, water, essentially, riding this stuff down to the water table, and remove the drying mechanism and, basically, have it contained within this sort of whole mass underneath the cap.

MR. MORELL: But even before we slant the top, even before we sample the ground water, we would be surprised at what we found. The way we would treat ground water contaminated particularly with organics (sic), would be to send it to a carbon filter system because it would absorb it and contain it. That's what we have, essentially, here, right in the mine, is a carbon inversion system. It has a tremendous capacity among the mass of material there, compared to the mass of 4,500 drums, 200,000 gallons of water with some oil in it. The absorbent capacity of this thing is tremendous. We would be surprised, before we even sank the wells, to find it.

UNIDENTIFIED SPEAKER: Metal contamination, also.

MR. MORELL: Well, that's brings up a good issue, because metal won't absorb the carbon.

UNIDENTIFIED SPEAKER: Metal won't absorb the carbon?

MR. MORELL: Most of the metals. But they are -- surrounding these clay beds are clay or shale, which are clay beds -- clay stone -- which have a high absorbent capacity for metals. So we also have a very massive absorbing medium for metal contained in water.

UNIDENTIFIED SPEAKER: Of course metals aren't water-soluble, anyway.

MR. MORELL: Well, all of these things are, certainly, water-soluble to a degree.

MR. SOUTH: Metals can be solubilized if the water becomes acid.

UNIDENTIFIED SPEAKER: Metal solubility is very complex because there are some metals that are very soluble; other ones that are not as soluble. It depends on a lot of things. But the thing, basically, is, to be -- it has to be solubilized out of the mine site to get to the waters. As it moves through -- water moves through this mine readily. But solvents, constituents, or even simple solvents do not.

MS. MELEWSKI: In looking at the RI/FS, some of the key words that really stuck out, to me, are "potential" and "at this time," and it's really obvious that there will always be the potential of chemicals exiting, you know, whether you did No. 9 or

did No. 5. I mean, either way, there is always -- that's always going to be there.

And you know, if -- if you did No. 5, who is saying an act of Mother Nature, say, a major earthquake or something, isn't going to open up seams, and who knows what's going to get out. Because we know there is bad stuff in there. We saw it in the reports from the initial testing. And it's there, and it will always be there, and it's always, you know, got that potential.

MR. PANCOAST: Well, the cap is easily fixable with your scenario of an earthquake. That's the benefit, is that you can go back and fix things, and you can monitor.

MS. MELEWSKI: I guess that's where the "20 years" bothers me, you know. I see, you know, it's always there, so it should be indefinite. Not a time of 20 years. To me, that's a very short period of time.

MS. DEPPMAN: Is there a time limit on liability, David, in the laws, for this?

MR. SOUTH: I'd have to review the exact regulatory language on that, but that would be -- part of the Cleanup Action Plan will be the basic ideas of the ground water monitoring and the operations and maintenance of whatever is chosen, and how long that will last. I believe, currently, a hazardous waste landfill in Washington State that accepts hazardous waste -- and this should be Washington Administrative Code 173.303. The dangerous waste laws indicate a 30-year monitoring period after closure. I'd have to check that. I'm not 100 percent sure that it's 30 years. It might be 20 -- it is 30. It's 20 years for old municipal waste landfills. I think it's back up to 30 years under the new municipal waste landfill regulations. And the last waste that we have record of was placed in this area in about 1978. But we've made no decision on the length of time of the monitoring or the monitoring program.

MS. DEPPMAN: Just to maybe help out is, if, after 20 years of monitoring, nothing is found, then nothing more would be required; is that right?

MR. SOUTH: We have not reached a decision on the monitoring period. Often we have a periodic review. But if it were, say, a 20-year monitoring period, the general thought is, after that period, the monitoring ceases. A lot of that is for landfills. But in this case, I'd have to review the regulations to see the exact -- I just don't have that off the top of my head. But I think that's -- make that comment, if you would, during the comment period. And that way -- because all the formal comments -- and that's coming. Even if you've asked a question, if you want to get a comment on the record, I will prepare a responsiveness summary, a formal document, that goes in the record, and everybody who commented will get a copy of that, and it will probably be placed in the public repositories, as well, for the others. And anybody who wants it can call up and request a copy. But you know, make that comment during the formal comment

period, that you are concerned about the length of time that monitoring and activities will continue. And that way, I'll have that for a formal response. Am I -- I'm trying to answer you as best I can right now. I hope that's satisfactory.

