APPENDIX C

Work Order Correspondence with USEPA

EPA Region 5 Records Ctr.
228798

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

October 15, 2002 SE-5J

Mr. Richard Berggreen
STS Consultants
750 Corporate Woods Parkway
Vernon Hill, IL 60061

RE: Lakeshore East Revised Workplan

Dear Mr. Berggreen:

The U.S. Environmental Protection Agency (USEPA) has reviewed the revised Workplan for the Lakeshore East Development (Workplan) dated September 30, 2002. USEPA hereby approves the Workplan.

In addition, this letter confirms the verbal approval of the Workplan and the authorization to begin Site removal actions given on October 4, 2002 by Verneta Simon and myself.

If you have questions regarding this letter, please contact me, as soon as possible, at (312) 886-5123 or contact Verneta Simon, On-Scene Coordinator, at (312) 886-3601, or Larry Jensen, Senior Health Physicist at (312) 886-5026.

Sincerely,

Fredrick A. Micke

Fredrick A. Micke, P.E.
On-Scene Coordinator
ERB Section #3

cc: Lakeshore East L.L.C.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

December 13, 2002 SE-5J

Mr. Richard Berggreen
STS Consultants
750 Corporate Woods Parkway
Vernon Hill, IL 60061

RE: Lakeshore East

Dear Mr. Berggreen:

The U.S. Environmental Protection Agency (USEPA) has reviewed your letter of December 10, 2002 with regard to air monitoring procedures for the remaining work at the Lakeshore East project. The letter properly confirms the verbal approval to the air monitoring procedures given by myself on December 6, 2002 and is hereby approved. This letter and the December 10 letter should be added to the workplan for the project.

If you have questions regarding this letter, please contact me, as soon as possible, at (312) 886-5123.

Sincerely,

Fredrick A. Micke

Fredrick A. Micke, P.E.
On-Scene Coordinator
ERB Section #3

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STS CONSULTANTS

STS Consultants, Ltd.
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3153

voice 847-279-2500
fax 847-279-2520
web www.stsconsultants.com

December 10, 2002

Mr. Fred Micke, On-Scene Coordinator
Ms. Verneta Simon
U. S. Environmental Protection Agency
Region 5
77 W. Jackson Blvd., SE-5J
Chicago, Illinois 60604

RE: Request to Discontinue Area Air Monitoring, Lakeshore East Remediation Site, 221 N. Columbus Drive, Chicago, Illinois - STS Project No. 32193-XC

Dear Mr. Micke and Ms. Simon:

On Friday, December 6, 2002, a verbal request was made by STS Consultants, Ltd. (STS) at the above referenced site to discontinue area air monitoring. This request was made as a result of the completion of the Phase II removal of the known impacted soils and the completion by USEPA of the verification surveys of the identified exclusion zones on site.

In response to that request, we understand you agreed that the area monitoring could be discontinued. Air monitoring would be required, however, with Personal Air Monitors (PAMs) on the Health Physics technicians conducting the grading surveys that make up the Phase III work scope.

Further, we understand that in the event radiologically impacted material is encountered in the grading phase, an exclusion zone would be established at that location. The presence of radiologically impacted material at the ground surface will require that, until the area is remediated, that area should have area monitoring established when excavation work is to be conducted. This monitoring requirement, however, would not apply to impacted material encountered in utility trenches or caisson test pits, where material would not be exposed at the ground surface, unless an effort to remedy the impacted material involved excavation and removal.

We request you provide a brief written response to this request for our files to confirm your agreement, or notify us of your comments and any necessary revisions. Thank you for your attention to this matter.

Regards,

STS CONSULTANTS, LTD.

Richard G. Berggreen, C.P.G.
Principal Geologist

cc: Kara Hughes, Lakeshore East Development, LLC

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STS CONSULTANTS

STS Consultants, Ltd.
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3153

voice 847-279-2500
fax 847-279-2510
web www.stsconsultants.com

February 4, 2003

Mr. Fred Micke, On-scene Coordinator
Ms. Verneta Simon, On-scene Coordinator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Blvd., SE-5J
Chicago, Illinois 60604

RE: Lakeshore East Development Site, Radiological Impacts Beneath the Adjacent Sidewalk, Harbor Drive, Chicago - STS Project Number 1-32193-XC

Dear Mr. Micke and Ms. Simon:

As you are aware, we have been proceeding with the excavation of identified radium-impacted materials from the Lakeshore East property over the past few months. In the course of verifying that sufficient excavation had been completed on the southeast boundary of the subject property, radiological impacts were detected in one sample from the wall of the excavation. The NUTRANL results of that sample analysis are attached.

The sampled boundary wall material measures barely above the cleanup threshold, both in the field gamma measurements and in the NUTRANL analysis. The field results show a gamma count of 25,000 counts per minute (CPM) unshielded or 7,900 CPM shielded, readings only slightly over the thresholds of 21,072 CPM unshielded or 7,447 CPM shielded corresponding to a concentration of the 7.1 pCi/g cleanup criterion. The NUTRANL results showed a total radium activity of 7.28 pCi/g.

As this material is off-site, our excavation will not extend beyond our property boundaries. The excavation wall is vertical at this location, and we propose to backfill as soon as we obtain USEPA verification sign-off for the on-site remediation. If requested by USEPA, we will provide some demarcation separation between any backfill and the remaining in-place impacted material, such as plywood sheeting or a polyethylene membrane or geotextile.

We are at present uncertain as to whether the owner is the owner of the building in the airspace over this location or perhaps the City as owner of the right-of-way occupied by the Harbor Drive sidewalk and street. However, we trust that USEPA will provide the property owner and any other party the Agency feels appropriate with information about this finding.

The on-site area within the exclusion zone has been surveyed and pre-verification sampled and is now ready for USEPA verification surveying and sampling. We anticipate your providing this survey, assessment and release of the on-site excavation at your next opportunity to visit the property. It is our understanding that you may be visiting the property tomorrow, February 5, 2003. Please advise us if you anticipate any delay in proceeding with this verification work.

Regards,

STS CONSULTANTS, LTD.

Steven Kornder, Ph.D.
Senior Project Chemist

Richard G. Berggreen, C.P.G.
Principal Geologist

cc: Kara Hughes, Lakeshore East
David Carlins, Lakeshore East

K:\WPDOCS\PROJECT\132193XC\C132193XC-Harbor_Drive_Sidewalk.doc

100-LH-7 (7/02)

Nutranl Gamma Spec Report- Lakeshore East Site

221 North Columbus Drive, Chicago, IL

Daily Report for 1/30/03

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
491	1/30/03	background	bkg13003	7.5	-0.51	2.33	0.27	0.85	-0.46	0.92	-0.19	1.126454615
492	1/30/03	soil standard	soilstd013003	36.9	-2.08	2.64	6.17	0.72	1.65	0.94	7.82	1.184060809
493	1/30/03	Pre EPA	S2364 29C Pre EPA#1	23.7	1.9	3.01	2.44	0.81	0.16	1.08	2.6	1.35
494	1/30/03	Pre EPA	S2365 29C Pre EPA#2	24.5	3.11	2.89	1.01	0.77	3.05	1.11	4.06	1.350925609
495	1/30/03	Pre EPA	S2366 29C Pre EPA#3	22.6	6.01	2.8	0.41	0.72	0.97	1.03	1.38	1.258702033
496	1/30/03	exclusion zone	S2367 29C East Wall	28.8	3.87	3.28	2.25	0.87	2.24	1.22	4.49	1.498432514
497	1/30/03	Pre EPA	S2368 29C Pre EPA #4	28.5	6.28	2.55	0.58	0.67	3.19	0.97	3.77	1.17889779
498	1/30/03	exclusion zone	S2369 29C East Wall(2)	28	2.45	3.47	2.17	0.92	5.11	1.34	7.28	1.625423022

APPENDIX D

USEPA Correspondence Reporting Elevated Radioactivity

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUL 02 2001

REPLY TO THE ATTENTION OF SE-5J

HAND DELIVERED

Mr. Sean Linnane
Magellan Development Group
1 West Superior, Suite 200
Chicago, Illinois 60610

RE: Lakeshore East

Dear Mr. Linnane:

U.S. EPA conducted a partial radiation walkover survey of the property proposed for Lakeshore East on June 19, 20, and 29, 2001, and detected three anomalies in radiation levels. These anomalies were found with a gamma count rate meter linked to a Global Positioning System (GPS). Further measurements were made to identify radioactive materials and to determine the gamma exposure rate at the anomalies.

Two of the anomalies are significantly different from the background count rate (at about 100 times background at the southeast anomaly and about 35 times background at the northeast anomaly) that they should be considered strong indications of high soil radioactivity concentrations. Both of these appear to be in depressions adjacent to drains. The third anomaly was not recognized during the survey but appeared as a single data point upon data maps and requires further checking before it is labeled an actual anomaly. The GPS map, a plot of GPS gamma count rate data and a spreadsheet of the data on disk and on hard copy, accompany this letter.

Uranium and thorium radionuclides were specifically identified at the southeast anomaly using a portable multi-channel analyzer. These radionuclides are consistent with those encountered in other Streeterville environmental remediation projects. The dose rates on contact with the ground at the northeast and southeast anomalies were both about 190 microroentgen or more than 20 times background.

By way of explanation, if an area is blank on the GPS map, it means either there were not enough satellites in position over the horizon and out of the shadows of buildings to give sufficient accuracy or the area was not walked by us. We surveyed many areas where GPS was not responding and have clipboard data on these areas. These appeared to be at background gamma count rate levels. U.S. EPA did not survey the entire site because the anomalies detected and the presence of the thorium and uranium contamination warrant a detailed radiation survey by other parties.

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Since you intend to commence construction in September 2001, we would like you to fully delineate radioactive contamination at this property prior to construction of Lakeshore East. At a minimum, it should consist of a gamma count rate survey, a subsurface assessment by gamma logging, and a subsurface soil collection for radionuclide identification and quantification at the anomalies. Gamma logging is measuring subsurface gamma exposure rates down a borehole so that seams can be identified and, at least qualitatively, measured. Please let us know within 14 calendar days, if you intend to delineate the anomalies discovered prior to construction.

Your continued cooperation in this matter is highly valued. If you would like to discuss this matter further, please contact me at (312) 886-3601, or Fred Micke, On-Scene Coordinator, at (312) 886-5123 or Larry Jensen, Senior Health Physicist, at (312) 886-5026. Please direct any legal questions to Mary Fulghum, Associate Regional Counsel, at (312) 886-4683 or Cathleen Martwick, Associate Regional Counsel, at (312) 886-7166.

Sincerely,

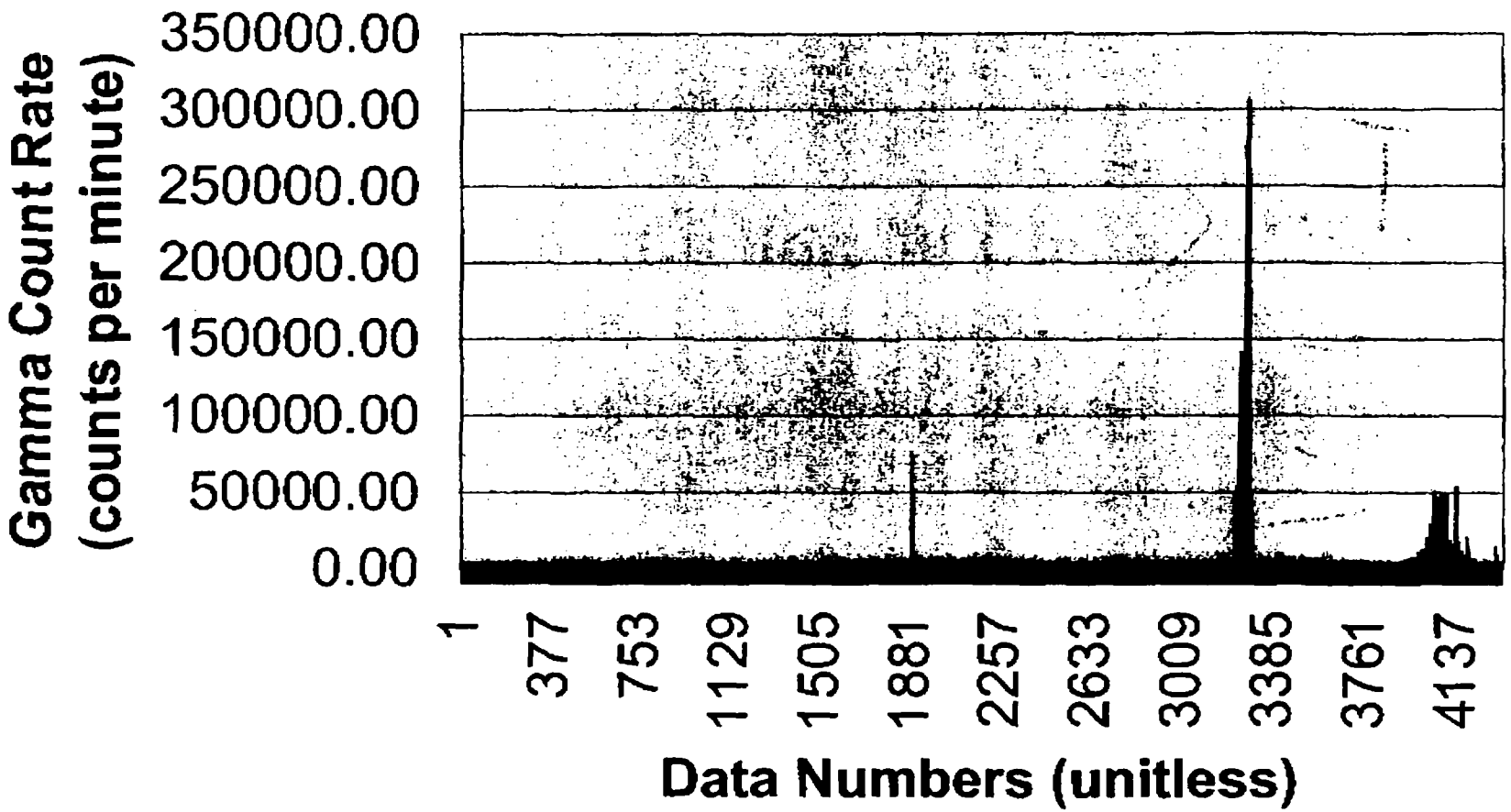
Vemeta Simon

Vemeta Simon
On-Scene Coordinator

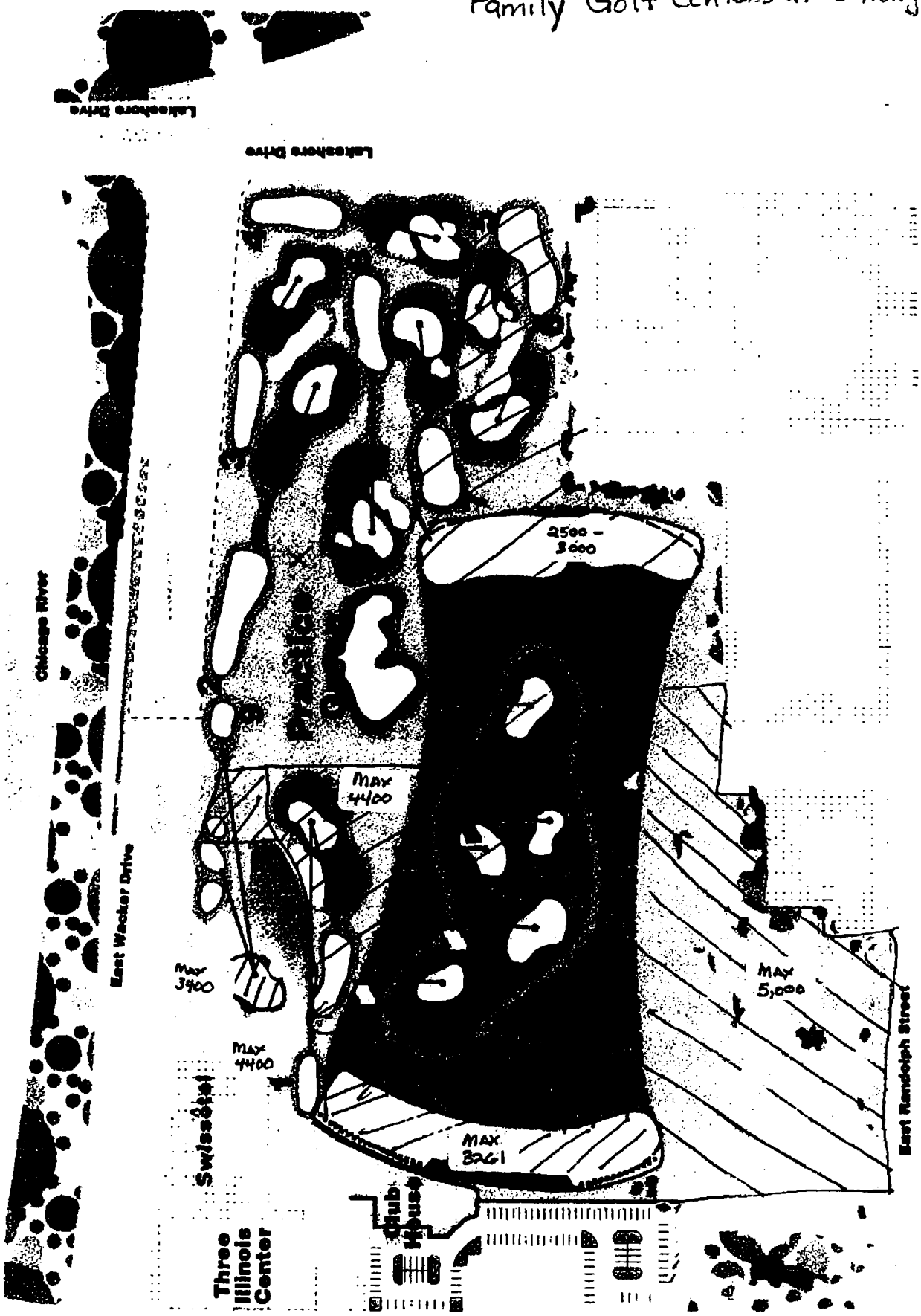
Enclosures
1. GPS map of gamma exposure rates
2. Hard copy gamma exposure rates
3. Computer Disk of gamma exposure rates

cc: Naren Prasad, City of Chicago - Department of Environment, w/o enclosures
Benet Haller, City of Chicago - Department of Planning and Development, w/o enclosures

Family Golf Centers at Chicago



Family Golf Centers at Chicago, Il



All readings in counts per min (cpm)

▨ means surveyed by U.S. EPA

APPENDIX F

USEPA Signed Notification of Successful Verification Sampling Forms

Table 1
Excavation Phase (II)
USEPA Notice of Successful Verification Summary
Lakeshore East LLC

Location	Grid Designation	USEPA Signature Date	Comments
Northern Slip Area	JJ-OO, 8-11	12/10/2002	Exclusion Zone subdivided into 3 areas
	JJ-OO, 11-13.5	12/10/2002	
	JJ-OO, 13.5-16	12/10/2002	
	CC-FF, 1-4	12/10/2002	
	EE-FF, 12-14	12/10/2002	
	SS-UU, 32-34	12/10/2002	Includes 3 small exclusion zones
	XX, 18	12/10/2002	
	GG-HH.5, 32-38	12/3/2002	Exclusion zone subdivided into 4 areas
	HH.5-KK, 32-38	12/3/2002	
	KK-LL.5, 32-38	12/3/2002	
	LL.5-MM, 32-38	12/3/2002	
	OO-TT,17-19.5	12/3/2002	Exlcusion zone subdivided into 2 areas
	OO-TT, 19.5-22	12/3/2002	
	RR-SS, 43-45	11/19/2002	
	KK-MM.5, 54-56.5	11/19/2002	
	NN-PP, 42-45	12/10/2002	Exlcusion zone subdivided into 2 areas
	KK-OO, 41-44	11/19/2002	
Southern Slip	E-F.5 & I-N, 13-19	1/29/2003	Exlcusion zone subdivided into 2 areas
	E-K, 1-13	11/19/2002	
	C-E,9.5-10.5	11/19/2002	
	F-J, 29-35	10/18/2002	

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA : II to OO, 88 to 11

Date of Verification Survey. 12-6-02

Time of Verification Survey 10:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12-10-02

JOHN ANDERSON (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/10/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/10/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 6, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
296	12/6/2002	EPA	S2225 JJ-OO/8-11 EPA#1	19.3	1.29	2.38	0.39	0.65	1.11	0.93	1.5	1.134636506
297	12/6/2002	EPA	S2226 JJ-OO/8-11 EPA#2	19.8	6.78	1.86	-1.2	0.48	3.57	0.73	2.37	0.873670418
298	12/6/2002	EPA	S2227 JJ-OO/8-11 EPA#3	19.7	1.87	1.76	0.55	0.47	1	0.68	1.55	0.826619622
299	12/6/2002	EPA	S2228 JJ-OO/8-11 EPA#4	19.3	1.96	2.27	0.85	0.62	0.96	0.87	1.81	1.068316433
300	12/6/2002	EPA	S2229 JJ-OO/8-11 EPA#5	18.2	3.57	1.69	0.82	0.45	0.95	0.65	1.77	0.790569415

Average Total Radium (Th-232+Ra-226) Concentration for : JJ-OO/8-11 = 1.80 pCi/g

FORM 223-1

NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA: TJ TO 00, 11 TO 13.5

Date of Verification Survey: 12-6-02

Time of Verification Survey 10:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12-10-02

John Anderson (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/10/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/10/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 6, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
303	12/9/2002	EPA	S2230 JJ-OO/11-13.5 EPA#1	16.9	3.27	2.71	0.14	0.72	1.98	1.05	2.12	1.27314571
304	12/9/2002	EPA	S2231 JJ-OO/11-13.5 EPA#2	18.3	-1.86	2.09	0.19	0.58	1.95	0.86	2.14	1.037304198
305	12/9/2002	EPA	S2232 JJ-OO/11-13.5 EPA#3	17.1	1.2	2.04	0.04	0.55	1.61	0.81	1.65	0.979081202
306	12/9/2002	EPA	S2233 JJ-OO/11-13.5 EPA#4	17.8	5.57	2.83	0.29	0.75	1.57	1.08	1.86	1.31487642
307	12/9/2002	EPA	S2234 JJ-OO/11-13.5 EPA#5	17.6	3.31	1.79	-0.63	0.47	2.21	0.71	1.58	0.851469318

Average Total Radium (Th-232+Ra-226) Concentration for : JJ-OO/11-13.5 = 1.87 pCi/g

Note: Sampled on 12/6/02 but were not analyzed until 12/9/02. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA : J1 TO 00, 13.5 TO 16

Date of Verification Survey: 12-6-02

Time of Verification Survey 10:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12-10-02

JOHN ANDERSON (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/10/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/10/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 6, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
308	12/9/2002	EPA	S2235 JJ-OO/13.5-16 EPA#1	18.1	4.55	2.74	0.18	0.73	1.68	1.04	1.86	1.270629765
309	12/9/2002	EPA	S2236 JJ-OO/13.5-16 EPA#2	17.9	5.34	2.83	1.15	0.75	0.26	1.04	1.41	1.282224629
310	12/9/2002	EPA	S2237 JJ-OO/13.5-16 EPA#3	17.8	7.41	1.74	-0.21	0.44	2.48	0.66	2.27	0.793221281
311	12/9/2002	EPA	S2238 JJ-OO/13.5-16 EPA#4	18.2	0.91	2.71	0.88	0.73	1.39	1.07	2.27	1.295299193
312	12/9/2002	EPA	S2239 JJ-OO/13.5-16 EPA#5	17.2	4.39	2.06	0.9	0.54	0.31	0.77	1.21	0.940478602

Average Total Radium (Th-232+Ra-226) Concentration for : JJ-OO/13.5-16 = 1.80 pCi/g

Note: Sampled on 12/6/02 but were not analyzed until 12/9/02. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA: CC TO FF, 1 TO 4

Date of Verification Survey: 12-6-02

Time of Verification Survey 10:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12-10-02

John Anderson (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/10/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/10/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 6, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
276	12/6/2002	EPA	S2205 CC-FF/1-4 EPA#1	24.5	3.72	2.08	0.09	0.55	0.87	0.8	0.96	0.970824392
277	12/6/2002	EPA	S2206 CC-FF/1-4 EPA#2	23.6	2.91	2.08	0.67	0.56	-0.36	0.78	0.31	0.960208311
278	12/6/2002	EPA	S2207 CC-FF/1-4 EPA#3	23.3	2.46	1.77	0.33	0.48	1.42	0.7	1.75	0.848763807
279	12/6/2002	EPA	S2208 CC-FF/1-4 EPA#4	25.4	6.42	2.06	-0.52	0.55	1.91	0.81	1.39	0.979081202
280	12/6/2002	EPA	S2209 CC-FF/1-4 EPA#5	22.3	7.08	1.53	0	0.38	-0.18	0.55	-0.18	0.668505797

Average Total Radium (Th-232+Ra-226) Concentration for : CC-FF/1-4 0.85 pCi/g

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA: EE TO FF, 12 TO 14

Date of Verification Survey: 12-6-02

Time of Verification Survey 10:00 AM am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12-10-02

John Anderson (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/10/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/10/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 6, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
281	12/6/2002	EPA	S2210 EE-FF/12-14 EPA#1	27.2	3.2	2.66	1.27	0.71	-1.47	0.97	-0.2	1.202081528
282	12/6/2002	EPA	S2211 EE-FF/12-14 EPA#2	27.4	3.38	1.87	0.14	0.51	1.11	0.73	1.25	0.890505474
283	12/6/2002	EPA	S2212 EE-FF/12-14 EPA#3	28.3	5.13	1.75	0.1	0.46	0.88	0.68	0.98	0.82097503
284	12/6/2002	EPA	S2213 EE-FF/12-14 EPA#4	27.9	2.09	2.49	0.7	0.67	1.04	0.96	1.74	1.170683561
285	12/6/2002	EPA	S2214 EE-FF/12-14 EPA#5	27.2	6.16	2.43	-0.67	0.62	1.54	0.95	0.87	1.134416149

Average Total Radium (Th-232+Ra-226) Concentration for : EE-FF/12-14 0.93 pCi/g

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA: SS TOWN, 32 TO 34

Date of Verification Survey: 12-6-02

Time of Verification Survey 10:00 Am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12-10-02

John Anderson (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/10/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/10/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 6, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
286	12/6/2002	EPA	S2215 SS-UU/32-34 EPA#1	20.9	2.39	2.11	1.1	0.56	-0.18	0.79	0.92	0.968349111
287	12/6/2002	EPA	S2216 SS-UU/32-34 EPA#2	21.7	6.09	1.88	-0.41	0.48	1.52	0.72	1.11	0.865332306
288	12/6/2002	EPA	S2217 SS-UU/32-34 EPA#3	20.4	5.49	2.08	-0.44	0.55	2.03	0.81	1.59	0.979081202
289	12/6/2002	EPA	S2218 SS-UU/32-34 EPA#4	20.5	0.63	1.97	-0.04	0.54	1.56	0.8	1.52	0.965194281
290	12/6/2002	EPA	S2219 SS-UU/32-34 EPA#5	20.8	4.12	2.22	-0.04	0.59	1.7	0.87	1.66	1.051189802

Average Total Radium (Th-232+Ra-226) Concentration for : SS-UU/32-34 = 1.36 pCi/g

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA: XX-18

Date of Verification Survey: 12-6-02

Time of Verification Survey 10:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12-10-02

JOHN ANDERSON (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/10/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/10/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 6, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
291	12/6/2002	EPA	S2220 XX-18 EPA#1	18.2	3.4	2.82	-0.13	0.76	1.28	1.11	1.15	1.345250906
292	12/6/2002	EPA	S2221 XX-18 EPA#2	19.2	-0.63	1.83	0.76	0.5	0.79	0.74	1.55	0.893084542
293	12/6/2002	EPA	S2222 XX-18 EPA#3	18	1.77	2.1	0.18	0.58	1.81	0.83	1.99	1.012570985
294	12/6/2002	EPA	S2223 XX-18 EPA#4	18.5	3.15	1.55	0.79	0.41	0.47	0.58	1.26	0.710281634
295	12/6/2002	EPA	S2224 XX-18 EPA#5	19.8	2.12	2.21	1.09	0.59	0.2	0.83	1.29	1.018331969

Average Total Radium (Th-232+Ra-226) Concentration for : XX-18 = 1.45 pCi/g

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

***
***

Area Identification: North Slip Area GG-HH.5 / 32-38

Date of Verification Survey: 11/29/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA

Signed:

Charles E Brown Date 12/03/02

Charles Brown (Print Name)

Records Officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/3/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/3/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
243	12/2/2002	EPA	S2180 GG-HH.5/32-38 EPA#1	36.2	4.51	2.04	1.03	0.54	1.48	0.75	2.51	0.924175308
244	12/2/2002	EPA	S2181 GG-HH.5/32-38 EPA#2	37.7	10.27	2.71	0.94	0.69	2.34	0.99	3.28	1.206731122
245	12/2/2002	EPA	S2182 GG-HH.5/32-38 EPA#3	35.6	2.02	2.07	1.83	0.56	1.52	0.78	3.35	0.960208311
246	12/2/2002	EPA	S2183 GG-HH.5/32-38 EPA#4	33.7	6.18	2.77	0.39	0.71	1.45	1.04	1.84	1.259245806
247	12/2/2002	EPA	S2184 GG-HH.5/32-38 EPA#5	35.6	5.96	2.4	1.73	0.62	0.53	0.85	2.26	1.052093152

Average Total Radium (Th-232+Ra-226) Concentration for : GG-HH.5/32-38 2.65 pCi/g

Note: All samples were obtained on 11/29/02 but were not analyzed until 12/2/02

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLEP AREA HH.5-KK 132-38

Date of Verification Survey: 11/29/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E. Brown Date 12/03/02

Charles Brown (Print Name)

Records officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/3/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/3/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for November 29, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
218	12/2/2002	EPA	S2155 HH.5-KK/32-38 EPA#1	33.1	4.73	2.15	0.93	0.57	2.96	0.82	3.89	0.998649088
219	12/2/2002	EPA	S2156 HH.5-KK/32-38 EPA#2	33.4	9.37	2.61	0.71	0.67	2.48	0.96	3.19	1.170683561
220	12/2/2002	EPA	S2157 HH.5-KK/32-38 EPA#3	33.5	10.82	2.67	0.15	0.68	3.19	0.99	3.34	1.201041215
221	12/2/2002	EPA	S2158 HH.5-KK/32-38 EPA#4	31.7	5.45	2.38	0.83	0.64	2.39	0.91	3.22	1.112519663
222	12/2/2002	EPA	S2159 HH.5-KK/32-38 EPA#5	31.9	3.35	2.82	1.7	0.77	1.22	1.08	2.92	1.326386067

Average Total Radium (Th-232+Ra-226) Concentration for : HH.5-KK/32-38 3.31 pCi/g

Note: All samples were obtained on 11/29/02 but were not analyzed until 12/2/02

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

***

Area identification: North Slip Area KK-LL.5/32.38

Date of Verification Survey: 11/29/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E. Brown Date 12/03/02

Charles Brown (Print Name)

Records Officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/3/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/3/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
238	12/2/2002	EPA	S2175 KK-LL.5/32-38 EPA#1	30.4	5.2	2.99	1.91	0.79	0.35	1.08	2.26	1.338095662
239	12/2/2002	EPA	S2176 KK-LL.5/32-38 EPA#2	31.5	0.76	2.59	1.68	0.69	1.23	0.97	2.91	1.190378091
240	12/2/2002	EPA	S2177 KK-LL.5/32-38 EPA#3	31.6	0.06	1.9	1.32	0.51	1.02	0.72	2.34	0.88232647
241	12/2/2002	EPA	S2178 KK-LL.5/32-38 EPA#4	31.2	-0.32	2.94	2.44	0.79	0.15	1.11	2.59	1.36242431
242	12/2/2002	EPA	S2179 KK-LL.5/32-38 EPA#5	27.6	1.51	2.08	1.41	0.56	1.5	0.79	2.91	0.968349111

Average Total Radium (Th-232+Ra-226) Concentration for : KK-LL.5/32-38 = 2.60 pCi/g

Note: All samples were obtained on 11/29/02 but were not analyzed until 12/2/02

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

** Area Identification: NORTH SLIP AREA LL.5-MM/82-38

Date of Verification Survey: 11/29/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E Brown Date 12/03/02

Charles Brown (Print Name)

Records Officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/3/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/3/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
223	12/2/2002	EPA	S2160 LL.5-MM/32-38 EPA#1	37.1	7.22	2.46	1.34	0.63	1.1	0.89	2.44	1.090412766
224	12/2/2002	EPA	S2161 LL.5-MM/32-38 EPA#2	34.6	4.41	2.26	0.61	0.59	1.71	0.85	2.32	1.034698024
225	12/2/2002	EPA	S2162 LL.5-MM/32-38 EPA#3	36.3	1.57	2.25	0.65	0.61	2.23	0.86	2.88	1.054371851
226	12/2/2002	EPA	S2163 LL.5-MM/32-38 EPA#4	36	6.44	3.4	0.97	0.89	1.28	1.26	2.25	1.542627628
227	12/2/2002	EPA	S2164 LL.5-MM/32-38 EPA#5	37.1	5.74	2.16	0.23	0.56	2.44	0.82	2.67	0.992975327

Average Total Radium (Th-232+Ra-226) Concentration for : LL.5-MM/32-38 2.51 pCi/g

Note: All samples were obtained on 11/29/02 but were not analyzed until 12/2/02

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

*** Area Identification: NORTH SLIP AREA 00-TT/17-19.5

Date of Verification Survey: 11/29/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA

Signed:

Charles E Brown Date 12/03/02

Charles Brown (Print Name)

Records officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/3/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/3/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
228	12/2/2002	EPA	S2165 OO-TT/17-19.5 EPA#1	26.1	5.05	2.07	1.49	0.53	1.46	0.76	2.95	0.926552751
229	12/2/2002	EPA	S2166 OO-TT/17-19.5 EPA#2	26.3	0.15	2.21	1.31	0.6	0.65	0.85	1.96	1.040432602
230	12/2/2002	EPA	S2167 OO-TT/17-19.5 EPA#3	25.4	-1.1	2.44	0.55	0.67	1.61	0.97	2.16	1.17889779
231	12/2/2002	EPA	S2168 OO-TT/17-19.5 EPA#4	26.9	7.07	2.54	0.11	0.66	2.78	0.95	2.89	1.156762724
232	12/2/2002	EPA	S2169 OO-TT/17-19.5 EPA#5	25.3	2.36	1.94	1.01	0.53	3.03	0.76	4.04	0.926552751

Average Total Radium (Th-232+Ra-226) Concentration for : OO-TT/17-19.5 = 2.80 pCi/g

Note: All samples were obtained on 11/29/02 but were not analyzed until 12/2/02

[illegible] DEC 03'02 15:25 No.004 P.04

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

**** Area Identification: North Slip Area 00-TT/19.5-22

Date of Verification Survey: 11/29/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E Brown Date 12/03/02

Charles Brown (Print Name)

Records Officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/3/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/3/02

FREDRICK A MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
233	12/2/2002	EPA	S2170 OO-TT/19.5-22 EPA#1	25.5	5.53	2.38	0.27	0.62	2.27	0.89	2.54	1.084665847
234	12/2/2002	EPA	S2171 OO-TT/19.5-22 EPA#2	28.2	6.81	2.94	0.86	0.76	1.02	1.07	1.88	1.312440475
235	12/2/2002	EPA	S2172 OO-TT/19.5-22 EPA#3	28.8	4.96	1.93	0.82	0.51	1.31	0.73	2.13	0.890505474
236	12/2/2002	EPA	S2173 OO-TT/19.5-22 EPA#4	27.3	3.71	1.87	1.09	0.49	0.58	0.68	1.67	0.838152731
237	12/2/2002	EPA	S2174 OO-TT/19.5-22 EPA#5	28.7	-4.38	2.76	2.04	0.79	1.38	1.13	3.42	1.378767566

Average Total Radium (Th-232+Ra-226) Concentration for : OO-TT/19.5-22 2.33 pCi/g

Note: All samples were obtained on 11/29/02 but were not analyzed until 12/2/02

FORM 223-1

NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA RR-55, 43-45

Date of Verification Survey: 11/15/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E Brown Date 11/18/02

Charles E. Brown (Print Name)

Records Officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o Nov 19, 2002. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 11/19/02

