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SUP-11

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Mr. Stephen W. Holt
Senior Environmental Engineer
Environmental Control Department
NL Industries, Inc., P.O. Box 1090
Hightstown, N.J. 08520

Dear Mr. Holt:

Pursuant to subparagraph 15(a) of the Remedial Investigation/Feasibility Study (RI/FS) Administrative Order by Consent (Order), the U.S. EPA and Illinois EPA hereby disapprove the draft RI Report for the NL Industries site in Granite City, Illinois. The specific inadequacies with the report, which in one case involve further study, are listed below, and the inadequacies which must be addressed for U.S. EPA and Illinois EPA to grant approval of the document are so indicated.

U.S. EPA comments are arranged into three sections: major comments, minor comments, and specific comments. The specific comments comprise Attachment I to this letter. Illinois EPA comments comprise Attachment II to this letter, and Illinois Attorney General (AG) comments comprise Attachment III to this letter. All major comments, Illinois EPA comments, and Illinois AG comments, and minor and specific comments with an asterisk (*) must be addressed for approval of the RI Report to be granted.

Major Comments

* 1. More on-site and off-site soil data must be collected. More data is needed in grid sample areas and remote areas with higher lead concentrations to determine the extent of contamination for future remedial action. Additionally, analyses for parameters other than lead may be necessary to appropriately address the risk associated with on-site and off-site soils and, thus, set cleanup or action levels. This further is being required under subparagraph 15(a) of the RI/FS Order and necessitates the following actions:

i) the RI Report shall be amended to reflect that on-site and off-site soil data is insufficient for determining the extent of soil contamination and that further study concerning the soil sampling program shall be undertaken. The progress on all other work being performed under the RI/FS Order shall not be delayed by this determination (i.e. Final RI Report shall be submitted as stated in the RI/FS Order), and

iii) the schedule shown in Attachment IV shall govern the additional onsite and offsite soils study.

2. The risk assessment is inadequate and is contradictory with text located in other portions of the body of the report. The portions of the risk assessment dealing with onsite and offsite soils can be related and processed with the IT report for the additional study. U.S. EPA and Illinois EPA comments specifically regarding the soils portion of the risk assessment may be disregarded but should be retained for future reference. The conclusion of the risk assessment, that there are no unacceptable health impacts, is incorrect and misleading statement and should be deleted. Section 6.00 and elsewhere in the document. The conclusion should be stated in terms of what is really shown by the data i.e., using updated health effects levels for lead, exposure to the contamination associated with the site may cause...effect listed in updated lead health effects levels for the exposure calculated). Other specific deficiencies with the risk assessment (RA) include:

1) * i) [illegible], it notes that the RA is only concerned with the identification and documentation of complete exposure [illegible], it does not consider the magnitude of any of the potential exposures identified. The Drinking Water Regulations allowing that the potential impacts on humans and [illegible] are just as important as actual contact and should be considered in the RA.

ii) [illegible], the cessation of smelting operations and a [illegible] of air monitoring below the National Ambient Air Quality Standards, which are not as protective as once [illegible] does not constitute proof that the onsite waste piles is not a significant source for lead transport to off-site locations. In addition, no local air modeling was conducted for the immediate vicinity of the site.

2) * iii) On page 31, accumulating epidemiological evidence has demonstrated that blood lead (PbB) levels of 10 µg/dl in children are associated with hyperactivity, increased reaction times, and small decrements in [illegible] scores, not [illegible] µg/dl as stated in the RA [illegible]. Indeed, [illegible] studies there may be evidence for [illegible] environmental effects from lead exposure.

3) * iv) On page 33, last paragraph, the statement regarding lead [illegible] should be restated and in recent [illegible].

vi) On page 55, the averaging of concentrations in the study area does not take into account the distribution of the residents. The near-site residents would be effected to a greater extent than residents further away. The DHS thinks that an Air Modeling approach would be appropriate.

vii) Indoor activity exposure to soil should be considered as well as outdoor activity exposure to soil, due to the enrichment of Pb in indoor dusts.

viii) On page 66, what were the levels of concern used when compared to the site ground water and vegetables grown in lead contaminated soil?

ix) On page 66, at the bottom, restate the last sentence; a quote from the study, in context, may be more appropriate.

x) On page 67, there may have been sampling bias in the way children were chosen for the blood lead measurements. How were the children chosen? Also, what was their proximity to the HLT sites?, to the contaminated residential sites?

xi) On page 67, The Illinois Department of Public Health deemed Pb blood levels of 30 ug/dl in combination with an FEP level of 50 ug/dl to constitute a level of endangerment. In fact, these levels show frank demonstrable neurobehavorial effects.

xii) On page 71, the PA concludes the intake of lead is below acceptable intake levels, however, it should be noted that acceptable daily intake level for lead levels are dropping dramatically. This should be appropriately noted.

4) xiii) On page 73, at the bottom, a typical worst case surface lead level is not 5000 ppm.

Minor Comments

5) 1. The term "site" is used inconsistently throughout the document. Soil grid sample 421 is considered to be an on-site sample; however, this area is not shaded on Figure 1, and on page 40 of the text, a statement is made that surface water does not migrate off-site. This statement is true if "the site" includes the

southern area in which sample #21 is located but is incorrect if only the shaded area in Figure 1 is considered. The term "site" must be applied consistently throughout the document.

* 2. The statement made on p. F-2 and elsewhere in the document, that heavy metals are not migrating off-site through the ground water, must be changed to "based on the ground water data, it appears that heavy metals are not migrating off-site through the ground water." The application of the term "site" may be relevant here.

3. On page 24, it should be noted that acid rain may increase the solubility of metals and, thus, increase their mobility in the ground water.

4. Units should be provided in the tables which present the RI analytical results.

5. U.S. EPA regulatory actions (NPL listing, etc.) should also be noted in Appendix A.

Specific Comments

Refer to Attachment I; note the comments with an asterisk (*).

Illinois EPA Comments
Refer to Attachment II

Illinois AG Comments
Refer to Attachment III

Per subparagraph 14(b)(1) of the RI/FS Order, this comment letter represents final agency action with respect to the draft RI Report; therefore, the final RI Report is hereby due 30 days after your receipt of this letter.

The schedule for the further on-site and off-site soil study is hereby an integral and enforceable element of the RI/FS Order, subject to the provisions for dispute resolution set out therein. This schedule, which is set forth under subparagraph 15(a) of the RI/FS Order and comprises Attachment IV to this letter, shall become effective 30 days from the date of your receipt of this letter.

Some of the U.S. EPA, Illinois EPA, and Illinois AG comments are duplicative, and some comments may require clarification; therefore, as previously discussed with you by telephone, U.S. EPA and Illinois EPA would like to meet with you and your representatives to discuss the comments and answer any questions you may have. March 30 and March 31 have been selected as tentative meeting dates. In the meantime, if you have any questions or comments concerning this letter, please contact me at (312) 886-8740.

Sincerely yours,

Jon Bradley, Project Coordinator
CERCLA Enforcement Section

Attachments

cc: Ken Miller, IEPA w/Attachments I and IV
Nancy Wolfenstein, IAG w/Attachments I and IV

bcc: R. Diefenbach, ILL/Ind Unit
R. Hadenogg
R. Grimes, SRS-TUB-1
C. Gittman, SRS-TUB-2
R. Kleus, SRS-26

SRS-11:CERCLA ILL/IND:JBRADLEY:adr:3/11/88 Telex Disk #2

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Mr. Stephen W. Holt
Senior Environmental Engineer
Environmental Control Dept.
NL Industries, Inc., P.O. Box 109C
Hightstown, New Jersey 08520

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PS Form 3800, June 1985

Attachment I
Specific Comments

progressively coarser with depth. Recharge to ground water within the area is from precipitation and induced infiltration of surface water from the Mississippi River and other surface water bodies in the area. Water within the unconsolidated deposits beneath Granite City is used for industrial and flood control purposes. No potable uses for the ground water were identified. The Granite City water system uses the Mississippi River as its water source.

Twelve wells were installed proximate to and on the site as part of a ground water investigation which began in October 1982. The ground water flows in a south-southwesterly direction towards the Mississippi River at a velocity ranging from 2×10^{-3} to 0.5 feet/day.

Ground water quality since 1982 has remained reasonably consistent. Lead concentrations observed in all wells have generally remained less than 0.02 mg/l, within the drinking water standards for lead. Background ground water quality in the deeper wells is characterized by dissolved solids of 993 mg/l, an alkalinity of 430 mg/l as $CaCO_3$, sulfate of 288 mg/l, and a pH of 6.7 S.U. In addition the filterable manganese concentration was 0.99 mg/l. Accordingly, the ground water is not suitable for development as a potable supply due to the elevated concentrations of dissolved solids, sulfates, and manganese.

Background ground water quality in the shallow wells is characterized by dissolved solids of 1000 mg/l, ~~a alkalinity of~~ sulfate of 320 mg/l, and a pH of 6.6 S.U. Only cadmium was detected in a concentration above the detection limit, at .002 mg/l.

Two wells located on the site demonstrate elevated concentrations, as compared to background, of sulfates, dissolved solids, arsenic, cadmium, manganese, nickel, and zinc. However, wells located at the hydraulically down gradient property boundary demonstrated water quality similar to that in the background monitoring well. This is evidence that heavy metals are not migrating off the site. This lack of measurable migration of metals is explained by the high alkalinity of the

ground water, the low solubility of metal carbonates, and cation exchange within the unconsolidate deposits. Evidence to support these mechanisms was provided in the 1983 studies conducted by the Illinois EPA.