UNIDENTIFIED SPEAKER: You might want to keep in mind that one of the reasons we use -- the potential for that document is, we couldn't say absolutely nothing could come out of here -- you know, waste was put down there for a long, long time, but we're not seeing that now. It's been open and uncontrolled for, you know, a couple decades. We don't expect anything to happen. If something were going to be coming out of the mine, we would expect to see it by now. So to us, the fact that we don't see it now is a pretty strong indication that you're probably not going to see it, particularly if you put a cap over it and eliminate the spreading.

MS. DEPPMAN: The gentleman in the brown and -- did you have a question, sir?

UNIDENTIFIED SPEAKER: The proposed fix is limited to the northern portion of the trench?

MR. PANCOAST: Yeah. I mean, if you look at the trench, there would be a little bit of a -- of kind of the central, and then the northern part of the trench. Not the farthest north, right up by the road, because that was not used. But it's kind of the --

UNIDENTIFIED SPEAKER: Is it everything north of the fault?

MR. PANCOAST: No. There is actually some that's south of the fault. A small zone that was used there, too.

MR. MELEWSKI: Up until recently, the ground water hasn't been -- or, it just started being tested and that type of thing. But up until that point, everything has just been flowing through, or whatever. Any medical studies in the area, as far as potential sicknesses and that type of thing in the area?

MR. SOUTH: No. There have been no medical studies related to this. The Department of Health would have to take that on. And it's, actually, fairly unusual, at least for a model toxic control lab site, that there are large-scale medical studies of any sort with -- I only know of one or two sites, personally, where there have been actual studies. One of them was at the Norseland site, which I'm also involved in. These are both sites I'm involved in. At that site, there were some health questionnaires. The Department of Health has had an ongoing involvement because it's a senior citizens mobile home park located over -- at least partially located over a formal landfill.

The other one that has had much more extensive involvement of the Department of Health, as well as the Agency for Toxic Substances and Disease Registry, which is a federal -- anyway, a federal agency. That site is Everett Smelter, where people are actually living on and adjacent to a former smelter. Actually, that smelter operated in 1908 to -- no. When did it operate?

Eight -- I forget. But like 1902 to 1914 or something like that. And there were, actually, people living directly -- actually, it was a smelter from which the equipment was moved to the Tacoma Smelter, if you've heard of it. But this one is in Everett. And there were actually people living on areas with up to -- I think the highest value found was 72 percent arsenic in a person's yard. So it's kind of a hot site.

MR. MELEWSKI: Is there a way of getting a medical study done at the area?

MR. SOUTH: The formal answer is, feel free to make that comment, and I will take it up. However, I must tell you that in all practicality, I doubt very much that we would be able to get a medical study going.

MR. MELEWSKI: Okay. Because I'm within one mile of the mine site, itself. And I've lived in a lot of different areas. And this area I've lived in, I know of seven cases of cancer, four of them in children, one in my own daughter, in this recent area, within a one-mile radius of this mine.

MR. PANCOAST: Where do you live? Which site?

MR. MELEWSKI: I live on just 256th and 272nd.

MR. SOUTH: I would appreciate it very much if you would make a formal comment to that effect. And that way, we will respond to it formally.

MR. MELEWSKI: Okay.

MR. SOUTH: And that's the best I can do. I will promise you that I will -- if you make the formal comment, I will take it forward to the proper people, and we'll get it to the Health Department; the Washington Department of Health. Ecology doesn't do the medical studies. But we will do that; I will be sure that that gets to the Washington Department of Health. And from there, I can't -- I don't know what will happen to it, but I will respond formally to that.

MR. MELEWSKI: Okay. Thank you.

MS. DEPPMAN: Any other questions? I guess we'll go ahead.

MR. SOUTH: I have a question.