FREDRICK A MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for November 15, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
180	11/18/2002	EPA	S2131 RR-SS/43-45 EPA#1	33.4	7.94	2.24	-0.13	0.57	2.67	0.85	2.54	1.02342562
181	11/18/2002	EPA	S2132 RR-SS/43-45 EPA#2	33.3	4.46	2.25	0.07	0.58	2.58	0.86	2.65	1.037304198
182	11/18/2002	EPA	S2133 RR-SS/43-45 EPA#3	31.5	0.76	2.15	1.52	0.58	-0.17	0.81	1.35	0.996242942
183	11/18/2002	EPA	S2134 RR-SS/43-45 EPA#4	32.3	5.92	1.76	0.37	0.46	1.27	0.66	1.64	0.804487414
184	11/18/2002	EPA	S2135 RR-SS/43-45 EPA#5	33.6	1.48	1.99	0.35	0.52	1.61	0.76	1.96	0.920869155

Average Total Radium (Th-232+Ra-226) Concentration for : RR-SS/43-45 = 2.03 pCi/g

Note: USEPA batches were sampled on 11/15/02, but were not analyzed until 11/18/02. GAH

FORM 223-1

NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

*****

Area Identification: KK - MM.5, 54 - 56.5 NORTH SLIP AREA

Date of Verification Survey: 11/15/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E Brown Date 11/18/02

Charles E. Brown (Print Name)

RECORDS OFFICER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o Nov 19, 2002. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 11/19/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for November 15, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
160	11/18/2002	EPA	S2111 KK-MM.5/54-56.5 EPA#1	32.9	4.46	2.3	0.45	0.62	2.13	0.88	2.58	1.076475731
161	11/18/2002	EPA	S2112 KK-MM.5/54-56.5 EPA#2	32	3.11	2.14	0.85	0.57	1.21	0.82	2.06	0.998649088
162	11/18/2002	EPA	S2113 KK-MM.5/54-56.5 EPA#3	31.8	7.39	1.83	1.01	0.46	-0.03	0.65	0.98	0.796303962
163	11/18/2002	EPA	S2114 KK-MM.5/54-56.5 EPA#4	29.7	3.13	2.49	0.7	0.68	1.7	0.96	2.4	1.176435294
164	11/18/2002	EPA	S2115 KK-MM.5/54-56.5 EPA#5	31.4	7.86	2.58	-0.56	0.65	2.32	0.97	1.76	1.167647207

Average Total Radium (Th-232+Ra-226) Concentration for : KK-MM.5/54-56.5 = 1.96 pCi/g

Note: USEPA batches were sampled on 11/15/02, but were not analyzed until 11/18/02. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: NORTH SLIP AREA: NNTPP, 42 TO 45

Date of Verification Survey: 12-6-02

Time of Verification Survey 10:00 AM am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12-10-02

John Anderson (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 12/10/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 12/10/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 6, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
313	12/9/2002	EPA	S2240 NN-PP/42-45 EPA#1	19.2	1.54	2.03	1.76	0.55	0.3	0.76	2.06	0.938136451
314	12/9/2002	EPA	S2241 NN-PP/42-45 EPA#2	18	3.76	2.32	1.19	0.62	0.15	0.87	1.34	1.068316433
315	12/9/2002	EPA	S2242 NN-PP/42-45 EPA#3	18.2	2.34	1.96	0.81	0.53	1.87	0.76	2.68	0.926552751
316	12/9/2002	EPA	S2243 NN-PP/42-45 EPA#4	18.2	3.11	2.6	1.27	0.69	0.51	0.99	1.78	1.206731122
317	12/9/2002	EPA	S2244 NN-PP/42-45 EPA#5	17.9	2.89	2.37	0.68	0.63	1.86	0.92	2.54	1.115033632

Average Total Radium (Th-232+Ra-226) Concentration for : NN-PP/42-45 = 2.08 pCi/g

Note: Sampled on 12/6/02 but were not analyzed until 12/9/02. GAH

FORM 223-1

NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: *** NORTH SLIP AREA KK-00, 41-44

Date of Verification Survey: 11/15/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E Brown Date 11/18/02

Charles E. Brown (Print Name)

Records Officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o Nov 19, 2002. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 11/19/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for November 15, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
175	11/18/2002	EPA	S2126 KK-OO/41-44 EPA#1	35.8	7.08	2.25	0.11	0.57	4.21	0.84	4.32	1.015135459
176	11/18/2002	EPA	S2127 KK-OO/41-44 EPA#2	34	-0.12	2.28	1.79	0.63	0.2	0.85	1.99	1.058017013
177	11/18/2002	EPA	S2128 KK-OO/41-44 EPA#3	35.6	6.2	2.6	1.15	0.68	1.51	0.96	2.66	1.176435294
178	11/18/2002	EPA	S2129 KK-OO/41-44 EPA#4	36.1	4	2.55	2.09	0.68	0.38	0.92	2.47	1.144027972
179	11/18/2002	EPA	S2130 KK-OO/41-44 EPA#5	35.6	7.23	2.95	0.67	0.76	2.02	1.11	2.69	1.345250906

Average Total Radium (Th-232+Ra-226) Concentration for : KK-OO/41-44 = 2.83 pCi/g

Note: USEPA batches were sampled on 11/15/02, but were not analyzed until 11/18/02. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: E to F.5, 13 to 19 and I to N, 13 to 19

Date of Verification Survey: 1-27-03

Time of Verification Survey 9 00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 1-29-03

John Anderson (Print Name)

Field Team Leader (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 1/29/03. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 1/29/03

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for January 27, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
469	1/28/2003	EPA	S2344 E-F.5/13-19 EPA#1	30.4	6.2	2.35	-0.31	0.59	2.54	0.9	2.23	1.076150547
470	1/28/2003	EPA	S2345 E-F.5/13-19 EPA#2	29.8	0.2	2.17	0.95	0.59	3.34	0.86	4.29	1.042928569
471	1/28/2003	EPA	S2346 E-F.5/13-19 EPA#3	30.3	3.27	1.93	0.45	0.5	1.97	0.74	2.42	0.893084542
472	1/28/2003	EPA	S2347 E-F.5/13-19 EPA#4	29.8	-4.49	2.35	1.34	0.65	3.13	0.93	4.47	1.134636506
473	1/28/2003	EPA	S2348 E-F.5/13-19 EPA#5	30.8	-0.91	2.89	0.97	0.78	3.48	1.16	4.45	1.3978555

Average Total Radium (Th-232+Ra-226) Concentration for : E-F.5/13-19 3.57 pCi/g

Note: - Samples were collected on 1/27/03, but were not analyzed until 1/28/03 and 1/29/03. GAH

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
476	1/29/2003	EPA	S2349 I-N/13-19 EPA#1	25.9	2.99	2.08	2.27	0.55	0.99	0.77	3.26	0.946255779
477	1/29/2003	EPA	S2350 I-N/13-19 EPA#2	31.1	2.03	2.35	2.14	0.62	1.83	0.88	3.97	1.076475731
478	1/29/2003	EPA	S2351 I-N/13-19 EPA#3	31.3	5.6	2.3	1.33	0.6	2.97	0.86	4.3	1.048618138
479	1/29/2003	EPA	S2352 I-N/13-19 EPA#4	27.2	7.73	2.63	1.07	0.67	1.51	0.94	2.58	1.154339638
480	1/29/2003	EPA	S2353 I-N/13-19 EPA#5	33.1	4.23	2.43	1.58	0.64	3.48	0.9	5.06	1.104355015

Average Total Radium (Th-232+Ra-226) Concentration for : I-N/13-19 3.83 pCi/g

Note: - Samples were collected on 1/27/03, but were not analyzed until 1/28/03 and 1/29/03. GAH

FORM 223-1

NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: SOUTH SLIP AREA E-K, 1-13

Date of Verification Survey: 11/15/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E Brown Date 11/18/02

Charles E. Brown (Print Name)

RECORDS Officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U S EPA, Region V o Nov 19, 2002. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 11/19/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
165	11/18/2002	EPA	S2116 E-I/1-3 EPA#1	28	6.58	2.12	1.35	0.55	1.93	0.78	3.28	0.954410813
166	11/18/2002	EPA	S2117 E-I/1-3 EPA#2	28.5	5.39	2.42	1.78	0.64	1.55	0.9	3.33	1.104355015
167	11/18/2002	EPA	S2118 E-I/1-3 EPA#3	29.1	1.88	2.34	2.05	0.63	0.76	0.87	2.81	1.074150827
168	11/18/2002	EPA	S2119 E-I/1-3 EPA#4	28.9	3.33	2.19	0.86	0.58	2.56	0.85	3.42	1.029028668
169	11/18/2002	EPA	S2120 E-I/1-3 EPA#5	29	4.76	3.17	1.7	0.83	0.88	1.15	2.58	1.418238344

Average Total Radium (Th-232+Ra-226) Concentration for : E-I/1-3 = 3.08 pCi/g

Note: USEPA batches were sampled on 11/15/02, but were not analyzed until 11/18/02. GAH

Exclusion Zone Confirmatory Samples for November 15, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
138	11/15/2002	EPA	S2091 E-I/3-5 EPA#1	29.3	1.86	2.21	1.46	0.59	0.28	0.83	1.74	1.018331969
139	11/15/2002	EPA	S2092 E-I/3-5 EPA#2	28.5	2.54	1.67	1.24	0.45	1.88	0.64	3.12	0.7823682
140	11/15/2002	EPA	S2093 E-I/3-5 EPA#3	28.9	8.16	2.2	0.18	0.56	2.64	0.82	2.82	0.992975327
141	11/15/2002	EPA	S2094 E-I/3-5 EPA#4	32	4.58	2.48	1.04	0.65	2.17	0.94	3.21	1.142847321
142	11/15/2002	EPA	S2095 E-I/3-5 EPA#5	30	6.43	2.62	0.59	0.69	2.54	0.99	3.13	1.206731122

Average Total Radium (Th-232+Ra-226) Concentration for : E-I/3-5 = 2.80 pCi/g

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
143	11/15/2002	EPA	S2096 E-I/5-7 EPA#1	31.9	3.69	1.82	1.31	0.48	2.08	0.68	3.39	0.832346082
144	11/15/2002	EPA	S2097 E-I/5-7 EPA#2	33.4	5.76	1.97	1.93	0.52	1.52	0.72	3.45	0.888144132
145	11/15/2002	EPA	S2098 E-I/5-7 EPA#3	32.1	5.59	2.23	0.1	0.58	3.42	0.86	3.52	1.037304198
146	11/15/2002	EPA	S2099 E-I/5-7 EPA#4	29.2	4.99	1.76	1.14	0.46	0.55	0.65	1.69	0.796303962
147	11/15/2002	EPA	S2100 E-I/5-7 EPA#5	33.1	4.24	2.92	0.8	0.78	2.54	1.09	3.34	1.340335779

Average Total Radium (Th-232+Ra-226) Concentration for : E-I/5-7 = 3.08 pCi/g

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
165	11/18/2002	EPA	S2116 E-I/1-3 EPA#1	28	6.58	2.12	1.35	0.55	1.93	0.78	3.28	0.954410813
166	11/18/2002	EPA	S2117 E-I/1-3 EPA#2	28.5	5.39	2.42	1.78	0.64	1.55	0.9	3.33	1.104355015
167	11/18/2002	EPA	S2118 E-I/1-3 EPA#3	29.1	1.88	2.34	2.05	0.63	0.76	0.87	2.81	1.074150827
168	11/18/2002	EPA	S2119 E-I/1-3 EPA#4	28.9	3.33	2.19	0.86	0.58	2.56	0.85	3.42	1.029028668
169	11/18/2002	EPA	S2120 E-I/1-3 EPA#5	29	4.76	3.17	1.7	0.83	0.88	1.15	2.58	1.418238344

Average Total Radium (Th-232+Ra-226) Concentration for : E-I/1-3 = 3.08 pCi/g

Note: USEPA batches were sampled on 11/15/02, but were not analyzed until 11/18/02. GAH

Exclusion Zone Confirmatory Samples for November 15, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
150	11/18/2002	EPA	S2101 E-J/7-9 EPA#1	27.7	3.7	1.91	1.13	0.51	1.6	0.72	2.73	0.88232647
151	11/18/2002	EPA	S2102 E-J/7-9 EPA#2	26.5	2.31	2.15	1.67	0.58	1.72	0.81	3.39	0.996242942
152	11/18/2002	EPA	S2103 E-J/7-9 EPA#3	25.7	3.49	2.05	0.19	0.55	3.24	0.8	3.43	0.970824392
153	11/18/2002	EPA	S2104 E-J/7-9 EPA#4	27.1	4.68	2.57	1.81	0.66	0.25	0.92	2.06	1.132254388
154	11/18/2002	EPA	S2105 E-J/7-9 EPA#5	26.2	5.23	1.9	1.12	0.5	1.67	0.71	2.79	0.868389314

Average Total Radium (Th-232+Ra-226) Concentration for : E-J/7-9 = 2.88 pCi/g

Note: USEPA batches were sampled on 11/15/02, but were not analyzed until 11/18/02. GAH

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
155	11/18/2002	EPA	S2106 I-K/9-13 EPA#1	28.8	4.72	2.52	0.94	0.67	2.75	0.97	3.69	1.17889779
156	11/18/2002	EPA	S2107 I-K/9-13 EPA#2	27.6	1.57	2.32	1.02	0.63	2.83	0.9	3.85	1.098590005
157	11/18/2002	EPA	S2108 I-K/9-13 EPA#3	29.6	5.65	2.66	2.41	0.7	1.55	0.97	3.96	1.196202324
158	11/18/2002	EPA	S2109 I-K/9-13 EPA#4	27.9	10.93	3.21	1.39	0.81	1.45	1.13	2.84	1.390323703
159	11/18/2002	EPA	S2110 I-K/9-13 EPA#5	29	4.55	3	1.55	0.78	1.89	1.12	3.44	1.364844313

Average Total Radium (Th-232+Ra-226) Concentration for : I-K/9-13 = 3.56 pCi/g

Note: USEPA batches were sampled on 11/15/02, but were not analyzed until 11/18/02. GAH

FORM 223-1

NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification** SOUTH SLIP AREA C-E, 9-10.5

Date of Verification Survey. 11/15/02

Time of Verification Survey 1300 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E Brown /2-ces Date 11/18/02

Charles E. BROWN ~~Rec~~ ces (Print Name)

RECORDS officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o Nov 19, 2002. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 11/19/02

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for November 15, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
170	11/18/2002	EPA	S2121 C-E/9.5-10.5 EPA#1	32.6	4.85	2.39	0.57	0.62	1.38	0.88	1.95	1.076475731
171	11/18/2002	EPA	S2122 C-E/9.5-10.5 EPA#2	34.4	6.09	3.07	1.39	0.8	1.22	1.14	2.61	1.392695229
172	11/18/2002	EPA	S2123 C-E/9.5-10.5 EPA#3	31.5	5.53	2.58	0.91	0.69	1.52	0.96	2.43	1.18224363
173	11/18/2002	EPA	S2124 C-E/9.5-10.5 EPA#4	32.7	4.56	2.43	1.23	0.64	0.86	0.91	2.09	1.112519663
174	11/18/2002	EPA	S2125 C-E/9.5-10.5 EPA#5	31.8	2.86	2.35	1.5	0.63	1.22	0.9	2.72	1.098590005

Average Total Radium (Th-232+Ra-226) Concentration for : C-E/9.5-10.5 = 2.36 pCi/g

Note: USEPA batches were sampled on 11/15/02, but were not analyzed until 11/18/02. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: F-J, 29-35

Date of Verification Survey: 10/18/02

Time of Verification Survey 0900 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Charles E Brown Date 10/18/02

Charles E. Brown (Print Name)

Records Officer (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 10/18/02. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Veneta Simon Date 10/18/02

Veneta Simon (Print Name)

On-Scene Coordinator (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for October 18, 2002

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
53	10/18/2002	EPA	S2026 F-H/32-35 EPA#1	28.2	9.09	2.78	0.08	0.71	3.11	1.04	3.19	1.259245806
54	10/18/2002	EPA	S2027 F-H/32-35 EPA#2	31.4	2.03	2.28	1.09	0.6	2.92	0.87	4.01	1.056834897
55	10/18/2002	EPA	S2028 F-H/32-35 EPA#3	30.9	6.18	2.04	0.59	0.53	2.77	0.77	3.36	0.9347727
56	10/18/2002	EPA	S2029 F-H/32-35 EPA#4	26.9	2.96	1.88	1.53	0.5	2.59	0.72	4.12	0.87658428
57	10/18/2002	EPA	S2030 F-H/32-35 EPA#5	28.7	2.24	1.86	0.33	0.5	4.37	0.74	4.7	0.893084542

Average Total Radium (Th-232+Ra-226) Concentration for : F-H.5/32-35 = 3.88 pCi/g

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
58	10/18/2002	EPA	S2031 H-J/32-35 EPA#1	34.6	0.72	1.92	1.71	0.52	0.45	0.72	2.16	0.888144132
59	10/18/2002	EPA	S2032 H-J/32-35 EPA#2	33.2	1.62	1.79	0.57	0.49	2.68	0.7	3.25	0.854458893
60	10/18/2002	EPA	S2033 H-J/32-35 EPA#3	35.4	5.91	2.63	0	0.68	2.87	1.01	2.87	1.217579566
61	10/18/2002	EPA	S2034 H-J/32-35 EPA#4	31.7	6.32	2.17	0.27	0.56	2.28	0.81	2.55	0.984733466
62	10/18/2002	EPA	S2035 H-J/32-35 EPA#5	34	0.25	2.46	0.79	0.67	2.57	0.96	3.36	1.170683561

Average Total Radium (Th-232+Ra-226) Concentration for : H-J/32-35 = 2.84 pCi/g

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
63	10/18/2002	EPA	S2036 H-J/29-32 EPA#1	29.5	3.31	1.98	0.8	0.52	2.54	0.76	3.34	0.920869155
64	10/18/2002	EPA	S2037 H-J/29-32 EPA#2	30.6	3.94	2.85	1.59	0.75	1.24	1.05	2.83	1.29034879
65	10/18/2002	EPA	S2038 H-J/29-32 EPA#3	30.6	3.13	2.37	0.95	0.61	1.27	0.88	2.22	1.070747403
66	10/18/2002	EPA	S2039 H-J/29-32 EPA#4	30.2	-0.37	2	1.34	0.54	2.14	0.78	3.48	0.948683298
67	10/18/2002	EPA	S2040 H-J/29-32 EPA#5	28.7	1	2.33	0.38	0.64	3.39	0.93	3.77	1.128937554

Average Total Radium (Th-232+Ra-226) Concentration for : H-J/29-32 = 3.13 pCi/g

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
68	10/18/2002	EPA	S2041 F-H/29-32 EPA#1	27.2	-2	2.45	1.8	0.68	0.76	0.97	2.56	1.18460964
69	10/18/2002	EPA	S2042 F-H/29-32 EPA#2	26.1	2.17	2.36	1.27	0.63	2.81	0.91	4.08	1.106797181
70	10/18/2002	EPA	S2043 F-H/29-32 EPA#3	24.9	1.78	2.04	1.37	0.56	1.82	0.78	3.19	0.960208311
71	10/18/2002	EPA	S2044 F-H/29-32 EPA#4	26	1.28	1.85	0.76	0.5	1.93	0.72	2.69	0.87658428
72	10/18/2002	EPA	S2045 F-H/29-32 EPA#5	26.6	4.08	2.01	0.54	0.52	2.56	0.76	3.1	0.920869155

Average Total Radium (Th-232+Ra-226) Concentration for : F-H/29-32 = 3.12 pCi/g

Table 2
Grading Phase (III)
USEPA Notice of Successful Verification Summary
Lakeshore East LLC

Location	Grid Designation	USEPA Signature Date	Comments
Grading Phase Lifts	7C	3/7/2003	
	10B-11A East	2/12/2003	Exlcusion zone subdivided into 2 areas
	10B-11A West	2/7/2003	
	10A	2/7/2003	
	29C	2/7/2003	
	35/36A	12/23/2002	
	28A	12/23/2002	
	26C-D	12/23/2002	
Test Pits	36 (S-9)	1/29/2003	
	36A	4/2/2003	

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: Section 7c

Date of Verification Survey: 3-6-03

Time of Verification Survey 9.00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Date 3-6-03

John Anderson (Print Name)

Field Team Leader (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o March 7, 2003. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 3/7/03

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for March 6, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
637	3/6/2003	EPA	S2459 7C EPA#1	30.6	2.74	2.44	0.3	0.64	1.24	0.94	1.54	1.137189518
638	3/6/2003	EPA	S2460 7C EPA#2	32.5	1.35	2.18	0.56	0.59	1.05	0.85	1.61	1.034698024
639	3/6/2003	EPA	S2461 7C EPA#3	30.9	0.72	2.4	1.25	0.66	2.43	0.95	3.68	1.156762724
640	3/6/2003	EPA	S2462 7C EPA#4	35	9.72	2.87	0.05	0.71	0.91	1.05	0.96	1.267517258
641	3/6/2003	EPA	S2463 7C EPA#5	29.1	3.31	2.59	0.19	0.68	1.5	0.99	1.69	1.201041215

Average Total Radium (Th-232+Ra-226) Concentration for : 7C 1.90 pCi/g

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: 11A-10B EAST

Date of Verification Survey: 2-10-03

Time of Verification Survey 7:00 AM am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 2-11-03

John Anderson (Print Name)

Field Team Leader (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 2/12/03. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

[signature] Date 2/12/03

Veneta Simon (Print Name)

On-Scene Coordinator (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for February 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
559	2/12/2003	EPA	S2411 11A10B East EPA#1	30.4	3.51	2.45	1.67	0.64	0.46	0.89	2.13	1.096220781
560	2/12/2003	EPA	S2412 11A10B East EPA#2	29.2	-5.25	1.73	1.46	0.5	1.76	0.7	3.22	0.860232527
561	2/12/2003	EPA	S2413 11A10B East EPA#3	26.1	0.94	2.81	0.55	0.73	1.29	1.07	1.84	1.295299193
562	2/12/2003	EPA	S2414 11A10B East EPA#4	28.5	3.89	2.07	0.1	0.53	1.36	0.78	1.46	0.943027041
563	2/12/2003	EPA	S2415 11A10B East EPA#5	31.6	-0.05	1.96	1.85	0.54	0.19	0.74	2.04	0.916078599

Average Total Radium (Th-232+Ra-226) Concentration for : 11A10B East 2.14 pCi/g

Note:
- Samples were collected on 2/11/03, but were not analyzed until 2/12/03. GAH
- This is the exclusion zone that was previously above the cleanup threshold of 7.1 pCi/gram and was cleaned up.

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: 11# 10B WEST

Date of Verification Survey: 2-5-03

Time of Verification Survey 9:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 2-7-03

John Anderson (Print Name)

Field Team Leader (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 2/7/03. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Larry Jensen for Fred Mocke Date 2/7/03

Larry Jensen (Print Name)

Health Physicist (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for February 5, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
538	2/7/2003	EPA	S2396 11A10B West EPA#1	37.7	0.73	2.81	1.45	0.75	1.13	1.07	2.58	1.30667517
539	2/7/2003	EPA	S2397 11A10B West EPA#2	40.8	5.91	2.33	-0.41	0.6	1.58	0.87	1.17	1.056834897
540	2/7/2003	EPA	S2398 11A10B West EPA#3	39.9	2.49	2.88	1.63	0.75	0.16	1.05	1.79	1.29034879
541	2/7/2003	EPA	S2399 11A10B West EPA#4	39.8	6.54	1.92	0.69	0.49	1.13	0.7	1.82	0.854458893
542	2/7/2003	EPA	S2400 11A10B West EPA#5	37.2	2.52	2.13	0.37	0.56	2.45	0.82	2.82	0.992975327

Average Total Radium (Th-232+Ra-226) Concentration for : 11A10B West 2.04 pCi/g

Note: - Samples were collected on 2/5/03, but were not analyzed until 2/6/03 and 2/7/03. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: SECTION 10A

Date of Verification Survey: 2-5-03

Time of Verification Survey 9:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 2-7-03

JOHN ANDERSON (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 2/7/03. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Larry Jensen for Fred Micke Date 2/7/03

Larry Jensen (Print Name)

Health Physicist (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for February 5, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
520	2/6/2003	EPA	S2381 10A EPA#1	29.7	3.21	2.63	0.05	0.68	2.1	1.01	2.15	1.217579566
521	2/6/2003	EPA	S2382 10A EPA#2	29.6	0.87	3.19	0.71	0.84	3.02	1.24	3.73	1.497731618
523	2/6/2003	EPA	S2383 10A EPA#3	28.9	-0.97	2.05	0.18	0.55	3.69	0.83	3.87	0.995690715
524	2/6/2003	EPA	S2384 10A EPA#4	32.5	-4.75	4.75	1.14	1.28	4.92	1.88	6.06	2.274379036
525	2/6/2003	EPA	S2385 10A EPA#5	29.8	-7.07	5.08	1.78	1.37	2.91	1.96	4.69	2.391338537

Average Total Radium (Th-232+Ra-226) Concentration for : 10A 4.10 pCi/g

Note: - Samples were collected on 2/5/03, but were not analyzed until 2/6/03 and 2/7/03. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: Section 29c

Date of Verification Survey: 2-5-03

Time of Verification Survey 9:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 2-7-03

John Anderson (Print Name)

Field Team Leader (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 2/7/03. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Larry Jensen for Fred Micke Date 2/7/03

Larry Jensen (Print Name)

Health Physicist (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for February 5, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
528	2/7/2003	EPA	S2386 29C EPA #1	27.1	0.58	2.8	3.35	0.75	-0.1	1	3.25	1.25
529	2/7/2003	EPA	S2387 29C EPA #2	27.5	4.39	2.38	1.07	0.61	3.22	0.89	4.29	1.078981001
530	2/7/2003	EPA	S2388 29C EPA #3	24.9	4.9	1.55	-0.24	0.41	4.28	0.61	4.04	0.734982993
531	2/7/2003	EPA	S2389 29C EPA #4	25.2	3.65	2.24	1.04	0.59	2.27	0.84	3.31	1.026498904
532	2/7/2003	EPA	S2390 29C EPA #5	26.1	5.12	2.47	1.21	0.64	1.81	0.93	3.02	1.128937554

Average Total Radium (Th-232+Ra-226) Concentration for : 29C 3.58 pCi/g

Note: - Samples were collected on 2/5/03, but were not analyzed until 2/6/03 and 2/7/03. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: Grading Phase Grid Location 35B36A

Date of Verification Survey: 12/23/02

Time of Verification Survey 9:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 12/23/02

Steve Kornder (Print Name)

Senior Geochemist (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o _____. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Larry Jensen for Fred Micke Date 12/23/02

Larry Jensen (Print Name)

Senior Health Physicist (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 23, 2002 (Lift Phase)

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
368	12/23/2002	EPA	S2281 35B36A EPA#1	19.2	0.78	3.19	2.28	0.86	1.9	1.19	4.18	1.468230227
369	12/23/2002	EPA	S2282 35B36A EPA#2	19.6	1.01	1.9	2.26	0.51	1.31	0.7	3.57	0.866083137
370	12/23/2002	EPA	S2283 35B36A EPA#3	17.6	6.59	1.56	0.94	0.4	2.19	0.58	3.13	0.704556598
371	12/23/2002	EPA	S2284 35B36A EPA#4	18.5	9.32	2.35	-0.3	0.6	3.7	0.87	3.4	1.056834897
372	12/23/2002	EPA	S2285 35B36A EPA#5	18.9	7.47	2.44	1.25	0.63	2.77	0.92	4.02	1.115033632

Average Total Radium (Th-232+Ra-226) Concentration for : 35B36A 3.66 pCi/g

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: Grading Phase Grid Location 28A

Date of Verification Survey: 12/23/02

Time of Verification Survey 9:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Date 12/23/02

Steve Koenda (Print Name)

Senior Geochemist (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o _____. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Date 12/27/02

Larry Jensen (Print Name)

Senior Health Physicist (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project 221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 23, 2002 (Lift Phase)

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
363	12/23/2002	EPA	S2276 28A EPA #1	29	0.76	1.84	-0.19	0.5	1.72	0.75	1.53	0.901387819
364	12/23/2002	EPA	S2277 28A EPA #2	27.9	5.15	2.18	0.23	0.56	0.58	0.81	0.81	0.984733466
365	12/23/2002	EPA	S2278 28A EPA #3	28.5	5.19	2.48	1.48	0.63	-1.43	0.86	0.05	1.06606754
366	12/23/2002	EPA	S2279 28A EPA #4	28.2	3.99	2.26	-0.04	0.6	0.93	0.89	0.89	1.073359213
367	12/23/2002	EPA	S2280 28A EPA #5	27	1.99	1.98	0	0.52	0.84	0.76	0.84	0.920869155

Average Total Radium (Th-232+Ra-226) Concentration for : 28A 0.82 pCi/g

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: Grading Phase Grid Location 26 CD

Date of Verification Survey: 12/23/02

Time of Verification Survey 9:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA

Signed:

[signature] Date 12/23/02

Steve Kornder (Print Name)

Senior Geochemist (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o _____. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Larry Jensen for Fred Mcke Date 12/23/02

Larry Jensen (Print Name)

Senior Health Physicist (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for December 23, 2002 (Lift Phase)

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
358	12/23/2002	EPA	S2271 26CD EPA #1	27.2	-0.77	2.44	1.24	0.67	1.21	0.94	2.45	1.154339638
359	12/23/2002	EPA	S2272 26CD EPA #2	25.8	8.14	2.14	0.11	0.55	2.27	0.8	2.38	0.970824392
360	12/23/2002	EPA	S2273 26CD EPA #3	23.9	3.27	2	1.04	0.53	1.88	0.77	2.92	0.9347727
361	12/23/2002	EPA	S2274 26CD EPA #4	25.2	7.1	2.2	-0.03	0.56	2.6	0.84	2.57	1.009554357
362	12/23/2002	EPA	S2275 26CD EPA #5	23.4	1.43	2.75	0.1	0.73	1.84	1.09	1.94	1.311868896

Average Total Radium (Th-232+Ra-226) Concentration for : 26CD 2.45 pCi/g

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: S-9 East and West

Date of Verification Survey: 1-27-03

Time of Verification Survey 9.00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 1-29-03

John Anderson (Print Name)

Field Team Leader (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o 1/29/03. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 1/29/03

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for January 27, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
481	1/29/2003	EPA	S2354 S-9 West EPA#1	27.1	4.49	3.1	1.19	0.81	2.03	1.16	3.22	1.414814475
482	1/29/2003	EPA	S2355 S-9 West EPA#2	26.2	1.72	2.34	1.95	0.63	1.14	0.86	3.09	1.06606754
483	1/29/2003	EPA	S2356 S-9 West EPA#3	26.9	4.05	2.02	0.73	0.54	3.18	0.77	3.91	0.940478602
484	1/29/2003	EPA	S2357 S-9 West EPA#4	29	1.21	2.34	0.97	0.62	2.22	0.89	3.19	1.084665847
485	1/29/2003	EPA	S2358 S-9 West EPA#5	28	4.21	2.93	1.25	0.77	1.65	1.09	2.9	1.33454112

Average Total Radium (Th-232+Ra-226) Concentration for : S-9 West 3.26 pCi/g

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
486	1/29/2003	EPA	S2359 S-9 East EPA#1	23.5	2.69	1.65	1.96	0.44	0.85	0.61	2.81	0.752130308
487	1/29/2003	EPA	S2360 S-9 East EPA#2	22	4.19	2.89	0.09	0.78	2.04	1.11	2.13	1.356650287
488	1/29/2003	EPA	S2361 S-9 East EPA#3	23.5	7.53	2.28	0.09	0.58	3.35	0.88	3.44	1.05394497
489	1/29/2003	EPA	S2362 S-9 East EPA#4	21.4	-1.35	2.17	1.7	0.61	1.93	0.86	3.63	1.054371851
490	1/29/2003	EPA	S2363 S-9 East EPA#5	22.5	1.23	2.21	0.54	0.6	3.5	0.88	4.04	1.065082156

Average Total Radium (Th-232+Ra-226) Concentration for : S-9 East 3.21 pCi/g

Note: - Samples were collected on 1/27/03, but were not analyzed until 1/28/03 and 1/29/03. GAH

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: SECTION 36A

Date of Verification Survey: 3-27-03

Time of Verification Survey 9:00 am am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

[signature] Date 3-27-03

JOHN ANDERSON (Print Name)

FIELD TEAM LEADER (Print Title)

STS Consultants, Ltd.
Solutions through Science & Engineering

The attached Verification Survey documents were reviewed by U.S. EPA, Region V o April 2, 2003. The results of this survey indicate that the verificatio criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavatior

Signed:

Fredrick A. Micke Date 4/2/03

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Gamma Spec Report- Lakeshore East Project

221 North Columbus Drive, Chicago, IL

Exclusion Zone Confirmatory Samples for March 27, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
706	3/27/2003	EPA	S2497 36A EPA#1	31.6	1.24	2.84	1.85	0.75	-1.44	1.02	0.41	1.266056871
707	3/27/2003	EPA	S2498 36A EPA#2	33.5	2.22	1.83	1.21	0.48	0.05	0.68	1.26	0.832346082
708	3/27/2003	EPA	S2499 36A EPA#3	30.9	2.24	2.67	0.25	0.7	1.55	1.04	1.8	1.253634716
709	3/27/2003	EPA	S2500 36A EPA#4	31.8	6.38	2.59	0.62	0.68	0.02	0.95	0.64	1.168289348
710	3/27/2003	EPA	S2501 36A EPA#5	31.5	2.68	2.12	0.36	0.56	0.64	0.81	1	0.984733466

Average Total Radium (Th-232+Ra-226) Concentration for : 36A 1.02 pCi/g

Lakeshore East Project - OVERBURDEN STOCKPILE SAMPLING

OVERBURDEN SOIL

Using USEPA approved procedure SOP 214

Excavation Area: North Slip Exclusion Zones

Date Sampled: 11/15/02

PILE # : North Road

Est. Volume of Lift in Cubic Yards: 150

Number of Samples Required Per SOP 214: 6

Sample #	Total Radium in pCi/g	QC Sample Dup. Tot. Rad. in pCi/g	E lab uncertainty	S_2 Std. Dev. for the analyses of the duplicate sample	S_{dup} Std. Dev. of the duplicate sampling & measurement
S2081 OB N. Road #1	2.91				
S2082 OB N. Road #2	1.77				
S2083 OB N. Road #3	0.94				
S2084 OB N. Road #4	1.81				
S2085 OB N. Road #5	2.66				
S2086 OB N. Road #6	0.64				
S2087 OB N. Road QC		2.43	1.15	0.575	
Number of Samples (n)	6			$S_{dup} = \text{sqrt}(S_1^2 + S_2^2) =$	0.99
Average (Mean of the sample population) (X bar)	1.79				

Average of samples is <7.1 pCi/g, Proceed with Confidence Level Check described in SOP-214, Paragraph 6.12

Standard Deviation of sample population (S_1)	0.81	
U_α (True Mean) = (X bar) + (t * (S_1/sqrt(n))) *Where "t" is a statistic used for small sample tests of hypothesis (the Student Distribution), from SOP No. KMS-102, Attachment 10.6*	2.46	"t" value 2.015
Release Criteria	7.1	
U_α < Release Criteria?	SAMPLES TESTED MEET 95% CONFIDENCE LEVEL - LIFT IS RADIOLOGICALLY ACCEPTABLE FOR USE AS ONSITE BACKFILL PER SOP-214	

Check if QC Sample Dup. is within 3 Standard Deviations (3 S_{dup}) of the mean of the sample population, per SOP 214, paragraph 12.1

3 x S_{dup} =	2.97		
Mean + 3 S_{dup} =	4.8	QC < (Mean + 3S_{dup})?	O.K.
Mean - 3 S_{dup} =	-1.2	QC > (Mean - 3S_{dup})?	O.K.