Waste Pile Investigation

Located on the site is a pile composed primarily of blast furnace slag, and battery case material. The volume of the pile is approximately 85,000 cubic yards. In addition, smaller piles, which were associated with the adjacent St. Louis Lead Recycler's (SLLR) recycling operation, comprise approximately 6300 cubic yards. Tests conducted on the materials in the piles demonstrate lead concentrations in the range of 11-29% and 1-28% for the SLLR pile and slag pile, respectively. Test results demonstrate that the waste pile materials are a characteristic hazardous waste under 40 CFR 261.

Soils Investigation

Surface soil samples were collected from 52 locations, primarily from off-site areas. Generally samples were collected at a depths of 0-3 and 3-6 inches below grade. with the exception of one anamalous value further from the site (14,700 mg/l lead), The results indicate that the lead concentration in soils near the site were higher (~~3110~~ 73 to 4150 mg/kg) than those further from the site (~~200-500~~ 45-2940 mg/kg). off-site Surface samples typically contained more lead (average 1160 mg/kg) than the 3-6 inch samples (average 560 mg/kg). On-site lead concentrations ranged from 1550-48,300 mg/l. Leachate testing on a sample of the soil with an elevated lead concentration demonstrated that the lead in this sample was not extractable and that this material is not a characteristic hazardous waste under 40 CFR 261.

lead reclamation activities conducted by SLLR. The IEPA therefore procured Administrative Orders by Consent with Taracorp, St. Louis Lead Recyclers, Inc., Stackorp, Inc., Tri-City Truck Plaza, Inc. and Trust 454 during March 1984. The orders specified the implementation of remedial activities relative to the air quality.

The U.S. Environmental Protection Agency (USEPA) determined that the Site was a CERCLA facility. Due to Taracorp's bankruptcy and NL's former ownership of the Site, NL voluntarily entered into an Agreement and Administrative Order by Consent (Consent Order) with the USEPA and IEPA in May 1985 to implement a Remedial Investigation and Feasibility Study (RI/FS) of the Site and other potentially affected areas. NL retained O'Brien & Gere Engineers, Inc. (O'Brien & Gere) in July 1985 to conduct the RI/FS in accordance with the Consent Order. O'Brien & Gere prepared a Work Plan which was approved by the Illinois EPA and US EPA (O'Brien & Gere, 1986).

1.02 Nature and Extent of Problem

The nature of the problem on and near the Site is one of lead and other heavy metals in several environmental matrices. Lead concentrations have been observed in surface soils at on-site and off-site locations (IEPA, 1983). The off-site locations at which lead concentrations have been observed include properties to the north, south, and east of the Site, and properties in Venice Township, south of the Site, where hard rubber from battery cases was utilized as fill material and/or paving material by private parties and Venice Township.

The waste pile on the Site contains slag, lead bearing fines in 55-gallon drums, and plastic and hard rubber from battery cases.

Remedial Response Objectives

The present conditions do not pose a threat to human health or the environment. A change in land use which would allow direct contact with or disturbances of the waste pile could pose a risk in the future. Consequently, response objectives are presented based on reasonable worst case scenarios. The objectives address surface soil/waste pile lead concentrations and ground water quality and are based on applicable or relevant and appropriate requirements (ARARs). A response objective is presented for air to address the situation where a remedial technology could increase the atmospheric concentration of lead due to waste pile disturbances and resultant suspension of lead particulates in air.

delete or call these potential ARARs

Preliminary Remedial Technologies

The universe of remedial technologies was defined and those technologies which appeared appropriate for the site were presented. These technologies include:

- recycle/recovery
- solidification/fixation
- containment
- excavation
- ground water collection/treatment

Development of and detailed evaluation of alternatives will be addressed in a Feasibility Study Report.

Samples of these materials exhibit elevated lead concentrations as well as other heavy metals associated with the secondary lead smelting industry.

1.03 Remedial Investigation Summary

The objectives of the RI were to:

1) identify environmental conditions on and off the site relative to facility operations;
2) address potential health and environmental impacts resulting from the existing environmental conditions; and
3) develop a set of preliminary remedial technologies to be evaluated during the Feasibility Study.

To accomplish these objectives samples of on-site and off-site surface soils, waste materials from the slag piles and SLLR pile, surface water and ground water were obtained and analyzed for heavy metals and other inorganic parameters. The analytical results were used to determine potential health and environmental impacts associated with the observed environmental conditions and to identify preliminary remedial technologies.

The field activities included sampling ground water and measuring ground water elevations during each of the seasons of 1987. Two additional wells were installed to clarify ground water flow directions. Eight soil borings in the vicinity of the slag pile were conducted to clarify the extent and nature of an underlying clay material. In addition, two test pits were excavated in the slag pile to provide information on the stratigraphy within the pile.

Section 5 presents the results of the soils investigation, including a summary of analytical data and an evaluation of the data relative to site activities. The investigation included sampling of on-site and off-site surface soils.

Section 6 presents the findings of the surface water investigation. This includes a discussion of analytical data from samples of surface runoff and deposition from the waste pile.

Section 7 presents the results of the air investigation, which consisted of an evaluation of air quality data collected by IEPA air monitoring stations used for the SIP.

Section 8 presents a discussion of public health and environmental impacts. The section identifies potential receptors that may be affected by the observed environmental conditions, and summarizes public health and environmental concerns associated with the observed environmental conditions.

Section 9 presents remedial response objectives developed from data generated by the RI and chemical based ARAR's. — delete or list as potential ARARs

8) *

Section 10 presents the preliminary remedial technologies to be evaluated during the Feasibility Study. The preliminary remedial technologies were developed pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

The reference section presents bibliographic citations for the sources used and cited in the text of the Report.

that the hydraulic gradient across the site is less than 0.003 ft/ft. Process water supply wells on adjacent properties which tap the unconsolidated sediments could influence this gradient. The area surrounding the site is heavily industrialized. Finally the unconsolidated deposits are quite variable in nature, ranging from clays to coarse sands.

Four wells were selected based on ground water elevations during 1987 and water quality as representing "background" water quality in the vicinity of the site. These wells, 102, 105S, 105D, and 110 are located north and east of the site. The concentration ranges observed for these wells were as follows:

Total Dissolved Solids: 610-1000 mg/l

Conductivity: 680-1100 micromhos/cm

Sulfate: 120-320 mg/l

pH: 6.3-6.8 S.U.

Filterable Iron: LT 0.1-0.12 mg/l

Filterable Manganese: LT 0.025-0.99 mg/l.

Filterable Lead: LT 0.005-0.013 m/l

Filterable Nickel: LT 0.01-0.02 mg/l

Filterable Cadmium: LT 0.001-0.006 mg/l

Filterable Zinc: 0.013-0.03 mg/l

Three wells 101, 108S, and 108D have consistently demonstrated elevated concentrations of several parameters. Although monitoring well 101 is slightly hydraulically upgradient, it is quite close to the slag pile and may be influenced by localized mounding. Ground water from this well demonstrated average concentrations of iron (21 mg/l), manganese (4.7 mg/l), arsenic (0.079 mg/l) and zinc (0.039 mg/l), higher than observed at the background shallow well, ~~110~~ 105S. Other parameters were similar to

well ~~110~~ 105. Well 108S could only be sampled on one occasion due to low ground water elevation. The results demonstrate elevated concentrations relative to background of sulfates (1250 mg/l), dissolved solids (3110 mg/l), cadmium (0.209 mg/l), and manganese (13.1 mg/l). In addition to these parameters being elevated (average sulfates - 1759 mg/l), well 108D also contained nickel (0.74 mg/l) and zinc (42 mg/l) relative to well 110, the background deep well. The high total dissolved solids and sulfates at the 108 wells ~~is~~ may be explained by the proximity to the former battery breaking operations. Each of these wells contained less than 0.01 mg/l of lead. - 4315 mg/l, cadmium - 3.85 mg/l and manganese - 25.4 mg/l

Seven wells located to the south and west of the Taracorp manufacturing area and slag pile have been selected to evaluate water quality hydraulically down gradient of the site. These wells, 103, 104, 106S, 106D, 107S, 107D, and 109 screen the water table aquifer in the range of 382-406 feet USGS, with a water table at approximately 400 feet USGS.

The two wells located south of the site, 103 and 109, produced water quality suggesting no contaminant migration from the site in this direction. Total dissolved solids (520 mg/l), conductivity (720 micromhos/cm), sulfates (130 mg/l), pH (6.6 S.U.) and the absence of significant concentrations of heavy metals characterized the water quality south of the site. a) *

Each of the wells west of the site had water quality within or close to the ranges observed for background with the exception of 104, 106S and 107D. Well 104, despite being the well with the lowest ground water elevation of those studied, had water quality as defined by dissolved solids (380 mg/l) and sulfates (125 mg/l) better than that observed in the "background" wells. However, 104 did have a depressed pH which averaged 5.6 S.U. Well 106S which could only be

sampled on one occasion due to low ground water, yielded water with a cadmium concentration of 0.013 mg/l, however, the remainder of the parameters fell within the background well ranges. Well 107D was samples on four occasions, consistently yielding water with elevated sulfates (507 mg/l), total dissolved solids (1290 mg/l), and iron (6.7 mg/l). Manganese and other metals were within the ranges observed at the background wells. The down gradient wells consistently yielded water that was generally similar in quality to background deep Well 110 and background shallow well 105S, except as noted above. Metal concentrations, were generally less than detectable.