MS. DEPPMAN: We'll go ahead and accept formal comments -- we have three, and we'll just sort of formally start the formal comment period for the Remedial Investigation/Feasibility Study Report for the Landsburg Mine site. And first is Wendy Melewski. Would you stand and -- you can stand right there if it's more comfortable for you.

MS. MELEWSKI: My name is Wendy Melewski. I live at 25620 - 272nd Avenue Southeast, which is east, probably less than a mile, quarter-mile from the north end of the trench. I'm keeping in mind, also, that the RI/FS that is prepared by Golder Associates is on behalf of the PLPs.

As I mentioned, there will always be the potential of chemicals exiting the mine in the ground water. The geophysical data, based on sampling and historical information, suggests the

waste materials in the trench appear to be confined. "Appear." Key word. This is not a guarantee that the ground water won't be affected or has been, you know. We don't know. We do not know that any act of Mother Nature could not open up a seam, which, in effect, could contaminate any private wells in any direction around the seam. There will always be that potential. And I feel, as a landowner, I should continue to have my private well monitored at the PLP's expense. Never in my wildest dreams did I realize, when I bought 10 acres and built my dream home and raised my family, I was doing all this next to a toxic waste dump.

If Alternative 5 is used as opposed to No. 9, which is extremely cost-effective to the PLPs, I would like to see it added that there is continued private well monitoring. I, personally, would be happy with a once-a-year monitoring with the seasonal rotation, such as in '96 it's checked in the winter, '97, spring, so on and so forth. I feel that I'm the loser because of my decreased land value and the potential that's always out there of contaminated drinking water, and I feel I'm asking very little for this continued monitoring, you know, to make me feel better. What was it you said I should really bring up?

MR. SOUTH: You mentioned your concern about the 20 years.

MS. MELEWSKI: Oh, my concern about the 20 years, because the potential is always going to be there. No matter what alternative is used, the potential is always there for contamination, and I think 20 years is just -- that's nothing, you know. It should be a lifetime -- or, more than a lifetime. It should be indefinite, in my opinion.

MS. DEPPMAN: Thank you. And next is Bill Wolinski, City of Kent.

MR. WOLINSKI: I'm Bill Wolinski. I'm with the Department of Public Works, City of Kent, Environmental Engineering. The City just recently received the RI/FS report, and we are arranging for an independent pier review of the report to enable us to provide adequate comments on the report.

The City has a tremendous responsibility with regard to this site. Our major drinking water supply, Clark Springs, is located adjacent to the site along Rock Creek. It's a valuable, irreplaceable resource. And by "irreplaceable," I mean that this region is facing a water crisis. There is a moratorium on water rights in the whole area. If our water supply becomes contaminated, it's virtually irreplaceable. We are concerned, not just in the short run, but the long run. And any Cleanup Action Plan that's presented will be tremendously scrutinized with regard to our responsibility in protecting the water supply for both the current generations and future generations. And we will be looking at this from that vantage point. We're going to prepare formal comments, but I just wanted to make a statement in the record, as far as our intent.

MS. DEPPMAN: Thank you. Richard, did you want to make your comment?

MR. MELEWSKI: Yes.

MS. DEPPMAN: Richard Melewski.

MR. MELEWSKI: I just wanted to make a comment that there should be some type of a study or some type of a -- something done about the medical in the area; see if there has been any -- just from what I know -- just from neighbors, this is what I know, you know, and it seems to be an extreme amount. I'm not saying that's what caused it, but it should be looked into, in some type of a -- I don't know how they go about checking out an area, but -- well, I guess we'll go about it and find out how.

I know seven people in the area, in the one-mile area of the mine, and like I said, four are children, and one of them is our daughter, and it doesn't run in our family. The cancer doesn't run in our family. So you know, we don't know -- like I said, the wells have not been monitored until recently, and we've been there, you know, before that time. So basically --

MS. DEPPMAN: Thank you. Does anyone else want to make a formal comment? Okay. We'll conclude that.

UNIDENTIFIED SPEAKER: I guess I would like to make a comment.

MS. DEPPMAN: Okay. State your name and address, and I'll have you fill out a card.

MR. BECK: My name is William Beck, and I'm the Chair of the Greater Maple Valley Area Council. And you folks have made presentations to us in the past. I was not aware of a potential medical problem. But it appears, based on this gentleman's testimony, that some sort of an epidemiological study would certainly be called for, and I would like to make that comment tonight.