APPROVED: FIELD TEAM LEADER:

APPROVED: PROJECT MANAGER: 11/21/02

Name/date

Nutranl Gamma Spec Report- Lakeshore East Site

221 North Columbus Drive, Chicago, IL

Overburden Report for 11/15/02

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
128	11/15/02	overburden	S2081 OB-N.Road OB#1	29.2	1.88	2.3	2.15	0.61	0.76	0.83	2.91	1.030048543
129	11/15/02	overburden	S2082 OB-N.Road OB#2	27.9	-1.82	2.98	2.05	0.82	-0.28	1.15	1.77	1.412408289
130	11/15/02	overburden	S2083 OB-N.Road OB#3	32.2	5.91	3.43	0.23	0.9	0.71	1.3	0.94	1.58113883
131	11/15/02	overburden	S2084 OB-N.Road OB#4	31.9	-1.99	4.08	1.93	1.11	-0.12	1.59	1.81	1.939123513
132	11/15/02	overburden	S2085 OB-N.Road OB#5	33.1	2.43	3.69	1.02	0.98	1.64	1.44	2.66	1.74183611
133	11/15/02	overburden	S2086 OB-N.Road OB#6	31.1	1.38	2.7	1.44	0.7	-0.8	0.99	0.64	1.212476804
134	11/15/02	overburden	S2087 OB-N.Road OBQC	30.1	2.11	2.41	1.43	0.67	1	0.94	2.43	1.154339638

Overburden taken from multiple exclusion zones on North Side Slip. Material used as base for access road after surveying and sample analysis. GAH

APPENDIX G

USEPA Correspondence Regarding Granite Paving Stones

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

SE-5J

FEB 11 2003

VIA FACSIMILE (847) 279-2510 AND U.S. MAIL

Mr. Richard Berggreen
STS Consultants, Ltd.
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061

RE: Lakeshore East - South Slip

Dear Mr. Berggreen:

In response to your letter dated February 7, 2003 and our discussion today, U.S. EPA concurs that all radioactive contamination identified by STS in the south slip has been removed. Therefore, please feel free to backfill. However, due to the limitations of your investigation and removal activities radioactive contamination may remain. Accordingly, any future removal activity or construction excavation within the south slip area will require radiation monitoring as specified in the Work Plan.

If you would like to discuss this matter further, please contact me at (312) 886-3601 or Cathleen Martwick, Associate Regional Counsel, at (312) 886-7166.

Sincerely,

Verneta Simon

Verneta Simon
On-Scene Coordinator

cc: Naren Prasad, Chicago Department of Environment

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STS CONSULTANTS

STS Consultants Ltd.
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3153

voice 847-279-2500
fax 847-279-2510
web www.stsconsultants.com

February 7, 2003

Ms. Verneta Simon, On-Scene Coordinator
Mr. Fred Micke, On-Scene Coordinator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Blvd., SE-5J
Chicago, Illinois 60604

RE: Clarification of Request for USEPA Sign-off on Removal Verification for South Slip Area of Lakeshore East, 221 North Columbus Drive, Chicago, Illinois - STS Project Number 1-32193-XC

Dear Ms. Simon and Mr. Micke:

Please recall that in correspondence dated November 6, 2002, STS Consultants, Ltd. (STS) on behalf of Lakeshore East Development, LLC, provided information on an area within the South Slip of the Lakeshore East development site where evidence was detected of radiological impacts in soil below the groundwater table. That area was excavated to several feet below the water table, and four casings were installed and surveyed to assess whether radiological impacts remained. Recent correspondence from USEPA dated January 24, 2003, indicates your review of the data provided by STS shows no radiological impacts above the cleanup level.

The objective of this letter is to clarify the sign-off requested from USEPA with regard to the previous detections of radiological impacts at that location.

The approved Work Plan, Figure 1, recognizes two different types of areas within the subject site. The majority of the site is underlain by fill placed prior to 1900, thus pre-dating the potential placement of Lindsay Light materials. In accordance with the Work Plan, those portions of the site underlain by pre-1900 fill can achieve closure sign-off from USEPA that all contamination has been removed by providing survey results for the excavations down to the 1900 elevation.

The site also includes several areas that were shipping slips in the early 1900s. Those slips were filled between 1906 and 1929. Site-wide gamma survey results show the impacted materials found at the site are closely associated with the previous locations of the slips (refer to Work Plan Figure 1). An extensive drilling program within the slips, Work Plan Figure 2, explored the upper approximately 12 feet of the fill to identify potentially impacted material for removal. Deeper exploration was not pursued due to the fact that deeper removal is constrained by the difficulty in excavation below the water table because of slope stability considerations. USEPA closure sign-off in the slip areas is to be limited to the verification that the identified impacted material has been removed to below the cleanup threshold. The sign-off will not indicate that all contamination has been removed due to the acknowledged limitations of the drilling and survey exploration of the slip areas. Further, any future construction excavation within the slip areas will require radiation monitoring, in accordance with the Work Plan.

With specific regard to the area in the South Slip where the radiologically impacted material was found to extend below the water table, we are seeking the slip area sign-off as described above. The exploration following the removal effort found no further evidence of contamination above the cleanup threshold. On this basis, we are requesting sign-off that all identified contamination has been removed. It is acknowledged that the previously agreed to administrative controls applicable to the slip areas will apply and future excavations of historical fill in this slip will require radiation monitoring. No variance from the routine sign-off and monitoring obligations specified in the Work Plan is requested as part of the resolution of this specific location closure.

We request your review of this request and further, your sign-off on the specific location in the south slip that remains open. We appreciate your prompt attention to this matter as the area is due to be impacted by construction activities in the near future. Please contact us with any questions you may have regarding this matter.

Regards,

STS CONSULTANTS, LTD.

Steven Kornder, Ph.D.
Senior Project Chemist

Richard G. Berggreen, C.P.G.
Principal Geologist

cc: David Carlins, Lakeshore East Development, LLC
Kara Hughes, Lakeshore East Development, LLC

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

JAN 30 2003

SE-5J

VIA FACSIMILE (847) 279-2510 AND U.S. MAIL

Mr. Richard Berggreen
STS Consultants, Ltd.
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061

RE: Lakeshore East Borehole Calculation Adjustment for Water

Dear Mr. Berggreen:

Based on your concerns, U.S. EPA has recalculated the adjustment made for water surrounding the borehole work on October 29, 2002. Enclosed is a copy of a memorandum dated January 24, 2003, which shows that none of the nine data points exceed the modified cleanup criterion. Therefore, you may disregard the earlier letter dated January 7, 2003 regarding calculation adjustment for water. Please note we normally do not include internal correspondence, however, for this situation, we made an exception so all involved could follow the rationale and view the calculations.

If you would like to discuss this matter further, please contact me at (312) 886-3601 or Mary Fulghum, Associate Regional Counsel, at (312) 886-4683.

Sincerely,

Verneta Simon

Verneta Simon
On-Scene Coordinator

Enclosure

cc: Naren Prasad, Chicago Department of Environment

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U.S. ENVIRONMENTAL PROTECTION AGENCY
SUPERFUND DIVISION
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

DATE: January 24, 2003

SUBJECT: Adjustment of Criterion for Borehole Measurements Below Groundwater at Lakeshore East Due to Water Around Borehole Casing, Revised

FROM: Larry Jensen, CHP
Regional Radiation Expert
Emergency Response Section #3

TO: Fred Micke
On-Scene Coordinator
Emergency Response Section #3

Verneta Simon
On-Scene Coordinator
Emergency Response Section #3

During the Removal Action at Lakeshore East, the Potentially Responsible Party's contractor, STS Consultants, reached groundwater before they were sure they had completely removed all the thorium contaminants. Because of the difficulty of locating any thorium materials under water and because of the difficulty of ensuring that any contaminants were removed, STS drove four borings into the area and conducted gamma logging (see attached map for locations).

Their data was based on calibrations for a borehole casing of steel pipe but did not allow for water between the casing and the surrounding soil. As a result, their coefficient corresponding to the Lakeshore East cleanup criterion (5396 counts per 30 seconds for 7.2 picocuries per gram) was not directly usable for determining if subsurface material exceeded the criterion for cleanup.

In this memo I describe how I adjusted their coefficient to include 3 inches and 1.5 inches of water absorber (two cases as requested by Fred Micke, On-Scene Coordinator). The calculation with 3 inches of water assumes the pipe is leaning against one side of the boring wall and all the water is on one side. The calculation for 1.5 inches assumes the pipe is down the center of the borehole.

The calculation was also adjusted to account for the fact that the calibration was done to 7.2 pCi/g while the Lakeshore East cleanup criterion is 7.1 pCi/g.

The new coefficient is 5336 counts per 30 seconds per 7.1 pCi/g for 3 inches of water and 5216 counts per 30 seconds per 7.1 pCi/g for 1.5 inches of water.

As a result of this information, no downhole logging count rates were deemed to exceed the equivalent Lakeshore East cleanup criterion at 7.1 pCi/g.

Adjustment of Cleanup Criterion for 3 Inches and for 1.5 Inches of Water Absorber

Overview of Adjustment

When gamma rays impact a medium, such as water, there will be absorption but there may also be some enhancement (or buildup) due to scattering of the gamma rays as they collide with the absorber. The result is found by multiplying the incoming level by an absorption factor and by a buildup factor. The effect will vary depending on the energy of the gamma ray. The total or net effect will be the sum of the individual energy-dependent values.

The equation for this calculation is not complicated. However, the parameters that go into the equation cannot be determined by direct calculation, but must be interpolated from data tables. Most of the work necessary to calculate an answer for this problem was spent interpolating from available data sets.

The result was a modified parameter corresponding to a count rate per 30 seconds for the site cleanup criterion, 7.1 picocuries per gram (pCi/g).

Method for Calculation of Adjusted Criterion Count Rate

The fundamental equation for this calculation was taken from the Radiological Health Handbook published by the Department of Health, Education and Welfare. However, it can be found in academic and reference texts, as well as on the internet. Specifically,

$$X = X_o * B * \exp(-ux) \qquad \textbf{Equation 1}$$

where

X = the corrected count rate (counts per 30 seconds, c/30s)

X_o = the uncorrected count rate (c/30s)

B = Buildup Factor (unitless)

exp = base of natural logarithms

u = Linear Absorption Coefficient (cm^{-1})

x = absorber thickness (cm)

and further,

$$ux = u/p * x * p \qquad \textbf{Equation 2}$$

where

u/p = Mass Attenuation Coefficient (cm^2/g)

x = thickness of absorber (cm)

p = density of absorber (g/cm^3)

Radionuclide Emission Energies, Yields and Branching Ratios

The soil was assumed to contain only thorium radionuclides, specifically the principal gamma-ray emitters, Actinium-228, Lead-212 and Thallium-208 (see Radiological Health Handbook for the Thorium Decay Series and the principal gamma-ray emitters). The gamma-ray energies of these are given in Table 1.

When a radionuclide decays, it may not produce a gamma-ray with a given energy every time. The fraction of the time that a particular gamma-ray energy is produced is called the Yield. For example, referring to Table 1, Lead-212 (Pb-212) only produces a 238.6 kilo-electron volt (keV) gamma-ray 44.6% of the time. The Yields are found in Publication 38 of the International Commission on Radiological Protection, "Radionuclide Transformations, Energy and Intensity of Emissions" (ICRP 38)

Also, when a radionuclide decays, it may not produce the same decay product every time. For example, when Bismuth-212 decays, it produces Polonium-212 64.1% of the time and Thallium-208 35.9% of the time. These fractions, called Branching Ratios, are also found in ICRP 38.

The two actions together produce the final emission rate of the radionuclide. Thus, in Table 1, the product of the Gross Yield times the Branching Ratio gives the Net Yield. The Net Yield will be used in the calculation to be described in the section titled Adjustment for Yield.

Calculation of Mass Attenuation Coefficients

The Radiological Health Handbook contains tables with Mass Attenuation Coefficients by gamma ray energy for a water absorber (see Table 2). The Mass Attenuation Coefficients corresponding to reference gamma ray energies are listed in Table 1. Figure 1 shows that they are non-linear but, over small energy variations, Mass Attenuation Coefficients for energies between those listed (e.g., Pb-212, Ac-228, Tl-208) may be found by interpolation.

Interpolation for the Mass Attenuation Coefficients was done by two methods. As can be seen from Figure 1, the curve of Mass Attenuation Coefficient versus energy is quite concave so that there could not be any linear interpolation over many data points. It

was decided to try both a least squares fit over 3 points and an interpolation over two points. The results were compared.

Table 3 shows a Least Squares Fit over three points surrounding the thorium energy. The data for the Least Square Fit came from Table 2. For example, when the energy range was selected as 150 - 300 keV, the Mass Attenuation Coefficient points were those for 150, 200 and 300 keV. The Least Squares Fit calculation was done using the website at www.physics.csbsju.edu/stats/QF_NROW_form.html.

Each Least Squares Fit was done twice, once where two points were below the thorium gamma energy and again when two points were above the thorium gamma energy. Results for these two calculations were averaged. For example, with the thorium energy 238.6 keV, the Mass Attenuation Coefficients at 150, 200 and 300 keV were used in a Least Squares Fit . Then the Mass Attenuation Coefficients at 200, 300 and 400 keV were used in another Least Square Fit. The two results were averaged.

The Mass Attenuation Coefficient was also calculated by 2 Point Interpolation. Specifically, 238.6 keV is 38.6% of the difference between 200 and 300 keV. Thus, the Mass Attenuation Coefficient for 238.6 keV will be at 38.6% of the difference between 0.137 and 0.119 centimeters squared per gram (cm^2/g).

The results from these two methods are given in Table 4. The two methods compare very well. The results of the 2 Point Interpolation Method were used in the rest of the calculations because it was felt the method gave results that would correspond better to the exact coefficient.

Calculation of Linear Absorption Coefficients

Mass Attenuation Coefficients can be used to calculate Linear Absorption Coefficients by Equation 2. Using the two cases requested by the On-Scene Coordinator, 3 inches of water absorber and 1.5 inches of water absorber, the coefficients were calculated and tabulated in Table 11.

Calculation of Buildup Factors

The Linear Absorption Coefficients can be used in data from the Radiological Health Handbook to obtain Buildup Factors corresponding to the Thorium Decay Series gamma-ray emission energies.

Interpolation for the Buildup Factors was complicated because there are no listed Buildup Factors for energies less than 500 keV and Linear Absorption Coefficients less than one. These had to be interpolated.

First, when the thickness of the absorber is zero (ux = 0) the Buildup Factor must be 1. This is apparent from Equation 1 since X must equal X_o and exp (-ux) equals 1 when ux is 0. This gives all the Buildup Factors for ux = 0 as 1.

Second, when the emission energy is zero, the Buildup Factor must be interpolated. Tables 9 and 10 provide data from the Radiological Health Handbook. Figures 6 and 7 show that linear extrapolation can be used to obtain the Buildup Factors at zero emission energy. This can be done by creating an equation for a line using the two lowest energies (500, 1000 keV) and extrapolating to zero energy. This gives the Buildup Factors for zero emission energy at ux = 1 and ux = 2.

Third, the Buildup Factors for the Linear Absorption Coefficient corresponding to a particular emission energy can be found by the Least Squares method. For example, the Linear Absorption Coefficient is 0.99100 for an Emission Energy of 238.6 keV (see Table 11). What is needed is the corresponding Buildup Factor.

The Least Square method is found at www.physics.csbsju.edu/stats/QF_NROW_form.html.

By example, Least Squares was applied (see Table 12) at zero energy, Linear Attenuation Coefficients ux = 0, 1, 2 and Buildup Factors B = 1, 3.00, 5.19, respectively, to obtain the line equation with intercept, a = 0.968 and slope, b = 2.10. Using ux = 0.99100 in this linear equation (B = a + b * ux), the corresponding Buildup Factor is 3.05. This value should be slightly less than 3.00, as shown by the pattern from ux = 0 to ux = 2. The difference is believed to be due to roundoff errors. This method was used to obtain Buildup Factors for emission energies of 0, 500, 1000, 2000, 3000 keV.

Fourth, the Buildup Factor for the emission and Linear Attenuation Coefficient of concern (the darkly boxed numbers on the left side of Tables 12 - 19) was obtained by interpolation.

Again, by example, using Table 12, the Buildup Factors for emission energies of 0 and 500 keV, are 3.05 and 2.62 at a Linear Attenuation Coefficient of 0.99100. These fit a line with intercept a = 3.05 and slope b = -0.000858 (see lower right of Table 12) and give the Buildup Factor, B = 2.84 at ux = 0.99100 (B = a + b * ux).

By these four methods, all the Buildup Factors necessary to complete the calculation were obtained. The data and calculation results are found in Tables 12 - 19 and the resulting Buildup Factors at the thorium emission energies are boxed and tabulated in Table 11.

Adjustment to Cleanup Criterion

When calibrations were done by STS Consultants for the downhole logging probes, the criterion was based on 7.2 pCi/g. Since the cleanup criterion for Lakeshore East is 7.1 pCi/g, a slight adjustment had to be made by ratioing (7.1/7.2). The adjusted count rate is 5321 counts per 30 seconds. This calculation can be found below Table 20.

Adjustment for Yield

Since the adjustment for count rate is energy dependent, it was necessary to find out what fraction of the total count rate corresponded to each emission energy.

First, the fraction of each radioactive decay corresponding to a thorium gamma-ray energy was found. For example, when lead-212 decays, a gamma-ray with an energy of 238.6 keV is emitted 44.6% of the time. These values, called Net Yields, are tablulated in Table 1 and repeated in Tables 20 and 21.

The total Yield is the sum of the individual Yields. Table 20 shows the total Net Yield for the Thorium Decay Series is 1.82 emissions. Below Table 18 a calculation is made that shows, at the cleanup criterion level of 5321 counts per 30 seconds, each emission is 2926 counts per 30 seconds. When this number is multiplied by the Net Yields, the count rate corresponding to the cleanup criterion is found. These are tabulated in Table 21 under Column C. As a check, the column was added and agreed exactly.

Changes in Exposure Rate Due to Absorption and Buildup

The equation listed at the beginning of this attachment can be adjusted to give the ratio of the initial count rate to the count rate after absorption and buildup.

$$X / X_o = B \exp(-[u/p] * x * p) \qquad \textbf{Equation 3}$$

where

X / X_o = ratio of initial count rate to count rate after absorption and buildup (unitless)

B = Buildup Factor (unitless)

exp = base of natural logarithms

u/p = Mass Attenuation Coefficient (cm^2)

x = thickness of absorber (cm)

p = density of absorber (g/cm^3)

Table 20 shows the input factors for this calculation at each energy and gives the ratio in the far right column.

Adjusted Count Rate

In Table 21 the initial count rates, by energy, are listed in Column C. When these are mulitiplied by the ratios, X / X_o, in Column D the adjusted count rate by energy is obtained in Column E. The sum of the adjusted, energy dependent, count rates is 5336 counts per 30 seconds. This is slightly more, rather than less, than the initial count rate. This difference is believed to be due to roundoff error in the calculations. The final result is boxed at the end of this calculation.

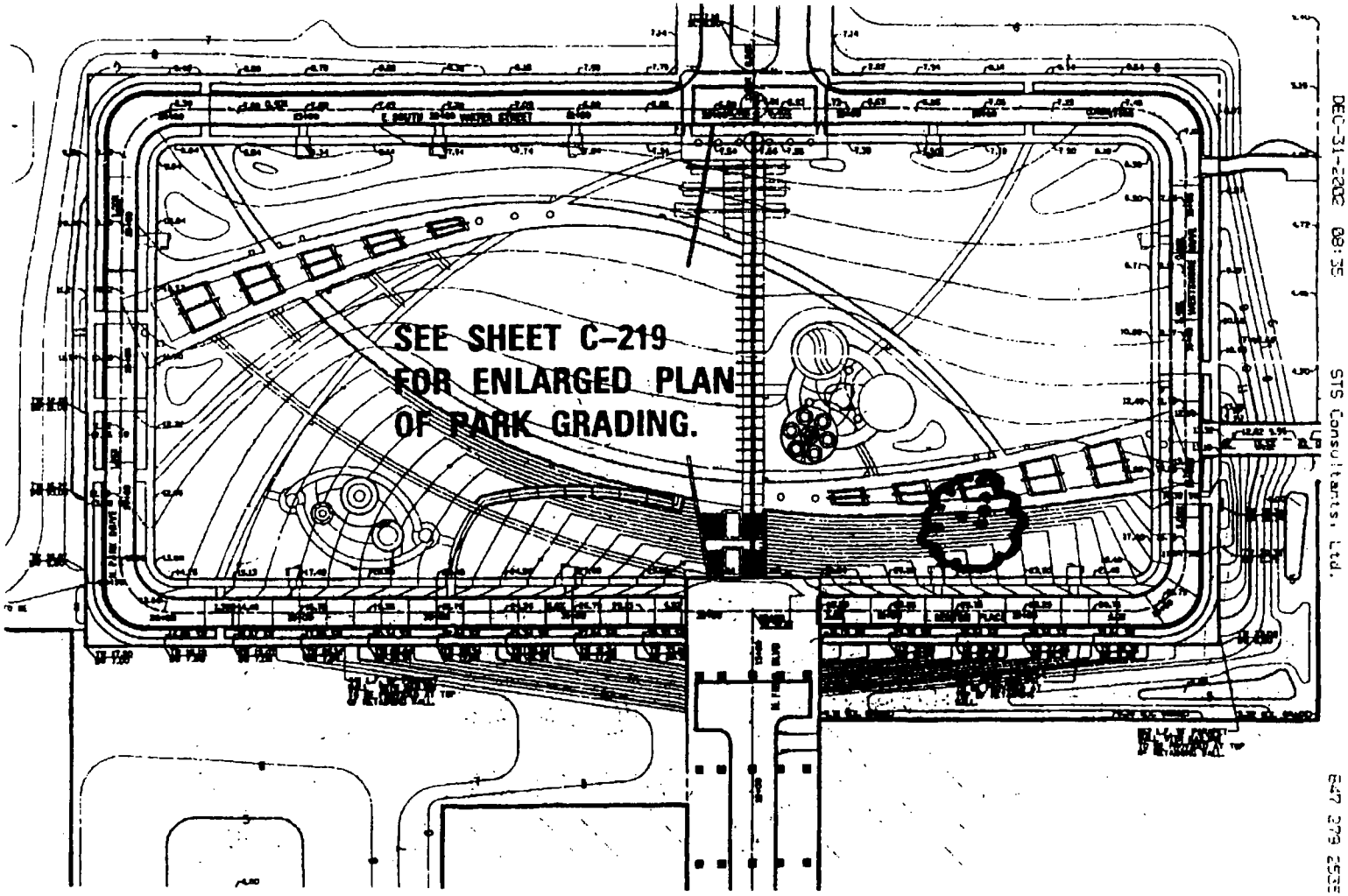
Conclusions

For 3 inches of water, the adjusted count rate is 5336 counts per 30 seconds compared to a no-water value of 5321 counts per 30 seconds. The difference is believed due to roundoff error in the calculations. Effectively, the 3 inches of water does not appreciably change the count rate.

For 1.5 inches of water, the adjusted count rate is 5216 counts per 30 seconds compared to a no-water value of 5321 counts per 30 seconds. The adjusted value is less than the no water value as would be expected. It is less, rather than greater, than the value for 3 inches of water. However, the values are close enough that the difference is believed to be due to roundoff error.

Effectively, the water has little to no effect on the measured count rates for downhole gamma logging. With these new values, there are no downhole logging data that exceed the equivalent cleanup criterion of 7.1 pCi/g.

SITE MAP WITH BORING LOCATONS


SEE SHEET C-219
FOR ENLARGED PLAN
OF PARK GRADING.

DATA , CALCULATIONS, AND FIGURES
FOR CASES WITH

3 INCHES OF WATER
AND
1.5 INCHES OF WATER

BETWEEN EARTH AND DETECTOR

(INSERT EXCEL SPREADSHEETS)

LAKESHORE EAST, CALCULATIONS OF IMPACT ON GAMMA COUNT RATE WITH WATER ABSORBER

CALCULATION FOR 3 INCHES---Tables 1 to 21, Figures 1 to 7
CALCULATION FOR 1.5 INCHES---Tables 22 to 42, Figures 8 to 14

Tables and Figures for 1.5 inches calculation are found below those for the 3 inches calculation on this spreadsheet

Table 1: Thorium Gamma Emission Energies and Yields

Radio-nulclide	Emission Energies (keV)	Gross Yield (unitless)	Branching Ratio (fraction)	Net Yield (unitless)
Pb-212	238.6	0.446	1.000	0.446
Ac-228	338.4	0.120	1.000	0.120
Tl-208	510.8	0.216	0.359	0.078
Tl-208	583.1	0.858	0.359	0.308
Tl-208	860.4	0.120	0.359	0.043
Ac-228	911.1	0.290	1.000	0.290
Ac-228	968.9	0.175	1.000	0.175
Tl-208	2615	0.998	0.359	0.359

From: Publication 38
International Commission on Radiological Protection
"Radionuclide Transformations, Energy and Intensity of Emissions"

Table 2: Mass Attenuation Coefficients

Emission Energy (keV)	Mass Attenuation Coefficient (cm^2/g)
100	0.171
150	0 151
200	0.137
300	0.119
400	0.106
500	0.0968
600	0.0896
800	0.0786
1000	0.0707
1500	0.0575
2000	0.0494
3000	0.0397
4000	0.0340

From. Radiological Health Handbook

Figure 1: Mass Attenuation Coefficients versus Gamma Emission Energy

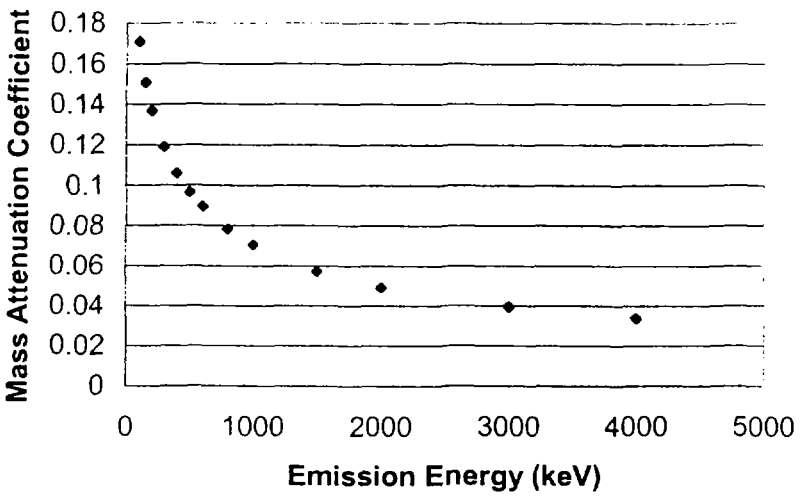


Table 3: Least Squares Fit for Mass Attenuation Coefficient

Energy Range for Least Squares Fit (keV)	Least Squares Fit				Emission Energy (keV)		Mass Attenuation Coefficient (cm2/g)	Mean Mass Attenuation Coefficient (cm2/g)
	a	+	b	*		=		
150 - 300	0.181	+	-2.086E-04	*	238.6	=	0.131	0.131
200 - 400	0.167	+	-1.550E-04	*	238.6	=	0.130	
200 - 400	0.167	+	-1.550E-04	*	338.4	=	0.115	0.114
300 - 500	0.152	+	-1.110E-04	*	338.4	=	0.114	
400 - 600	0.152	+	-1.110E-04	*	510.8	=	0.095	0.095
500 - 800	0.126	+	-5.986E-05	*	510.8	=	0.095	
400 - 600	0.138	+	-8.200E-05	*	583.1	=	0.090	0.091
500 - 800	0.126	+	-5.986E-05	*	583.1	=	0.091	
600 - 1000	0.117	+	-4.725E-05	*	860.4	=	0.076	0.076
800 - 1500	0.101	+	-2.942E-05	*	860.4	=	0.076	
600 - 1000	0.117	+	-4.725E-05	*	911.1	=	0.074	0.074
800 - 1500	0.101	+	-2.942E-05	*	911.1	=	0.074	
600 - 1000	0.117	+	-4.725E-05	*	968.9	=	0.071	0.072
800 - 1500	0.101	+	-2.942E-05	*	968.9	=	0.072	
1500 - 3000	0.07391	+	-1.156E-05	*	2615	=	0.044	0.044
2000 - 4000	0.06413	+	-7.70E-06	*	2615		0.044	

Table 4: Mass Attenuation Coefficient by 2 Point Interpolation and Comparison to Mean Mass Attenuation Coefficient by Least Squares Fit

Energy (keV)	Mass Attenuation Coefficient---By 2 Point Interpolation (cm2/g)	Mean Mass Attenuation Coefficient---By Least Squares Fit (cm2/g)
200	0.137	
238.6	**0.130**	0.131
300	0.119	
300	0.119	
338.4	**0.114**	0.114
400	0.106	
500	0.0968	
510.8	**0.0960**	0.0954
600	0.0896	
500	0.0968	
583.1	**0.0908**	0.0906
600	0.0896	
800	0.0786	
860.4	**0.0762**	0.0760
1000	0.0707	
800	0.0786	
911.1	**0.0742**	0.0741
1000	0.0707	
800	0.0786	
968.9	**0.0719**	0.0719
1000	0.0707	
2000	0.0494	
2615	**0.0434**	0.0438
3000	0.0397	

Table 5: Linear Absorption Coefficient and Buildup Factor For 500 keV

Emission Energy (keV)	Linear Absorption Coefficient ux (unitless)	Buildup Factor B (unitless)
500	1	2.63
	2	4 29
	4	9 05
	7	20 0
	10	35 9

Figure 2: Linear Absorption Coefficient versus Buildup Factor for 500 keV

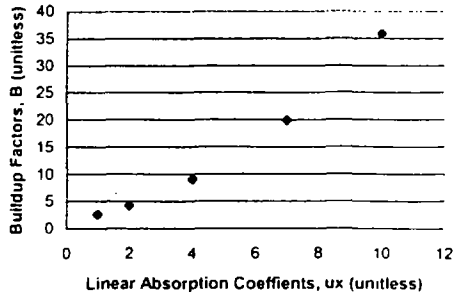


Table 6: Linear Absorption Coefficient and Buildup Factor For 1000 keV

Emission Energy (keV)	Linear Absorption Coefficient ux (unitless)	Buildup Factor B (unitless)
1000	1	2 26
	2	3.39
	4	6 27
	7	11 5
	10	18.0

Figure 3: Linear Absorption Coefficient versus Buildup Factor for 1000 keV

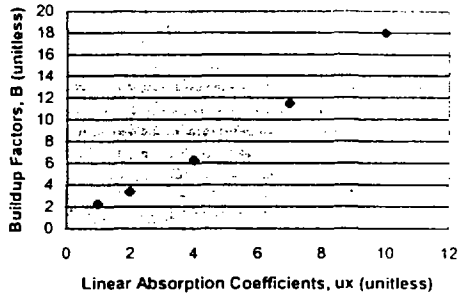


Table 7: Linear Absorption Coefficient and Buildup Factor For 2000 keV

Emission Energy (keV)	Linear Absorption Coefficient ux (unitless)	Buildup Factor B (unitless)
2000	1	1.84
	2	2 63
	4	4 28
	7	6 96
	10	9 87

Figure 4: Linear Absorption Coefficient versus Buildup Factor for 2000 keV

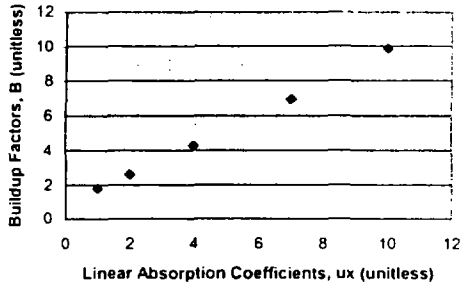


Table 8: Linear Absorption Coefficient and Buildup Factor For 3000 keV

Emission Energy (keV)	Linear Absorption Coefficient ux (unitless)	Buildup Factor B (unitless)
3000	1	1 69
	2	2 31
	4	3 57
	7	5 51
	10	7 48

Figure 5: Linear Absorption Coefficient versus Buildup Factor for 3000 keV

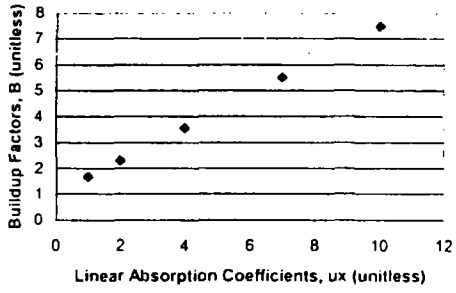
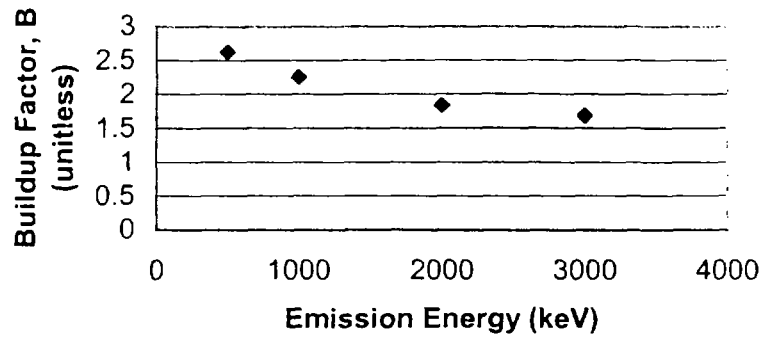


Table 9: E Buildup Factor by Energy, ux = 1

Emission Energy (keV)	Buildup Factor for ux =1 (unitless)
500	2.63
1000	2.26
2000	1.84
3000	1.69

Figure 6: Buildup Facts by Energy for ux = 1



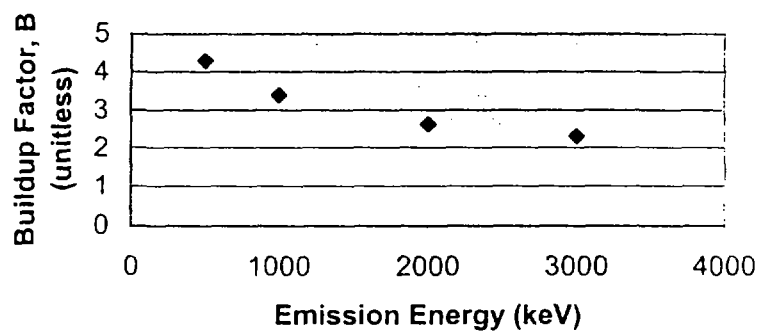
extrapolated to E = 0 keV using E = 500, 1000 keV

a +	b *	E =	B
3.00	-0.00074	0	3.00

Table 10: Buildup Factor by Energy, ux = 2

Emission Energy (keV)	Buildup Factor for ux =2 (unitless)
500	4.29
1000	3.39
2000	2.63
3000	2.31

Figure 7: Buildup Facts by Energy for ux = 2



extrapolated to E = 0 keV using E = 500, 1000 keV

a +	b *	E =	B
5.19	-0.0018	0,	5.19

Table 11: Interpolated Plane
Monodirectional Source
Buildup Factor

Emission Energy (MeV)	Mean Emission Energy Mass Absorption Coefficient (u/p) (cm2/g)	Mean Emission Energy Linear Absorption Coefficient (ux) (unitless)	Interpolated Plane Source Buildup Factor (b) (unitless)
238.6	0.130	0.99100	2.84
338.4	0.114	0.86874	2.54
510.8	0.0960	0.73169	2.19
583.1	0.0908	0.69202	2.08
860.4	0.0762	0.58075	1.78
911.1	0.0742	0.56549	1.74
968.9	0.0719	0.54809	1.69
2615	0.0434	0.33097	1.25

$u\kappa = u/p * x * p$

where

x =	3	inches =	7.62	cm	
p =	1	g/cm3 =	1	g / cm3	

Buildup Factor Interpolations

Table 12: Buildup Factor Interpolations for 238.6 keV

	0	0.99100	1	2	a *	b *	ux	=		
0	1	3.05	3.00	5.19	0.968	2.10	0.99100	=	3.05	
238.6	1	2.84								
500	1	2.62	2.63	4.29	0.995	1.84	0.99100	=	2.62	By Least Squares
					3.05	-0.000858	238.6	=	2.84	By 2 points

Table 13: Buildup Factor Interpolations for 338.4 keV

	0	0.86874	1	2	a *	b *	ux	=		
0	1	2.79	3.00	5.19	0.968	2.10	0.86874	=	2.79	
338.4	1	2.54								
500	1	2.42	2.63	4.29	0.995	1.64	0.86874	=	2.42	By Least Squares
					2.79	-0.000745	338.4	=	2.54	By 2 points

Table 14: Buildup Factor Interpolations for 510.8 keV

	0	0.73169	1	2	a *	b *	ux	=		
500	1	2.19	2.63	4.29	0.995	1.64	0.73169	=	2.19	By Least Squares
510.8	1	2.19								
1000	1	1.90	2.26	3.39	1.02	1.20	0.73169	=	1.90	By Least Squares
					2.49	-0.000594	510.8	=	2.19	By 2 points