Ground water quality data indicate a ground water flow in a southwesterly direction, consistent with ground water elevations reported in Section 3.03. The absence of a clearly defined ground water contaminant plume in the presence of a source such as the slag pile is most likely explained by limited recharge potential coupled with high ground water flow in the unconsolidated deposits. Recharge from the pile and the remainder of the site is limited by the extensive on-site paving as well as a low permeability clay layer beneath ~~most~~ portions of the slag pile. However, the data available from well 108D do suggest that dissolved solids and metals from the pile have entered the water table aquifer to an elevation of 385-390 feet USGS. This elevation is beneath the screened interval of well 104 so deeper migration to the west is possible and should be evaluated further.

not major

All the wells around the perimeter of the site demonstrate heavy metal concentrations within or close to the ranges observed for the background wells. The observed low concentrations of metals in the ground water beneath such a substantial source as the slag pile

requires comment. One factor which limits transport of metals from the slag pile to ground water is the tight clay soil discussed in Section 4.02, which is beneath ~~much~~ portions of the pile. The fact that much of the site was paved during the field investigation also limits runoff recharge to ground water. The second factor is the high alkalinity and sulfates within the ground water hydraulically upgradient of the site. Mundell, et al. 1987 presented a paper which demonstrated that in ground water systems, lead migration is limited by the solubility of lead carbonate, and lead sulfate. The solubility products for these substances are sufficiently low as to have this mechanism included as a promising technology for remediation of hazardous waste sites (USEPA, 1985).

Data generated by the Illinois EPA during 1983 and presented as Table 14 suggests that some lead may have migrated from the surface to the ground water table. Percolation when contacted by the ground water with high alkalinity could have deposited the metal at the interface. This was most noticeable at location 101, however, it was also observed at 107 and 108. These mechanisms apparently limit the migration of the heavy metals within the ground water system.

operations in 1983, a reduction in ambient lead was realized. This supports the findings of the SIP concerning lead emission sources.

An increase in ambient lead concentrations during 1984, particularly at the air quality monitor at 15th and Madison, coincides with activity by SLLR. Since blast furnace and SLLR operations shut down early in 1984, air quality has been well below NAAQS. Thus, the waste piles and plant proper are not continuous sources of airborne lead emissions sufficient to cause excursions in the NAAQS for lead at the air monitoring locations in the area.

8.03 Qualitative Exposure Pathway Assessment

The physical, chemical, and biological characteristics of lead residues at the Granite City site and surrounding area are discussed in Section 1 and Appendix A. Site-specific elements basic to this risk assessment are reviewed in the following sections.

8.03.1 Source Description

As discussed in section 1.02, particulate lead has accumulated at onsite and offsite locations in the vicinity of the Taracorp facility due to atmospheric emissions produced during many years of lead smelting activities at the site and the accumulation of an exposed onsite slag waste pile consisting predominantly of iron oxides and battery parts with an elevated lead content. Elevated lead residues in soil both onsite and off-site are evident. Rubber battery casings with high lead content may have also been used in some paving/filling operations producing localized areas of offsite contamination. Smelting operations ceased in 1983 and air monitoring data for the past five years have been well below the NAAQS (indicating that emissions of lead from the on-site waste pile ~~is~~ are not ~~contributing significantly as a source for transport of lead to off-site locations at present~~ sufficient to create an exceedance of the lead NAAQS at the monitoring locations). Evaluation of lead exposure will, therefore, focus upon ingestion of lead-contaminated soil in off-site locations.

10) *

8.03.2 Environmental Chemistry and Dynamics

The key elements of the environmental chemistry and transport of lead in the context of urban areas are reviewed in Appendix K and selected physical properties of various lead compounds

SECTION 9 - REMEDIAL RESPONSE OBJECTIVES

9.01 General

The Statement of Work identifies, in Task 4, several items relative to remedial technologies and alternatives that are to be presented in the RI Report. Several of the requirements of Task 4 are inconsistent with the current NCP, EPA guidance on RI/FS's based on the current NCP (USEPA, 1985), and EPA guidance on SARA and the proposed revisions to the NCP (USEPA, 1986). These inconsistencies specifically relate to the screening of remedial technologies, and the screening and evaluation of remedial alternatives, which are major considerations of the FS rather than the RI. While the intent of Task 4, i.e., to "... ensure that site investigations will develop a data base adequate for the evaluation of alternatives during the feasibility study," was incorporated into the planning and execution of the RI, the FS will include the screening of remedial technologies and screening and evaluation of remedial alternatives. Therefore, to be consistent with current regulations and EPA guidance which supercede the Statement of Work, the FS Report will document the screening of technologies and screening and evaluation of alternatives.

The RI, by defining the nature and extent of contamination on and around the site, forms the basis for the development and evaluation of Remedial Alternatives during the FS. In addition to identifying the nature and extent of contamination at the site, ~~the pertinent cleanup levels,~~ remedial response objectives, and preliminary remedial technologies are outlined during the RI. delete

knowledge of site conditions. This step is critical as it lays the foundation for the FS. It is appropriate, therefore, to introduce in the RI Report a list of preliminary remedial technologies which will be among those considered in the FS.

10.02 Preliminary Remedial Technologies

Response technologies may address a cause of a problem or an effect. For example at the site the slag pile is a source which contains tons of lead and iron. An effect of such a source would be concentrations of lead or iron in the ground water above standards. If the effect is causing an unacceptable risk, then the effect is typically addressed, however, the preferred approach is to address the source (cause).

Lead or iron can not be destroyed, therefore the focus of the technology assessment is to manage the lead in a manner that protects human health and the environment. The preferred approach is to recycle/recover the lead and ~~then~~ render the residue non hazardous for all metals of concern. Advantages of this approach are substantially reduced if residuals must still be managed as hazardous wastes to be protective of human health and the environment. If recycle/recovery is not technically or economically feasible then technologies which render the waste permanently less hazardous become more important. Selected fixation processes have been developed which take EP-Toxic materials and change the characteristics by chemical fixation such that lead is not available to impact human health or the environment. Other technologies which are pertinent to lead contaminated soils are various containment methods. These technologies are based on preventing contact with the lead, thus being protective of human health and the environment.

12) * delete or list as potential ARARs

TABLE 8

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENT

Matrix	ARAR
Waste Piles	- 40 CFR Part 260 - Hazardous Waste Management System: General;
	- 40 CFR Part 261 - Identification and Listing of Hazardous Waste;
	- 40 CFR Part 262 - Standards Applicable to Generators of Hazardous Waste;
	- 40 CFR Part 263 - Standards Applicable to Transporters of Hazardous Waste;
	- 40 CFR Part 264 - Standards for Owners and Operators of Hazardous; Waste Treatment, Storage, and Disposal Facilities;
	- 40 CFR Part 265 - Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;
	- 40 CFR Part 266 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities;
	- 40 CFR Part 267 - Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities;
	- 40 CFR Part 268 - Land Disposal Restrictions;
	- 35 Illinois Administrative Code, Part 700 - Outline of Waste Disposal Regulations;
	- 35 Illinois Administrative Code, Part 702 - RCRA and UIC Permit Programs;
	- 35 Illinois Administrative Code, Part 703 - RCRA Permit Program;
	- 35 Illinois Administrative Code, Part 720 - Hazardous Waste Management System: General;
	- 35 Illinois Administrative Code, Part 721 - Identification and Listing of Hazardous Waste;
	- 35 Illinois Administrative Code, Part 722 - Standards Applicable to Generators of Hazardous Waste;
	- 35 Illinois Administrative Code, 723 - Standards Applicable to Transporters of Hazardous Waste;
	- 35 Illinois Administrative Code, Part 724 - Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;
	- 35 Illinois Administrative Code, Part 725 - Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;
	- 35 Illinois Administrative Code, Part 726 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities; and
	- 35 Illinois Administrative Code, Part 729 - Landfills: Prohibited Hazardous Wastes.
Ground Water	- 35 Illinois Administrative Code, Part 302 - Water Quality Standards, Subpart A - General Water Quality Provisions

TABLE 8

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENT
(Continued)

Matrix	ARAR
Ground Water	- 35 Illinois Administrative Code, Part 302 - Water Quality Standards, Subpart B - General Use Water Quality Standards - 35 Illinois Administrative Code, Part 303 - Water Use Designations and Site Specific Water Quality Standards, Subpart A - General Provisions; and - 35 Illinois Administrative Code, Part 303 - Water Use Designations and Site Specific Water Quality Standards, Subpart B - Nonspecific Water Use Designations.
Air	- 40 CFR Part 50 - National Primary and Secondary Ambient Air Quality Standards; - 35 Illinois Administrative Code, Part 211 - Illinois Emission Standards and Limitations for Stationary Sources, Definitions and General Provisions; - 35 Illinois Administrative Code, Part 212 - Illinois Emission Standards and Limitations for Stationary Sources, Visual and Particulate Matter Emissions; and - 35 Illinois Administrative Code, Part 234 - Illinois Air Quality Standards.

B)

TABLE 10

REMEDIAL RESPONSE OBJECTIVES

Exposure Pathway	Objective	Criteria
Soil	* Minimize potential risk from direct contact with contaminated soils, fill, and paving materials ~~by maintaining blood lead concentrations below 25 ug/dl in children~~.	* - Surface soil lead ~~concentration of~~ level at a concentration that will ~~3,000 mg/kg as determined by site-~~ not pose ~~specific risk assessment~~. risks to human health.
Waste Pile	* - Minimize potential risk from inhalation or direct contact with the waste piles containing wastes from secondary lead smelting process ~~by~~ * ~~maintaining blood lead concentrations below~~ 25 ~~ug/dl in children~~.	* - ~~Surface lead concentration of~~ 3,~~000 mg/kg as determined by site-~~ ~~specific risk assessment.~~ no numerical criterion
Air	- Maintain lead concentrations in air at concentrations which do not pose risks to human health as defined in 40 CFR Part 50.	- Ambient air lead concentration of 1.5 ug/m^3.
Ground Water	- Meet Illinois General Use Water Standards 35 IAC Part 302B.	- Reduce Fe, Mn, Zn, Cd, TDS, SO_4 to IEPA ground water quality standards (35 IAC Part 302B) at hydraulic downgradient wells 109, 104, 107, 106.