MS. DEPPMAN: Okay, thank you. Okay. We can continue with some questions if there are some, or we will certainly stay after the meeting if you'd like to just talk to people one-on-one. Is there a preference? Do you want to ask a few more questions?

MR. THOMAS: I'd just like to make a statement. Not an official statement. I'm State Representative Brian Thomas. I represent you out here. And I just want to let you know that I am concerned about this. If you have any questions, or you need me to nudge this process along, I'm interested in this, so be sure and give me a call.

MS. DEPPMAN: Thank you.

UNIDENTIFIED SPEAKER: One question I had is: You're obviously recording all of this. Will we be able to get the minutes of this meeting?

MS. DEPPMAN: Certainly. Anyone that would like a copy, we can make a copy of the transcript for you, and we can also put them in the Maple Valley Library for people to look at.

MR. SOUTH: There may be, if it runs over 25 pages, a charge. What happens is, we will get the transcript; we'll put it in our records. In fact, all of the files on this site are in our central records, and they are all open. There might be -- we do have things called "exempt" files that are not -- that are exempt from public disclosure. I don't think there is anything much on this site that's exempt. Typically, on the sites I work on, the things that are in the exempt file are something from the Attorney General's Office that comes on their letterhead that says, "We've assigned this attorney to the site." And since it's got AG letterhead, it goes in the exempt file.

UNIDENTIFIED SPEAKER: So I can get the address off of here and request --

MR. SOUTH: Absolutely.

UNIDENTIFIED SPEAKER: -- the minutes?

MR. SOUTH: Yes.

MS. DEPPMAN: Wendy?

MS. MELEWSKI: I was curious if the RI/FS and the Landsburg Mine site volumes will continue to always remain at the library. And, say, once, you know, they get going on one of the alternatives, I imagine that would go there. But say, anything they do, whether it's after it's capped and, say, one year they come out and they check it, will that kind of information be sent to the library?

MR. SOUTH: Not usually. Usually, if you want to see that, you are going to have to come into our Bellevue office.

MS. MELEWSKI: But your office will always know what is going on, or do they have to inform you every time they go out there, and everything that they do?

MR. SOUTH: They will be reporting to us. Oh, yes. It will be a formal schedule and a plan, a sampling schedule, and what will be sampled for, and the results will come in. We don't typically go out publicly with the results.

MS. DEPPMAN: Unless there is something new.

MR. SOUTH: Well, typically -- typically, once you get into a real long-term monitoring, if something came up, probably, and we were going to require something additional, then we'd probably have to have something that would trigger a public comment. I'm not sure that there is actually anything formally required. I mean, like what I pointed out were things that are formally required under the law, for public comment. Actually, we do a lot more on many, many sites than is formally required. And if something came up that we felt people would know about -- you know, I have to couch this -- we would probably do something. But if it's 10 years from now, and I'm not here, and it's not required by the law, I can't say the law will trip in and require that, so that's why I'm being so cautious.

MS. DEPPMAN: I would say, if there were -- certainly if there were human health impacts, you would be notified.

UNIDENTIFIED SPEAKER: That's what I was going to say. Although we are not obligated to, but if we had a question of policy or something like that, they are not going to certainly sweep it under the rug.

MR. SOUTH: We're going to be moving pretty fast.

UNIDENTIFIED SPEAKER: Yeah. And be notifying --

MR. SOUTH: Everybody involved in this is going to be wanting to move very fast, including the PLPs.

UNIDENTIFIED SPEAKER: Marianne, I guess I'd like to make a statement.

MS. DEPPMAN: A formal comment?

UNIDENTIFIED SPEAKER: Sure.

MS. DEPPMAN: We're sorting of flexing in and out of formal comments.

MR. SOUTH: That's all right.

MS. DEPPMAN: Go ahead. State your name, please.