Table 15: Buildup Factor Interpolations for 583.1 keV

	0	0.69202	1	2	a *	b *	ux	=		
500	1	2.13	2.63	4.29	0.995	1.64	0.69202	=	2.13	By Least Squares
583.1	1	2.08								
1000	1	1.85	2.26	3.39	1.02	1.20	0.69202	=	1.85	By Least Squares
					2.41	-0.000559	583.1	=	2.08	By 2 points

Table 16: Buildup Factor Interpolations for 860.4 keV

	0	0.58075	1	2	a *	b *	ux	=		
500	1	1.95	2.63	4.29	0.995	1.64	0.58075	=	1.95	By Least Squares
860.4	1	1.78								
1000	1	1.72	2.26	3.39	1.02	1.20	0.58075	=	1.72	By Least Squares
					2.18	-0.000461	860.4	=	1.78	By 2 points

Table 17: Buildup Factor Interpolations for 911.1 keV

	0	0.56549	1	2	a *	b *	ux	=		
500	1	1.92	2.63	4.29	0.995	1.64	0.56549	=	1.92	By Least Squares
911.1	1	1.74								
1000	1	1.70	2.26	3.39	1.02	1.20	0.56549	=	1.70	By Least Squares
					2.15	-0.000448	911.1	=	1.74	By 2 points

Table 18: Buildup Factor Interpolations for 968.9 keV

	0	0.54809	1	2	a *	b *	ux	=		
500	1	1.89	2.63	4.29	0.995	1.64	0.54809	=	1.89	By Least Squares
968.9	1	1.69								
1000	1	1.68	2.26	3.39	1.02	1.20	0.54809	=	1.68	By Least Squares
					2.11	-0.000432	968.9	=	1.69	By 2 points

Table 19: Buildup Factor Interpolations for 2615 keV

	0	0.33097	1	2	a *	b *	ux	=		
2000	1	1.28	1.84	2.63	1.01	0.815	0.33097	=	1.28	By Least Squares
2615	1	1.25								
3000	1	1.23	1.69	2.31	1.01	0.655	0.33097	=	1.23	By Least Squares
					1.39	-0.000053	2615	=	1.25	By 2 points

Table 20: Ratio of Adjusted to Original Count Rate

Emission Energies (keV)	Interpolated Plane Source Buildup Factor (b) (unitless)	Emission Energy Mass Absorption Coefficient (u/p) (MeV)	Thickness of Water Absorber (x) (cm)	Density of Water (p) (g/cm3)	Net Yield (unitless)	Ratio, Absorbed Exposure Rate (unitless)
238.6	2.84	0.130	7.62	1	0.446	1.06
338.4	2.54	0.114	7.62	1	0.120	1.07
510.8	2.19	0.0960	7.62	1	0.078	1.05
583.1	2.08	0.0908	7.62	1	0.308	1.04
860.4	1.78	0.0762	7.62	1	0.043	1.00
911.1	1.74	0.0742	7.62	1	0.290	0.99
968.9	1.69	0.0719	7.62	1	0.175	0.98
2615	1.25	0.0434	7.62	1	0.359	0.90
					1.82	

Ratio = X / Xo = B exp(-[u/p] * x * p)

Total counts at 7.2 pCi/g 5396 counts / 30 seconds
Total counts at 7.1 pCi/g 5321

5321 / 1.82 = 2926 counts / 30 seconds

Table 21: Adjusted Count Rate for Cleanup Criterion

A	B	C	D	E	F
Emission Energy	Net Yield	Emission Rate by Energy	Ratio, Absorbed Exposure Rate	Adjusted Emission Rate by Energy	Ratio, Original Emission Rate to Adjusted Emission Rate
		2926 * Net Yield	Table 20	Column C * Column D	Column E / Column C
(keV)	(unitless)	(counts/30 sec)	(unitless)	(counts/30 sec)	(unitless)
238.6	0.446	1305	1.06	1378	1.056
338.4	0.120	351	1.07	374	1.066
510.8	0.078	227	1.05	239	1.053
583.1	0.308	902	1.04	941	1.043
860.4	0.043	126	1.00	126	0.997
911.1	0.290	849	0.99	838	0.988
968.9	0.175	512	0.98	501	0.978
2615	0.359	1049	0.90	940	0.896
	Total	5321	**Total**	5336	100.3%

Count rate equivalent to 7.1 pCi/g	=	5336 counts per 30 seconds

LAKESHORE EAST, CALCULATION OF IMPACT ON GAMMA COUNT RATE
WITH 1.5 INCHES OF WATER ABSORBER

Table 22: Thorium Gamma Emission Energies and Yields

Radio-nulclide	Emission Energies (keV)	Gross Yield (unitless)	Branching Ratio (fraction)	Net Yield (unitless)
Pb-212	238.6	0.446	1.000	0.446
Ac-228	338.4	0.120	1.000	0.120
Tl-208	510.8	0.216	0.359	0.078
Tl-208	583.1	0.858	0.359	0.308
Tl-208	860.4	0.120	0.359	0.043
Ac-228	911.1	0.290	1.000	0.290
Ac-228	968.9	0.175	1.000	0.175
Tl-208	2615	0.998	0.359	0.359

From: Publication 38
International Commission on
Radiological Protection
"Radionuclide Transformations,
Energy and Intensity of
Emissions"

Table 23: Mass Attenuation Coefficients

Emission Energy (keV)	Mass Attenuation Coefficient (cm^2/g)
100	0 171
150	0.151
200	0 137
300	0 119
400	0.106
500	0.0968
600	0.0896
800	0.0786
1000	0 0707
1500	0.0575
2000	0.0494
3000	0.0397
4000	0.0340

From: Radiological Health Handbook

Figure 8: Mass Attenuation Coefficients versus Gamma Emission Energy

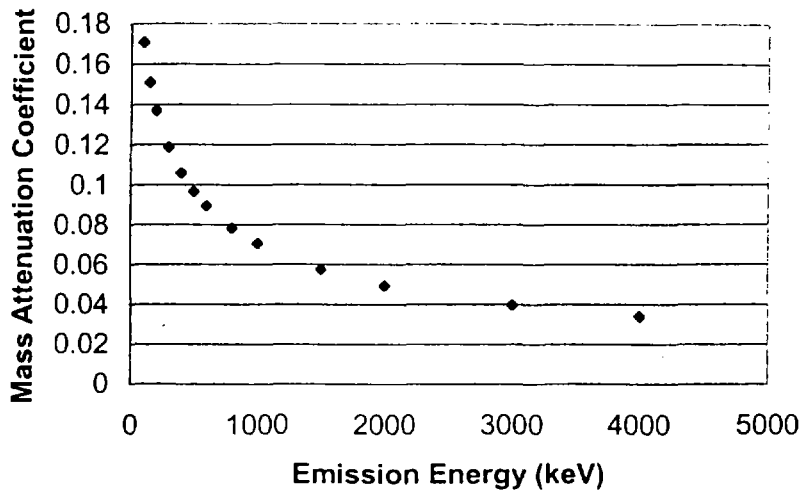


Table 24: Least Squares Fit for Mass Attenuation Coefficient

Energy Range for Least Squares Fit (keV)	Least Squares Fit				Emission Energy (keV)		Mass Attenuation Coefficient (cm2/g)	Mean Mass Attenuation Coefficient (cm2/g)
	a	+	b	*		=		
150 - 300	0.181	+	-2.086E-04	*	238.6	=	0.131	0.131
200 - 400	0.167	+	-1.550E-04	*	238.6	=	0.130	
200 - 400	0.167	+	-1.550E-04	*	338.4	=	0.115	0.114
300 - 500	0.152	+	-1.110E-04	*	338.4	=	0.114	
400 - 600	0.152	+	-1.110E-04	*	510.8	=	0.095	0.095
500 - 800	0.126	+	-5.986E-05	*	510.8	=	0.095	
400 - 600	0.138	+	-8.200E-05	*	583.1	=	0.090	0.091
500 - 800	0.126	+	-5.986E-05	*	583.1	=	0.091	
600 - 1000	0.117	+	-4.725E-05	*	860.4	=	0.076	0.076
800 - 1500	0.101	+	-2.942E-05	*	860.4	=	0.076	
600 - 1000	0.117	+	-4.725E-05	*	911.1	=	0.074	0.074
800 - 1500	0.101	+	-2.942E-05	*	911.1	=	0.074	
600 - 1000	0.117	+	-4.725E-05	*	968.9	=	0.071	0.072
800 - 1500	0.101	+	-2.942E-05	*	968.9	=	0.072	
1500 - 3000	0.07391	+	-1.156E-05	*	2615	=	0.044	0.044
2000 - 4000	0.06413	+	-7.70E-06	*	2615		0.044	

Table 25: Mass Attenuation Coefficient by 2 Point Interpolation and Comparison to Mean Mass Attenuation Coefficient by Least Squares Fit

Energy (keV)	Mass Attenuation Coefficient--- By 2 Point Interpolation (cm2/g)	Mean Mass Attenuation Coefficient---By Least Squares Fit (cm2/g)
200	0.137	
238.6	**0.130**	0.131
300	0.119	
300	0.119	
338.4	**0.114**	0.114
400	0.106	
500	0.0968	
510.8	**0.0960**	0.0954
600	0.0896	
500	0.0968	
583.1	**0.0908**	0.0906
600	0.0896	
800	0.0786	
860.4	**0.0762**	0.0760
1000	0.0707	
800	0.0786	
911.1	**0.0742**	0.0741
1000	0.0707	
800	0.0786	
968.9	**0.0719**	0.0719
1000	0.0707	
2000	0.0494	
2615	**0.0434**	0.0438
3000	0.0397	

Table 26: Linear Absorption Coefficient and Buildup Factor For 500 keV

Emission Energy (keV)	ux	B
500	1	2.63
	2	4.29
	4	9.05
	7	20.0
	10	35 9

Figure 9: Linear Absorption Coefficient versus Buildup Factor for 500 keV

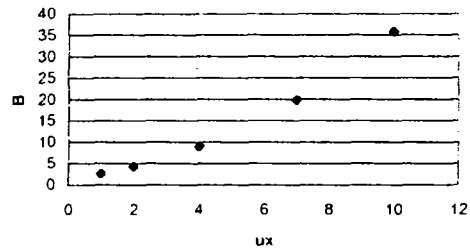


Table 27: Linear Absorption Coefficient and Buildup Factor For 1000 keV

Emission Energy (keV)	ux	B
1000	1	2.26
	2	3.39
	4	6 27
	7	11.5
	10	18 0

Figure 10: Linear Absorption Coefficient versus Buildup Factor for 1000 keV

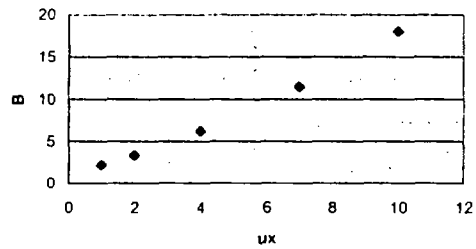


Table 28: Linear Absorption Coefficient and Buildup Factor For 2000 keV

Emission Energy (keV)	ux	B
2000	1	1.84
	2	2.63
	4	4.28
	7	6.96
	10	9.87

Figure 11: Linear Absorption Coefficient versus Buildup Factor for 2000 keV

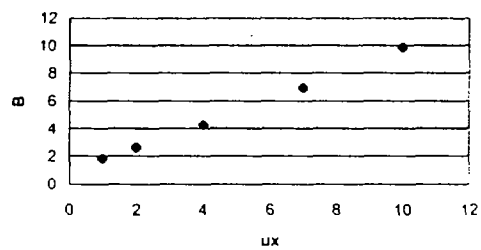


Table 29: Linear Absorption Coefficient and Buildup Factor For 3000 keV

Emission Energy (keV)	ux	B
3000	1	1.69
	2	2.31
	4	3.57
	7	5 51
	10	7 48

Figure 12: Linear Absorption Coefficient versus Buildup Factor for 3000 keV

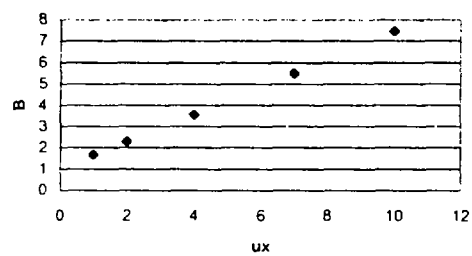
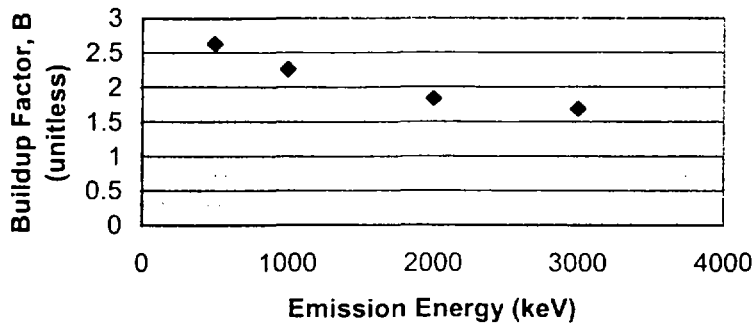


Table 30: Buildup Factor by Energy, ux = 1

Energy (keV)	Buildup Factor for ux =1
500	2.63
1000	2.26
2000	1.84
3000	1.69

Figure 13: Buildup Facts by Energy for ux = 1



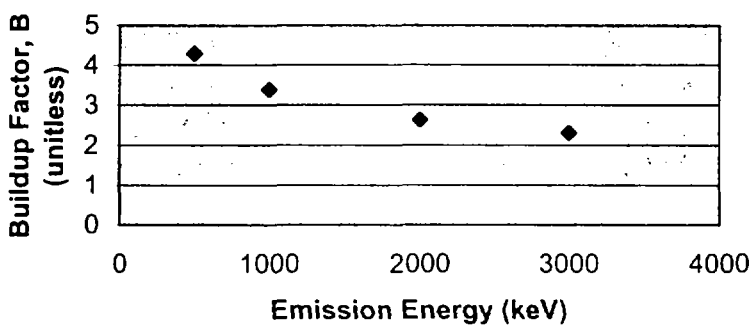
extrapolated to E = 0 keV using E = 500, 1000 keV

a +	b *	E =	B
3.00	-0.00074	0	3.00

Table 31: Buildup Factor by Energy, ux = 2

Energy (keV)	Buildup Factor for ux =2
500	4.29
1000	3.39
2000	2.63
3000	2.31

Figure 14: Buildup Facts by Energy for ux = 2



extrapolated to E = 0 keV using E = 500, 1000 keV

a +	b *	E =	B
5.19	-0.0018	0	5.19

Table 32: Interpolated Plane Monodirectional Source Buildup Factor

Emission Energy (MeV)	Mean Emission Energy Mass Absorption Coefficient (u/p) (cm2/g)	Mean Emission Energy Linear Absorption Coefficient (ux) (unitless)	Interpolated Plane Source Buildup Factor (b) (unitless)
238 6	0 130	0 49550	1 91
338 4	0 114	0 43437	1 76
510 8	0 0960	0 36585	1 59
583 1	0 0908	0 34601	1 54
860 4	0 0762	0 29038	1 40
911 1	0 0742	0 28275	1 38
968 9	0 0719	0 27405	1 35
2615	0 0434	0 16549	1 13

ux = u/p * x * p

where

x =	1 5	inches =	3 81	cm	
p =	1	g/cm3 =	1	g / cm3	

Buildup Factor Interpolations

Table 33: Buildup Factor Interpolations for 238 6 keV

	0	0 49550	1	2	a *	b *	ux	=		
0	1	2.01	3 00	5 19	0 968	2 1	0 49550	=	2 01	
238.6	1	1.91								
500	1	1.81	2 63	4 29	0 995	1.64	0 49550	=	1 81	By Least Squares
					2 01	-0 000402	238 6	=	1 91	By 2 points

Table 34: Buildup Factor Interpolations for 338.4 keV

	0	0 43437	1	2	a *	b *	ux	=		
0	1	1.88	3 00	5 19	0 968	2 1	0 43437	=	1 88	
338.4	1	1.76								
500	1	1.71	2 63	4 29	0 995	1 64	0 43437	=	1 71	By Least Squares
					1 88	-0 000346	338 4	=	1 76	By 2 points

Table 35: Buildup Factor Interpolations for 510.8 keV

	0	0 36585	1	2	a *	b *	ux	=		
500	1	1.59	2 63	4 29	0 995	1 64	0 36585	=	1 59	By Least Squares
510.8	1	1.59								
1000	1	1.46	2 26	3 39	1 02	1 20	0 36585	=	1 46	By Least Squares
					1 73	-0 000272	510 8	=	1 59	By 2 points

Table 36: Buildup Factor Interpolations for 583.1 keV

	0	0 34601	1	2	a *	b *	ux	=		
500	1	1.56	2.63	4 29	0 995	1 64	0 34601	=	1 56	By Least Squares
583.1	1	1.54								
1000	1	1.44	2 26	3 39	1 02	1 20	0 34601	=	1 44	By Least Squares
					1 69	-0 000254	583 1	=	1 54	By 2 points

Table 37: Buildup Factor Interpolations for 860.4 keV

	0	0 29038	1	2	a *	b *	ux	=		
500	1	1.47	2 63	4 29	0 995	1 64	0 29038	=	1 47	By Least Squares
860.4	1	1.40								
1000	1	1.37	2 26	3 39	1 02	1 20	0 29038	=	1 37	By Least Squares
					1 57	-0 000206	860 4	=	1 40	By 2 points

Table 38: Buildup Factor Interpolations for 911 1 keV

	0	0 28275	1	2	a *	b *	ux	=		
500	1	1.46	2 63	4 29	0 995	1 64	0 28275	=	1 46	By Least Squares
911 1	1	1.38								
1000	1	1.36	2 26	3 39	1 02	1 20	0 28275	=	1 36	By Least Squares
					1 55	-0 000199	911 1	=	1 38	By 2 points

Table 39: Buildup Factor Interpolations for 968.9 keV

	0	0 27405	1	2	a *	b *	ux	=		
500	1	1.44	2 63	4 29	0 995	1 64	0 27405	=	1 44	By Least Squares
968.9	1	1.35								
1000	1	1.35	2 26	3 39	1 02	1 20	0 27405	=	1 35	By Least Squares
					1 54	-0 000191	968 9	=	1 35	By 2 points

Table 40: Buildup Factor Interpolations for 2615 keV

	0	0 16549	1	2	a *	b *	ux	=		
2000	1	1.14	1 84	2 63	1 01	0 815	0 16549	=	1 14	By Least Squares
2615	1	1.13								
3000	1	1 12	1 69	2 31	1 01	0 655	0 16549	=	1 12	By Least Squares
					1 20	-0 000026	2615	=	1 13	By 2 points

Table 41: Ratio of Adjusted to Original Count Rate

Emission Energies (keV)	Interpolated Plane Source Buildup Factor (b) (unitless)	Emission Energy Mass Absorption Coefficient (u/p) (MeV)	Thickness of Water Absorber (x) (cm)	Density of Water (p) (g/cm3)	Net Yield (unitless)	Ratio, Absorbed Exposure Rate (unitless)
238.6	1.91	0.130	3.81	1	0.446	1.17
338.4	1.76	0.114	3.81	1	0.120	1.14
510.8	1.59	0.0960	3.81	1	0.078	1.10
583.1	1.54	0.0908	3.81	1	0.308	1.09
860.4	1.40	0.0762	3.81	1	0.043	1.05
911.1	1.38	0.0742	3.81	1	0.290	1.04
968.9	1.35	0.0719	3.81	1	0.175	1.03
2615	1.13	0.0434	3.81	1	0.359	0.96
					1.82	

Ratio = X / Xo = B exp(-[u/p] * x * p)

Total counts at 7.2 pCi/g 5396 counts / 30 seconds
Total counts at 7.1 pCi/g 5321

5321 / 1.82 = 2926 counts / 30 seconds

Table 42: Adjusted Count Rate for Cleanup Criterion

A	B	C	D	E	F
Emission Energy	Net Yield	Emission Rate by Energy	Ratio, Absorbed Exposure Rate	Adjusted Emission Rate by Energy	Ratio, Original Emission Rate to Adjusted Emission Rate
		2926 * Yield	Table 20	Column C * Column D	Column E / Column C
(keV)	(unitless)	(counts/30 sec)	(unitless)	(counts/30 sec)	(unitless)
238.6	0.446	1305	1.17	1521	1.165
338.4	0.120	351	1.14	401	1.142
510.8	0.078	227	1.10	251	1.104
583.1	0.308	902	1.09	984	1.090
860.4	0.043	126	1.05	132	1.045
911.1	0.290	849	1.04	881	1.038
968.9	0.175	512	1.03	527	1.030
2615	0.359	1049	0.96	1004	0.956
	Total	5321	**Total**	5699	107.1%

Count rate equivalent to 7.1 pCi/g = 5699 counts per 30 seconds

STS CONSULTANTS

STS Consultants, Ltd.
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3153

voice 847-279-2500
fax 847-279-2510
web www.stsconsultants.com

January 10, 2003

Ms. Verneta Simon, On-Scene Coordinator
Mr. Fred Micke, On-Scene Coordinator
US Environmental Protection Agency
Region 5
77 W. Jackson Blvd., SE-5J
Chicago, Illinois 60604

RE: Investigation of Radiological Impacts Below Groundwater, Lakeshore East Site, 221 N. Columbus Drive, Chicago, Illinois - STS Project No. 1-32193-XC

Dear Ms. Simon and Mr. Micke:

This letter and the attached information are in response to your correspondence dated January 7, 2003 regarding the above-referenced project. We have reviewed the memorandum dated January 6, 2003 from Mr. Larry Jensen provided with your letter and have the following comments and recommended revisions.

The item of most significance appears to be the revision in the gamma count threshold to be used as indicative of an exceedance of the cleanup threshold. The background in developing the adjustment factors and the calculations provided by Mr. Jensen were extremely useful. We have used the interpreted factors and spreadsheets developed by Mr. Jensen.

One revision to the calculation is in the "thickness of water absorber" factor "x". In our correspondence to you dated November 6, 2002 presenting the topic of this material below groundwater, we described the down-hole gamma measurements as having been taken inside a 3-inch casing that was placed inside a 6-inch diameter boring. This provides a 1.5-inch annular space between the casing and the wall of the bore hole. We note that in the calculation performed by Mr. Jensen, he used a 3-inch thickness of water absorber factor. We have recalculated the equation throughout to change the factor "x" to 1.5 inches (3.81 cm).

Additionally, review of the equations and calculations noted an input error on Tables 10 through 17, where a factor was entered as "0" and should have been "1". When this correction was made, the adjusted count equivalent to 7.1 pCi/g was found to be 5,054 counts per 30 seconds.

We note in Mr. Jensen's memorandum that he was directed to make "worst case" assumptions. This may have been interpreted to assume the casing was pressed against one side of the bore hole resulting in there being 3 inches of annular space and water on the other side. However, this assumption would also require that the radioactive material be solely limited to the portion of the borehole wall opposite the casing, requiring any detected gamma radiation to pass through the intervening 3 inches of water, with no radiation coming from the wall against which the casing was in contact. While this may be a worst case, it does not appear to be reasonable.

We also request that the cleanup threshold used at the site be agreed to as follows. The total radium value that is the cleanup threshold is background (2.1 pCi/g) plus 5 pCi/g. Anything over this, i.e., 7.2 pCi/g, is an exceedance of the threshold. Our calibration is meant to determine the readings in gamma counts that represent 7.2 pCi/g. Therefore, our value of 5,396 counts per 30 seconds is a valid threshold for determining the presence of material equal to or exceeding the 7.2 pCi/g total radium criterion. The adjustment for this factor is rather small, (7.2/7.1 = 1.014) and raises the threshold to 5,126 counts per 30 seconds.

In considering these two adjustments to the down-hole gamma survey, we represent that the adjusted cleanup threshold considering the presence of water in the annular space around the steel casing used in the down-hole survey is 5,126 counts per 30 seconds. With this adjusted threshold, none of the down-hole gamma readings are in excess of the threshold.

We request your written concurrence with this information, and that no further exploration or remediation is required at this location.

Please contact us with any questions you may have regarding the attached information.

Regards,

STS CONSULTANTS, LTS.

Richard G. Berggreen, C.P.G.
Principal Geologist

cc: Mary Fulghum, USEPA
David Carlin, Kara Hughes, Lakeshore East Development, LLC

Attachment: Revised Attachments from Mr. Larry Jensen Memorandum dated January 6, 2003

Table 1: Thorium Gamma Emission Energies and Yields

Radio-nulclide	Emission Energies (keV)	Yield (unitless)
Pb-212	238.6	0.446
Ac-228	338.4	0.120
Tl-208	510.8	0.216
Tl-208	583.1	0.858
Tl-208	860.4	0.120
Ac-228	911.1	0.290
Ac-228	968.9	0.175
Tl-208	2615	0.998

From: Publication 38
International Commission on Radiological Protection
"Radionuclide Transformations, Energy and Intensity of Emissions"

Table 2: Mass Attenuation Coefficients

Emission Energy (keV)	Mass Attenuation Coefficient (cm^2/g)
100	0.171
150	0.151
200	0.137
300	0.119
400	0.106
500	0.0968
600	0.0896
800	0.0786
1000	0.0707
1500	0.0575
2000	0.0494
3000	0.0397
4000	0.0340

From: Radiological Health Handbook

Figure 1: Mass Attenuation Coefficients versus Gamma Emission Energy

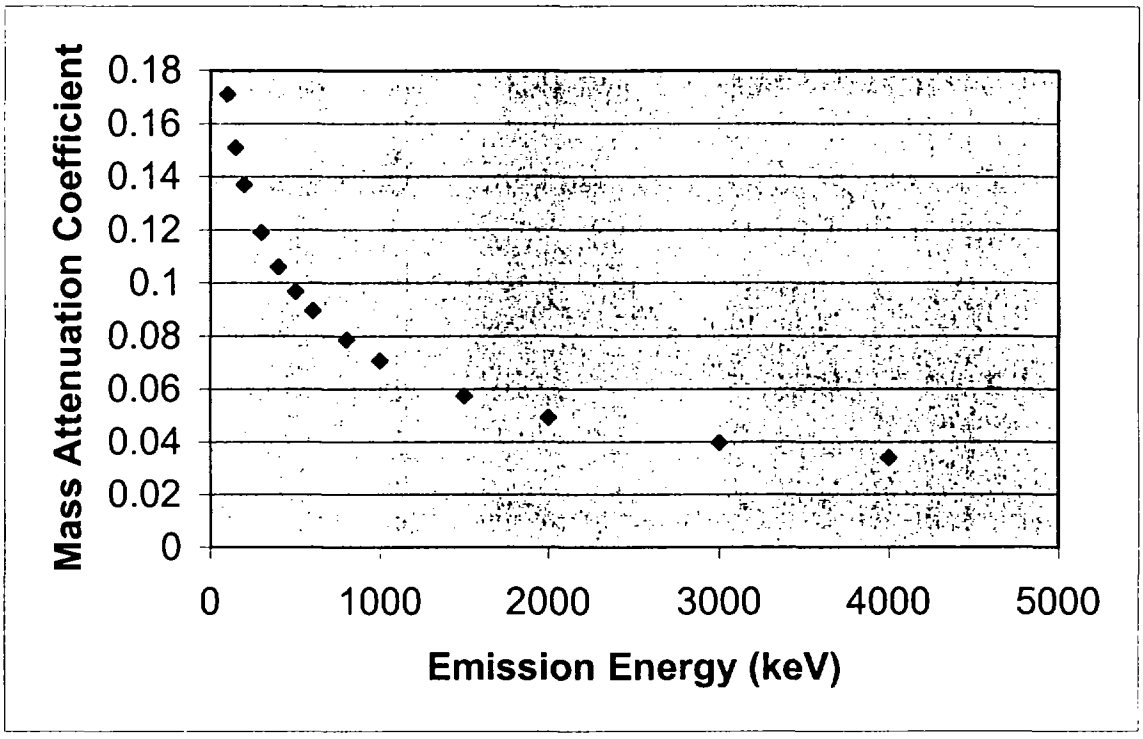


Table 3: Least Squares Fit for Mass Attenuation Coefficient

Energy Range for Least Squares Fit (keV)	Least Squares Fit a	+	b	*	Emission Energy (keV)	=	Mass Attenuation Coefficient (cm2/g)	Mean Mass Attenuation Coefficient (cm2/g)
150 - 300	0.181	+	-2.086E-04	*	238.6	=	0.131	0.131
200 - 400	0.167	+	-1.550E-04	*	238.6	=	0.130	
200 - 400	0.167	+	-1.550E-04	*	338.4	=	0.115	0.114
300 - 500	0.152	+	-1.110E-04	*	338.4	=	0.114	
400 - 600	0.152	+	-1.110E-04	*	510.8	=	0.095	0.095
500 - 800	0.126	+	-5.986E-05	*	510.8	=	0.095	
400 - 600	0.138	+	-8.200E-05	*	583.1	=	0.090	0.091
500 - 800	0.126	+	-5.986E-05	*	583.1	=	0.091	
600 - 1000	0.117	+	-4.725E-05	*	860.4	=	0.076	0.076
800 - 1500	0.101	+	-2.942E-05	*	860.4	=	0.076	
600 - 1000	0.117	+	-4.725E-05	*	911.1	=	0.074	0.074
800 - 1500	0.101	+	-2.942E-05	*	911.1	=	0.074	
600 - 1000	0.117	+	-4.725E-05	*	968.9	=	0.071	0.072
800 - 1500	0.101	+	-2.942E-05	*	968.9	=	0.072	
1500 - 3000	0.07391	+	-1.156E-05	*	2615	=	0.044	0.044
2000 - 4000	0.06413	+	-7.70E-06	*	2615		0.044	

Table 4: **Mass Attenuation Coefficient by 2 Point Interpolation and Comparison to Mean Mass Attenuation Coefficient by Least Squares Fit**

Energy (keV)	Mass Attenuation Coefficient--- By 2 Point Interpolation (cm2/g)	Mean Mass Attenuation Coefficient---By Least Squares Fit (cm2/g)
200	0.137	
238.6	**0.130**	0.131
300	0.119	
300	0.119	
338.4	**0.114**	0.114
400	0.106	
500	0.0968	
510.8	**0.0960**	0.0954
600	0.0896	
500	0.0968	
583.1	**0.0908**	0.0906
600	0.0896	
800	0.0786	
860.4	**0.0762**	0.0760
1000	0.0707	
800	0.0786	
911.1	**0.0742**	0.0741
1000	0.0707	
800	0.0786	
968.9	**0.0719**	0.0719
1000	0.0707	
2000	0.0494	
2615	**0.0434**	0.0438
3000	0.0397	

Table 5: Linear Absorption Coefficient and Buildup Factor For 500 keV

Emission Energy (keV)	ux	B
500	1	2.63
	2	4.29
	4	9.05
	7	20.0
	10	35.9

Figure 2: Linear Absorption Coefficient versus Buildup Factor for 500 keV

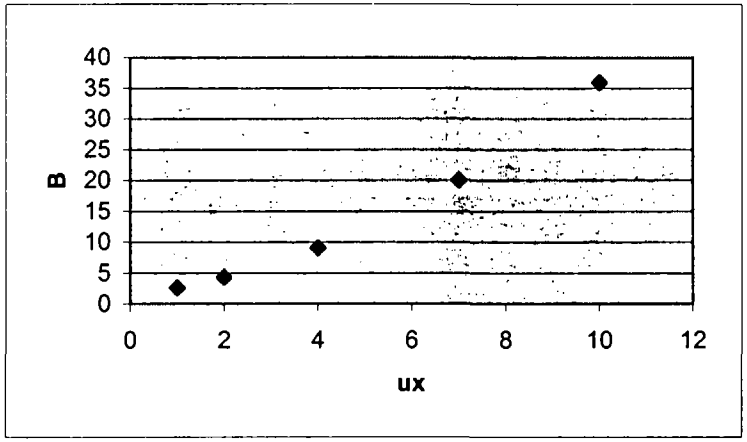


Table 6: Linear Absorption Coefficient and Buildup Factor For 1000 keV

Emission Energy (keV)	ux	B
1000	1	2.26
	2	3.39
	4	6.27
	7	11.5
	10	18.0

Figure 3: Linear Absorption Coefficient versus Buildup Factor for 1000 keV

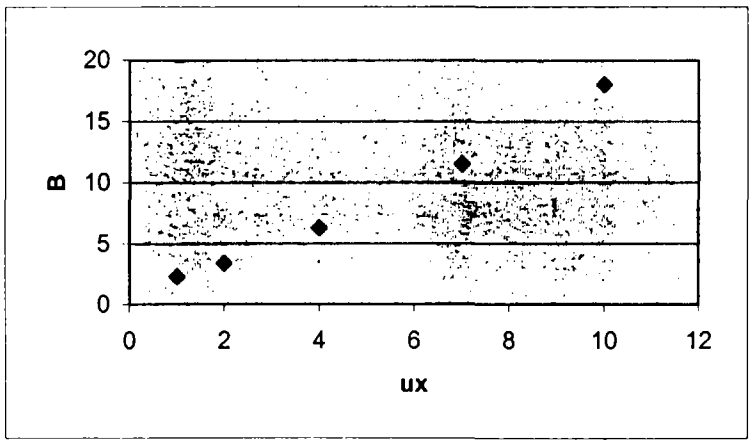


Table 7: Linear Absorption Coefficient and Buildup Factor For 2000 keV

Emission Energy (keV)	ux	B
2000	1	1.84
	2	2.63
	4	4.28
	7	6.96
	10	9.87

Figure 4: Linear Absorption Coefficient versus Buildup Factor for 2000 keV

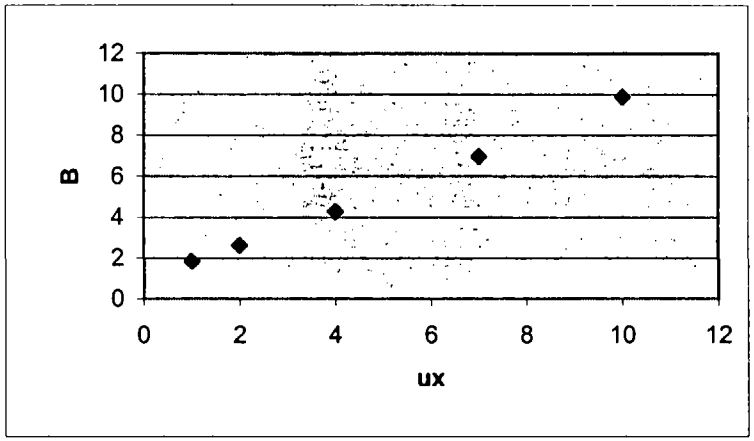


Table 8: Linear Absorption Coefficient and Buildup Factor For 3000 keV

Emission Energy (keV)	ux	B
3000	1	1.69
	2	2.31
	4	3.57
	7	5.51
	10	7.48

Figure 5: Linear Absorption Coefficient versus Buildup Factor for 3000 keV

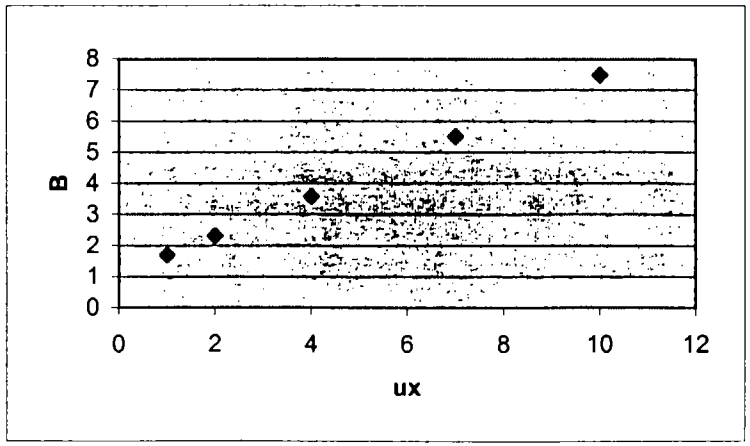


Table 9: Interpolated Plane Monodirectional Source Buildup Factor

Emission Energy (MeV)	Mean Emission Energy Mass Absorption Coefficient (u/p) (cm2/g)	Mean Emission Energy Linear Absorption Coefficient (ux) (unitless)	Interpolated Plane Source Buildup Factor (b) (unitless)
238.6	0.130	0.49550	0.86
338.4	0.114	0.43437	1.16
510.8	0.0960	0.36585	1.59
583.1	0.0908	0.34601	1.54
860.4	0.0762	0.29038	1.40
911.1	0.0742	0.28275	1.38
968.9	0.0719	0.27405	1.35
2615	0.0434	0.16549	1.13

ux = u/p * x * p

where

x = 3 inches = 7.62 cm

p = 1 g / cm3 = 1 g / cm3

Buildup Factor Interpolations

Buildup Factor Interpolations

Table 10: Buildup Factor Interpolations for 238.6 keV

	0	0.49550	1	2	a +	b *	ux	=		
0	0	0	0.00	0						
238.6	1	**0.86**								
500	1	**1.81**	2.63	4.29	0.995	1.64	0.49550	=	1.81	By Least Squares
					0	0.003615	238.6	=	0.86	By 2 points