Attachment II

Illinois Environmental Protection Agency 2200 Churchill Road Springfield Illinois 62706

217/782-6760

Refer to: L1190400007 -- Madison County
Taracorp
Superfund/Technical Reports

March 8, 1988

Mr. Brad Bradley (5HE-12)
USEPA - Region V
230 South Dearborn
Chicago, Illinois 60604

Dear Mr. Bradley:

The IEPA has completed its review of the draft Remedial Investigation Report dated January 1988 and submitted by NL Industries. Pursuant to the Administrative Order by Consent, Section G, paragraph 15(a) the IEPA disapproves this submittal. Specific inadequacies are outlined in two attachments to this letter: 1) comments on the entire report, 2) additional comments on risk assessment related concerns.

Should you require additional information, please contact me.

Sincerely,

Kenneth M. Miller

Kenneth M. Miller, Project Manager
Federal Site Management Unit
Remedial Project Management Section
Division of Land Pollution Control

KMM:ct/618j,29

cc: DLPC Fileroom
Terry Ayers w/att.
Gary King
Robert Sharpe - APC
Connie Sullinger - OCS w/att.
Dave Kolaz - APC w/att.
Keri Luly - Comm. Rel. w/att.
Tim Kluge - WPC w/att.
Charlie Zeal w/att.
Sherry Otto w/att.
Tom Miller - S. Region
Jim Shaw - LAB w/att.
Dave Webb - IDPH w/att.
Nancy Mackiewicz - AG's Office w/att.

Attachment IV

Schedule For Further Study / Supplemental RI/FS

The schedule located at subparagraph 14(a) through subparagraph 14(c) of the RI/FS Order shall govern the further study, which can be considered a supplemental RI/FS, with the following changes:

- Subparagraph 14(a) - put "supplemental" in front of the words "Work Plan" wherever they appear in this subparagraph
  - line 4: replace "of this Consent Order" with "as set forth in the March 11, 1988 letter from U.S. EPA to NL Industries"

- subparagraph 14(b) - put "supplemental" in front of the words "Remedial Investigation", "RI", and "FS", wherever they appear in this subparagraph
  - lines 4 and 5: delete "which is depicted in Exhibit 'B', 'Anticipated Project Completion Schedule'"
  - lines 1 and 2: delete the first sentence of this subparagraph

- subparagraph 14(c), line 4 - put "supplemental" in front of "RI/FS"

Illinois Environmental Protection Agency 2200 Churchill Road Springfield, IL 62706

COMMENTS ON THE JANUARY 1988 REMEDIAL INVESTIGATION
TARACORP/NL INDUSTRIES, GRANITE CITY, IL

In reviewing this report, site history, aerial photographs and a Preliminary Assessment of Markle Lead Works, it was found that the plant covered a 30 acre area in the past while the present site is defined as a 15.8 acre parcel of property in the Consent Order. It appears that the plant property included all or part of two adjacent properties which are presently owned by Tri-Cities Trucking Inc. (TCT) and St. Louis Lead Recyclers, Inc. (SLLR). The IEPA's April 1983 study revealed soil lead levels of 12,000 and 75,000 ppm at TCT and 5,100 and 86,000 ppm at SLLR. All of these factors cause concern that site activities have affected these areas. The IEPA feels that these two properties should be further investigated to determine the extent of contamination.

Site investigations reveal that upper strata materials and drummed waste in the slag pile are EP toxic for cadmium as well as lead and groundwater analyses at well G108D indicate that cadmium has and is leaching into groundwater. Furthermore, cadmium was detected in upper strata materials (640 ppm), drummed materials (2700 ppm) and the SLLR pile (7000 ppm). To adequately define the extent of contamination off-site soils and runoff/sediments should be tested for cadmium, arsenic and chromium as well as lead. It is also suggested that a sampling of residential areas be conducted on a smaller grid pattern to better define areas for remediation.

The report indicates that the slag pile contains lead oxide dust and drums of baghouse dust (p. 25). This materials is a listed hazardous waste (K069) if it is emission control dust/sludge from secondary lead smelting. Clarification of this matter and any available documentation should be provided.

The extent of groundwater contamination has not been defined. A strong downward hydraulic gradient was found in two of the well clusters on site. One of the deepest wells (G108D) had contaminant levels that greatly exceeded the Illinois general use water quality standards. Combine this with the fact that sediments become coarser (more permeable) with depth and it becomes possible that the contaminants could be migrating off-site below the existing monitoring wells. The "clay" beneath the slag pile and th paved areas on site are irrelevant. The fact remains that groundwater at well G108D does have high levels of metals relative to upgradient wells so the pile must be the source (see comments on pages 14, 22, 23). This is confirmed by the fact that waste pile materials are EP toxic for lead and cadmium (RI p. 30). Also, the use of several downgradient wells has not been determined so it is not clear whether groundwater is used as a drinking water source.

The following recommendations are provided to enhance community relations.

(1) A one or two page "Citizen Summary" at the beginning of the document would be very helpful since the Executive Summary assumes a level of knowledge that most citizens lack. Such a summary should include a brief background description of CERCLA, the RI/FS process, the Consent Order and the roles played by everyone. The attached information from USEPA fact sheets and the RI might be helpful in that effort.

A Glossary of Terms would also be useful since none of the terminology is explained in the text. It could be a part of the "Citizen Summary", perhaps in reduced-size print. Terms to be (briefly) defined should include (but not be limited to):

a) characteristic hazardous waste
b) groundwater-up and down gradient
c) EP Toxicity
d) alluvial, glaciofluvial and glaciolacustrine deposits
e) Riley-Landers-Parkville Assoc.
f) non-attainment area
g) heavy metal
h) soil boring
i) peripheral neuropathy
j) encehalopathic effects
k) nephropathy
l) volatilization

(2) Put some of the maps, especially Figures 1 and 2, in the front of the report for easier reference.

(3) Include IEPA Chemical Information Sheets for lead and cadmium (attached) in the Appendices (unabridged) and mention them in the Citizen Summary and Section 8.03.3.

(4) Include IEPA and/or USEPA contact names and phone numbers for citizens seeking further information.

Specific Comments

Page	Comment
E-1,E-2,etc.	pH is the negative logarithm of a solution's hydrogen ion concentration therefore it does not have units. "S.U." is inaccurate and inappropriate so it should be removed from wherever it appears in the document.
E-2 par. 3	Specify the standards, criteria, etc., which were used to determine that upgradient "groundwater is unsuitable for development as a potable water supply".
14) * E-4	Air Invest. According to the Illinois Annual Air Quality Reports, Granite City exceeded particulate and ozone standards in 1984 and particulate standards in 1985 and 1986. It had the highest levels of arsenic, iron and manganese and the second highest levels of cadmium and sulfates in Illinois in 1986. Only Chicago had higher levels of chromium and nickel in 1986.
15) * E-5	The statement that "present conditions do not pose a threat to human health or the environment" should be removed (see p. 75 comment).

2 par. 3 The locations and contents of SLLR piles needs to be better defined. Figure 12 (or another figure should show property lines and should indicate which piles are "SLLR" and which are "slag". Also, a small pile of material similar in appearance to piles 1-4 and located south of the SLLR pile is not shown although the location of a sample taken from it is shown in Figure 12.

4 Section 1.01. A discussion of the HRS scoring should be added including the score, date of scoring and factors contributing to the score. Add the dates of work plan approval and RI activities.

16) * Section 1.02. Nature and Extent of Problem. This section should discuss the TCT property to the southeast at which lead concentrations were observed in the 1983 study. It should also discuss the SLLR hard rubber pile to the south of the slag pile and the extent of contamination in residential areas.

The report indicates that "lead bearing fines in 55-gallon drums" (p. 4), "20% lead oxide dust" and "25-35 drums of unrecycled drosses and bag house dust" (p. 25), and "lead oxide dust" (p. 32) are contained in the waste pile on site. Are these fines emission control dust/sludge from secondary lead smelting (K069)?

17) 6,20,39 App. E * The report indicates that data is usable for the purposes of this RI. However, IEPA's review of rounds 1 and 2 data revealed some quality control problems. Raw data for rounds 3 and 4 was not submitted as required and was requested from NL on 2/26/88. Complete comments on data quality will be provided after the raw data is reviewed.

stopped on 5/3

18) 14 * Section 3.02.3. This section states that "sediments beneath the site consist of silt and clay overlying sand". However, IEPA well boring logs and boring logs by NL indicate that sediments beneath the site are primarily sand with some silts and clay lenses rather than a continuous clay layer as shown in the cross section (figure 18). Clay was not found in some of the borings and when found was usually less than two feet thick except a boring 16S where approximately 5.9 feet of clay was found.

The gamma logs in Appendix B are very generalized and not very useful for interpretation (see App. B comment). The text should note that boring logs are more reliable than and should be used to aid in interpretting gamma logs not vice versa.

17 19) * Sentence one should be changed to indicate that the aquifer is composed primarily of sand and silt with some clay. Only 1.7 feet of clay was found at two monitoring well locations (15S and 18S) and 5.9 feet at 16S.