MR. WOODRIFF: My name is Ed Woodriff, and I lived close to that mine for a number of years. My well is a surface well only 20-some-odd feet deep, and I'm probably within -- oh, I don't know, I'm closer to Rick and Wendy. I'm maybe three or four hundred yards from the mine. I was surprised to hear that it's only 750 feet deep. I had heard it was 1,100 feet deep. And I can't, in my wildest imagination, imagine how anything 750 feet deep is going to run uphill in my 20-foot-deep well, and my property is higher than the property where the contamination is. Any water that runs off of my property is going to run towards the mine, not away from the mine.

It's interesting that since this has been happening for 30-some-odd years, that most all of that that's going to come out of there has come out of there. I mean, it's not a runoff. As it flows through, it's going to get less and less and less every year. It's not going to get more and more every year. And how in the world it would affect my well or any of my neighbors' wells, I don't know. I was curious as to how deep your well is from the City of Kent down there. Do you know?

MR. WOLINSKI: Between 1,500 and 1,200 feet. Different depths.

MR. WOODRIFF: See, so you're even above the contaminant.

MS. DEPPMAN: Could we just have your comments, sir, and then we can --

MR. SOUTH: We need to be making formal comments in here, so --

MR. WOODRIFF: Anyway, that's my comment. It sounds like it's very well contained. It's running through a coal filter element, and a cap on the top of it is going to keep water from coming in and flushing it out further. It seems like a logical solution. That's my comment.

MS. DEPPMAN: Thank you.

MR. SOUTH: We don't want to cut you off. I mean, that's the end of your formal comment. If you want to have some more conversation, of course feel free. It's --

MR. WOODRIFF: Okay.

MS. DEPPMAN: Okay. We'll stay around to at least 9:00. And then just a reminder. Then Dave, following the end of the comment period -- and we still have until April the 12th, I believe it is. Yes. To send written comments in. And I don't think we would reject them if they came in on the 14th or something. But certainly --

MR. SOUTH: If you can't get something in by the 12th, but you want to get something in, give us a call. I'm, actually, taking some leave. But certainly, as soon as I get back from that, I'll want to be wrapping this up. So there is a limit. But if you want to make another comment, and it's April 11th, just give a call and say, "I've got another one coming in." But obviously, once I get the report -- the responsiveness summary wrapped up, it's going to be too late. You know, it's not like, midnight on the 12th, we're going to say, "That's it."

MS. DEPPMAN: So what happens is, Dave responds to all comments; the ones that were made here. And then the ones that we receive in writing, he writes his responses and then makes a decision about approving the report, or based on -- if any changes are going to be made based on comments, he will make that determination. And then the Cleanup Action Plan --

MR. SOUTH: Then we'll move forward into the Cleanup Action Plan and develop the cleanup actions, including the monitoring and that sort of thing. And then we will come back out for another public meeting and do this again.

MS. DEPPMAN: So there will be another opportunity before the actual work starts on the cleanup of the site, for you to comment.

UNIDENTIFIED SPEAKER: Any idea of the time line on that?

MS. DEPPMAN: On the document itself? If cleanup is going to start --

MR. SOUTH: Bob had a slide on that, and so maybe he remembers. What he picked out was, try to get going in the construction season of '97 for any actual --

UNIDENTIFIED SPEAKER: So before the actual construction, it will be another --

MS. DEPPMAN: Yeah. Probably a good number of months before that, since you need to bid everything. So probably early '97 if all goes as we hope it does right now. And if you'd like to get a copy of the responsiveness summary for this comment period, we will mail it to all people who comment. But if you want one just for your own information, let me know. I'll mail you one of those, which generally aren't too lengthy, depending on the number of comments.

MR. SOUTH: No. I don't think we're going to get -- we're not going to get 250 comments on Landsburg, I don't think. I hope not.

MS. DEPPMAN: Okay. Thanks for coming. I appreciate your participation.

(Whereupon, the proceedings concluded at 8:50 p.m.)

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STATE OF WASHINGTON)
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COUNTY OF PIERCE)

As Court Reporter and Notary Public, I hereby certify that the foregoing transcript includes all the facts, matters, and proceedings occurring at a hearing, conference, or other matter held on March 27, 1996, in Maple Valley, Washington, at the hour of 7:00 p.m.

Notary Public in and for the
State of Washington,
residing at Puyallup, Washington.
(Notary expires: 1-19-98)