Table 11: Buildup Factor Interpolations for 338.4 keV

	0	0.43437	1	2	a +	b *	ux	=		
0	0	**0.00**	0	0						
338.4	1	**1.16**								
500	1	**1.71**	2.63	4.29	0.995	1.64	0.43437	=	1.71	By Least Squares
					0	0.003415	338.4	=	1.16	By 2 points

Table 12: Buildup Factor Interpolations for 510.8 keV

	0	0.36585	1	2	a +	b *	ux	=		
500	1	**1.59**	2.63	4.29	0.995	1.64	0.36585	=	1.59	By Least Squares
510.8	1	**1.59**								
1000	1	**1.46**	2.26	3.39	1.02	1.20	0.36585	=	1.46	By Least Squares
					1.7309583	-0.000272	510.8	=	1.59	By 2 points

Table 13: Buildup Factor Interpolations for 583.1 keV

	0	0.34601	1	2	a +	b *	ux	=		
500	1	**1.56**	2.63	4.29	0.995	1.64	0.34601	=	1.56	By Least Squares
583.1	1	**1.54**								
1000	1	**1.44**	2.26	3.39	1.02	1.20	0.34601	=	1.44	By Least Squares
					1.689705	-0.000254	583.1	=	1.54	By 2 points

Table 14: Buildup Factor Interpolations for 860.4 keV

	0	0.29038	1	2	a +	b *	ux	=		
500	1	**1.47**	2.63	4.29	0.995	1.64	0.29038	=	1.47	By Least Squares
860.4	1	**1.40**								
1000	1	**1.37**	2.26	3.39	1.02	1.20	0.29038	=	1.37	By Least Squares
					1.5739823	-0.000206	860.4	=	1.40	By 2 points

Table 15: Buildup Factor Interpolations for 911.1 keV

	0	0.28275	1	2	a +	b *	ux	=		
500	1	**1.46**	2.63	4.29	0.995	1.64	0.28275	=	1.46	By Least Squares
911.1	1	**1.38**								
1000	1	**1.36**	2.26	3.39	1.02	1.20	0.28275	=	1.36	By Least Squares
					1.5581117	-0.000199	911.1	=	1.38	By 2 points

Table 16: Buildup Factor Interpolations for 968.9 keV

	0	0.27405	1	2	a +	b *	ux	=		
500	1	**1.44**	2.63	4.29	0.995	1.64	0.27405	=	1.44	By Least Squares
968.9	1	**1.35**								
1000	1	**1.35**	2.26	3.39	1.02	1.20	0.27405	=	1.35	By Least Squares
					1.5400186	-0.000191	968.9	=	1.35	By 2 points

Table 17: Buildup Factor Interpolations for 2615 keV

	0	0.16549	1	2	a +	b *	ux	=		
2000	1	**1.14**	1.84	2.63	1.01	0.815	0.16549	=	1.14	By Least Squares
2615	1	**1.13**								
3000	1	**1.12**	1.69	2.31	1.01	0.655	0.16549	=	1.12	By Least Squares
					1.197826	-0.000026	2615	=	1.13	By 2 points

Table 18: Ratio of Adjusted to Original Count Rate

Emission Energies (keV)	Interpolated Plane Source Buildup Factor (b) (unitless)	Emission Energy Mass Absorption Coefficient (u/p) (MeV)	Thickness of Water Absorber (x) (cm)	Density of Water (p) (g/cm3)	Yield (unitless)	Ratio, Absorbed Exposure Rate (unitless)
238.6	0.86	0.130	3.81	1	0.446	0.53
338.4	1.16	0.114	3.81	1	0.120	0.75
510.8	1.59	0.0960	3.81	1	0.216	1.10
583.1	1.54	0.0908	3.81	1	0.858	1.09
860.4	1.40	0.0762	3.81	1	0.120	1.05
911.1	1.38	0.0742	3.81	1	0.290	1.04
968.9	1.35	0.0719	3.81	1	0.175	1.03
2615	1.13	0.0434	3.81	1	0.998	0.96
					3.22	7.54

Ratio = X / Xo = B exp(-[u/p] * x * p)

Total counts at 7.2 pCi/g 5396 counts / 30 seconds
Total counts at 7.1 pCi/g 5321

5321 / 3.22 1652

Table 19: Adjusted Count Rate for Cleanup Criterion

A	B	C	D	E	F
Emission Energy (keV)	Yield (unitless)	1652 * Yield (unitless)	Ratio, Absorbed Exposure Rate (unitless)	Column C * Column D (unitless)	Column E / Column C
238.6	0.446	737	0.53	387	
338.4	0.120	198	0.75	148	
510.8	0.216	357	1.10	394	
583.1	0.858	1417	1.09	1546	
860.4	0.120	198	1.05	207	
911.1	0.290	479	1.04	497	
968.9	0.175	289	1.03	298	
2615	0.998	1649	0.96	1577	
	Total	5324	**Total**	5054	95%

Count rate equivalent to 7.1 pCi/g = 5054 counts per 30 seconds

Table 18: Ratio of Adjusted to Original Count Rate (ux =1 at x=0, and x = 3 inch)

Emission Energies (keV)	Interpolated Plane Source Buildup Factor (b) (unitless)	Emission Energy Mass Absorption Coefficient (u/p) (MeV)	Thickness of Water Absorber (x) (cm)	Density of Water (p) (g/cm3)	Yield (unitless)	Ratio, Absorbed Exposure Rate (unitless)
238.6	1.25	0.130	7.62	1	0.446	0.46
338.4	1.64	0.114	7.62	1	0.120	0.69
510.8	2.19	0.0960	7.62	1	0.216	1.05
583.1	2.08	0.0908	7.62	1	0.858	1.04
860.4	1.78	0.0762	7.62	1	0.120	1.00
911.1	1.74	0.0742	7.62	1	0.290	0.99
968.9	1.69	0.0719	7.62	1	0.175	0.98
2615	1.25	0.0434	7.62	1	0.998	0.90
					3.22	7.10

Ratio = X / Xo = B exp(-[u/p] * x * p)

Total counts at 7.2 pCi/g 5396 counts / 30 seconds
Total counts at 7.1 pCi/g 5321

5321 / 3.22 1652

Table 19: Adjusted Count Rate for Cleanup Criterion (ux=1 at x=0, and x = 3 inch)

A	B	C	D	E	F
Emission Energy (keV)	Yield (unitless)	1652 * Yield (unitless)	Ratio, Absorbed Exposure Rate (unitless)	Column C * Column D (unitless)	Column E / Column C
238.6	0.446	737	0.46	342	
338.4	0.120	198	0.69	136	
510.8	0.216	357	1.05	376	
583.1	0.858	1417	1.04	1478	
860.4	0.120	198	1.00	198	
911.1	0.290	479	0.99	473	
968.9	0.175	289	0.98	283	
2615	0.998	1649	0.90	1477	
	Total	5324	**Total**	4762	89%

Count rate equivalent to 7.1 pCi/g = 4762 counts per 30 seconds

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

JAN 07 2003

SE-5J

VIA FACSIMILE (847) 279-2510 AND U.S. MAIL

Mr. Richard Berggreen
STS Consultants, Ltd.
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061

RE: Lakeshore East Borehole Calculation Adjustment for Water

Dear Mr. Berggreen:

Enclosed is a copy of a memorandum that details the calculations to adjust for water surrounding the borehole casings for the sampling work performed on October 29, 2002. These calculations show there were nine data points that exceeded the modified cleanup criterion. According to the development plans that have been presented to U.S. EPA, this portion of the property will be a public park owned by the City of Chicago. Therefore, your options are as follows:

1. Excavate the contaminated material;

2. Leave the contaminated material in place and implement institutional controls with the City of Chicago to prevent uncontrolled exposure and dispersion.

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If you would like to discuss this matter further, please contact me at (312) 886-3601 or Mary Fulghum, Associate Regional Counsel, at (312) 886-4683.

Sincerely,

Verneta Simon

Verneta Simon
On-Scene Coordinator

Enclosure

cc: Naren Prasad, Chicago Department of Environment

U.S. ENVIRONMENTAL PROTECTION AGENCY
SUPERFUND DIVISION
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

DATE: January 6, 2003

SUBJECT: Adjustment of Criterion for Borehole Measurements Below Groundwater at Lakeshore East Due to Water Around Borehole Casing

FROM: Larry Jensen, CHP
Regional Radiation Expert
Emergency Response Section #3

TO: Fred Micke
On-Scene Coordinator
Emergency Response Section #3

Verneta Simon
On-Scene Coordinator
Emergency Response Section #3

During the Removal Action at Lakeshore East, the Potentially Responsible Party's contractor, STS Consultants, reached groundwater before they had completely removed all the thorium contaminants. Because of the difficulty of locating these materials under water and because of the difficulty of ensuring that all contaminants were removed, they drove four borings into the area and conducted gamma logging (see attached map for locations).

Their data was based on calibrations for a borehole casing of steel pipe but did not allow for water between the casing and the surrounding soil. As a result, their coefficient corresponding to the cleanup criterion (5396 counts per 30 seconds for 7.2 picocuries per gram) was not directly usable for determining if subsurface material exceeded the criterion for cleanup.

In this memo I describe how I adjusted their coefficient to include 3 inches of water absorber (worst case as requested by Fred Micke, On-Scene Coordinator) and to adjust the coefficient to the Lakeshore East cleanup criterion (7.1 pCi/g). The new coefficient is 3176 counts per 30 seconds per 7.1 picocuries per gram.

As a result of this information, nine data points were found to exceed the criterion for cleanup. Specifically,

BOREHOLE	DEPTH (FEET)	MEASURED COUNT RATE (COUNTS / 30 SECONDS)
EE1	16.5	3441
EE3	7	3274
	7.5	4169
	8	4395
	8.5	3423
EE4	5.5	3624
	6	4036
	6.5	3845
	7	3514

Adjusted Cleanup Criterion = 3176 counts per 30 seconds at 7.1 picocuries per gram

Adjustment of Cleanup Criterion to Include 3 Inches of Water

Overview of Adjustment

When gamma rays impact a medium, such as water, there will be absorption but there may also be some enhancement (or buildup). The result is found by multiplying the incoming level by an absorption factor and by a buildup factor. The effect will vary depending on the energy of the gamma ray. The total or net effect will be the sum of the individual energy-dependent values.

The equation for this calculation is not complicated. However, the parameters that go into the equation cannot be determined by direct calculation, but must be interpolated from data tables. Most of the work necessary to calculate an answer for this problem was spent interpolating from available data sets.

The result was a modified parameter corresponding count rate per 30 seconds to the site cleanup criterion, 7.1 picocuries per gram (pCi/g).

Method for Calculation of Adjusted Criterion Count Rate

The fundamental equation for this calculation was taken from the Radiological Health Handbook published by the Department of Health, Education and Welfare. However, it can be found in academic and reference texts, as well as on the internet. Specifically,

$$X = X_o * B * \exp(-ux)$$

where

X = the corrected count rate (counts per 30 seconds, c/30s)

X_o = the *uncorrected count rate (c/30s)*

B = Buildup Factor (unitless)

exp = base of natural logarithms

u = Linear Absorption Coefficient (cm^{-1})

x = absorber thickness (cm)

and further

$$ux = u/p * x * p$$

where

u/p = Mass Attenuation Coefficient (cm^2/g)

x = thickness of absorber (cm)

p = density of absorber (g/cm^3)

Calculation of Mass Attenuation Coefficients

The Radiological Health Handbook contains tables with Mass Attenuation Coefficients by gamma ray energy for a water absorber (see Table 2). The Mass Attenuation Coefficients corresponding to the principal thorium gamma ray energies (see Table 1) were found by interpolation (see Tables 3 and 4). [Gamma-ray energies were taken from Publication 38 of the International Commission on Radiological Protection, "Radionuclide Transformations, Energy and Intensity of Emissions"] The Mass Attenuation Coefficients were used to calculate the Linear Attenuation Coefficients by multiplying by the water thickness (3 inches or 7.62 centimeters) and by the density of water (1 gram per cubic centimeter) [see Table 9].

Interpolation for the Mass Attenuation Coefficients was done by two methods. As can be seen from Figure 1, the curve of Mass Attenuation Coefficient versus energy is quite concave so that there could not be any linear interpolation over many data points. It was decided to try both a least squares fit over 3 points and an interpolation over two points. The results were compared.

Table 3 shows a Least Squares Fit over three points surrounding the thorium energy. The data for the Least Square Fit came from Table 2. For example, when the energy range was selected as 150 - 300 keV, the Mass Attenuation Coefficient points were those for 150, 200 and 300 keV. The Least Squares Fit calculation was done using the website at www.physics.csbsju.edu/stats/QF_NROW_form.html.

Each Least Squares Fit was done twice, once where two points were below the thorium gamma energy and again when two points were above the thorium gamma energy. Results for these two calculations were averaged. For example with the thorium energy 238.6 keV. the Mass Attenuation Coefficients at 150, 200 and 300 keV were used in a Least Squares Fit . Then the Mass Attenuation Coefficients at 200, 300 and 400 keV were used in another Least Square Fit. The two results were averaged. These results are given in Tables 3 and 4. The two methods compare very well.

Calculation of Linear Absorption Coefficients

Interpolation for the Buildup Factors was more complicated. First the Mass Attenuation Coefficients were used to compute the Linear Absorption Coefficients by the equation

$$ux = (u/p) * x * p$$

where

u = Linear Absorption Coefficient
u/p = Mass Attenuation Coefficient
x = thickness of absorber
p = density of absorber

For each thorium energy, the Mass Attenuation Coefficient from Table 4 was used with a water thickness of 3 inches (7.62 centimeters) and a water density of 1 gram per cubic centimeter to compute the Linear Absorption Coefficients shown in Table 9.

It can be seen from Figures 2 - 5 that the Linear Absorption Coefficients are very close to linearly varying. [Data was taken from the Radiological Health Handbook.]

Calculation of Buildup Factors

Further interpolation was necessary to obtain the Buildup Factors corresponding to the thorium gamma-ray energy. Data for Buildup Factors corresponding to Linear Absorption Coefficients was given in the Radiological Health Handbook. These are tabulated in Tables 10 - 17. On the left side of these tables there is a box where the absorption factor is across the top (ux = 0, 1, 2) and the gamma-ray energy is on the left. There were no Buildup Factors for energies less than 500 kilo-electron volts (keV) so, for the purposes of interpolation, it was assumed that the Buildup Factor was zero at zero energy.

First, Least Squares Fits were done for gamma-ray energies above and below the thorium gamma-ray energy. See, for example, Table 12 where fits were made for 500 keV and for 1000 keV. The Least Squares Fit equations are on the right side of the table [e.g., 0.162 + 2.14 (0.73169)]. These give the Buildup Factors for each energy.

The Buildup Factors computed by Least Squares Fit were then used with 2 point interpolation to get the Buildup Factor corresponding to the thorium gamma-ray energy. See, for example, Table 12 where 1.73 and 1.43 were computed for 500 and 1000 keV and used to get 1.72, the Buildup Factor for 510.8 keV. The Buildup Factors computed in this manner were tabulated on the right side of Table 9.

Adjustment to Cleanup Criterion

When calibrations were done by STS Consultants for the downhole logging probes, the criterion was based on 7.2 pCi/g. Since the cleanup criterion for Lakeshore East is 7.1 pCi/g, a slight adjustment had to be made by ratioing (7.1/7.2). The adjusted count rate is 5321 counts per 30 seconds. This calculation can be found below Table 18.

Adjustment for Yield

Since the adjustment for count rate is energy dependent, it was necessary to find out what fraction of the total count rate corresponded to each emission energy. First, the fraction of each radioactive decay corresponding to a thorium gamma-ray energy was found. For example, when lead-212 decays, a gamma-ray with an energy of 238.6 keV is emitted 44.6% of the time. These values, called Yields, are tablulated in Tables 18 and 19.

The total Yield is the sum of the individual Yields. Table 18 shows the total Yield for the Thorium Decay Series is 3.22 emissions. Below Table 18 a calculation is made that shows, at the cleanup criterion level of 5321 counts per 30 seconds, each emission is 1652 counts per 30 seconds. When this number is multiplied by the individual yields, the count rate corresponding to the cleanup criterion is found. These are tabulated in Table 19 under Column C. As a check, the column was added and agreed well within small roundoff errors (5324 versus 5321).

Changes in Exposure Rate Due to Absorption and Buildup

The equation listed at the beginning of this attachment can be adjusted to give the ratio of the initial count rate to the count rate after absorption and buildup.

$$X / X_o = B \exp(-[u/p] * x * p)$$

where

X / X_o = ratio of initial count rate to count rate after absorption and buildup (unitless)

B = Buildup Factor (unitless)

exp = base of natural logarithms

u/p = Mass Attenuation Coefficient (cm^2)

x = thickness of absorber (cm)

p = density of absorber (g/cm^3)

Table 18 shows the input factors for this calculation at each energy and gives the ratio in the far right column.

Adjusted Count Rate

In Table 19 the initial count rates, by energy, are listed in Column C. When these are mulitiplied by the ratios, X / X_o, in Column D the adjusted count rate by energy is obtained. The sum of the adjusted, energy dependent, count rates is 3176 counts per 30 seconds.

3176 counts per 30 seconds is the count rate for 7.1 pCi/g, corrected for 3 inches of water.

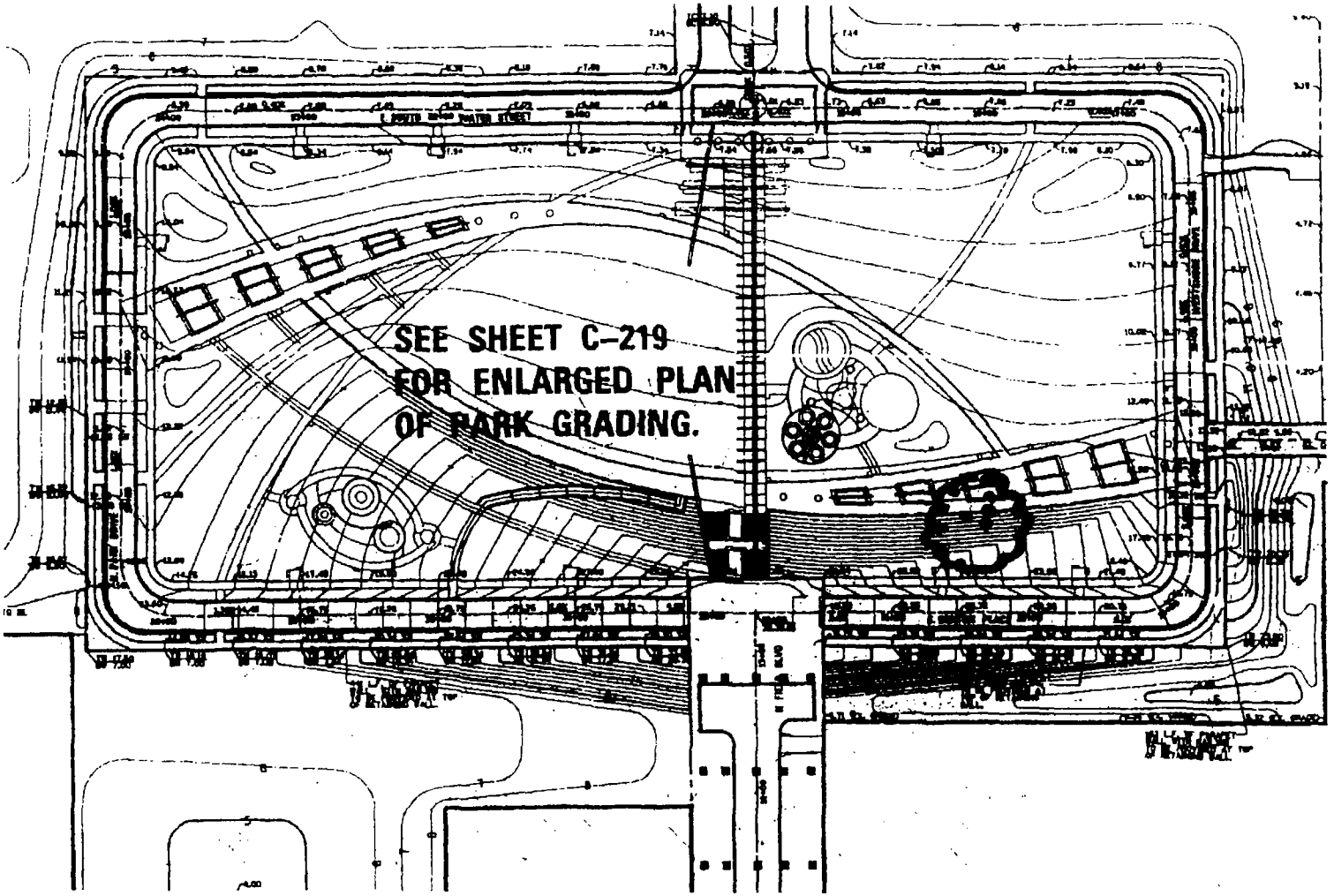
SEE SHEET C-219
FOR ENLARGED PLAN
OF PARK GRADING.

Table 1: Thorium Gamma Emission Energies and Yields

Radio-nuclide	Emission Energies (keV)	Yield (unitless)
Pb-212	238.6	0.446
Ac-228	338.4	0.120
Tl-208	510.8	0.216
Tl-208	583.1	0.858
Tl-208	860.4	0.120
Ac-228	911.1	0.290
Ac-228	968.9	0.175
Tl-208	2615	0.998

From: Publication 38
International Commission on Radiological Protection
"Radionuclide Transformations, Energy and Intensity of Emissions"

Table 2: Mass Attenuation Coefficients

Emission Energy (keV)	Mass Attenuation Coefficient (cm^2/g)
100	0.171
150	0.151
200	0.137
300	0.119
400	0.106
500	0.0968
600	0.0896
800	0.0786
1000	0.0707
1500	0.0575
2000	0.0494
3000	0.0397
4000	0.0340

From: Radiological Health Handbook

Figure 1: Mass Attenuation Coefficients versus Gamma Emission Energy

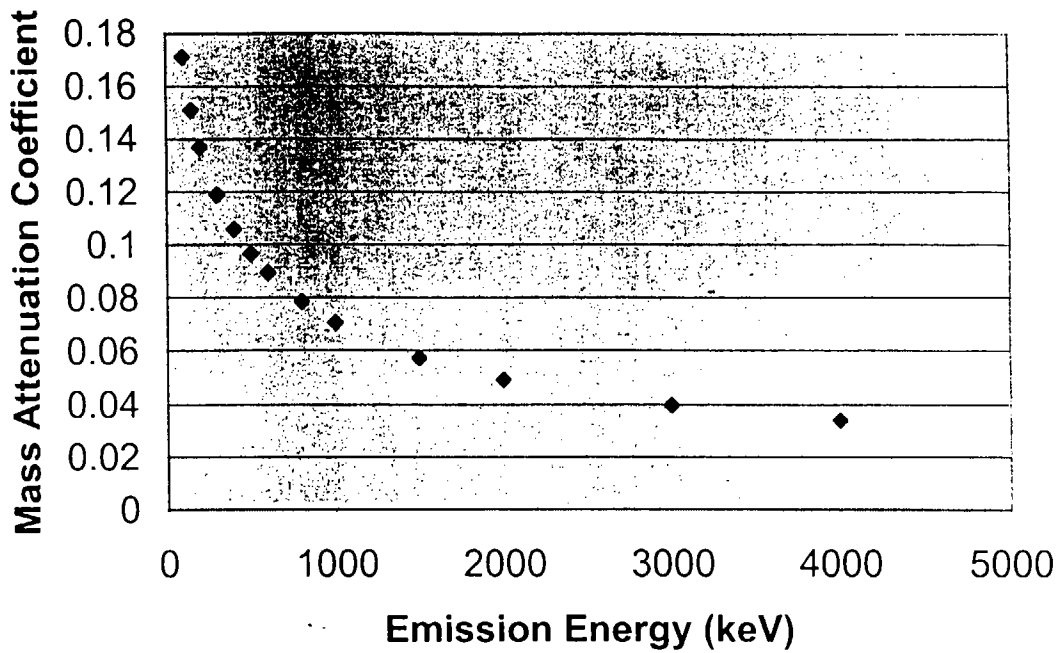

Table 3: Least Squares Fit for Mass Attenuation Coefficient

Energy Range for Least Squares Fit (keV)	Least Squares Fit a	+	b	*	Emission Energy (keV)	=	Mass Attenuation Coefficient (cm2/g)	Mean Mass Attenuation Coefficient (cm2/g)
150 - 300	0.181	+	-2.086E-04	*	238.6	=	0.131	0.131
200 - 400	0.167	+	-1.550E-04	*	238.6	=	0.130	
200 - 400	0.167	+	-1.550E-04	*	338.4	=	0.115	0.114
300 - 500	0.152	+	-1.110E-04	*	338.4	=	0.114	
400 - 600	0.152	+	-1.110E-04	*	510.8	=	0.095	0.095
500 - 800	0.126	+	-5.986E-05	*	510.8	=	0.095	
400 - 600	0.138	+	-8.200E-05	*	583.1	=	0.090	0.091
500 - 800	0.126	+	-5.986E-05	*	583.1	=	0.091	
600 - 1000	0.117	+	-4.725E-05	*	860.4	=	0.076	0.076
800 - 1500	0.101	+	-2.942E-05	*	860.4	=	0.076	
600 - 1000	0.117	+	-4.725E-05	*	911.1	=	0.074	0.074
800 - 1500	0.101	+	-2.942E-05	*	911.1	=	0.074	
600 - 1000	0.117	+	-4.725E-05	*	968.9	=	0.071	0.072
800 - 1500	0.101	+	-2.942E-05	*	968.9	=	0.072	
1500 - 3000	0.07391	+	-1.156E-05	*	2615	=	0.044	0.044
2000 - 4000	0.06413	+	-7.70E-06	*	2615		0.044	

Table 4: Mass Attenuation Coefficient by 2 Point Interpolation and Comparison to Mean Mass Attenuation Coefficient by Least Squares Fit

Energy (keV)	Mass Attenuation Coefficient--- By 2 Point Interpolation (cm2/g)	Mean Mass Attenuation Coefficient---By Least Squares Fit (cm2/g)
200	0.137	
238.6	**0.130**	0.131
300	0.119	
300	0.119	
338.4	**0.114**	0.114
400	0.106	
500	0.0968	
510.8	**0.0960**	0.0954
600	0.0896	
500	0.0968	
583.1	**0.0908**	0.0906
600	0.0896	
800	0.0786	
860.4	**0.0762**	0.0760
1000	0.0707	
800	0.0786	
911.1	**0.0742**	0.0741
1000	0.0707	
800	0.0786	
968.9	**0.0719**	0.0719
1000	0.0707	
2000	0.0494	
2615	**0.0434**	0.0438
3000	0.0397	

Table 5: Linear Absorption Coefficient and Buildup Factor For 500 keV

Emission Energy (keV)	ux	B
500	1	2 63
	2	4 29
	4	9 05
	7	20 0
	10	35 9

Figure 2: Linear Absorption Coefficient versus Buildup Factor for 500 keV

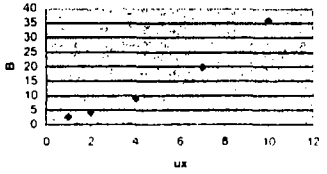

Table 6: Linear Absorption Coefficient and Buildup Factor For 1000 keV

Emission Energy (keV)	ux	B
1000	1	2 26
	2	3 39
	4	6 27
	7	11 5
	10	18 0

Figure 3: Linear Absorption Coefficient versus Buildup Factor for 1000 keV

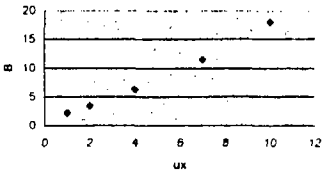

Table 7: Linear Absorption Coefficient and Buildup Factor For 2000 keV

Emission Energy (keV)	ux	B
2000	1	1 84
	2	2.63
	4	4 28
	7	6 96
	10	9 87

Figure 4: Linear Absorption Coefficient versus Buildup Factor for 2000 keV

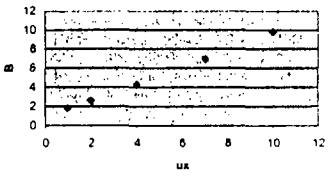

Table 8: Linear Absorption Coefficient and Buildup Factor For 3000 keV

Emission Energy (keV)	ux	B
3000	1	1 69
	2	2.31
	4	3 57
	7	5 51
	10	7 48

Figure 5: Linear Absorption Coefficient versus Buildup Factor for 3000 keV

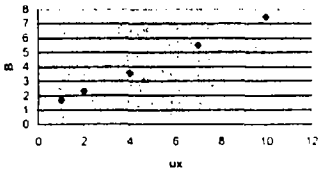

Table 9 Interpolated Plane Monodirectional Source Buildup Factor

Emission Energy (MeV)	Mean Emission Energy Mass Absorption Coefficient (u/p) (cm2/g)	Mean Emission Energy Linear Absorption Coefficient (ux) (unitless)	Interpolated Plane Source Buildup Factor (b) (unitless)
238.6	0.130	0.99100	1.09
338.4	0.114	0.86874	1.37
510.8	0.0960	0.73169	1.72
583.1	0.0908	0.69202	1.60
860.4	0.0762	0.58075	1.24
911.1	0.0742	0.56549	1.19
968.9	0.0719	0.54809	1.13
2615	0.0434	0.33097	0.58

ux = u/p * x * p

where

x = 3 inches = 7.62 cm

p = 1 g / cm3 = 1 g / cm3

Buildup Factor Interpolations

Table 10 Buildup Factor Interpolations for 238.6 keV

	0	0.99100	1	2	a +	b *	ux	=	
0	0	0	0.00	0					
238.6	0	1.09							
500	0	2.28	2.63	4.29	0.162	2.14	0.99100	=	2.28
					0	0.004565	238.6	=	1.09

Table 11: Buildup Factor Interpolations for 338.4 keV

	0	0.86874	1	2	a +	b *	ux	=	
0	0	0.00	0	0					
338.4	0	1.37							
500	0	2.02	2.63	4.29	0.162	2.14	0.86874	=	2.02
					0	0.004042	338.4	=	1.37

Table 12 Buildup Factor Interpolations for 510.8 keV

	0	0.73169	1	2	a +	b *	ux	=	
500	0	1.73	2.63	4.29	0.162	2.14	0.73169	=	1.73
510.8	0	1.72							
1000	0	1.43	2.26	3.39	0.188	1.70	0.73169	=	1.43
					2.023762	-0.000592	510.8	=	1.72

Table 13: Buildup Factor Interpolations for 583.1 keV

	0	0.69202	1	2	a +	b *	ux	=	
500	0	1.64	2.63	4.29	0.162	2.14	0.69202	=	1.64
583.1	0	1.60							
1000	0	1.36	2.26	3.39	0.188	1.70	0.69202	=	1.36
					1.921422	-0.000557	583.1	=	1.60

Table 14 Buildup Factor Interpolations for 860.4 keV

	0	0.58075	1	2	a +	b *	ux	=	
500	0	1.40	2.63	4.29	0.162	2.14	0.58075	=	1.40
860.4	0	1.24							
1000	0	1.18	2.26	3.39	0.188	1.70	0.58075	=	1.18
					1.534341	-0.000459	860.4	=	1.24

Table 15 Buildup Factor Interpolations for 911.1 keV

	0	0.56549	1	2	a +	b *	ux	=	
500	0	1.37	2.63	4.29	0.162	2.14	0.56549	=	1.37
911.1	0	1.19							
1000	0	1.15	2.26	3.39	0.188	1.70	0.56549	=	1.15
					1.594969	-0.000446	911.1	=	1.19

Table 16: Buildup Factor Interpolations for 968.9 keV

	0	0.54809	1	2	a +	b *	ux	=	
500	0	1.33	2.63	4.29	0.162	2.14	0.54809	=	1.33
968.9	0	1.13							
1000	0	1.12	2.26	3.39	0.188	1.70	0.54809	=	1.12
					1.550085	-0.000430	968.9	=	1.13

Table 17: Buildup Factor Interpolations for 2615 keV

	0	0.33097	1	2	a +	b *	ux	=	
2000	0	0.61	1.84	2.63	0.175	1.32	0.33097	=	0.61
2615	0	0.58							
3000	0	0.56	1.69	2.31	0.178	1.15	0.33097	=	0.56
					0.718412	-0.000053	2615	=	0.58

Table 18: Ratio of Adjusted to Original Count Rate

Emission Energies (keV)	Interpolated Plane Source Buildup Factor (b) (unitless)	Emission Energy Mass Absorption Coefficient (u/p) (MeV)	Thickness of Water Absorber (x) (cm)	Density of Water (p) (g/cm3)	Yield (unitless)	Ratio, Absorbed Exposure Rate (unitless)
238.6	1.09	0.130	7.62	1	0.446	0.40
338.4	1.37	0.114	7.62	1	0.120	0.57
510.8	1.72	0.0960	7.62	1	0.216	0.83
583.1	1.60	0.0908	7.62	1	0.858	0.80
860.4	1.24	0.0762	7.62	1	0.120	0.69
911.1	1.19	0.0742	7.62	1	0.290	0.68
968.9	1.13	0.0719	7.62	1	0.175	0.66
2615	0.58	0.0434	7.62	1	0.998	0.42
					3.22	5.05

Ratio = X / Xo = B exp(-[u/p] * x * p)

Total counts at 7.2 pCi/g 5396 counts / 30 seconds
Total counts at 7.1 pCi/g 5321

5321 / 3.22 1652

Table 19: Adjusted Count Rate for Cleanup Criterion

A	B	C	D	E	F
Emission Energy (keV)	Yield (unitless)	1652 * Yield (unitless)	Ratio, Absorbed Exposure Rate (unitless)	Column C * Column D (unitless)	Column E / Column C
238.6	0.446	737	0.40	298	
338.4	0.120	198	0.57	114	
510.8	0.216	357	0.83	296	
583.1	0.858	1417	0.80	1133	
860.4	0.120	198	0.69	137	
911.1	0.290	479	0.68	324	
968.9	0.175	289	0.66	189	
2615	0.998	1649	0.42	686	
	Total	5324	**Total**	3176	60%

Count rate equivalent to 7.1 pCi/g = 3176 counts per 30 seconds

STS CONSULTANTS

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November 6, 2002

Mr. Fred Micke, On-Scene Coordinator
Ms. Verneta Simon, On-Scene Coordinator
U. S. Environmental Protection Agency
Region 5
77 W. Jackson Blvd., SE-5J
Chicago, Illinois 60604

RE: Exploration for Radiological Impacts Below Groundwater, Lakeshore East, 221 N. Columbus Drive, Chicago, Illinois – STS Project No. 1-32193-XC

Dear Mr. Micke and Ms. Simon:

As you know, remediation of radiologically-impacted soil is in progress at the Lakeshore East site at 221 N. Columbus Drive, Chicago, Illinois. This work is being conducted in accordance with a Work Plan approved by USEPA on September 20, 2002.

In the course of the previously completed investigation at the site and during the current remediation, radiologically-impacted soil was found to extend below the level of groundwater. The Work Plan allows for impacted material to remain below the groundwater provided the location is documented and appropriate notice is made, the wording of which is to be resolved between the site owner and USEPA.

Following the identification of this material below the groundwater during remediation, efforts to remove the impacted material consisted of excavating to approximately 4 feet below the water table. At that point, no further excavation was practical because of unstable sideslopes. A decision was made to assess the material through a subsurface, downhole gamma survey.

The gamma survey was completed as follows. The area suspected of containing impacted soil below the water table was filled with clean soil. The fill was placed to approximately 2 feet above the level of water in the excavation. Based on survey measurements, the elevation of the water table is estimated at -0.65 feet CCD. A drill rig was mobilized to the site and hollow-stem augers were advanced to a depth of approximately 20 feet. A 3-inch diameter steel casing was placed inside the augers, and the augers were withdrawn. The resulting borehole consisted of an approximately 6-inch borehole with a 3-inch casing. Groundwater entered the annular space between the borehole wall and the casing. The inside of the casing was dry.