18 Lines 14-18. The vertical hydraulic gradients for wells G105S and D and G106S and D were very slight or unable to determine because the shallow well was dry. However, G107S and D and G108S and D had consistent downward gradients. Nested wells G107 S and D gradients ranged from 0.13 ft/ft to 0.42 ft/ft and wells G108S and D gradients ranged from 0.01 ft/ft to 0.06 ft/ft. These wells consistently had a downward gradient and did not vary from date to date.

22 Lines 5-6. In comparison to the shallow well G108S, G108D had significantly higher levels of sulfates (1825 mg/l), dissolved solids (4600 mg/l), cadmium (6.9 mg/l), and manganese (29.4 mg/l). This verifies that contaminants are migrating downward. The extent of downward contaminant migration needs to be defined.

23, par. 2 IEPA agrees that deeper migration of contaminants is possible and that further evaluation is necessary.

The text states that the absence of a groundwater plume is due to limited recharge and high groundwater flow. The meaning of "high ground water flow" needs to be clarified.

20) * The presence of a "low permeability clay layer" (p. 23) or a "tight clay soil" (p. 24) or "clay layer" (p. 28) beneath most of the slag pile is not substantiated by the RI data. No clay was encountered at some locations and only two feet of "clay" was found in some of the borings and the trench excavations. A two foot "clay" (or no clay) is not considered a layer.

21) * Furthermore, visual descriptions of soils from NL's borings indicate that the "clay" layer is actually silt (Exhibit C). Using the grain size analysis (Exhibit A) and Unified Soil Classification System (USCS) one sample from each excavation was classified as a clayey sand one sample from excavation one was a clay.

28 22) * The text indicates that the permeability of the clay was estimated based on the reference information provided in Exhibit A. Please clarify how this information was used to estimate permeability.

23) r. 1 * "... available information including logs for soil borings conducted in the early 1900's, indicates that this low permeability layer is naturally occurring and is generally consistent beneath the pile". This information should be referenced and attached, however, it cannot be considered more reliable than present data which indicates that a clay layer is not present.

Sectin 4.03. Four sets of samples rather than three were collected. Slag samples are not listed in par. 1.

24) * 30-31 The text states that 2 samples of drummed material and 3 samples from the SLLR pile were collected, however, the key in Appendix G shows 1 drummed material sample and 5 SLLR samples.

25) * 32 Add cadmium as being available for leaching in the last sentence.

26) * 38-40 Section 6. None of the figures provided document the study's conclusion that stormwater runoff from the waste pile does not reach drainage ditches or storm sewer systems. A larger scale topographic map showing runoff paths and storm sewer systems should be provided for evaluation. Also provide information about the precipitation event(s) during which runoff patterns have been observed. RCRA requires management of runoff and runon resulting from a 24-hour - 25-year storm event.

40 The text indicates that sediments are not being transported off-site. Runoff to adjacent properties is, however, occurring. The waste pile is adjacent to the property line on the southeast, south and southwest and ponding occurs at these boundaries (field observation and 1984 aerial photograph).

The lead concentration range in sediments is shown as 5,400 to 9,700 mg/kg (wet weight) and should actually be 97,000 per Appendix I (not J-p.39). The dry weight concentration range is 13,636 to 148,559 mg/kg (almost 15% lead) and should be used in the text.

47 Mid-page. Either the acronym "SNARL'S" or the word "Impact" is incorrect.

50 Line 4. "Section 1" and "Appendix A" appear to be incorrect.

51 Last par. The term "in-cloud rainout" needs to be defined.

53 Section 8.03.3 Refer to IEPA Chemical Information Sheets for lead and cadmium here and add them to Appendices.

57 It is very misleading to give them impression that the combustion of coal and fuel oil "in all American urban areas" has resulted in elevated lead levels to the extent that leaded gasoline has. Such phrasing certainly lessens the appearance of the contributions of lead smelters, but does not do so appropriately, especially considering that the coal/fuel oil related levels are not concentrated in specific areas, as are smelters.

59 Site Specific. The soil and direct contact pathway is functional for areas which received fill by waste materials. It is also a functional pathway in locations where sediments are carried off-site by runoff (p. 40 comment).

60 Site Specific. The surface water pathway is functional (p. 38-40, 40 comments). Additionally, there are several off-site areas which are not well vegetated (p. 68 comment).

27) *	61	Site Specific. RCRA requires groundwater monitoring during closure and 30 year post-closure period and corrective action if necessary. Also, it is unclear whether the ground water pathway is complete since the use of several wells listed in Table 1 has not been determined.
	66	Text fails to mention that due to a lack of participation, the sample group for blood-lead testing was very small, limiting the extent to which conclusions could be extrapolated to the rest of the area's population. Text also fails to mention that sampling was done in November and December when children are indoors and less exposed to lead. Both these points are important to the conclusions drawn.
	68	Although the RI describes the neighborhoods around Taracorp as "generally well vegetated and maintained," the IEPA study sampled seven areas described as open dirt areas in yards, playgrounds, etc. with lead levels averaging 51 to 2390 ppm. Two other areas near the facility showed over 5000 ppm lead.
28) *	72	The text states that a complete exposure pathway to soil containing 3000 ppm lead exists. The IEPA study, however, identified two off-site locations with greater than 5000 ppm soil lead concentrations and NL's study revealed levels up to 4150 ppm off-site (location 10).
29) *	75	Lines 13-15. The statement that soil lead and air residues do not represent a risk is incorrect and should at least be qualified to say "significant" risk. The IEPA cleanup objectives team (COT) will determine cleanup levels which present a significant risk.
30) *	78	Soil. The Risk Assessment must clearly outline the rationale and procedure for arriving at an "acceptable" soil lead concentration of 3000 mg/kg.
31) *	79	Groundwater. The risk assessment did not conclude that down gradient water quality did not pose a risk to human health and the environment, but rather concluded that the groundwater exposure pathway is incomplete.
	82	If the waste is a listed waste then the waste or residue cannot be rendered non-hazardous except by delisting.
	83, par. 2	The technologies in Table 11 also include groundwater.
32) *	Table 8	ARAR's are to be determined by the Agencies after an initial screening of alternatives. ARAR's are specific to each remedial action alternative and therefore cannot be developed at this time. This table should be removed or relabeled as "Potential ARAR's". Note also that Federal groundwater standards, etc. are not included and there is no soil matrix list e.g., RCRA requirements.

Table 11	Add groundwater treatment technologies.
Table 12	Indicate the units of measurement.
33) * Figures	Include a figure showing the locations of all waste piles relative to each other, the site and property boundaries (Fig. 3 shows only the on site pile and fig. 12 shows all piles).
Figure 8	Show the cross section location. Show deep wells.
Figure 9	A log for well G104 which is shown in this figure is not provided in the RI.
Figure 12	Show the locations of all samples listed in appendices e.g., drum samples.
Figure 16	Show location of monitor at 2001 and 20th Streets which is listed in Table 7.
34) * Figure 18	See comments on pages 14, 23.
i. Appendices	The units of measurement for all data must be clearly identified e.g., app. G and H.
Appendix B	These gamma logs do not include enough data points for correlations. It would be helpful to include simplified gamma log graphs (example attached) and boring logs at the same scale.
Appendix D	Gamma ray logs for wells G101, G102 and G104 indicate the colors of geologic materials but boring logs for these wells are not included. How were colors determined from gamma log graphs?
36) * Appendix E	The key lists well 108S in place 107S.
Appendix G	See p. 6 comment.
Exhibit A	There appears to be an error in the key "Sample Type" column (see p. 30-31 comment).
Exhibit B	The location from which samples A, B and C were collected should be specified.
Exhibit C	Add monitor well construction diagrams for wells MW-109 and MW-110.
	Explain the reason for using such high confining (71 psi), head (68 psi), and back (64 psi), pressures for permeability tests. These high pressures can compact the sample and seal fractures so that the measured permeability is lower than and not representative of in situ conditions. The measured permeabilities (10^{-7} to 10^{-8}) are extremely low especially for silts.

1:ct/618j,29-36

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY MEMORANDUM

DATE March 2, 1988

TO Terry Ayers Attention: Ken Miller

FROM Jim O'Brien By: Connie Sullinger CAS

SUBJECT Comments on Remedial Investigation for NL Industries/Granite City

I have reviewed the Remedial Investigation for the NL Industries/Granite City site. The analytical results found in the appendices were reported incorrectly. All the results were reported in mg/l and some of the results did not correspond to the numbers used in the text. Via conversation we had regarding this problem, you indicated that certain results were reported in wet weight (mg/kg) and had to be divided by the total percent solids to get the dry weight value that was reported in the text. Any necessary conversions of the analytical results should be clearly outlined in the text. The appropriate units should be clearly indicated on the analytical results. This problem was a chronic one found throughout the analytical results in the appendices and the tables. Tables 9, 12, and 13 did not have the appropriate units indicated either. These are serious problems that present the data surrounded by total uncertainty. The analytical results in the appendices combine the total and EP Toxicity results on one page and give the units in mg/l. This is inexcusable because totals are reported in mg/kg and EP Toxicity in mg/l.

Another serious problem I had with the RI was that lead was the only parameter tested for in soils, sediment, and stormwater. The slag pile, SLLR pile, and drums contained additional metals of possible concern such as cadmium, arsenic, and chromium. Cadmium is considered a probable human carcinogen by the inhalation route. Arsenic is considered a human carcinogen by inhalation or ingestion. Chromium is considered a human carcinogen by the inhalation route. Other contaminants detected at the site should be tested for in off site soils. Illinois EPA air monitoring data on parameters such as arsenic, cadmium, chromium, iron, manganese, and nickel are available for the Granite City area and should be reviewed and included in the RI along with the lead data. Also, a number of soil pH measurements should be taken to determine any impacts from battery acid. A decrease in the soil pH can increase the mobility of metals in soil.

It should be noted that based upon carcinogenic animal studies, U.S. EPA is considering classifying lead as a B2 (probable human) carcinogen by the oral route. If this occurs and a carcinogenic potency factor for lead is published, it may be necessary to reevaluate the appropriateness of using the current Acceptable Chronic Intake value for conducting the risk assessment. Additional specific comments follow below.

- Pg. 29, 4.03, ¶ 3: The characterization of the slag is not complete. The analytical results in Appendix G indicate that cadmium, chromium, antimony, silver, and barium were also detected in the slag.

- Pg. 30, ¶ 3: The characterization of the upper strata of the slag pile is also incomplete. Cadmium, manganese, mercury, zinc, chromium, antimony, nickel, silver, and barium were also detected.

- Pg. 31, ¶ 2: The comment is made that "elevated" concentrations of cadmium and lead were observed in the drummed material. What levels are considered "elevated" for drummed materials?

- Pg. 31, ¶ 2: The contents of the drummed material also contained copper, iron, manganese, zinc, chromium, and antimony. The arsenic result was unable to be distinguished due to the poor quality of the analytical result copy.

39) - Pg. 31, ¶ 2: It is indicated on Page 31 that two samples of the drummed material were tested for total metals. However, the analytical results in Appendix G show that only one sample was tested for totals and one for EP Toxicity.

40) * - Pg. 31, ¶ 2: The only value shown for lead in the analytical results in Appendix G is 273,000 mg/kg. The value of 23700 mg/kg as stated on Page 31 does not exist.

41) * - Pg. 31, ¶ 2: The EP Toxicity results in Appendix G indicated that the drummed material was EP Toxic for cadmium as well as lead. The RI indicates that only lead was EP Toxic.

42) * - Pg. 31, ¶ 3: The RI indicates that three samples were collected from the SLLR pile, however, the analytical results indicate 5 samples were tested for totals and one for EP Toxicity.

- Pg. 31, ¶ 5: The results of the SLLR pile testing also showed that copper, manganese, mercury, chromium, nickel, silver, and barium were detected. The RI does not list the complete results on Page 31.

43) * - Pg. 31, ¶ 5: The maximum values reported for antimony (1600 mg/kg) and zinc (42,100) are not correct. The results in Appendix G give the maximum values of 2900 mg/kg for antimony and 260,000 mg/kg for zinc.

44) * - Pg. 34, ¶ 3: It is indicated that locations 15 and 21 are "on-site" locations, however, location 21 is on the St. Louis Lead Recyclers, Inc. property, not on the property identified as the on-site area of study for this RI.

- Figure 13: The legend is incorrect. The soil depths 0-3" and 3-6" should be properly indicated.

45) * - Pg. 39, last ¶: The RI indicates that sediment results are presented in Appendix J. The sediment results are found in Appendix I, not Appendix J. Analytical results in Appendix I have the same units (mg/l) for stormwater and sediment. The sediment values should be reported in mg/kg.

46) * - Pg. 40: The maximum lead concentration in sediment was 97,000 mg/kg (wet weight) not 9700 mg/kg as indicated on Page 40. Why were the values for sediment left as wet weight? Converted to dry weight, the range of lead in sediment is 13,636 - 148,559 mg/kg.

47) * - Pg. 40: I do not feel that O'Brien and Gere submitted enough evidence to support their conclusion that sediments are not being transported

off site. From looking at Figure 12, it is not clear whether sediment/ stormwater sampling locations are on site or off site. The boundary lines of the property are not indicated anywhere on Figure 12.

- Pg. 50, ¶ 1: The physical, chemical, and biological characteristics of lead are not discussed in Appendix A as stated on Page 50.

48) * - Pg. 50: The qualitative risk assessment only discusses lead. The other parameters detected in the waste should also be considered in the risk assessment. Further testing for additional parameters off site will have to be conducted before a complete risk assessment can be conducted for this site.

- Pg. 55, ¶ 3: The units mg/kg and ppm are redundant.

- Pg. 60: In the list of exposure pathways for contaminants in surface water, dermal contact with contaminated water or sediment while swimming or wading is yet another possible pathway.

- Pg. 61, ¶ 1: Human exposure via contaminated groundwater may also occur if groundwater recharges surface water.

- Pg. 61: The RI concluded that the groundwater pathway is incomplete based upon the absence of drinking water usage. The groundwater results in Table 12 indicated that shallow well 108, which is located on site, showed .209 mg/l (the units are an assumption on my part because no units are reported in Table 12) of cadmium and 13.1 mg/l of manganese. Both were well above the Illinois General Use Standards of 0.05 mg/l for cadmium and 1.0 mg/l for manganese. Deep well 108 showed 6.9 mg/l of cadmium, 29.4 mg/l of manganese, and 44 mg/l of zinc. The Illinois General Use Standard for zinc is 1.0 mg/l. It should be noted that neither shallow nor deep background wells were above any of the Illinois General Use Standards for the parameters tested.

  The question that remains in my mind is do we allow contamination of the groundwater in this area to continue and therefore resign ourselves to the idea that the aquifer will probably never have any future usage. On the other hand, is it possible to prevent further contamination and thereby give the aquifer a chance to recover and hopefully provide some future use to the area.

- Pg. 61, Section 8.04: The RI includes no discussion of nearby sensitive populations such as schools, hospitals, nursing homes, playgrounds, etc.

49) * - Pg. 62, ¶ 2: The assessment of exposure to contaminants in dust should be considered an inhalation route of exposure, not an ingestion route. The site of deposition of particulates in the lung is highly dependent upon particle size. The particles too large to penetrate to the alveolar zone may be swallowed and absorbed from the gastrointestinal tract; however, the smaller particles reaching the alveolar sacs of the lung can be readily absorbed into the blood.

- Pg. 65, ¶ 1: Based upon the data presented in Table 7, the 1986 quarterly mean for lead in air should be 0.25 $\mu g/m^3$ instead of the 0.23 $\mu g/m^3$ stated on Page 65.

* - Pg. 65-66: As discussed above, inhalation of dusts should not be assessed as an ingestion scenario. I don't agree with either of the points stated on Page 66. The mode of entry into the body of a contaminant in dust is highly dependent upon particle size. Oral exposure to lead in soil and inhalation exposure to lead in dust cannot be considered proportional to one another. Lead particles reaching the alveolar region of the lung are virtually absorbed 100%; however, lead absorption via the GI tract is approximately 50% for children and 8% for adults.

* - Pg. 66: A total exposure from all routes (air, dust, ingestion, etc.) should be determined and evaluated appropriately.

- Pg. 67: Although the April 1983 report "Study of Lead Pollution in Granite City, Madison and Venice, Illinois" stated that "The results of the children's blood tests, however, provided no evidence that there are lead-related health problems present in the area", these conclusions were qualified. The report said that the number (46) of children sampled was ". . . not enough samples to draw broad conclusions about the rest of the children living in the area."

Uncertainty remained in the conclusions drawn by the report due to various elements. The sample size limited the extent to which conclusions could be extrapolated to the rest of the population in the area. The timing of the sampling (Nov. and Dec. 1982) could not be considered the peak time of the year for exposure to contaminated soil and air. Exposure, especially for children, would be greatest during summer months when there is no school and the children spend a great deal of time outdoors.

* - Pg. 69: The values indicated for soil ingestion (LaGoy 1987) are average values. If estimations are to be made under "worst case" conditions as indicated in paragraph 2, the values considered to be maximum soil ingestion rates should also be used for the calculations.

* - Pg. 70: As stated in the "Assessment of Health Risk from Exposure to Contaminated Soil", *Risk Analysis*, Vol. 5, No. 4, 1985, pages 289-302; John K. Hawley suggests that the exposure scenario for soil ingestion should use six months of the year, five days per week for exposure duration. The use of three days per week as indicated on Page 70 may be an underestimation of the number of exposure incidents if the contaminated soil is in a backyard or playground.

* - Pg. 70: Why was 3000 mg/kg lead chosen for the exposure scenario? A "worst case" and most probable or average case should be calculated. Location 10 showed 4150 mg/kg of lead in the soil at the 0-3" level.

* - Pg. 70: The following calculation should be used to determine a daily dose (oral ingestion) for comparison to the Acceptable Chronic Intake (AIC). Because the AIC is an acceptable dose which can be consumed daily for a lifetime, it is not appropriate to include years of exposure.

$$\underset{\text{(ave. over one year) mg/kg/day}}{\text{Daily Dose}} = \underset{\text{mg/kg}}{\text{conc. in medium}} \times \underset{\text{kg/day}}{\text{amount of exposure}} \times \frac{1}{\underset{\text{kg}}{\text{BW}}} \times \frac{\text{frequency of contact (days)}}{\text{365 (days)}}.$$

57) * - Pg. 70: The methods used for the calculations on Page 70 are confusing. All assumptions and standard values used in the calculations should be clearly stated.

- Pg. 71: Because the quantitative assessment of the site data has not been adequately conducted or presented, I do not agree with the conclusions that the lead levels do not exceed an acceptable intake level for oral and inhalation routes.

58) * - Pg. 72, ¶ 2: The best slope estimates (USEPA 1984) for dietary intake vs. blood lead concentration, based on the data for absorption and distribution in humans, are:

0.0002 µg/ml for each µg lead ingested (adults)

0.0016 µg/ml for each µg lead ingested (children)

For dust and soil the slope is 0.006 - 0.068 for 1000 ppm (children).

These slopes should be used to estimate blood lead levels resulting from a "worst case" and probable case soil ingestion and dust inhalation scenario.