The gamma survey was taken in 6-inch increments using a Ludlum 2221 rate meter-scaler and a 2 x 2 inch NaI model 44-10 probe. The probe was fitted with a 1-inch lead end cap and a ¼-inch lead ring around the detector. This configuration is consistent with the configuration recently calibrated at the Kerr-McGee West Chicago calibration blocks, in cooperation with USEPA, for use with the steel casing. However, it is recognized that the configuration of the borehole is somewhat different than the calibration conditions. Specifically, the borehole is larger than the exterior of the casing, allowing an annular space. Additionally, this annular space is filled with water below a depth of 2 to 3 feet from the top of the survey. The annular space and presence of water are recognized as conditions that will reduce the gamma readings measured inside the casing. As a result, some value less than the calibrated threshold value would represent an exceedance of the cleanup criteria of 7.1 pCi/g. For the calibration conducted August 7, 2002, the exceedance reading was 5,396 counts for 30 seconds.

Four borings were advanced and four separate steel casings were installed. The attached Figure 1 shows the layout of the borings on an enlarged section of the fill isopach drawing. The borings are generally within approximately 8 to 10 feet of each other, over an area approximately 19 feet from north to south and 17 feet from east to west.

The downhole gamma readings show typically low gamma 30-second counts from 1,200 to about 2,000 in the upper 4 to 6 feet, generally, the clean fill placed in the previous excavation. The highest readings measured in each boring was between 6 to 8 feet deep: 2,910 in Boring No. 1 at 6 feet; 2,794 in Boring No. 2 at 7 feet; 4,395 in Boring No. 3 at 8 feet; and 4,036 in Boring No. 4 at 6 feet. Below these maxima, the readings return to reading in the range of 2,000 to 3,000 or lower, similar to the soil above the maximum readings. Table 1 shows the gamma values measured. Table 2 presents the boring coordinates.

The downhole survey data indicates a thin zone of material is present several feet below the groundwater table which exhibits elevated gamma radiation. While calibration values are not directly applicable, no readings were found showing an exceedance of the cleanup threshold. The highest reading is approximately 80 percent of the value indicating an exceedance.

It is requested that the USEPA accept the remediation that has been completed at this location and the downhole survey results provided herein as sufficient cleanup and documentation for this exclusion zone. In making this consideration, please note that this area lies within the previously designated Slip E area. The slip areas have been specified by USEPA as continuing to be subject to soil monitoring anytime excavation occurs for foundation installation, utility installation or any other purpose. Further, this specific area is proposed to be covered by an earthen berm approximately 15 to 20 feet high. Finally, the area is beneath a proposed roadway or in the proposed park, suggesting little likelihood that construction in the proposed development will penetrate this material.

Therefore, given the existing conditions and proposed construction, no further remediation appears necessary, no deed restriction beyond that already anticipated for the slip areas is necessary and no additional exploration is required to close this location.

Please contact us with any questions you may have regarding this information.

Regards,

STS CONSULTANTS, LTD.

Steven C. Kornder, Ph.D.
Senior Geochemist

Richard G. Berggreen, C.P.G.
Principal Geologist

cc: David Carlins, Kara Hughes, Lakeshore East Development

Attachments: Boring Layout Figure 1
Table 1 – Downhole Boring Log
Table 2 – Exploration Borings in Former Slip E

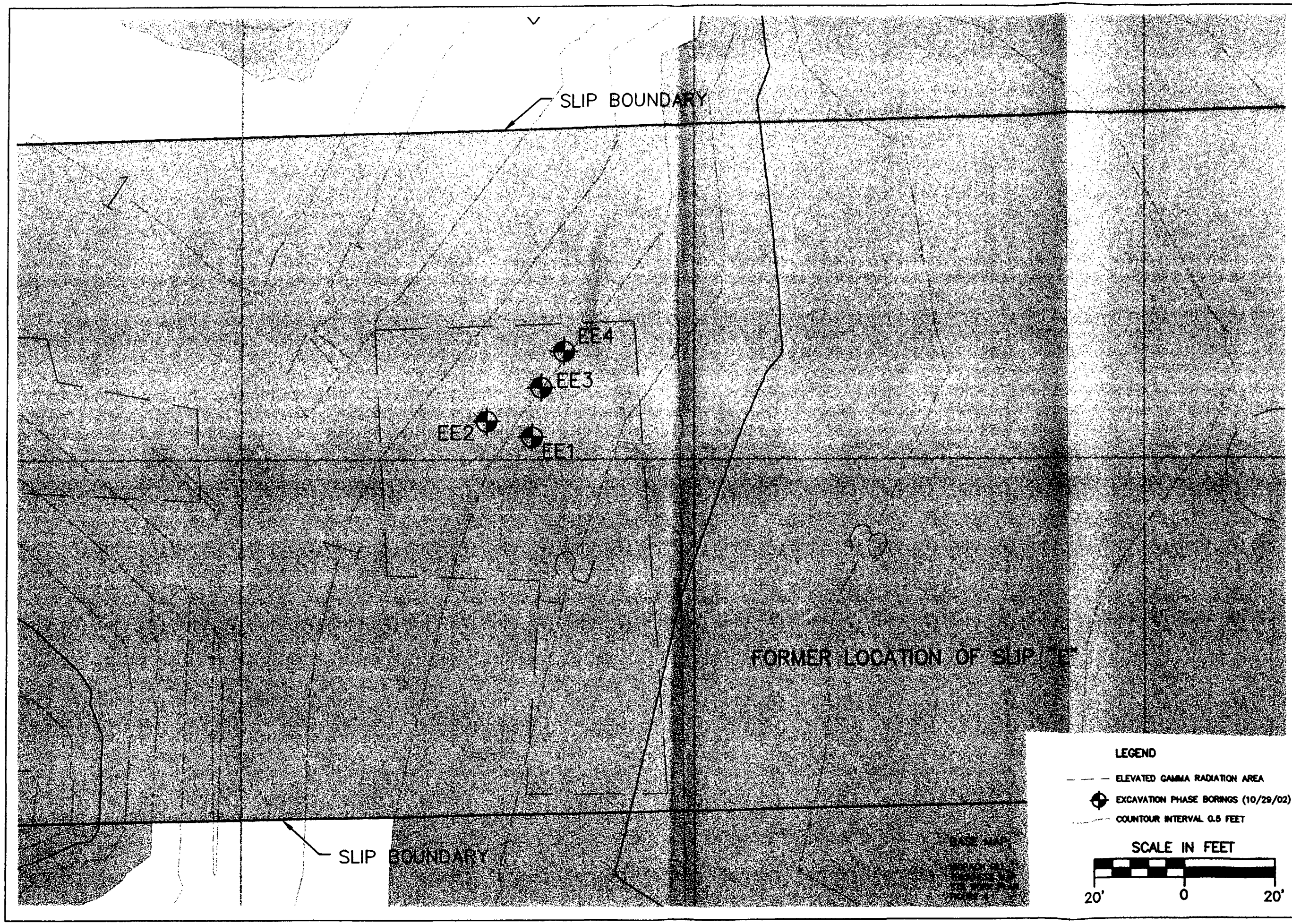
Table 1
Downhole Boring Log
Lakeshore East Site

Inst Model:	Ludlum 2221	**Date:**	10/29/02
Serial #:	126497	**Technician:**	Jerry Krane
Probe Model:	PR 44-10	**Calbr. Date:**	8/7/02
Serial #:	171991	**7.2pCi/g =**	5396 cts/30 sec
Probe Config:	Shielded 2X2 NaI w/ 1" endcap & ¼" ring around detector.		

Depth (ft)	Boring Number (counts per 30 seconds)			
	EE1	EE2	EE3	EE4
0.5	1401	1200	1376	1423
1	1432	1276	1573	1747
1.5	1477	1278	1655	1792
2	1552	1267	1911	1833
2.5	1371	1362	2009	1873
3	1359	1366	2033	1881
3.5	1170	1335	2010	1965
4	1294	1392	1886	2202
4.5	1915	1407	1640	2421
5	2519	1379	1724	2840
5.5	2693	1495	1931	3624
6	2910	1686	2013	4036
6.5	2684	2680	2445	3845
7	2534	2794	3274	3514
7.5	2428	2420	4169	3081
8	2209	2014	4395	2713
8.5	2162	2044	3423	2526
9	2106	2047	2592	2547
9.5	2273	2163	2393	2664
10	2161	2108	2429	2908
10.5	2235	2229	2614	2744
11	2125	2234	2257	2743
11.5	2312	2285	2115	2515
12	2319	2278	2364	2353
12.5	2126	2544	2420	2224
13	2179	2495	2324	1946
13.5	2423	2479	2639	1864
14	2669	2335	2627	1966
14.5	2871	2268	2205	2076
15	2801	2283	2132	2165
15.5	2790	2165	2049	2085
16	2688	2081	2137	1992
16.5	3441	1939	2156	1999
17	2579	2019	2297	2087
17.5	2658	2407	2598	2143
18	2403	2576	2483	1865
18.5	2182	2292	2357	1749
19	1924	1807	1957	1731
19.5		1667	1970	1594
20				1320

Table 2
Exploration Borings in Former Slip E - 10/29/02
Lakeshore East Site

Location	Coordinates	
	Northing (ft)	Easting (ft)
EE1	18805	21664
EE2	18808.5	21654
EE3	18816	21666
EE4	18824	21671



LOCATION OF CASINGS FOR GAMMA SURVEY
LAKESHORE EAST
221 N. COLUMBUS DRIVE
CHICAGO, ILLINOIS

DESIGNED BY SCK DATE 11/05/02
DRAWN BY PVP DATE 11/05/02
APPROVED BY RGB DATE 11/05/02

STS PROJECT NUMBER 32193-XC
STS PROJECT FILE GG-132193-1.dwg
SCALE 1"=20'
FIGURE NO. 1

STS CONSULTANTS

STS Consultants, Ltd
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3153

voice 847-279-2500
fax 847-279-2510
web www.stsconsultants.com

December 13, 2002

Mr. Fred Micke, On-Scene Coordinator
Ms. Verneta Simon, On-Scene Coordinator
US Environmental Protection Agency
Region 5
77 W. Jackson Blvd., SE-5J
Chicago, Illinois 60604

RE: Elevated Gamma Readings Attributed to Granite Paving Stones, Lakeshore East Remediation Project, 221 North Columbus Drive, Chicago, Illinois—STS Project No. 32193-XC

Dear Mr. Micke and Ms. Simon:

This letter is a follow-up to our telephone conversation of this date. Please recall that in the Phase III lift survey work currently being conducted at the Lakeshore East site, we advised you that we had encountered an area with gamma readings at the level indicative of an exceedance of the cleanup threshold. Upon further exploration, this area was found to be underlain by an in-place pavement of granite blocks. The readings were on the order of 20,000 counts per minute (CPM), which is the level indicative of activity equal to 7.1 pCi/g total radium.

To evaluate whether these readings were due to the granite or possibly impacted material below the paving stones, a small area of stone blocks was removed and the underlying base material surveyed. That material showed much lower readings, on the order of 8,000 to 10,000 CPM. Surveying the pile of stones resulted in readings of 20,000 to 25,000 CPM. It was apparent that the elevated readings were due to the granite, and not other soil or fill materials.

We proposed, and you concurred, that this material does not have to be managed as radiologically impacted. No special handling or disposal requirements will apply to these granite blocks. We have reserved a pile for your inspection when you next visit the site. Additionally, based on your agreement, these areas will not be treated as exclusion zones and no access restrictions will apply.

At your convenience, please provide a brief note indicating your concurrence with the contents of this letter, or any comments you may have to revise or clarify issues regarding this matter. Thank you for your attention to this matter.

Regards,

STS CONSULTANTS, LTD.

Steven C. Kornder, Ph.D.
Senior Geochemist

Richard G. Berggreen, C.P.G.
Principal Geologist

Cc: Kara Hughes, Lakeshore East
John Anderson, Holmes Testing
Glen Huber, SAHCI

APPENDIX H

Soil Sample Analyses

a. Radiological

i. NUTRANL
ii. RSSI Gamma Spectroscopy

a. **Radiological**

i. NUTRANL

Exclusion Zone Analyses

Nutranl - Exclusion Zone Analyses
Lakeshore East
221 North Columbus Drive, Chicago, Illinois
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
15	10/10/2002	exclusion zone	S2000 P-17	29.7	7.79	4.22	2.01	1.09	2.78	1.53	4.79	1.878563281
16	10/10/2002	exclusion zone	S2001 N-19	30.6	-1.56	2.94	2.87	0.81	1.86	1.1	4.73	1.366052708
17	10/10/2002	exclusion zone	S2002 J-16	29.1	-38.61	25.81	274.36	6.6	112.19	8.29	386.55	10.59641921
18	10/10/2002	exclusion zone	S2003 I-16	29.4	-142.14	25.88	245.88	6.8	63.08	8.33	308.96	10.75308793
19	10/10/2002	exclusion zone	S2004 G-16 -4'	21.4	4.79	4.22	2.62	1.1	0.92	1.5	3.54	1.860107524
20	10/10/2002	exclusion zone	S2005 G-16 -5'	15	-8.99	6.18	11.51	1.67	13.91	2.33	25.42	2.866670543
21	10/10/2002	exclusion zone	S2006 E-16.5	33.1	3.03	3.77	5.52	1	9.4	1.4	14.92	1.720465053
24	10/11/2002	exclusion zone	S2007 E-16	34	-6.68	13.13	107.74	3.38	42.66	4.24	150.4	5.422361109
25	10/11/2002	exclusion zone	S2008 E-16.8	37	26.43	14.71	120.68	3.73	72.44	4.8	193.12	6.078889701
26	10/11/2002	exclusion zone	S2009 L-16	29.8	1.75	3.89	3.65	1.03	2.37	1.4	6.02	1.738073646
29	10/14/2002	exclusion zone	S2010 E-16 Floor	34	-20.19	8.9	57.64	2.35	36.27	3.08	93.91	3.874132161
30	10/14/2002	exclusion zone	S2011 F-16 Floor	38.1	-53019.78	12349.63	15594.91	3636.96	26693.93	5196.19	42288.84	6342.544328
31	10/14/2002	exclusion zone	S2012 F.5-16 Floor	40.2	-27128.65	6576.49	11471.26	1878.47	14294.82	2621.12	25766.08	3224.735585
32	10/14/2002	exclusion zone	S2013 E.5-16 Floor	38.2	-10.96	9.91	39.88	2.62	17.78	3.38	57.66	4.276540658
33	10/14/2002	exclusion zone	S2014 G-15 Floor	33.4	-51.26	23.92	103.13	6.31	135.74	8.74	238.87	10.779782
36	10/15/2002	exclusion zone	S2015 H-31	29.5	-55.71	11.47	227.24	2.93	2.83	3.38	230.07	4.473175606
37	10/15/2002	exclusion zone	S2016 I-32	24.7	-154.78	28.9	554.55	7.35	-22.95	8.3	531.6	11.086591
38	10/15/2002	exclusion zone	S2017 H.5-32	29.7	-113.36	39.15	738.02	9.87	-3.81	11.28	734.21	14.9885056
39	10/15/2002	exclusion zone	S2018 H.5-32	27.2	-5.05	3.63	12.14	0.99	2.29	1.28	14.43	1.618177988
42	10/16/2002	exclusion zone	S2019 I-33	31.9	-87.84	64.61	369.12	16.3	-4.6	18.74	364.52	24.83702076
45	10/17/2002	exclusion zone	S2020 I-33	29.7	0.06	4.24	7.02	1.15	3.55	1.52	10.57	1.906016789
46	10/17/2002	exclusion zone	S2021 M-10	21	10.63	2.72	-0.22	0.69	5.98	1.04	5.76	1.248078523
80	10/28/2002	exclusion zone	S2051 J-8.5	28.4	23.39	20.19	-2.05	5.28	103.2	8.48	101.15	9.989434418
81	10/28/2002	exclusion zone	S2052 H-7.5	32.8	-3.71	8.66	55.12	2.22	8.88	2.67	64	3.472362308
82	10/28/2002	exclusion zone	S2053 G-6.5	31.2	-78.61	21.9	346.8	5.6	37.02	6.62	383.82	8.670893841
83	10/28/2002	exclusion zone	S2054 G-6	40.2	-21649.4	5270.51	9041.82	1565.94	2025.6	1942.22	11067.42	2494.872063
84	10/28/2002	exclusion zone	S2055 H.5-7.5	17	7.55	3.88	1.12	1.01	2.87	1.44	3.99	1.758891696
96	11/8/2002	exclusion zone	S2059 F.5-5	27.2	-3.89	4.79	10.09	1.31	6.3	1.74	16.39	2.178003673
97	11/8/2002	exclusion zone	S2060 F-6	32.5	7.48	3.66	10.59	0.94	5.86	1.25	16.45	1.564001279
98	11/8/2002	exclusion zone	S2061 G-5	24	9.48	4.2	0.6	1.1	9.81	1.62	10.41	1.958162404
101	11/11/2002	exclusion zone	S2062 boring D-77 #1	29.9	3.05	3.01	-0.21	0.79	2.68	1.19	2.47	1.428355698
102	11/11/2002	exclusion zone	S2063 boring B-13	28.2	6.89	1.26	0.83	0.32	0.73	0.46	1.56	0.560357029
105	11/12/2002	exclusion zone	S2064 D-623 #1	32.9	-134.05	23.02	261.57	6.04	19.19	7.11	280.76	9.329185388
106	11/12/2002	exclusion zone	S2065 D-623 #2	37.5	0.12	8.11	46.63	2.09	7.19	2.53	53.82	3.281615456
107	11/12/2002	exclusion zone	S2066 D-623 #3	32.4	-288.62	63.83	634.07	16.64	303.47	21.21	937.54	26.95836976
108	11/12/2002	exclusion zone	S2067 D-623 #4	33.3	-168.15	494.67	2592.93	124.83	729.54	153.96	3322.47	198.2074936
111	11/13/2002	exclusion zone	S2068 D-623 #5	38	111.18	24.69	190.58	6.1	104.5	7.79	295.08	9.894144733
117	11/14/2002	exclusion zone	S2072 II-35	34.2	6.88	3.28	0.79	0.85	4.48	1.23	5.27	1.495125413
118	11/14/2002	exclusion zone	S2073 II.5-35	33.5	2.09	2.91	4.03	0.78	4.32	1.06	8.35	1.31605471
119	11/14/2002	exclusion zone	S2074 JJ-35	32.6	8.52	3.42	-0.07	0.88	4.11	1.28	4.04	1.553319027

Nutranl - Exclusion Zone Analyses
Lakeshore East
221 North Columbus Drive, Chicago, Illinois
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
123	11/14/2002	exclusion zone	S2078 HH-35	35.7	-94.1	16.26	217.08	4.22	40.1	5.09	257.18	6.611845431
187	11/19/2002	exclusion zone	S2136 JJ/34	37.9	19.71	5.56	26.5	1.39	6.75	1.73	33.25	2.219234102
188	11/19/2002	exclusion zone	S2137 JJ/34.5	24.5	6.76	2.72	0.36	0.7	1.87	1	2.23	1.220655562
189	11/19/2002	exclusion zone	S2138 JJ.5/34	43.8	-1449.68	404.71	1784.46	107.44	497.19	132.09	2281.65	170.2677941
190	11/19/2002	exclusion zone	S2139 JJ.5/34.5	30.5	-4.3	11.71	65.41	3.01	12.98	3.66	78.39	4.738744559
191	11/19/2002	exclusion zone	S2140 MM-33	7.9	-211620.29	104075.21	11708.28	27647.31	354821.39	45588.1	366529.67	53316.49474
196	11/21/2002	exclusion zone	S2141QQ-19	36.3	-14868.5	11083.1	4142.53	2932.86	106042.19	4676.05	110184.72	5519.70211
197	11/21/2002	exclusion zone	S2142 RR-23	37.7	-137.35	92.05	38.08	24.73	690.55	38.86	728.63	46.06161634
198	11/21/2002	exclusion zone	S2143 SS-32	39.3	-1.68	2.97	1.63	0.8	1	1.16	2.63	1.409113196
203	11/25/2002	exclusion zone	S2144 LL.5-14	26.7	-146.27	20.88	317.26	5.41	48.54	6.47	365.8	8.433801041
204	11/25/2002	exclusion zone	S2145 MM-14	25.8	0.34	10.31	69.65	2.64	15.41	3.23	85.06	4.171630377
205	11/25/2002	exclusion zone	S2146 MM.5-14.5	28.7	-160.85	25.92	408.94	6.71	69.75	8.04	478.69	10.47213923
215	11/26/2002	exclusion zone	S2154 LL-14	24.2	-163.62	27.32	335.56	7.13	61.03	8.63	396.59	11.19436465
248	12/2/2002	exclusion zone	S2185 LL-11	32.8	-5.41	5.01	27.67	1.31	3.61	1.62	31.28	2.083386666
249	12/2/2002	exclusion zone	S2186 LL-12	33.7	-43.48	14.66	117.02	3.83	16.9	4.56	133.92	5.955039882
250	12/2/2002	exclusion zone	S2187 UU-32.25	33.9	3.66	1.95	0.66	0.52	1.9	0.74	2.56	0.904433524
251	12/2/2002	exclusion zone	S2188 UU-32.5	33.8	0.06	3.44	4.84	0.93	2.67	1.28	7.51	1.582182038
252	12/2/2002	exclusion zone	S2189 XX-18	34.4	0.53	2.84	1.45	0.79	0.97	1.11	2.42	1.36242431
410	1/7/2003	exclusion zone	S2311 S-9 #1	21.7	-56.86	18.73	204.05	4.83	32.6	5.77	236.65	7.524745843
411	1/7/2003	exclusion zone	S2312 S-9 #2	26.5	-327.19	42	561.8	10.99	87.94	13.17	649.74	17.15310468
443	1/21/2003	exclusion zone	S2328 S-9 Caisson	21.4	-85.83	18.45	214.99	4.8	43.54	5.81	258.53	7.53631873
446	1/22/2003	exclusion zone	S2329 29C fence	23	1.55	5.18	23.57	1.35	6.2	1.7	29.77	2.170829335
458	1/24/2003	exclusion zone	S2337 11A lift spot	22.3	-2229.57	1793.3	485.92	480.1	13331.51	761.17	13817.43	899.9309856
459	1/24/2003	exclusion zone	S2338 10B lift spot	6.2	-63515.78	23554.81	23.43	6301.6	224797.99	10308.05	224821.42	12081.64134
496	1/30/2003	exclusion zone	S2367 29C East Wall	28.8	3.87	3.28	2.25	0.87	2.24	1.22	4.49	1.498432514
498	1/30/2003	exclusion zone	S2369 29C East Wall(2)	26	2.45	3.47	2.17	0.92	5.11	1.34	7.28	1.625423022
507	2/4/2003	exclusion zone	S2372 10 A lift spot	6.9	-163643.25	38067.97	3896.62	10817.45	229234.1	17547.15	233130.72	20613.58042
554	2/10/2003	exclusion zone	S2410 7C lift spot	29.1	10.76	4.17	2.46	1.06	11.56	1.58	14.02	1.902629759
652	3/12/2003	exclusion zone	S2466 9D lift spot	31.5	-16.74	14.1	88.96	3.65	13.78	4.4	102.74	5.716861027
653	3/12/2003	exclusion zone	S2467 9A lift spot	33.5	1.4	4.42	8.37	1.17	4.38	1.56	12.75	1.95
660	3/17/2003	exclusion zone	S2468 9A lift spot #2	23.8	4.08	3.33	1.24	0.89	1.61	1.27	2.85	1.550806242
665	3/19/2003	exclusion zone	S2469 9B lift spot	27.8	-2.76	8.42	74.23	2.16	16.05	2.66	90.28	3.426543448
668	3/20/2003	exclusion zone	S2470 10D lift spot #1	40.6	-31.13	13.76	104.18	3.56	10.57	4.25	114.75	5.544014791
670	3/20/2003	exclusion zone	S2471 10D lift spot #2	37.5	0.87	6.07	31.86	1.57	15.79	2.02	47.65	2.558378393
673	3/21/2003	exclusion zone	S2472 10D lift spot #3	36.5	4.19	5.17	34.77	1.32	5.34	1.6	40.11	2.074222746
676	3/24/2003	exclusion zone	S2473 10C lift spot	37.6	8.49	7.99	40.34	2.04	2.19	2.46	42.53	3.195809757
677	3/24/2003	exclusion zone	S2474 11D lift spot	40.3	-2854.35	730.94	1588.33	207.79	180.29	249.61	1768.62	324.7796733
678	3/24/2003	exclusion zone	S2475 9C lift spot	38.6	5.14	7.48	49.26	1.9	7.14	2.3	56.4	2.983286778
686	3/26/2003	exclusion zone	S2479 9D North	20.4	-56.47	15.14	122.53	3.96	32.54	4.9	155.07	6.300126983
687	3/26/2003	exclusion zone	S2480 9D South	25.5	-60.55	15.48	104.48	4.09	72.49	5.38	176.97	6.758143236

Nutranl - Exclusion Zone Analyses
Lakeshore East
221 North Columbus Drive, Chicago, Illinois
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
711	3/27/2003	exclusion zone	S2502 11C #1	37.6	2.06	2.69	1.52	0.71	1.28	1.01	2.8	1.23458495
712	3/27/2003	exclusion zone	S2503 11C #2	27.4	7.41	3.36	4.5	0.89	5.37	1.21	9.87	1.502065245

Pre-EPA Verification Sample Analyses

NUTRANL - Pre-EPA Verification Sample Analyses
Lakeshore East
221 North Columbus Drive, Chicago, Illinois
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
47	10/17/2002	Pre EPA	S2022 I-32 Pre EPA#1	31.5	2.21	3.43	1.74	0.92	1.57	1.29	3.31	1.584455743
48	10/17/2002	Pre EPA	S2023 I-32 Pre EPA#2	26.9	7.67	2.86	1.01	0.73	2.02	1.06	3.03	1.287050893
49	10/17/2002	Pre EPA	S2024 I-32 Pre EPA#3	35.1	9.74	3.17	-0.36	0.78	2.21	1.17	1.85	1.406164997
93	11/8/2002	Pre EPA	S2056 I-32 Pre EPA#1	33.2	4.06	2.96	4.19	0.78	3.36	1.07	7.55	1.324122351
94	11/8/2002	Pre EPA	S2057 I-32 Pre EPA#2	28.9	7.02	2.17	0.56	0.55	2.73	0.82	3.29	0.987370245
95	11/8/2002	Pre EPA	S2058 I-32 Pre EPA#3	27.6	2.58	1.87	1.02	0.5	2.5	0.72	3.52	0.87658428
112	11/13/2002	Pre EPA	S2069 H-6& I.5-7.5 comp	32.3	6.1	4.59	6.01	1.2	2.74	1.63	8.75	2.024080038
113	11/13/2002	Pre EPA	S2070 F.5-2.0&L-12 comp	29.1	3.7	4.97	9.04	1.29	6.74	1.74	15.78	2.166033241
114	11/13/2002	Pre EPA	S2071 (L.5-K)(9-12) comp	28.2	5.77	2.98	1.8	0.79	4.67	1.13	6.47	1.378767566
120	11/14/2002	Pre EPA	S2075 KK.5-MM/56.5-54.5	38.7	5.3	2.26	0.56	0.59	1.92	0.86	2.48	1.042928569
121	11/14/2002	Pre EPA	S2076 OO-MM/41-42	35.6	10.1	2.94	0.76	0.75	2.95	1.09	3.71	1.323102415
122	11/14/2002	Pre EPA	S2077 OO-MM/42-44	37	1.24	2.14	2.18	0.58	1.51	0.8	3.69	0.988129546
126	11/15/2002	Pre EPA	S2079 D-10	38.6	2.4	2.48	0.8	0.65	0.55	0.95	1.35	1.151086443
127	11/15/2002	Pre EPA	S2080 PP-RR/44-45.5	25.9	5.41	2.97	0.31	0.77	1.48	1.13	1.79	1.367406304
135	11/15/2002	Pre EPA	S2088 E-I/1-5	30.1	4.26	2.46	1.59	0.65	1.95	0.91	3.54	1.118302285
136	11/15/2002	Pre EPA	S2089 E.5-I.5/5-9	27.3	0.43	3.22	1.18	0.85	3.43	1.25	4.61	1.511621646
137	11/15/2002	Pre EPA	S2090 I.5L.5/9-12	29.3	7.78	2.5	0.69	0.65	3.36	0.94	4.05	1.142847321
206	11/25/2002	Pre EPA	S2147 OO-RR/16-20	30.3	3.41	2.45	1.05	0.65	1.98	0.92	3.03	1.126454615
207	11/25/2002	Pre EPA	S2148 OO-RR/20-22	23.8	5.16	3.25	1.12	0.87	2.62	1.23	3.74	1.506585544
210	11/26/2002	Pre EPA	S2149 JJ-MM/34-37	46.2	6.97	2.3	1.33	0.59	2.69	0.84	4.02	1.026498904
211	11/26/2002	Pre EPA	S2150 FF-MM.5/32-38 #1	38.5	1.56	2.35	1.25	0.64	1.11	0.91	2.36	1.112519663
212	11/26/2002	Pre EPA	S2151 FF-MM.5/32-38 #2	41.7	2.64	2.27	0.71	0.6	2.03	0.87	2.74	1.056834897
213	11/26/2002	Pre EPA	S2152 SS.5-TT/35-35.5	42.4	4.03	1.93	0.44	0.51	2.53	0.74	2.97	0.898721314
214	11/26/2002	Pre EPA	S2153 SS-SS.5/32.5-33	43.4	4.85	2.44	0.38	0.64	0.67	0.92	1.05	1.120714058
353	12/20/2002	Pre EPA	S2268 28A	24.7	3.57	3.4	0.81	0.91	-1.09	1.26	-0.28	1.554252232
354	12/20/2002	Pre EPA	S2269 36A35B	22.7	8.23	3.77	1.51	0.99	1.86	1.38	3.37	1.698381583
355	12/20/2002	Pre EPA	S2270 26CD	25.9	6.68	2.93	-0.86	0.75	3.17	1.15	2.31	1.372953022
447	1/22/2003	Pre EPA	S2330 S-9 East	20.7	4.36	4.01	6.51	1.04	-0.19	1.34	6.32	1.696231116
448	1/22/2003	Pre EPA	S2331 S-9 West	22.7	5.26	3.33	0.25	0.89	3.2	1.3	3.45	1.575468184
455	1/24/2003	Pre EPA	S2334 E-N/13-19 #1	13.9	-4.19	6.36	0.9	1.7	4.52	2.59	5.42	3.098080051
456	1/24/2003	Pre EPA	S2335 E-N/13-19 #2	20.4	2.11	3.5	2.26	0.92	0.72	1.29	2.98	1.584455743
457	1/24/2003	Pre EPA	S2336 E-N/13-19 #3	20.9	4.73	3.27	0.37	0.84	2.03	1.25	2.4	1.506021248
460	1/24/2003	Pre EPA	S2339 E-N/13-19 #4	21.3	-6.99	5.07	0.12	1.36	0.92	2.05	1.04	2.460101624
493	1/30/2003	Pre EPA	S2364 29C Pre EPA#1	23.7	1.9	3.01	2.44	0.81	0.16	1.08	2.6	1.35
494	1/30/2003	Pre EPA	S2365 29C Pre EPA#2	24.5	3.11	2.89	1.01	0.77	3.05	1.11	4.06	1.350925609

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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
495	1/30/2003	Pre EPA	S2366 29C Pre EPA#3	22.6	6.01	2.8	0.41	0.72	0.97	1.03	1.38	1.256702033
497	1/30/2003	Pre EPA	S2368 29C Pre EPA #4	28.5	6.28	2.55	0.58	0.67	3.19	0.97	3.77	1.17889779
501	1/31/2003	Pre EPA	S2370 10B	35.4	7.44	3.28	1.72	0.84	-1.03	1.16	0.69	1.432201103
502	1/31/2003	Pre EPA	S2371 11A	32.1	2.57	3.28	1.76	0.85	-0.26	1.2	1.5	1.470544117
508	2/4/2003	Pre EPA	S2373 10A	31.2	-5.32	2.53	-0.54	0.7	4.02	1.06	3.48	1.270275561
552	2/10/2003	Pre EPA	S2408 11A10B Pre EPA #1(2)	22.7	-2.08	4.15	0.98	1.16	4.1	1.69	5.08	2.049804869
553	2/10/2003	Pre EPA	S2409 11A10B Pre EPA #2(2)	23.6	-0.03	2.86	1.43	0.79	2.82	1.13	4.25	1.378767566
629	3/4/2003	Pre EPA	S2453 7C	31.7	-0.93	3.07	0.99	0.85	2.6	1.21	3.59	1.478715659
681	3/25/2003	Pre EPA	S2476 9A#1	25.4	4.59	3.32	1.74	0.89	2.02	1.27	3.76	1.550806242
682	3/25/2003	Pre EPA	S2477 9A#2	27.8	2.24	2.13	0.63	0.56	1.8	0.82	2.43	0.992975327
683	3/25/2003	Pre EPA	S2478 9B	28.5	8.99	2.74	0.13	0.69	2.09	0.99	2.22	1.206731122
690	3/27/2003	Pre EPA	S2481 36A	41.5	-4.94	1.99	2.23	0.56	-0.11	0.79	2.12	0.968349111
722	4/2/2003	Pre EPA	S2505 11C#1	28.5	2.37	3.46	0.86	0.94	3.11	1.34	3.97	1.636826197
723	4/2/2003	Pre EPA	S2506 11C#2	31.6	0.8	2.73	1.43	0.74	1.12	1.06	2.55	1.292749009
724	4/2/2003	Pre EPA	S2507 11D	31.2	9.93	3.25	0.94	0.81	2.33	1.2	3.27	1.447791421
727	4/3/2003	Pre EPA	S2508 10C	28.5	1.55	3.18	2.22	0.83	1.14	1.16	3.36	1.426359001
728	4/3/2003	Pre EPA	S2509 10D#1	32.4	1.77	3.28	2.69	0.86	0.76	1.19	3.45	1.468230227
729	4/3/2003	Pre EPA	S2510 10D#2 (1)	27.3	6.08	3.8	1.94	0.99	1.03	1.38	2.97	1.698381583
730	4/3/2003	Pre EPA	S2511 10D#2 (2)	31.3	0.88	2.95	2.87	0.78	-1.76	1.05	1.11	1.308013761
731	4/3/2003	Pre EPA	S2512 10D#2 (3)	35.5	8.11	4.26	1.38	1.08	0.47	1.48	1.85	1.832157198
732	4/3/2003	Pre EPA	S2513 10D#2 (4)	36.3	2.97	2.89	1.51	0.75	1.86	1.1	3.37	1.331352696
733	4/3/2003	Pre EPA	S2514 10D#3	31.1	-0.53	4.22	2.38	1.15	2.48	1.62	4.86	1.986680649
734	4/3/2003	Pre EPA	S2515 9C (1)	28.5	-0.65	4.09	1.68	1.15	1.52	1.62	3.2	1.986680649
735	4/3/2003	Pre EPA	S2516 9C (2)	34.7	3.08	3.83	1.9	0.99	-0.74	1.4	1.16	1.71467198
775	4/10/2003	Pre EPA	S2552 9D/9C Pre EPA #1	32.5	5.59	3.13	1.63	0.79	-0.78	1.08	0.85	1.338095662
776	4/10/2003	Pre EPA	S2553 9D/9C Pre EPA #2	29.4	3.53	3.59	-0.51	0.97	4.48	1.49	3.97	1.777920133
777	4/10/2003	Pre EPA	S2554 9D/9C Pre EPA #3	26.4	5.77	3.27	3.02	0.85	0.93	1.15	3.95	1.430034965
778	4/10/2003	Pre EPA	S2555 9D/9C Pre EPA #4	33.6	1.52	3.07	1.83	0.83	2.51	1.18	4.34	1.442671134
779	4/10/2003	Pre EPA	S2556 9D/9C Pre EPA #5	33.2	3.21	3.05	1.21	0.8	1.25	1.12	2.46	1.376372043
780	4/10/2003	Pre EPA	S2557 9D/9C Pre EPA #6	40.3	-1.12	3.48	1.46	0.95	0.2	1.35	1.66	1.650757402
781	4/10/2003	Pre EPA	S2558 9D/9C Pre EPA #7	39.7	2.15	3.76	2.4	1.01	0.99	1.39	3.39	1.718196729
259	12/5/2002	Pre- EPA	S2190 JJ-OO/8-11	32.6	-0.22	2.12	1.53	0.58	1.93	0.82	3.46	1.004390362
260	12/5/2002	Pre- EPA	S2191 JJ-OO/11-13.5	31	2.63	2.47	1.33	0.67	1.18	0.94	2.51	1.154339638
261	12/5/2002	Pre- EPA	S2192 JJ-OO/13.5-16	21.8	0.46	2.25	1.69	0.62	1.83	0.86	3.52	1.060188662
262	12/5/2002	Pre- EPA	S2193 CC-FF/1-4	41.9	0.77	2.55	0.96	0.69	0.75	1	1.71	1.214948559