59) * - Pg. 75: I do not agree with the Risk Assessment conclusion that ". . . soil lead and air residues present in the Granite City study area do not represent a risk to public health." Additional assessment and quantification of risk needs to be conducted for this site.

60) * - Pg. 78, Under Soil: I do not agree that a soil lead concentration of 3000 mg/kg in residential areas is an acceptable level. The Risk Assessment needs to be quantitatively reevaluated.

CAS/psf

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. The Acts created a special tax that goes into a Trust Fund, commonly known as *Superfund*, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, EPA can either:

- Pay for site *cleanup* when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work.
- Take legal action to force parties responsible for site contamination to clean up the site or pay back the Federal government for the cost of the *cleanup*.

Remedial Investigation/Feasibility Study: Two distinct but related studies. They are usually performed at the same time, and together referred to as the "RI/FS." They are intended to:

- Gather the data necessary to determine the type and extent of contamination at a *Superfund* site.
- Establish criteria for cleaning up the site;
- Identify and screen *cleanup* alternatives for *remedial action*; and
- Analyze in detail the technology and costs of the alternatives.

Administrative Order on Consent (AO): A legal and enforceable agreement signed between EPA and *potentially responsible parties* (PRPs) whereby PRPs agree to perform or pay the cost of site *cleanup*. The agreement describes actions to be taken at a site and may be subject to a public *comment period*. Unlike a *consent decree*, an administrative order on consent does not have to be approved by a judge.

Ground Water: Water found beneath the earth's surface that fills pores between materials such as sand, soil, or gravel. In *aquifers*, ground water occurs in sufficient quantities that it can be used for drinking water, irrigation and other purposes.

Monitoring Wells: Special wells drilled at specific locations on or off a hazardous waste site where *ground water* can be sampled at selected depths and studied to determine such things as the direction in which *ground water* flows and the types and amounts of contaminants present.

Surface Water: Bodies of water that are above ground, such as rivers, lakes, and streams.

when? The U.S. Environmental Protection Agency (USEPA) determined that the Site was a CERCLA facility. Due to Taracorp's bankruptcy and NL's former ownership of the Site, NL voluntarily entered into an Agreement and Administrative Order by Consent (Consent Order) with the USEPA and IEPA in May 1985 to implement a Remedial Investigation and Feasibility Study (RI/FS) of the Site and other potentially affected areas. NL retained O'Brien & Gere Engineers, Inc. (O'Brien & Gere) in July 1985 to conduct the RI/FS in accordance with the Consent Order.

Illinois
Environmental
Protection Agency

Office of Chemical Safety
2200 Churchill Road, P.O. Box 19276
Springfield, Illinois 62794-9276

IEPA/ENV/87-001-7 April, 1987

- Lead -
Chemical Information Sheet*

WHAT IS LEAD?

Lead is a substance which can occur by itself as an element or in combinations with other ions. Some combinations of lead which have toxic effects are lead acetate and tetraethyl lead which is used in gasoline. Lead, the element, is a soft bluish or silvery grey heavy metal. In 1976, approximately 1.49 million tons of lead were produced in the U.S. Lead is also a by-product of fluorspar mining and Illinois is third in the nation for production of lead in this manner. Fifty-four percent of the lead produced in this country is used in batteries. Other uses of lead include metal products such as solders, bearings, printed type, and brasses; gasoline antiknock additives; and ceramics, inks, paints, and varnishes.

WHAT IS THE OCCURRENCE OF LEAD IN THE ENVIRONMENT?

Lead is widespread in the environment. It is present naturally in most soils and can occur in concentrated deposits. The use of lead dates from the earliest civilizations of man. Lead coins and medallions have been recovered from ancient Egyptian ruins, and lead water pipes were used in ancient Rome. These uses and more recent uses in this century have increased the lead levels in air, rain, snowfall, surface water, and soil, distributing lead widely with high concentrations in some urban areas.

Recently, lead in drinking water has become a concern. Lead rarely occurs naturally at high levels in drinking water sources. The major sources of lead in drinking water are pipes and soldered pipe joints containing lead. The corrosive action of water on distribution systems and residential plumbing systems causes the lead to dissolve from materials in these systems and enter the water.

The most common source of lead exposure for humans is through food, but it is usually environmental sources that result in exposures to lead in concentrations which can produce toxic effects. These sources include lead-based paint in old dwellings, lead in air and soil from combustion of lead-containing auto fuels or industrial emissions, and lead dissolving from pottery which has not been properly glazed. Lead is generally found in higher concentrations in urban environments than in rural.

WHAT ARE THE HEALTH EFFECTS OF LEAD EXPOSURE?

Adults tend to be less susceptible to lead poisoning than children and their exposure is usually limited to dust and fumes while at work. However, lead poisoning in adults can be serious if left untreated. Symptoms include loss of appetite, weight loss, insomnia, headache, and abdominal, muscle, or joint pain. If exposure has not been excessive or prolonged, these symptoms may

disappear when exposure ceases. Prolonged exposure to lead can cause permanent nerve damage leading to a condition known as "wrist drop", an inability to extend the hand. Lead has also been known to affect reproduction and cause elevated blood pressure.

Children, particularly those under the age of two, and developing fetuses, are most seriously threatened by lead. In this age group, lead may cause permanent damage to the developing nervous system leading to subtle learning, behavioral or psychological problems, or with higher exposures, to mental retardation. Children with pica, an abnormal tendency to chew on or eat non-food materials (such as paint chips, toys, and dirt), may be especially at risk for lead poisoning. Children with nutritional problems, such as iron or calcium deficiencies, may have enhanced lead absorption and more adverse health effects from lead. Some other effects of lead observed in both children and adults are anemia, damage to the kidneys, and digestive problems.

Laboratory tests have shown that some lead compounds (lead acetate and lead subacetate) can induce cancer in kidneys of rodents fed very high doses of lead. On the other hand, the evidence that lead causes cancer in humans is very limited. A study of lead workers in the U.S. showed an increase in deaths from cancer, but the significance of these findings have been debated. The most common tumors found were of the respiratory and digestive systems. US EPA considers the evidence sufficient to consider lead acetate and lead subacetate as probable human carcinogens.

HOW IS LEAD REGULATED?

Threshold limit values adopted by the American Conference of Governmental Industrial Hygienists refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all healthy workers may be repeatedly exposed day after day without adverse effect. The threshold limit value for lead is 0.15 mg/m^3 as an average eight hour exposure limit for a 5-day work week. The current drinking water standard is 50 micrograms of lead per liter of water and US EPA is considering lowering this level to 20 micrograms. The Safe Drinking Water Act Amendments of 1986 ban the use of lead pipe with more than 8 percent lead and solder and also ban flux with more than 0.2 percent lead in new plumbing or repairs to plumbing that supply drinking water. The Consumer Products Safety Commission has set a level of 0.06 percent lead in household paints and proposes to assess the use of lead in printing inks. As a result of auto emission controls under the Clean Air Act Amendments of 1970, the use of lead additives in gasoline is being phased out in an effort to reduce lead in the environment. US EPA estimates that 50 percent of the gasoline produced and used in this country is now lead-free.

TEV:st:2295g,spl-2

* Note: This information sheet is a summary of readily available data regarding the general nature and effects of this chemical. The reader is encouraged to consult other sources or an appropriate professional if a more detailed explanation for specific concerns is desired.

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Illinois
Environmental
Protection Agency

Office of Chemical Safety
2200 Churchill Road, P.O. Box 19276
Springfield, Illinois 62794-9276

IEPA/ENV/87-001-10 October, 1987

- CADMIUM -
CHEMICAL INFORMATION SHEET*

WHAT IS CADMIUM?

Cadmium is a soft, silver-white metal. Cadmium is mainly used in electroplating for corrosion protection, in pigment production for paints, and in the manufacture of plastic stabilizers and nickel-cadmium batteries. Pesticidal cadmium compounds are used as fungicides on golf courses and home lawns. The world consumption of the metal in 1980 was 12,000 tons.

Cadmium, although a naturally occurring element, is relatively rare. It constitutes only 0.00001% of the earth's crust and is found primarily as the mineral Greenockite (cadmium sulfide). Cadmium is not mined commercially, but is principally obtained as a secondary product in the refining of other metals (zinc, lead, etc) which contain cadmium as an impurity.

HOW DOES CADMIUM GET INTO THE ENVIRONMENT?

The presence of high levels of cadmium in the environment is usually due to its use in industry. Increased levels of cadmium in the soil may be a result of the extraction of cadmium from mining and smelting activities, the use of phosphate fertilizers, and the disposal of sewage and sewage sludge. Contamination of drinking water with cadmium may occur as the result of the leaching of cadmium impurities found in the zinc of galvanized pipes or from cadmium-containing solders in fittings, water heaters, water coolers, and taps.

The major nonoccupational routes of human exposure to cadmium are through food and tobacco smoke. Cadmium is found in nearly all foods and beverages. Fish and meat tend to have average levels which are higher than milk, eggs, cereals, and vegetables. The use of zinc-containing fungicides and soil contaminated with cadmium dust from industrial fall-out can partially explain the high cadmium levels in tobacco.

WHAT ARE THE HEALTH EFFECTS ASSOCIATED WITH CADMIUM EXPOSURE?

Short term exposure -- Ingestion of relatively high concentrations of cadmium in contaminated beverages or food results in nausea, vomiting, abdominal cramps, and headaches. In more severe cases, diarrhea, shock, and death may occur. The symptoms usually develop within a matter of minutes after ingestion. Contamination of food and drink by cadmium may be a result of solders in water pipes, taps, cooling or heating devices, or from dissolution of cadmium from pottery, usually occurring when acidic foods are stored in these items. The concentration of cadmium in water that causes vomiting is about 15 parts per million (ppm).