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263	12/5/2002	Pre- EPA	S2194 EE-FF/12-14	38.4	3.25	1.95	1.28	0.52	0.22	0.72	1.5	0.888144132
264	12/5/2002	Pre- EPA	S2195 SS-UU/32-34	39.9	9.7	2.45	1.22	0.63	1.69	0.88	2.91	1.082266141
265	12/5/2002	Pre- EPA	S2196 XX-18	32.3	6.32	1.85	0.18	0.48	1.54	0.7	1.72	0.848763807
273	12/5/2002	Pre- EPA	S2204 NN-PP/42-45	22.4	0.96	1.82	2.59	0.49	0.02	0.67	2.61	0.830060239

USEPA Verification Sample Analyses (Five Samples per Set)

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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
53	10/18/2002	EPA	S2026 F-H/32-35 EPA#1	28.2	9.09	2.78	0.08	0.71	3.11	1.04	3.19	1.259245806
54	10/18/2002	EPA	S2027 F-H/32-35 EPA#2	31.4	2.03	2.28	1.09	0.6	2.92	0.87	4.01	1.056834897
55	10/18/2002	EPA	S2028 F-H/32-35 EPA#3	30.9	6.18	2.04	0.59	0.53	2.77	0.77	3.36	0.9347727
56	10/18/2002	EPA	S2029 F-H/32-35 EPA#4	26.9	2.96	1.88	1.53	0.5	2.59	0.72	4.12	0.87658428
57	10/18/2002	EPA	S2030 F-H/32-35 EPA#5	28.7	2.24	1.86	0.33	0.5	4.37	0.74	4.7	0.893084542
58	10/18/2002	EPA	S2031 H-J/32-35 EPA#1	34.6	0.72	1.92	1.71	0.52	0.45	0.72	2.16	0.888144132
59	10/18/2002	EPA	S2032 H-J/32-35 EPA#2	33.2	1.62	1.79	0.57	0.49	2.68	0.7	3.25	0.854458893
60	10/18/2002	EPA	S2033 H-J/32-35 EPA#3	35.4	5.91	2.63	0	0.68	2.87	1.01	2.87	1.217579566
61	10/18/2002	EPA	S2034 H-J/32-35 EPA#4	31.7	6.32	2.17	0.27	0.56	2.28	0.81	2.55	0.984733466
62	10/18/2002	EPA	S2035 H-J/32-35 EPA#5	34	0.25	2.46	0.79	0.67	2.57	0.96	3.36	1.170683561
63	10/18/2002	EPA	S2036 H-J/29-32 EPA#1	29.5	3.31	1.98	0.8	0.52	2.54	0.76	3.34	0.920869155
64	10/18/2002	EPA	S2037 H-J/29-32 EPA#2	30.6	3.94	2.85	1.59	0.75	1.24	1.05	2.83	1.29034879
65	10/18/2002	EPA	S2038 H-J/29-32 EPA#3	30.6	3.13	2.37	0.95	0.61	1.27	0.88	2.22	1.070747403
66	10/18/2002	EPA	S2039 H-J/29-32 EPA#4	30.2	-0.37	2	1.34	0.54	2.14	0.78	3.48	0.948683298
67	10/18/2002	EPA	S2040 H-J/29-32 EPA#5	28.7	1	2.33	0.38	0.64	3.39	0.93	3.77	1.128937554
68	10/18/2002	EPA	S2041 F-H/29-32 EPA#1	27.2	-2	2.45	1.8	0.68	0.76	0.97	2.56	1.18460964
69	10/18/2002	EPA	S2042 F-H/29-32 EPA#2	26.1	2.17	2.36	1.27	0.63	2.81	0.91	4.08	1.106797181
70	10/18/2002	EPA	S2043 F-H/29-32 EPA#3	24.9	1.78	2.04	1.37	0.56	1.82	0.78	3.19	0.960208311
71	10/18/2002	EPA	S2044 F-H/29-32 EPA#4	26	1.28	1.85	0.76	0.5	1.93	0.72	2.69	0.87658428
72	10/18/2002	EPA	S2045 F-H/29-32 EPA#5	26.6	4.08	2.01	0.54	0.52	2.56	0.76	3.1	0.920869155
138	11/15/2002	EPA	S2091 E-I/3-5 EPA#1	29.3	1.86	2.21	1.46	0.59	0.28	0.83	1.74	1.018331969
139	11/15/2002	EPA	S2092 E-I/3-5 EPA#2	28.5	2.54	1.67	1.24	0.45	1.88	0.64	3.12	0.7823682
140	11/15/2002	EPA	S2093 E-I/3-5 EPA#3	28.9	8.16	2.2	0.18	0.56	2.64	0.82	2.82	0.992975327
141	11/15/2002	EPA	S2094 E-I/3-5 EPA#4	32	4.58	2.48	1.04	0.65	2.17	0.94	3.21	1.142847321
142	11/15/2002	EPA	S2095 E-I/3-5 EPA#5	30	6.43	2.62	0.59	0.69	2.54	0.99	3.13	1.206731122
143	11/15/2002	EPA	S2096 E-I/5-7 EPA#1	31.9	3.69	1.82	1.31	0.48	2.08	0.68	3.39	0.832346082
144	11/15/2002	EPA	S2097 E-I/5-7 EPA#2	33.4	5.76	1.97	1.93	0.52	1.52	0.72	3.45	0.888144132
145	11/15/2002	EPA	S2098 E-I/5-7 EPA#3	32.1	5.59	2.23	0.1	0.58	3.42	0.86	3.52	1.037304198
146	11/15/2002	EPA	S2099 E-I/5-7 EPA#4	29.2	4.99	1.76	1.14	0.46	0.55	0.65	1.69	0.796303962
147	11/15/2002	EPA	S2100 E-I/5-7 EPA#5	33.1	4.24	2.92	0.8	0.78	2.54	1.09	3.34	1.340335779
150	11/18/2002	EPA	S2101 E-J/7-9 EPA#1	27.7	3.7	1.91	1.13	0.51	1.6	0.72	2.73	0.88232647
151	11/18/2002	EPA	S2102 E-J/7-9 EPA#2	26.5	2.31	2.15	1.67	0.58	1.72	0.81	3.39	0.996242942
152	11/18/2002	EPA	S2103 E-J/7-9 EPA#3	25.7	3.49	2.05	0.19	0.55	3.24	0.8	3.43	0.970824392
153	11/18/2002	EPA	S2104 E-J/7-9 EPA#4	27.1	4.68	2.57	1.81	0.66	0.25	0.92	2.06	1.132254388
154	11/18/2002	EPA	S2105 E-J/7-9 EPA#5	26.2	5.23	1.9	1.12	0.5	1.67	0.71	2.79	0.868389314

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155	11/18/2002	EPA	S2106 I-K/9-13 EPA#1	28.8	4.72	2.52	0.94	0.67	2.75	0.97	3.69	1.17889779
156	11/18/2002	EPA	S2107 I-K/9-13 EPA#2	27.6	1.57	2.32	1.02	0.63	2.83	0.9	3.85	1.098590005
157	11/18/2002	EPA	S2108 I-K/9-13 EPA#3	29.6	5.65	2.66	2.41	0.7	1.55	0.97	3.96	1.196202324
158	11/18/2002	EPA	S2109 I-K/9-13 EPA#4	27.9	10.93	3.21	1.39	0.81	1.45	1.13	2.84	1.390323703
159	11/18/2002	EPA	S2110 I-K/9-13 EPA#5	29	4.55	3	1.55	0.78	1.89	1.12	3.44	1.364844313
160	11/18/2002	EPA	S2111 KK-MM.5/54-56.5 EPA#1	32.9	4.46	2.3	0.45	0.62	2.13	0.88	2.58	1.076475731
161	11/18/2002	EPA	S2112 KK-MM.5/54-56.5 EPA#2	32	3.11	2.14	0.85	0.57	1.21	0.82	2.06	0.998649088
162	11/18/2002	EPA	S2113 KK-MM.5/54-56.5 EPA#3	31.8	7.39	1.83	1.01	0.46	-0.03	0.65	0.98	0.796303962
163	11/18/2002	EPA	S2114 KK-MM.5/54-56.5 EPA#4	29.7	3.13	2.49	0.7	0.68	1.7	0.96	2.4	1.176435294
164	11/18/2002	EPA	S2115 KK-MM.5/54-56.5 EPA#5	31.4	7.86	2.58	-0.56	0.65	2.32	0.97	1.76	1.167647207
165	11/18/2002	EPA	S2116 E-I/1-3 EPA#1	28	6.58	2.12	1.35	0.55	1.93	0.78	3.28	0.954410813
166	11/18/2002	EPA	S2117 E-I/1-3 EPA#2	28.5	5.39	2.42	1.78	0.64	1.55	0.9	3.33	1.104355015
167	11/18/2002	EPA	S2118 E-I/1-3 EPA#3	29.1	1.88	2.34	2.05	0.63	0.76	0.87	2.81	1.074150827
168	11/18/2002	EPA	S2119 E-I/1-3 EPA#4	28.9	3.33	2.19	0.86	0.58	2.56	0.85	3.42	1.029028668
169	11/18/2002	EPA	S2120 E-I/1-3 EPA#5	29	4.76	3.17	1.7	0.83	0.88	1.15	2.58	1.418238344
170	11/18/2002	EPA	S2121 C-E/9.5-10.5 EPA#1	32.6	4.85	2.39	0.57	0.62	1.38	0.88	1.95	1.076475731
171	11/18/2002	EPA	S2122 C-E/9.5-10.5 EPA#2	34.4	6.09	3.07	1.39	0.8	1.22	1.14	2.61	1.392695229
172	11/18/2002	EPA	S2123 C-E/9.5-10.5 EPA#3	31.5	5.53	2.58	0.91	0.69	1.52	0.96	2.43	1.18224363
173	11/18/2002	EPA	S2124 C-E/9.5-10.5 EPA#4	32.7	4.56	2.43	1.23	0.64	0.86	0.91	2.09	1.112519663
174	11/18/2002	EPA	S2125 C-E/9.5-10.5 EPA#5	31.8	2.86	2.35	1.5	0.63	1.22	0.9	2.72	1.098590005
175	11/18/2002	EPA	S2126 KK-OO/41-44 EPA#1	35.8	7.08	2.25	0.11	0.57	4.21	0.84	4.32	1.015135459
176	11/18/2002	EPA	S2127 KK-OO/41-44 EPA#2	34	-0.12	2.28	1.79	0.63	0.2	0.85	1.99	1.058017013
177	11/18/2002	EPA	S2128 KK-OO/41-44 EPA#3	35.6	6.2	2.6	1.15	0.68	1.51	0.96	2.66	1.176435294
178	11/18/2002	EPA	S2129 KK-OO/41-44 EPA#4	36.1	4	2.55	2.09	0.68	0.38	0.92	2.47	1.144027972
179	11/18/2002	EPA	S2130 KK-OO/41-44 EPA#5	35.6	7.23	2.95	0.67	0.76	2.02	1.11	2.69	1.345250906
180	11/18/2002	EPA	S2131 RR-SS/43-45 EPA#1	33.4	7.94	2.24	-0.13	0.57	2.67	0.85	2.54	1.02342562
181	11/18/2002	EPA	S2132 RR-SS/43-45 EPA#2	33.3	4.46	2.25	0.07	0.58	2.58	0.86	2.65	1.037304198
182	11/18/2002	EPA	S2133 RR-SS/43-45 EPA#3	31.5	0.76	2.15	1.52	0.58	-0.17	0.81	1.35	0.996242942
183	11/18/2002	EPA	S2134 RR-SS/43-45 EPA#4	32.3	5.92	1.76	0.37	0.46	1.27	0.66	1.64	0.804487414
184	11/18/2002	EPA	S2135 RR-SS/43-45 EPA#5	33.6	1.48	1.99	0.35	0.52	1.61	0.76	1.96	0.920869155
218	12/2/2002	EPA	S2155 HH.5-KK/32-38 EPA#1	33.1	4.73	2.15	0.93	0.57	2.96	0.82	3.89	0.998649088
219	12/2/2002	EPA	S2156 HH.5-KK/32-38 EPA#2	33.4	9.37	2.61	0.71	0.67	2.48	0.96	3.19	1.170683561
220	12/2/2002	EPA	S2157 HH.5-KK/32-38 EPA#3	33.5	10.82	2.67	0.15	0.68	3.19	0.99	3.34	1.201041215
221	12/2/2002	EPA	S2158 HH.5-KK/32-38 EPA#4	31.7	5.45	2.38	0.83	0.64	2.39	0.91	3.22	1.112519663
222	12/2/2002	EPA	S2159 HH.5-KK/32-38 EPA#5	31.9	3.35	2.82	1.7	0.77	1.22	1.08	2.92	1.326386067

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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
223	12/2/2002	EPA	S2160 LL.5-MM/32-38 EPA#1	37.1	7.22	2.46	1.34	0.63	1.1	0.89	2.44	1.090412766
224	12/2/2002	EPA	S2161 LL.5-MM/32-38 EPA#2	34.6	4.41	2.26	0.61	0.59	1.71	0.85	2.32	1.034698024
225	12/2/2002	EPA	S2162 LL.5-MM/32-38 EPA#3	36.3	1.57	2.25	0.65	0.61	2.23	0.86	2.88	1.054371851
226	12/2/2002	EPA	S2163 LL.5-MM/32-38 EPA#4	36	6.44	3.4	0.97	0.89	1.28	1.26	2.25	1.542627628
227	12/2/2002	EPA	S2164 LL.5-MM/32-38 EPA#5	37.1	5.74	2.16	0.23	0.56	2.44	0.82	2.67	0.992975327
228	12/2/2002	EPA	S2165 OO-TT/17-19.5 EPA#1	26.1	5.05	2.07	1.49	0.53	1.46	0.76	2.95	0.926552751
229	12/2/2002	EPA	S2166 OO-TT/17-19.5 EPA#2	26.3	0.15	2.21	1.31	0.6	0.65	0.85	1.96	1.040432602
230	12/2/2002	EPA	S2167 OO-TT/17-19.5 EPA#3	25.4	-1.1	2.44	0.55	0.67	1.61	0.97	2.16	1.17889779
231	12/2/2002	EPA	S2168 OO-TT/17-19.5 EPA#4	26.9	7.07	2.54	0.11	0.66	2.78	0.95	2.89	1.156762724
232	12/2/2002	EPA	S2169 OO-TT/17-19.5 EPA#5	25.3	2.36	1.94	1.01	0.53	3.03	0.76	4.04	0.926552751
233	12/2/2002	EPA	S2170 OO-TT/19.5-22 EPA#1	25.5	5.53	2.38	0.27	0.62	2.27	0.89	2.54	1.084665847
234	12/2/2002	EPA	S2171 OO-TT/19.5-22 EPA#2	28.2	6.81	2.94	0.86	0.76	1.02	1.07	1.88	1.312440475
235	12/2/2002	EPA	S2172 OO-TT/19.5-22 EPA#3	28.8	4.96	1.93	0.82	0.51	1.31	0.73	2.13	0.890505474
236	12/2/2002	EPA	S2173 OO-TT/19.5-22 EPA#4	27.3	3.71	1.87	1.09	0.49	0.58	0.68	1.67	0.838152731
237	12/2/2002	EPA	S2174 OO-TT/19.5-22 EPA#5	28.7	-4.38	2.76	2.04	0.79	1.38	1.13	3.42	1.378767566
238	12/2/2002	EPA	S2175 KK-LL.5/32-38 EPA#1	30.4	5.2	2.99	1.91	0.79	0.35	1.08	2.26	1.338095662
239	12/2/2002	EPA	S2176 KK-LL.5/32-38 EPA#2	31.5	0.76	2.59	1.68	0.69	1.23	0.97	2.91	1.190378091
240	12/2/2002	EPA	S2177 KK-LL.5/32-38 EPA#3	31.6	0.06	1.9	1.32	0.51	1.02	0.72	2.34	0.88232647
241	12/2/2002	EPA	S2178 KK-LL.5/32-38 EPA#4	31.2	-0.32	2.94	2.44	0.79	0.15	1.11	2.59	1.36242431
242	12/2/2002	EPA	S2179 KK-LL.5/32-38 EPA#5	27.6	1.51	2.08	1.41	0.56	1.5	0.79	2.91	0.968349111
243	12/2/2002	EPA	S2180 GG-HH.5/32-38 EPA#1	36.2	4.51	2.04	1.03	0.54	1.48	0.75	2.51	0.924175308
244	12/2/2002	EPA	S2181 GG-HH.5/32-38 EPA#2	37.7	10.27	2.71	0.94	0.69	2.34	0.99	3.28	1.206731122
245	12/2/2002	EPA	S2182 GG-HH.5/32-38 EPA#3	35.6	2.02	2.07	1.83	0.56	1.52	0.78	3.35	0.960208311
246	12/2/2002	EPA	S2183 GG-HH.5/32-38 EPA#4	33.7	6.18	2.77	0.39	0.71	1.45	1.04	1.84	1.259245806
247	12/2/2002	EPA	S2184 GG-HH.5/32-38 EPA#5	35.6	5.96	2.4	1.73	0.62	0.53	0.85	2.26	1.052093152
276	12/6/2002	EPA	S2205 CC-FF/1-4 EPA#1	24.5	3.72	2.08	0.09	0.55	0.87	0.8	0.96	0.970824392
277	12/6/2002	EPA	S2206 CC-FF/1-4 EPA#2	23.6	2.91	2.08	0.67	0.56	-0.36	0.78	0.31	0.960208311
278	12/6/2002	EPA	S2207 CC-FF/1-4 EPA#3	23.3	2.46	1.77	0.33	0.48	1.42	0.7	1.75	0.848763807
279	12/6/2002	EPA	S2208 CC-FF/1-4 EPA#4	25.4	6.42	2.06	-0.52	0.55	1.91	0.81	1.39	0.979081202
280	12/6/2002	EPA	S2209 CC-FF/1-4 EPA#5	22.3	7.08	1.53	0	0.38	-0.18	0.55	-0.18	0.668505797
281	12/6/2002	EPA	S2210 EE-FF/12-14 EPA#1	27.2	3.2	2.66	1.27	0.71	-1.47	0.97	-0.2	1.202081528
282	12/6/2002	EPA	S2211 EE-FF/12-14 EPA#2	27.4	3.38	1.87	0.14	0.51	1.11	0.73	1.25	0.890505474
283	12/6/2002	EPA	S2212 EE-FF/12-14 EPA#3	28.3	5.13	1.75	0.1	0.46	0.88	0.68	0.98	0.82097503
284	12/6/2002	EPA	S2213 EE-FF/12-14 EPA#4	27.9	2.09	2.49	0.7	0.67	1.04	0.96	1.74	1.170683561
285	12/6/2002	EPA	S2214 EE-FF/12-14 EPA#5	27.2	6.16	2.43	-0.67	0.62	1.54	0.95	0.87	1.134416149

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286	12/6/2002	EPA	S2215 SS-UU/32-34 EPA#1	20.9	2.39	2.11	1.1	0.56	-0.18	0.79	0.92	0.968349111
287	12/6/2002	EPA	S2216 SS-UU/32-34 EPA#2	21.7	6.09	1.88	-0.41	0.48	1.52	0.72	1.11	0.865332306
288	12/6/2002	EPA	S2217 SS-UU/32-34 EPA#3	20.4	5.49	2.08	-0.44	0.55	2.03	0.81	1.59	0.979081202
289	12/6/2002	EPA	S2218 SS-UU/32-34 EPA#4	20.5	0.63	1.97	-0.04	0.54	1.56	0.8	1.52	0.965194281
290	12/6/2002	EPA	S2219 SS-UU/32-34 EPA#5	20.8	4.12	2.22	-0.04	0.59	1.7	0.87	1.66	1.051189802
291	12/6/2002	EPA	S2220 XX-18 EPA#1	18.2	3.4	2.82	-0.13	0.76	1.28	1.11	1.15	1.345250906
292	12/6/2002	EPA	S2221 XX-18 EPA#2	19.2	-0.63	1.83	0.76	0.5	0.79	0.74	1.55	0.893084542
293	12/6/2002	EPA	S2222 XX-18 EPA#3	18	1.77	2.1	0.18	0.58	1.81	0.83	1.99	1.012570985
294	12/6/2002	EPA	S2223 XX-18 EPA#4	18.5	3.15	1.55	0.79	0.41	0.47	0.58	1.26	0.710281634
295	12/6/2002	EPA	S2224 XX-18 EPA#5	19.8	2.12	2.21	1.09	0.59	0.2	0.83	1.29	1.018331969
296	12/6/2002	EPA	S2225 JJ-OO/8-11 EPA#1	19.3	1.29	2.38	0.39	0.65	1.11	0.93	1.5	1.134636506
297	12/6/2002	EPA	S2226 JJ-OO/8-11 EPA#2	19.8	6.78	1.86	-1.2	0.48	3.57	0.73	2.37	0.873670418
298	12/6/2002	EPA	S2227 JJ-OO/8-11 EPA#3	19.7	1.87	1.76	0.55	0.47	1	0.68	1.55	0.826619622
299	12/6/2002	EPA	S2228 JJ-OO/8-11 EPA#4	19.3	1.96	2.27	0.85	0.62	0.96	0.87	1.81	1.068316433
300	12/6/2002	EPA	S2229 JJ-OO/8-11 EPA#5	18.2	3.57	1.69	0.82	0.45	0.95	0.65	1.77	0.790569415
303	12/9/2002	EPA	S2230 JJ-OO/11-13.5 EPA#1	16.9	3.27	2.71	0.14	0.72	1.98	1.05	2.12	1.27314571
304	12/9/2002	EPA	S2231 JJ-OO/11-13.5 EPA#2	18.3	-1.86	2.09	0.19	0.58	1.95	0.86	2.14	1.037304198
305	12/9/2002	EPA	S2232 JJ-OO/11-13.5 EPA#3	17.1	1.2	2.04	0.04	0.55	1.61	0.81	1.65	0.979081202
306	12/9/2002	EPA	S2233 JJ-OO/11-13.5 EPA#4	17.8	5.57	2.83	0.29	0.75	1.57	1.08	1.86	1.31487642
307	12/9/2002	EPA	S2234 JJ-OO/11-13.5 EPA#5	17.6	3.31	1.79	-0.63	0.47	2.21	0.71	1.58	0.851469318
308	12/9/2002	EPA	S2235 JJ-OO/13.5-16 EPA#1	18.1	4.55	2.74	0.18	0.73	1.68	1.04	1.86	1.270629765
309	12/9/2002	EPA	S2236 JJ-OO/13.5-16 EPA#2	17.9	5.34	2.83	1.15	0.75	0.26	1.04	1.41	1.282224629
310	12/9/2002	EPA	S2237 JJ-OO/13.5-16 EPA#3	17.8	7.41	1.74	-0.21	0.44	2.48	0.66	2.27	0.793221281
311	12/9/2002	EPA	S2238 JJ-OO/13.5-16 EPA#4	18.2	0.91	2.71	0.88	0.73	1.39	1.07	2.27	1.295299193
312	12/9/2002	EPA	S2239 JJ-OO/13.5-16 EPA#5	17.2	4.39	2.06	0.9	0.54	0.31	0.77	1.21	0.940478602
313	12/9/2002	EPA	S2240 NN-PP/42-45 EPA#1	19.2	1.54	2.03	1.76	0.55	0.3	0.76	2.06	0.938136451
314	12/9/2002	EPA	S2241 NN-PP/42-45 EPA#2	18	3.76	2.32	1.19	0.62	0.15	0.87	1.34	1.068316433
315	12/9/2002	EPA	S2242 NN-PP/42-45 EPA#3	18.2	2.34	1.96	0.81	0.53	1.87	0.76	2.68	0.926552751
316	12/9/2002	EPA	S2243 NN-PP/42-45 EPA#4	18.2	3.11	2.6	1.27	0.69	0.51	0.99	1.78	1.206731122
317	12/9/2002	EPA	S2244 NN-PP/42-45 EPA#5	17.9	2.89	2.37	0.68	0.63	1.86	0.92	2.54	1.115033632
358	12/23/2002	EPA	S2271 26CD EPA #1	27.2	-0.77	2.44	1.24	0.67	1.21	0.94	2.45	1.154339638
359	12/23/2002	EPA	S2272 26CD EPA #2	25.8	8.14	2.14	0.11	0.55	2.27	0.8	2.38	0.970824392
360	12/23/2002	EPA	S2273 26CD EPA #3	23.9	3.27	2	1.04	0.53	1.88	0.77	2.92	0.9347727
361	12/23/2002	EPA	S2274 26CD EPA #4	25.2	7.1	2.2	-0.03	0.56	2.6	0.84	2.57	1.009554357
362	12/23/2002	EPA	S2275 26CD EPA #5	23.4	1.43	2.75	0.1	0.73	1.84	1.09	1.94	1.311868896

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363	12/23/2002	EPA	S2276 28A EPA #1	29	0.76	1.84	-0.19	0.5	1.72	0.75	1.53	0.901387819
364	12/23/2002	EPA	S2277 28A EPA #2	27.9	5.15	2.18	0.23	0.56	0.58	0.81	0.81	0.984733466
365	12/23/2002	EPA	S2278 28A EPA #3	28.5	5.19	2.48	1.48	0.63	-1.43	0.86	0.05	1.06606754
366	12/23/2002	EPA	S2279 28A EPA #4	28.2	3.99	2.26	-0.04	0.6	0.93	0.89	0.89	1.073359213
367	12/23/2002	EPA	S2280 28A EPA #5	27	1.99	1.98	0	0.52	0.84	0.76	0.84	0.920869155
368	12/23/2002	EPA	S2281 35B36A EPA#1	19.2	0.78	3.19	2.28	0.86	1.9	1.19	4.18	1.468230227
369	12/23/2002	EPA	S2282 35B36A EPA#2	19.6	1.01	1.9	2.26	0.51	1.31	0.7	3.57	0.866083137
370	12/23/2002	EPA	S2283 35B36A EPA#3	17.6	6.59	1.56	0.94	0.4	2.19	0.58	3.13	0.704556598
371	12/23/2002	EPA	S2284 35B36A EPA#4	18.5	9.32	2.35	-0.3	0.6	3.7	0.87	3.4	1.056834897
372	12/23/2002	EPA	S2285 35B36A EPA#5	18.9	7.47	2.44	1.25	0.63	2.77	0.92	4.02	1.115033632
469	1/28/2003	EPA	S2344 E-F.5/13-19 EPA#1	30.4	6.2	2.35	-0.31	0.59	2.54	0.9	2.23	1.076150547
470	1/28/2003	EPA	S2345 E-F.5/13-19 EPA#2	29.8	0.2	2.17	0.95	0.59	3.34	0.86	4.29	1.042928569
471	1/28/2003	EPA	S2346 E-F.5/13-19 EPA#3	30.3	3.27	1.93	0.45	0.5	1.97	0.74	2.42	0.893084542
472	1/28/2003	EPA	S2347 E-F.5/13-19 EPA#4	29.8	-4.49	2.35	1.34	0.65	3.13	0.93	4.47	1.134636506
473	1/28/2003	EPA	S2348 E-F.5/13-19 EPA#5	30.8	-0.91	2.89	0.97	0.78	3.48	1.16	4.45	1.3978555
476	1/29/2003	EPA	S2349 I-N/13-19 EPA#1	25.9	2.99	2.08	2.27	0.55	0.99	0.77	3.26	0.946255779
477	1/29/2003	EPA	S2350 I-N/13-19 EPA#2	31.1	2.03	2.35	2.14	0.62	1.83	0.88	3.97	1.076475731
478	1/29/2003	EPA	S2351 I-N/13-19 EPA#3	31.3	5.6	2.3	1.33	0.6	2.97	0.86	4.3	1.048618138
479	1/29/2003	EPA	S2352 I-N/13-19 EPA#4	27.2	7.73	2.63	1.07	0.67	1.51	0.94	2.58	1.154339638
480	1/29/2003	EPA	S2353 I-N/13-19 EPA#5	33.1	4.23	2.43	1.58	0.64	3.48	0.9	5.06	1.104355015
481	1/29/2003	EPA	S2354 S-9 West EPA#1	27.1	4.49	3.1	1.19	0.81	2.03	1.16	3.22	1.414814475
482	1/29/2003	EPA	S2355 S-9 West EPA#2	26.2	1.72	2.34	1.95	0.63	1.14	0.86	3.09	1.06606754
483	1/29/2003	EPA	S2356 S-9 West EPA#3	26.9	4.05	2.02	0.73	0.54	3.18	0.77	3.91	0.940478602
484	1/29/2003	EPA	S2357 S-9 West EPA#4	29	1.21	2.34	0.97	0.62	2.22	0.89	3.19	1.084665847
485	1/29/2003	EPA	S2358 S-9 West EPA#5	28	4.21	2.93	1.25	0.77	1.65	1.09	2.9	1.33454112
486	1/29/2003	EPA	S2359 S-9 East EPA#1	23.5	2.69	1.65	1.96	0.44	0.85	0.61	2.81	0.752130308
487	1/29/2003	EPA	S2360 S-9 East EPA#2	22	4.19	2.89	0.09	0.78	2.04	1.11	2.13	1.356650287
48	1/29/2003	EPA	S2361 S-9 East EPA#3	23.5	0.01	8.72	-0.21	2.37	0.93	3.67	0.72	4.368729793
488	1/29/2003	EPA	S2361 S-9 East EPA#3	23.5	7.53	2.28	0.09	0.58	3.35	0.88	3.44	1.05394497
489	1/29/2003	EPA	S2362 S-9 East EPA#4	21.4	-1.35	2.17	1.7	0.61	1.93	0.86	3.63	1.054371851
490	1/29/2003	EPA	S2363 S-9 East EPA#5	22.5	1.23	2.21	0.54	0.6	3.5	0.88	4.04	1.065082156
520	2/6/2003	EPA	S2381 10A EPA#1	29.7	3.21	2.63	0.05	0.68	2.1	1.01	2.15	1.217579566
521	2/6/2003	EPA	S2382 10A EPA#2	29.6	0.87	3.19	0.71	0.84	3.02	1.24	3.73	1.497731618
523	2/6/2003	EPA	S2383 10A EPA#3	28.9	-0.97	2.05	0.18	0.55	3.69	0.83	3.87	0.995690715
524	2/6/2003	EPA	S2384 10A EPA#4	32.5	-4.75	4.75	1.14	1.28	4.92	1.88	6.06	2.274379036

NUTRANL - USEPA Verification Sample Analyses (Five Samples per Set)
Lakeshore East
221 North Columbus Drive, Chicago, Illinois
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
525	2/6/2003	EPA	S2385 10A EPA#5	29.8	-7.07	5.08	1.78	1.37	2.91	1.96	4.69	2.391338537
528	2/7/2003	EPA	S2386 29C EPA #1	27.1	0.58	2.8	3.35	0.75	-0.1	1	3.25	1.25
529	2/7/2003	EPA	S2387 29C EPA #2	27.5	4.39	2.38	1.07	0.61	3.22	0.89	4.29	1.078981001
530	2/7/2003	EPA	S2388 29C EPA #3	24.9	4.9	1.55	-0.24	0.41	4.28	0.61	4.04	0.734982993
531	2/7/2003	EPA	S2389 29C EPA #4	25.2	3.65	2.24	1.04	0.59	2.27	0.84	3.31	1.026498904
532	2/7/2003	EPA	S2390 29C EPA #5	26.1	5.12	2.47	1.21	0.64	1.81	0.93	3.02	1.128937554
533	2/7/2003	EPA	S2391 11A10B East EPA#1	42.5	29.06	23.97	7.24	6.04	86.75	9.31	93.99	11.09764389
534	2/7/2003	EPA	S2392 11A10B East EPA#2	42	3.85	2.24	0.55	0.59	1.76	0.86	2.31	1.042928569
535	2/7/2003	EPA	S2393 11A10B East EPA#3	42.8	4.01	1.77	1.14	0.46	2.39	0.66	3.53	0.804487414
536	2/7/2003	EPA	S2394 11A10B East EPA#4	43.6	2.3	3.06	0.18	0.83	3.63	1.22	3.81	1.475567687
537	2/7/2003	EPA	S2395 11A10B East EPA#5	41.8	2.48	2.44	1.26	0.65	2.61	0.93	3.87	1.134636506
538	2/7/2003	EPA	S2396 11A10B West EPA#1	37.7	0.73	2.81	1.45	0.75	1.13	1.07	2.58	1.30667517
539	2/7/2003	EPA	S2397 11A10B West EPA#2	40.8	5.91	2.33	-0.41	0.6	1.58	0.87	1.17	1.056834897
540	2/7/2003	EPA	S2398 11A10B West EPA#3	39.9	2.49	2.88	1.63	0.75	0.16	1.05	1.79	1.29034879
541	2/7/2003	EPA	S2399 11A10B West EPA#4	39.8	6.54	1.92	0.69	0.49	1.13	0.7	1.82	0.854458893
542	2/7/2003	EPA	S2400 11A10B West EPA#5	37.2	2.52	2.13	0.37	0.56	2.45	0.82	2.82	0.992975327
559	2/12/2003	EPA	S2411 11A10B East EPA#1	30.4	3.51	2.45	1.67	0.64	0.46	0.89	2.13	1.096220781
560	2/12/2003	EPA	S2412 11A10B East EPA#2	29.2	-5.25	1.73	1.46	0.5	1.76	0.7	3.22	0.860232527
561	2/12/2003	EPA	S2413 11A10B East EPA#3	26.1	0.94	2.81	0.55	0.73	1.29	1.07	1.84	1.295299193
562	2/12/2003	EPA	S2414 11A10B East EPA#4	28.5	3.89	2.07	0.1	0.53	1.36	0.78	1.46	0.943027041
563	2/12/2003	EPA	S2415 11A10B East EPA#5	31.6	-0.05	1.96	1.85	0.54	0.19	0.74	2.04	0.916078599
637	3/6/2003	EPA	S2459 7C EPA#1	30.6	2.74	2.44	0.3	0.64	1.24	0.94	1.54	1.137189518
638	3/6/2003	EPA	S2460 7C EPA#2	32.5	1.35	2.18	0.56	0.59	1.05	0.85	1.61	1.034698024
639	3/6/2003	EPA	S2461 7C EPA#3	30.9	0.72	2.4	1.25	0.66	2.43	0.95	3.68	1.156762724
640	3/6/2003	EPA	S2462 7C EPA#4	35	9.72	2.87	0.05	0.71	0.91	1.05	0.96	1.267517258
641	3/6/2003	EPA	S2463 7C EPA#5	29.1	3.31	2.59	0.19	0.68	1.5	0.99	1.69	1.201041215
691	3/27/2003	EPA	S2482 9A#1 EPA#1	26.7	3.6	2.22	1.25	0.59	1.55	0.83	2.8	1.018331969
692	3/27/2003	EPA	S2483 9A#1 EPA#2	23.4	-0.3	2.76	1.89	0.74	1.49	1.06	3.38	1.292749009
693	3/27/2003	EPA	S2484 9A#1 EPA#3	24.6	6.3	2.32	1	0.61	2.62	0.88	3.62	1.070747403
694	3/27/2003	EPA	S2485 9A#1 EPA#4	25.3	3.35	2.55	1.61	0.68	0.6	0.96	2.21	1.176435294
695	3/27/2003	EPA	S2486 9A#1 EPA#5	24.6	-0.59	2.46	1.74	0.67	1.09	0.94	2.83	1.154339638
696	3/27/2003	EPA	S2487 9A#2 EPA#1	23.7	3.01	2.26	0.78	0.6	0.79	0.86	1.57	1.048618138
697	3/27/2003	EPA	S2488 9A#2 EPA#2	25.6	5.58	1.65	0.38	0.43	1.39	0.62	1.77	0.754519715
698	3/27/2003	EPA	S2489 9A#2 EPA#3	24.7	0.31	1.62	1.43	0.44	0.68	0.62	2.11	0.760263112
699	3/27/2003	EPA	S2490 9A#2 EPA#4	22.5	0.63	2.26	1.14	0.62	1.63	0.88	2.77	1.076475731