Inhalation of large amounts of cadmium may cause chemical pneumonitis (inflammation of the lung). Symptoms may not appear until 24 hours after exposure, which may cause difficulties in proper diagnosis. The symptoms are shortness of breath, general weakness, fever, and in severe cases respiratory insufficiency causing shock and death. Inhalation exposures most frequently result from the inhalation of the yellow cadmium oxide fumes generated by welding cadmium-containing materials or by smelting such materials under poor ventilation conditions. Approximately 5 milligrams of cadmium in a cubic meter of air (mg/m^3) inhaled over an eight hour period may be lethal.

Long-term exposure: Chronic inhalation of cadmium results in chronic obstructive pulmonary disease (especially emphysema) and kidney damage. In addition, anemia, liver disturbance, and bone disease may be seen. Long-term excessive ingestion of cadmium causes kidney damage and a severe bone disease known as Itai-itai disease. Itai-itai, which is Japanese for ouch-ouch, is characterized by pain in the back and legs resulting from severe osteomalacia (softening of the bones).

Cadmium and cadmium compounds have been shown to induce cancers in rats at the site of injection. Lung cancers have also been produced in rats as the result of inhalation exposure. There is no conclusive evidence that cadmium is carcinogenic following ingestion. On the basis of inhalation data, US EPA considers the evidence sufficient to classify cadmium as a probable human carcinogen. Cadmium also produces chromosomal changes and teratogenic effects in experimental animals.

HOW IS CADMIUM REGULATED?

Threshold Limit Values (TLV) adopted by the American Conference of Governmental Industrial Hygienists for regulation of workplace exposures refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all healthy workers may be repeatedly exposed day after day without adverse effects. The TLV for cadmium is 0.05 mg/m^3 as an average eight hour exposure limit for a 5-day workweek.

A Maximum Contaminant Level (MCL) of 10 parts per billion (ppb) of cadmium in drinking water has been established under the Safe Drinking Water Act. US EPA has developed an ambient water quality criterion for cadmium at 10 ppb for the protection of human health from consumption of contaminated water and fish.

TEV:bls/3558g,sp

*Note: This information sheet is a summary of readily available data regarding the general nature and effects of this chemical. The reader is encouraged to consult other sources or an appropriate professional if a more detailed explanation for specific concerns is desired.

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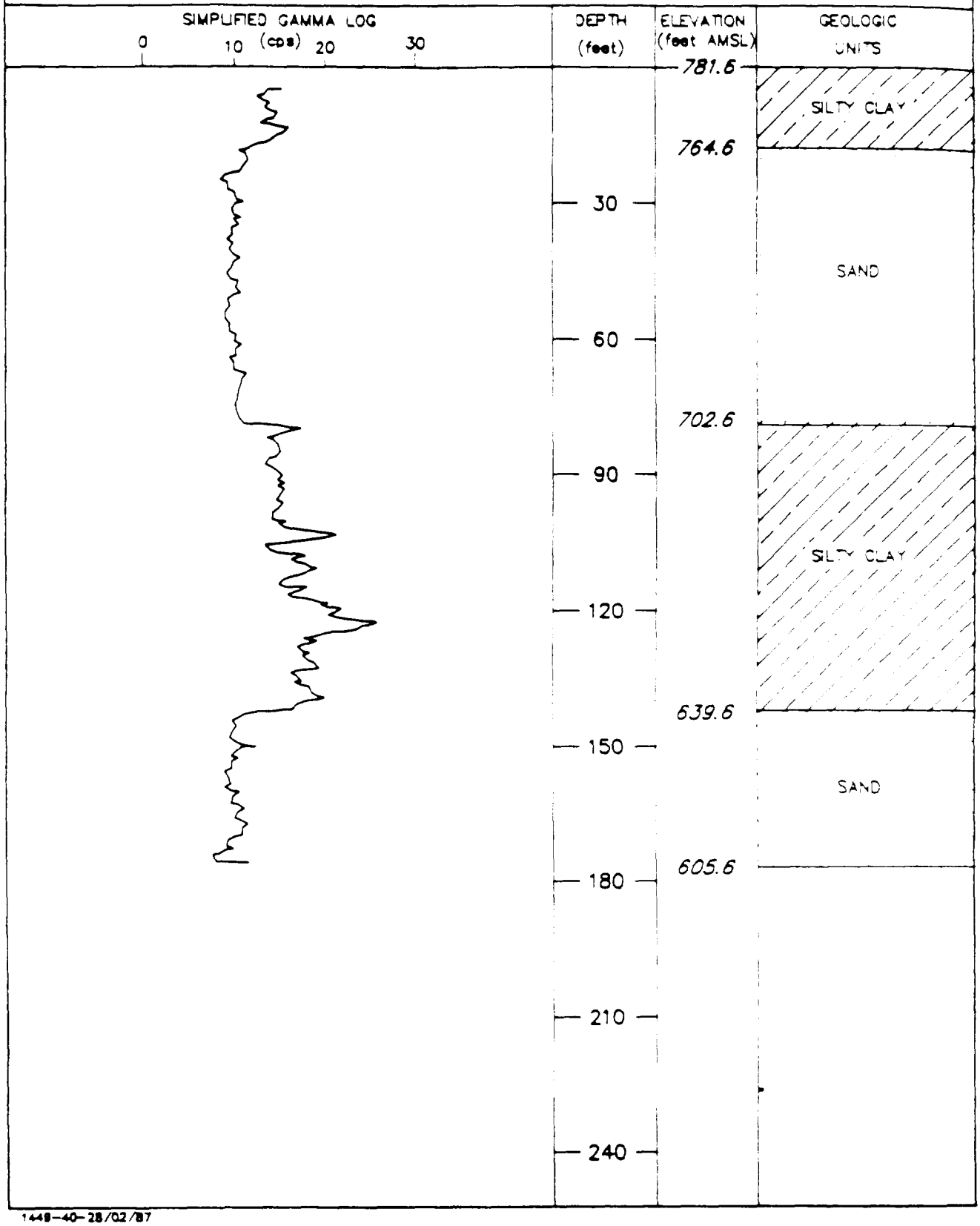
Job #17058 11/87 500

PROJECT NAME: WAUCONDA LANDFILL SITE
PROJECT No.: 1449-40
CLIENT: WAUCONDA TASK GROUP
LOCATION: WAUCONDA, ILLINOIS

HOLE DESIGNATION: OW-410
DATE COMPLETED: 9/12/86
GEOPHYSICAL LOG: GAMMA LOG
CRA SUPERVISOR: KEVIN NEITZKE



1449-40-28/02/87

Attachment III

NEIL F. HARTIGAN
ATTORNEY GENERAL
STATE OF ILLINOIS
SPRINGFIELD
62706

March 8, 1988

Mr. Brad Bradley (5HE-12)
Waste Management Division
USEPA Region V
230 South Dearborn Street
Chicago, IL 60604

Re: NL/Taracorp site, Granite City, IL

Dear Mr. Bradley:

I have reviewed the Draft RI report for the NL/Taracorp site and per our phone conversation, I am submitting comments on the report to you. Because my involvement in this site is only recent, my comments are restricted to major concerns. Most of these points I have discussed with you and Ken Miller of IEPA.

(61) * The major deficiency of the RI concerns the Soil Investigation - Section 5. Preliminary sampling conducted in the RI showed significant concentrations of lead in the soil, on-site and off-site, both surface and subsurface. These preliminary samples identify areas of contamination but do not define them. A second soil sampling phase should be implemented to define horizontally and vertically the extent of soil contamination. This would include setting up a grid sampling plan for:

1) the site property;

2) the St. Louis Lead Recyclers property;

3) the Tri-Cities Trucking property;

4) the remote fill areas; and

5) the residential areas.

Additional soil sampling would be warranted in those areas where preliminary soil samples were above some contaminant level, as defined by USEPA and/or IEPA's Cleanup Objectives Team.

(62) * The list of parameters to be analyzed for in these additional soil samples should be expanded to include those

metals detected in the waste piles, but should include at least arsenic, barium, cadmium and zinc.

63) EP Toxicity was performed on one sample from location 110. This sample was chosen as being representative of the off-site soil samples with a higher lead concentration. According to Table 5 (which was apparently taken from the work plan) an EP Toxicity for one sample with the highest lead should have been performed.

64) One EP Toxicity analysis is not representative of the range of parameters and soils or fill that may be present at off-site areas. For the additional soil samples to be collected, EP Toxicity should be performed on at least three of the soil samples with the highest lead levels. EP Toxicity should also be performed on samples which indicate high levels of other metals of concern.

Table 14 indicates low pH values (5.7 to 6.4) were recorded in wells 102, 104, 105, 106D, 108S and 108D. The source of this low pH is not discussed, however, Appendix A summarizes allegations that nitric acid and battery acid had been dumped on the site in at least 1983. This should be addressed.

65) It is interesting to note in Table 15 that lead and other metals are found concentrated at different and varying depths. For lead, these depths may be associated with clayey units, however, these clayey units are not continuous (see borings 105 and 106). Appendix K discusses the solubility and mobility of some lead compounds. Because of these factors, it may be prudent to ascertain geochemically that the lead is being bound by organics, phosphates or carbonates in the soil and is not being released into the aquifer at depths below the present screened intervals.

If you would like to discuss any of these comments further, you can contact me at 217/782-9031.

Sincerely,

Nancy Mackiewicz
Environmental Geologist
Environmental Control Division

NM:rsr
cc: Bob Mueller
Ken Miller - IEPA