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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
700	3/27/2003	EPA	S2491 9A#2 EPA#5	24.6	0	2	0.62	0.54	2.07	0.78	2.69	0.948683298
701	3/27/2003	EPA	S2492 9B EPA#1	26.5	4.25	2.18	2.01	0.58	1.58	0.8	3.59	0.988129546
702	3/27/2003	EPA	S2493 9B EPA#2	27.4	6.08	2.6	-0.07	0.68	4.45	1.01	4.38	1.217579566
703	3/27/2003	EPA	S2494 9B EPA#3	26.8	1.18	1.91	1.73	0.51	1.76	0.73	3.49	0.890505474
704	3/27/2003	EPA	S2495 9B EPA#4	27.5	1.46	2.48	2.5	0.67	1.02	0.92	3.52	1.138112472
705	3/27/2003	EPA	S2496 9B EPA#5	26.7	1.27	2.61	2.22	0.7	1.1	0.98	3.32	1.204325537
706	3/27/2003	EPA	S2497 36A EPA#1	31.6	1.24	2.84	1.85	0.75	-1.44	1.02	0.41	1.266056871
707	3/27/2003	EPA	S2498 36A EPA#2	33.5	2.22	1.83	1.21	0.48	0.05	0.68	1.26	0.832346082
708	3/27/2003	EPA	S2499 36A EPA#3	30.9	2.24	2.67	0.25	0.7	1.55	1.04	1.8	1.253634716
709	3/27/2003	EPA	S2500 36A EPA#4	31.8	6.38	2.59	0.62	0.68	0.02	0.95	0.64	1.168289348
710	3/27/2003	EPA	S2501 36A EPA#5	31.5	2.68	2.12	0.36	0.56	0.64	0.81	1	0.984733466
738	4/4/2003	EPA	S2517 11C#1 EPA#1	36.4	1.15	2.18	0.33	0.58	1.27	0.84	1.6	1.020784012
739	4/4/2003	EPA	S2518 11C#1 EPA#2	35.7	2.08	2.49	0.27	0.68	1.47	0.98	1.74	1.192811804
740	4/4/2003	EPA	S2519 11C#1 EPA#3	33.5	-1.69	1.64	0.9	0.45	0.36	0.64	1.26	0.7823682
741	4/4/2003	EPA	S2520 11C#1 EPA#4	36.5	8.6	3.15	1.46	0.8	-0.42	1.08	1.04	1.344023809
742	4/4/2003	EPA	S2521 11C#1 EPA#5	36.8	8.03	2.54	-0.4	0.64	3.25	0.97	2.85	1.16211015
743	4/4/2003	EPA	S2522 11C#2 EPA#1	31.8	5.93	2.59	1.5	0.67	2.74	0.97	4.24	1.17889779
744	4/4/2003	EPA	S2523 11C#2 EPA#2	32.3	10.52	3.22	0.68	0.81	2.34	1.17	3.02	1.423024947
745	4/4/2003	EPA	S2524 11C#2 EPA#3	32.5	1.86	2.77	1.63	0.74	1.41	1.03	3.04	1.268266534
746	4/4/2003	EPA	S2525 11C#2 EPA#4	29.4	5.47	2.27	1.9	0.59	1.99	0.83	3.89	1.018331969
747	4/4/2003	EPA	S2526 11C#2 EPA#5	32.9	-0.65	2.37	0.97	0.63	3.59	0.92	4.56	1.115033632
748	4/4/2003	EPA	S2527 11D EPA#1	35.4	6.96	3.13	0.6	0.79	2.52	1.16	3.12	1.40346001
749	4/4/2003	EPA	S2528 11D EPA#2	34.6	0.11	2.98	2.36	0.82	0.65	1.13	3.01	1.396173342
750	4/4/2003	EPA	S2529 11D EPA#3	36.7	3	2.91	-0.28	0.78	2.95	1.17	2.67	1.406164997
751	4/4/2003	EPA	S2530 11D EPA#4	32.9	2.81	2.22	0.79	0.59	2.46	0.86	3.25	1.042928569
752	4/4/2003	EPA	S2531 11D EPA#5	35.3	5.03	2.89	0.4	0.75	2.18	1.11	2.58	1.339626814
753	4/4/2003	EPA	S2532 10C EPA#1	32.2	6.17	2.92	1.74	0.74	0.58	1.03	2.32	1.268266534
754	4/4/2003	EPA	S2533 10C EPA#2	34.5	1.71	3.36	1.13	0.89	2.54	1.27	3.67	1.550806242
755	4/4/2003	EPA	S2534 10C EPA#3	32.6	-3.34	2	1.81	0.56	1.54	0.78	3.35	0.960208311
756	4/4/2003	EPA	S2535 10C EPA#4	31.1	6	3.97	0.66	1.02	1.51	1.45	2.17	1.772822608
757	4/4/2003	EPA	S2536 10C EPA#5	30.3	-0.27	3.33	0.33	0.89	1.89	1.29	2.22	1.56722685
758	4/4/2003	EPA	S2537 10D#1 EPA#1	31.6	-1.08	2.16	2.44	0.6	0.36	0.82	2.8	1.016070864
759	4/4/2003	EPA	S2538 10D#1 EPA#2	29.8	6.57	2.69	1.92	0.7	2	0.98	3.92	1.204325537
760	4/4/2003	EPA	S2539 10D#1 EPA#3	34.5	1.99	3.3	1.56	0.9	2.96	1.26	4.52	1.548418548
761	4/4/2003	EPA	S2540 10D#1 EPA#4	33.6	-1.67	3.02	1.24	0.84	3.83	1.21	5.07	1.472990156

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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
762	4/4/2003	EPA	S2541 10D#1 EPA#5	34.3	-2.79	2.85	1.38	0.79	1.75	1.15	3.13	1.395206078
763	4/4/2003	EPA	S2542 9C EPA#1	28.6	2.55	2.98	0.8	0.79	1.44	1.14	2.24	1.386975126
764	4/4/2003	EPA	S2543 9C EPA#2	27.7	2.13	2.5	0.01	0.67	2.83	1.02	2.84	1.220368797
765	4/4/2003	EPA	S2544 9C EPA#3	31.2	5.35	3.98	1.4	1.01	1.07	1.45	2.47	1.767088
766	4/4/2003	EPA	S2545 9C EPA#4	29.8	4.59	2.86	0.16	0.78	4.1	1.13	4.26	1.373062271
767	4/4/2003	EPA	S2546 9C EPA#5	32.6	0.09	3.5	1.81	0.93	1.58	1.31	3.39	1.606549097
768	4/4/2003	EPA	S2547 10D#3 EPA#1	34.6	1.85	2.04	1.65	0.55	1.47	0.77	3.12	0.946255779
769	4/4/2003	EPA	S2548 10D#3 EPA#2	34.8	5.31	2.57	1.91	0.68	0.3	0.94	2.21	1.160172401
770	4/4/2003	EPA	S2549 10D#3 EPA#3	34.2	4.35	1.83	0.9	0.48	2.12	0.69	3.02	0.840535544
771	4/4/2003	EPA	S2550 10D#3 EPA#4	33.4	-0.07	2.59	1.78	0.69	1.69	0.97	3.47	1.190378091
772	4/4/2003	EPA	S2551 10D#3 EPA#5	35.7	4.8	3.24	1.45	0.86	0.62	1.2	2.07	1.476346843
784	4/11/2003	EPA	S2559 9D/9C NE EPA#1	26.7	1.64	3.4	1.53	0.9	0.08	1.26	1.61	1.548418548
785	4/11/2003	EPA	S2560 9D/9C NE EPA#2	27.8	5.16	3.55	0.57	0.91	1.64	1.32	2.21	1.603277892
786	4/11/2003	EPA	S2561 9D/9C NE EPA#3	27.4	3.87	2.52	0.97	0.66	0.44	0.94	1.41	1.148564321
787	4/11/2003	EPA	S2562 9D/9C NE EPA#4	27.2	0.63	2.32	1	0.63	1.43	0.9	2.43	1.098590005
788	4/11/2003	EPA	S2563 9D/9C NE EPA#5	28.1	-0.14	2.45	1.79	0.66	0.66	0.93	2.45	1.140394669
789	4/11/2003	EPA	S2564 9D/9C SE EPA#1	29.6	-2.49	2.59	2.51	0.71	1.17	0.98	3.68	1.210165278
790	4/11/2003	EPA	S2565 9D/9C SE EPA#2	32.2	7.02	2.97	1.68	0.78	1.92	1.1	3.6	1.348480626
791	4/11/2003	EPA	S2566 9D/9C SE EPA#3	32.6	3.02	2.17	0.85	0.57	3.75	0.84	4.6	1.015135459
792	4/11/2003	EPA	S2567 9D/9C SE EPA#4	30.7	-0.4	3.59	0.69	0.96	3.1	1.42	3.79	1.714059509
793	4/11/2003	EPA	S2568 9D/9C SE EPA#5	30.3	6.38	2.53	2.59	0.65	0.69	0.9	3.28	1.110180166
794	4/11/2003	EPA	S2569 9D/9C NW EPA#1	28.6	-2.08	2.37	1.67	0.64	1.28	0.91	2.95	1.112519663
795	4/11/2003	EPA	S2570 9D/9C NW EPA#2	26.7	5.28	2.68	0.39	0.7	2.03	1.02	2.42	1.237093368
796	4/11/2003	EPA	S2571 9D/9C NW EPA#3	26.4	-0.75	1.93	2.45	0.52	-0.91	0.72	1.54	0.888144132
797	4/11/2003	EPA	S2572 9D/9C NW EPA#4	26.6	5.88	2.55	0.62	0.67	2.84	0.97	3.46	1.17889779
798	4/11/2003	EPA	S2573 9D/9C NW EPA#5	25.7	-1.94	2.98	1.34	0.81	1.47	1.17	2.81	1.423024947
799	4/11/2003	EPA	S2574 9D/9C SW EPA#1	21.6	0.93	3.74	1.26	1.04	0.65	1.44	1.91	1.776288265
800	4/11/2003	EPA	S2575 9D/9C SW EPA#2	24.4	4.55	3.34	0.04	0.89	3.31	1.31	3.35	1.583729775
801	4/11/2003	EPA	S2576 9D/9C SW EPA#3	22.3	2.01	2.79	0.33	0.74	2.32	1.1	2.65	1.325745074
802	4/11/2003	EPA	S2577 9D/9C SW EPA#4	25.3	0.5	2.57	2.11	0.71	1.97	0.99	4.08	1.218277472
803	4/11/2003	EPA	S2578 9D/9C SW EPA#5	24.5	7.41	3.18	1.22	0.82	-0.02	1.14	1.2	1.404279175
804	4/11/2003	EPA	S2579 10D#2 EPA#1	28.8	0.83	2.64	0.49	0.71	1.39	1.04	1.88	1.259245806
805	4/11/2003	EPA	S2580 10D#2 EPA#2	28.7	0.69	2.87	1.65	0.79	1.6	1.11	3.25	1.36242431
806	4/11/2003	EPA	S2581 10D#2 EPA#3	28.7	2.95	3.16	0.95	0.84	1.28	1.2	2.23	1.464786674
807	4/11/2003	EPA	S2582 10D#2 EPA#4	30.6	8.08	3.72	1	0.93	-0.87	1.29	0.13	1.590282994

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808	4/11/2003	EPA	S2583 10D#2 EPA#5	30.6	0.85	2.36	1.72	0.65	0.25	0.89	1.97	1.102088926
52	10/18/2002	EPA Spot	S2025 G.5-33	34.4	5.61	2.01	0.91	0.52	4.49	0.75	5.4	0.912633552

Phase III Lift Sample Analyses

NUTRANL - Phase III Lift Sample Analyses
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Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
318	12/9/2002	lift	S2245 25A	30.6	4.78	3.83	1.48	1.01	0.19	1.41	1.67	1.734416328
319	12/9/2002	lift	S2246 25B	25.1	6.55	3.27	0.89	0.85	0.85	1.24	1.74	1.503362897
320	12/9/2002	lift	S2247 25C	30.8	8.73	3.46	1.49	0.9	0.37	1.23	1.86	1.524106296
321	12/9/2002	lift	S2248 25D	30.7	2.9	2.27	1.22	0.59	0.95	0.84	2.17	1.026498904
322	12/9/2002	lift	S2249 34A	26.4	2.06	3.3	-0.4	0.86	2.48	1.31	2.08	1.567067325
323	12/9/2002	lift	S2250 34B	24.8	6.36	3.11	0.62	0.81	1.51	1.17	2.13	1.423024947
324	12/9/2002	lift	S2251 34C	27.1	9.72	3.31	0.69	0.83	-0.54	1.15	0.15	1.418238344
325	12/9/2002	lift	S2252 34D	26.9	7.67	3.32	-0.47	0.85	1.51	1.26	1.04	1.519901313
326	12/9/2002	lift	S2253 39A	22.1	7.75	2.4	-0.61	0.61	3.06	0.95	2.45	1.128981842
327	12/9/2002	lift	S2254 39B	24.1	11.58	3.38	-0.58	0.85	2.03	1.22	1.45	1.486909547
328	12/9/2002	lift	S2255 39C	25.6	0.37	2.62	0.2	0.75	2.22	1.09	2.42	1.323102415
329	12/9/2002	lift	S2256 39D	28.6	4.15	3.17	-0.21	0.87	2.78	1.25	2.57	1.522957649
330	12/9/2002	lift	S2257 40A	25	3.97	3.18	0.03	0.84	1.48	1.21	1.51	1.472990156
331	12/9/2002	lift	S2258 40B	27.7	6.92	3.69	1.66	0.95	0.18	1.32	1.84	1.626314853
336	12/12/2002	lift	S2259 16A	33.6	1.11	2.82	0.78	0.78	4.47	1.15	5.25	1.389568278
337	12/12/2002	lift	S2260 16B	22.5	-0.28	2.42	1.06	0.65	-1.5	0.91	-0.44	1.118302285
338	12/12/2002	lift	S2261 16C	25.1	-1.6	3.3	1.76	0.91	1.41	1.28	3.17	1.570509471
339	12/12/2002	lift	S2262 16D	26	9.92	3.47	0.73	0.86	0.39	1.27	1.12	1.533786165
375	12/24/2002	lift	S2286 26A	35.1	0.12	3.23	0.35	0.86	3.09	1.26	3.44	1.525516306
376	12/24/2002	lift	S2287 26B	36.3	3.53	2.05	1.32	0.54	0.81	0.77	2.13	0.940478602
377	12/24/2002	lift	S2288 26C	42.8	1.09	3.03	1.16	0.83	0.81	1.19	1.97	1.450861813
378	12/24/2002	lift	S2289 26D	40.8	11	3.35	-0.52	0.83	2.62	1.24	2.1	1.492146105
379	12/24/2002	lift	S2290 35A	39.8	4.84	3.92	1.79	1.02	-0.61	1.4	1.18	1.732166274
380	12/24/2002	lift	S2291 35B	40.5	4.18	2.41	1.41	0.62	0.03	0.86	1.44	1.060188662
381	12/24/2002	lift	S2292 35C	33	-1.17	2.7	1.44	0.75	1.34	1.07	2.78	1.30667517
382	12/24/2002	lift	S2293 35D	40.4	1.11	2.55	1.25	0.69	1.49	0.98	2.74	1.198540779
385	12/26/2002	lift	S2294 17A	36	4.92	3.57	-0.04	0.93	1.15	1.34	1.11	1.631103921
386	12/26/2002	lift	S2295 17B	35.5	2.73	3.53	0.31	0.95	2.82	1.38	3.13	1.675380554
387	12/26/2002	lift	S2296 17C	36.5	6.02	3.52	0.79	0.93	1.87	1.31	2.66	1.606549097
388	12/26/2002	lift	S2297 17D	33.2	4.77	2.79	0.61	0.72	2.79	1.07	3.4	1.289689885
389	12/26/2002	lift	S2298 37A	23.4	6.06	3.22	0.13	0.81	0.5	1.19	0.63	1.439513807
390	12/26/2002	lift	S2299 37B	21.8	-0.2	2.18	2.06	0.6	0.77	0.83	2.83	1.024158191
391	12/26/2002	lift	S2300 37C	20.3	1.52	2.87	1.62	0.78	-0.91	1.09	0.71	1.340335779
392	12/26/2002	lift	S2301 37D	22.8	-1.12	3.06	0.74	0.85	1.01	1.22	1.75	1.486909547
393	12/26/2002	lift	S2302 38A	28.1	0.79	3.36	2.09	0.92	-0.34	1.25	1.75	1.552063143

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Lakeshore East
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Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
394	12/26/2002	lift	S2303 38D	25.7	-1.56	2.81	0.61	0.78	0.71	1.13	1.32	1.373062271
402	1/3/2003	lift	S2307 27A	33	6.09	3.66	1.19	1	2.35	1.37	3.54	1.696142683
403	1/3/2003	lift	S2308 27B	33.6	5	2.9	0.73	0.75	2.2	1.09	2.93	1.323102415
404	1/3/2003	lift	S2309 27C	31.4	2.55	2.82	2.15	0.74	0.14	1.02	2.29	1.26015872
405	1/3/2003	lift	S2310 27D	31	2.53	3.52	1.91	0.93	-0.11	1.28	1.8	1.582182038
412	1/7/2003	lift	S2313 28A	37.7	0.14	2.12	1.11	0.58	0.63	0.82	1.74	1.004390362
413	1/7/2003	lift	S2314 28B	40.7	8.43	2.59	0.59	0.67	1.5	0.96	2.09	1.170683561
414	1/7/2003	lift	S2315 28C	34.9	7.99	3.36	0.18	0.88	1.3	1.25	1.48	1.528692252
415	1/7/2003	lift	S2316 28D	36	7.35	2.8	-0.7	0.72	2.42	1.07	1.72	1.289689885
418	1/8/2003	lift	S2317 29A	38.4	9.05	3.37	-0.19	0.84	2.48	1.23	2.29	1.48946299
419	1/8/2003	lift	S2318 29D	40.4	8.78	2.09	-0.19	0.53	4.08	0.81	3.89	0.967987603
422	1/10/2003	lift	S2319 29B	29.3	6.77	2.65	-0.98	0.65	1.76	1.02	0.78	1.209504031
423	1/10/2003	lift	S2320 29C	31.8	1.2	3.65	0.99	0.96	1.1	1.41	2.09	1.705784277
429	1/14/2003	lift	S2322 30A	36.5	8.57	3.79	0.75	0.96	1.16	1.36	1.91	1.664692164
430	1/14/2003	lift	S2323 30D	30.5	4.09	2.88	0.55	0.75	1.99	1.11	2.54	1.339626814
434	1/15/2003	lift	S2325 30B	26.2	5.09	2.69	0.19	0.7	1.46	1.02	1.65	1.237093368
435	1/15/2003	lift	S2326 30C	28.4	8.87	2.89	-0.59	0.74	2.08	1.09	1.49	1.317459677
449	1/22/2003	lift	S2332 31A	28.9	8.05	2.85	0.27	0.74	2.49	1.09	2.76	1.317459677
450	1/22/2003	lift	S2333 31D	25.9	2.54	3.05	0.22	0.82	1.84	1.22	2.06	1.469965986
463	1/27/2003	lift	S2340 13A	26	-1.34	2.52	1.31	0.69	2.43	0.99	3.74	1.206731122
464	1/27/2003	lift	S2341 13D	28.5	0.28	2.88	0.44	0.77	1.26	1.13	1.7	1.367406304
465	1/27/2003	lift	S2342 22A	27.8	5.32	2.89	-0.1	0.75	0.7	1.11	0.6	1.339626814
466	1/27/2003	lift	S2343 22D	30.2	4.27	3.61	1.14	0.91	-0.16	1.33	0.98	1.611521021
509	2/4/2003	lift	S2374 21B	39.1	-2.88	3.72	1.25	1.02	4.05	1.5	5.3	1.813945975
510	2/4/2003	lift	S2375 21C	44.1	-3.89	3.73	0.42	0.99	2.69	1.49	3.11	1.788910283
511	2/4/2003	lift	S2376 1D	42.6	4.53	3.33	0.91	0.87	0.93	1.25	1.84	1.522957649
512	2/4/2003	lift	S2377 3C	40.3	2.47	3.65	0.58	0.98	1.09	1.39	1.67	1.700735135
513	2/4/2003	lift	S2378 3D	38.4	-3.06	2.62	1	0.72	1.27	1.05	2.27	1.27314571
514	2/4/2003	lift	S2379 9A	37.6	8.94	2.65	-1.1	0.67	1.7	1.01	0.6	1.212023102
515	2/4/2003	lift	S2380 9B	37.3	-6.98	5.84	1.39	1.57	3.43	2.34	4.82	2.817889281
543	2/7/2003	lift	S2401 8B	30.9	2.71	2.99	1.09	0.77	-0.61	1.1	0.48	1.342721118
544	2/7/2003	lift	S2402 8C	34.1	2.89	3.05	0.31	0.81	2.64	1.18	2.95	1.431258188
545	2/7/2003	lift	S2403 8D	28.5	5.27	3.1	1.23	0.79	-0.02	1.1	1.21	1.354289482
546	2/7/2003	lift	S2404 12C	29.5	5.76	3.19	0.49	0.84	1.26	1.2	1.75	1.464786674
547	2/7/2003	lift	S2405 12D	29.6	0.59	2.81	-0.39	0.78	3.1	1.14	2.71	1.381303732

NUTRANL - Phase III Lift Sample Analyses
Lakeshore East
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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
548	2/7/2003	lift	S2406 21A	27.9	0.76	3.05	0.7	0.81	-0.36	1.13	0.34	1.390323703
549	2/7/2003	lift	S2407 21D	28.8	1.7	3.43	2.12	0.95	-0.1	1.27	2.02	1.586001261
566	2/13/2003	lift	S2416 4C	20	6.91	3.25	-0.03	0.84	0.48	1.21	0.45	1.472990156
567	2/13/2003	lift	S2417 4D	26.4	1.97	3.09	0.82	0.84	2.2	1.23	3.02	1.48946299
568	2/13/2003	lift	S2418 10A	25	5.35	4.38	0.07	1.13	1.96	1.69	2.03	2.032978111
569	2/13/2003	lift	S2419 10B	23.8	-3.44	2.4	0.77	0.67	1.65	0.99	2.42	1.19540788
570	2/13/2003	lift	S2420 11A	24.5	2.06	2.54	-0.12	0.68	3.76	1.04	3.64	1.242577965
571	2/13/2003	lift	S2421 11B	27.1	3.51	2.83	0.22	0.76	1.54	1.1	1.76	1.337011593
579	2/18/2003	lift	S2423 11C	43.7	4.61	2.54	1.95	0.67	0.18	0.93	2.13	1.14621115
580	2/18/2003	lift	S2424 20B	39.1	9.05	3.26	0.38	0.81	0.61	1.17	0.99	1.423024947
581	2/18/2003	lift	S2425 20C	36.4	7.17	3.21	0.64	0.83	0.76	1.15	1.4	1.418238344
584	2/19/2003	lift	S2426 11D	39.8	4.55	3.16	1.22	0.84	-0.69	1.16	0.53	1.432201103
585	2/19/2003	lift	S2427 20A	41.3	6.71	2.83	0.05	0.71	0.08	1.04	0.13	1.259245806
586	2/19/2003	lift	S2428 20D	38.8	2.12	2.55	0.47	0.7	4.33	1.02	4.8	1.237093368
606	2/25/2003	lift	S2440 19A	27.6	9.89	2.98	-0.68	0.72	-0.14	1.08	-0.82	1.297998459
607	2/25/2003	lift	S2441 19B	25.1	-0.2	2.19	1.19	0.6	-0.34	0.85	0.85	1.040432602
608	2/25/2003	lift	S2442 19C	31.6	4.35	3.12	-0.17	0.82	1.56	1.21	1.39	1.461677119
609	2/25/2003	lift	S2443 19D	32.1	1.93	2.96	-1.33	0.76	3.39	1.21	2.06	1.428880681
614	2/27/2003	lift	S2444 18A	35.2	-2.1	2.72	1.99	0.75	-1.12	1.03	0.87	1.274127152
615	2/27/2003	lift	S2445 18B	35.7	-0.22	3.01	0.58	0.83	1.12	1.21	1.7	1.467310465
616	2/27/2003	lift	S2446 18C	29.3	-1.48	2.76	0.28	0.77	1.55	1.12	1.83	1.359154149
617	2/27/2003	lift	S2447 18D	26.4	-0.98	2.34	1.02	0.66	0.65	0.93	1.67	1.140394669
620	2/28/2003	lift	S2448 36A	30.2	-0.73	2.69	1.2	0.75	0.61	1.04	1.81	1.282224629
621	2/28/2003	lift	S2449 36B	32.4	4.67	2.44	0.34	0.66	0.95	0.93	1.29	1.140394669
622	2/28/2003	lift	S2450 36C	36.7	6.77	2.64	-0.48	0.68	2.6	1.02	2.12	1.225887434
623	2/28/2003	lift	S2451 36D	30.2	7.22	4.31	-2.09	1.14	3.39	1.77	1.3	2.105350327
628	3/4/2003	lift	S2452 33B	28	7.09	3.57	0.76	0.93	2.7	1.36	3.46	1.647573974
630	3/4/2003	lift	S2454 7A	30.9	-2.17	2.35	2.24	0.65	0.14	0.91	2.38	1.118302285
631	3/4/2003	lift	S2455 7C	32.6	6.47	3.29	-0.14	0.85	2.82	1.24	2.68	1.503362897
632	3/4/2003	lift	S2456 7D	33.2	1.04	2.85	1.53	0.78	0.26	1.1	1.79	1.348480626
635	3/6/2003	lift	S2457 24B	33.2	-4.73	2.37	2.71	0.67	-0.79	0.92	1.92	1.138112472
636	3/6/2003	lift	S2458 24C	39.3	3.62	2.98	0.73	0.8	2.69	1.16	3.42	1.409113196
644	3/7/2003	lift	S2464 15B	42.3	2.63	3.19	0.71	0.85	2.27	1.26	2.98	1.519901313
645	3/7/2003	lift	S2465 15C	37	-1.33	2.82	0.71	0.77	1.52	1.14	2.23	1.375681649
342	12/13/2002	lift spot	S2263 36A-35B #1	27.5	0.7	4.09	3.05	1.1	3.33	1.54	6.38	1.892511559

NUTRANL - Phase III Lift Sample Analyses
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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
343	12/13/2002	lift spot	S2264 36A-35B #2	27.6	-1.94	3.56	2.57	0.97	5.45	1.38	8.02	1.686801707
344	12/13/2002	lift spot	S2265 28A#1	35.3	7.77	4.67	0.16	1.23	1.11	1.75	1.27	2.139018466
347	12/16/2002	lift spot	S2266 26D	30.1	10.72	3.46	-0.73	0.87	4.08	1.32	3.35	1.580917455
348	12/16/2002	lift spot	S2267 28A#2	23.9	1.85	2.69	1.28	0.74	0.46	1.04	1.74	1.276401191
713	3/27/2003	lift spot	S2504 11B	22.7	-0.37	3.53	1.14	0.96	3.46	1.4	4.6	1.697527614
572	2/13/2003	misc	S2422 Fill Soil	30.5	4.68	2.89	2.55	0.75	1.02	1.04	3.57	1.282224629

Imported Fill Soil Analyses

Lakeshore East Project - BORROW SOIL STOCKPILE SAMPLING

Offsite Fill

Using USEPA approved procedure SOP 214 *Workplan for Investigation and Removal of Radiologically Impacted Soil* (Revised September 30, 2002)

Excavation Area: Fill Soil Batch #1

Date Sampled: 2/20/03

PILE # : West Side of Site **Est. Volume of Lift in Cubic Yards:** 5000

Number of Samples Required Per SOP 214: 10

Sample #	Total Radium in pCi/g	QC Sample Dup. Tot. Rad. in pCi/g	E lab uncertainty	S_2 Std. Dev. for the analyses of the duplicate sample	S_{dup} Std. Dev. of the duplicate sampling & measurement
S2429 Fill Soil (1) #1	2.92				
S2430 Fill Soil (1) #2	1.99				
S2431 Fill Soil (1) #3	3.50				
S2432 Fill Soil (1) #4	4.48				
S2433 Fill Soil (1) #5	3.19				
S2434 Fill Soil (1) #6	2.43				
S2435 Fill Soil (1) #7	2.93				
S2436 Fill Soil (1) #8	3.42				
S2437 Fill Soil (1) #9	3.46				
S2438 Fill Soil (1) #10	3.09				
S2439 Fill Soil (1) QC		3.32	1.08	0.54	

Number of Samples (n) 10

Average (Mean of the sample population) (X bar) 3.14

S_{dup} = sqrt ($S_1^2 + S_2^2$) = 0.85

Average of samples is <7.1 pCi/g, Proceed with Confidence Level Check described in SOP-214, Paragraph 6.12

Standard Deviation of sample population (S_1) 0.66

"t" value

U_α (True Mean) = (X bar) + (t * (S_1/sqrt(n))) **3.14** 0

Where "t" is a statistic used for small sample tests of hypotheses (the Student Distribution), from SOP No. KMS-102, Attachment 10.6

Release Criteria 3.7 for fill soil SOP

U_α < Release Criteria? **SAMPLES TESTED MEET 95% CONFIDENCE LEVEL - LIFT IS RADIOLOGICALLY ACCEPTABLE FOR USE AS ONSITE BACKFILL PER SOP-214**

Check if QC Sample Dup. is within 3 Standard Deviations (3 S_{dup}) of the mean of the sample population, per SOP 214, paragraph 12.1

3 x S_{dup} = 2.55

Mean + 3 S_{dup} = 5.7 QC < (Mean + 3S_{dup})? O.K.

Mean - 3 S_{dup} = 0.6 QC > (Mean - 3S_{dup})? O.K.

APPROVED: FIELD TEAM LEADER:

APPROVED: PROJECT MANAGER:

Name/date

NUTRANL - Imported Fill Soil Analyses
Lakeshore East
221 North Columbus Drive, Chicago, IL
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
591	2/21/2003	Fill Soil	S2429 Fill Soil (1) #1	32.3	4.08	4.05	0.47	1.03	2.45	1.52	2.92	1.836110018
592	2/21/2003	Fill Soil	S2430 Fill Soil (1) #2	31.4	3.65	3.56	-0.24	0.93	2.23	1.41	1.99	1.689082591
593	2/21/2003	Fill Soil	S2431 Fill Soil (1) #3	33.1	8	3.14	-0.34	0.8	3.84	1.19	3.5	1.433910736
594	2/21/2003	Fill Soil	S2432 Fill Soil (1) #4	30.6	3.68	3.31	1.24	0.87	3.24	1.25	4.48	1.522957649
595	2/21/2003	Fill Soil	S2433 Fill Soil (1) #5	31.2	9.31	4.02	1.14	1.02	2.05	1.47	3.19	1.789217706
596	2/21/2003	Fill Soil	S2434 Fill Soil (1) #6	30.6	9.2	2.65	1.58	0.67	0.85	0.94	2.43	1.154339638
597	2/21/2003	Fill Soil	S2435 Fill Soil (1) #7	30.6	2.84	1.84	2.17	0.49	0.76	0.67	2.93	0.830060239
598	2/21/2003	Fill Soil	S2436 Fill Soil (1) #8	31.7	5.46	2.61	2.83	0.67	0.59	0.91	3.42	1.130044247
599	2/21/2003	Fill Soil	S2437 Fill Soil (1) #9	28.7	2.93	4.13	1.19	1.12	2.27	1.56	3.46	1.920416621
600	2/21/2003	Fill Soil	S2438 Fill Soil (1) #10	28.2	0.52	2.44	1.54	0.66	1.55	0.93	3.09	1.140394669
601	2/21/2003	Fill Soil	S2439 Fill Soil (1) QC	29.3	7.29	2.44	1.37	0.62	1.95	0.88	3.32	1.076475731

Overburden, Excavated Soil Analyses

NUTRANL - Overburden, Excavated Soil Analyses
Lakeshore East
221 North Columbus Drive, Chicago, IL
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
75	10/28/2002	overburden	S2046 A32-F32 OB1	37.1	4.42	3.87	0.56	1.07	1.9	1.5	2.46	1.842525441
76	10/28/2002	overburden	S2047 A32-F32 OB2	33.1	-2.5	2.7	1.85	0.76	1.62	1.07	3.47	1.312440475
77	10/28/2002	overburden	S2048 A32-F32 OB3	36.9	3.18	2.75	0.56	0.72	1.71	1.04	2.27	1.264911064
78	10/28/2002	overburden	S2049 A32-F32 OB4	35.8	7.57	3.62	-0.13	0.93	1.07	1.38	0.94	1.66412139
79	10/28/2002	overburden	S2050 A32-F32 OB4 QC	34.4	4.62	2.82	0.46	0.75	1.42	1.1	1.88	1.331352696
128	11/15/2002	overburden	S2081 OB-N.Road OB#1	29.2	1.86	2.3	2.15	0.61	0.76	0.83	2.91	1.030048543
129	11/15/2002	overburden	S2082 OB-N.Road OB#2	27.9	-1.82	2.98	2.05	0.82	-0.28	1.15	1.77	1.412409289
130	11/15/2002	overburden	S2083 OB-N.Road OB#3	32.2	5.91	3.43	0.23	0.9	0.71	1.3	0.94	1.58113883
131	11/15/2002	overburden	S2084 OB-N.Road OB#4	31.9	-1.99	4.08	1.93	1.11	-0.12	1.59	1.81	1.939123513
132	11/15/2002	overburden	S2085 OB-N.Road OB#5	33.1	2.43	3.69	1.02	0.98	1.64	1.44	2.66	1.74183811
133	11/15/2002	overburden	S2086 OB-N.Road OB#6	31.1	1.38	2.7	1.44	0.7	-0.8	0.99	0.64	1.212476804
134	11/15/2002	overburden	S2087 OB-N.Road OBQC	30.1	2.11	2.41	1.43	0.67	1	0.94	2.43	1.154339638
266	12/5/2002	overburden	S2197 TT-10 OB#1	20.6	10.26	4.04	-0.33	1.01	1.5	1.51	1.17	1.81664526
267	12/5/2002	overburden	S2198 TT-10 OB#2	27	7.79	2.32	-1.32	0.6	3.35	0.92	2.03	1.098362417
268	12/5/2002	overburden	S2199 TT-10 OB#3	25	2.76	2.93	-0.7	0.78	2.07	1.18	1.37	1.414496377
269	12/5/2002	overburden	S2200 TT-10 OB#4	26.1	-2.03	2.73	0.8	0.76	0.4	1.08	1.2	1.320605922
270	12/5/2002	overburden	S2201 TT-10 OB#5	27.2	4.48	3.31	0.83	0.88	0.11	1.23	0.94	1.512382227
271	12/5/2002	overburden	S2202 TT-10 OB#6	22.5	8.72	3.12	-0.74	0.77	0.15	1.14	-0.59	1.375681649
272	12/5/2002	overburden	S2203 TT-10 OBQC	25.6	5.47	2.91	-0.13	0.8	2.4	1.13	2.27	1.384521578

Miscellaneous Samples (Spot Samples, Test Pit Samples)

NUTRANL - Miscellaneous Samples (Spot Smaples, Test Pit Samples)
Lakeshore East
221 North Columbus Drive, Chicago, IL
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
442	1/21/2003	special HHH	S2327 B-23 8.5-10	37.3	1.15	3.38	0.11	0.91	-0.64	1.29	-0.53	1.578670327
428	1/14/2003	spot	S2321 29C spot	19.6	8.71	2.54	0.13	0.64	1.94	0.93	2.07	1.128937554
433	1/15/2003	spot	S2324 29C spot(2)	19.7	3.68	3.38	2.35	0.88	-0.63	1.2	1.72	1.488086019
397	12/27/2002	test pit spot	S2304 R16 #1	28	3.11	3.08	0.74	0.83	3.69	1.2	4.43	1.459075049
398	12/27/2002	test pit spot	S2305 R16 #2	28.7	7.21	3.94	2.41	0.99	6.69	1.44	9.1	1.747483906
399	12/27/2002	test pit spot	S2306 S9	30.4	-4165.86	1094.95	2274.55	310.75	576.28	383.15	2850.83	493.3249284

Daily Soil Standard Analysis

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221 North Columbus Drive, Chicago, IL
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
10	10/9/2002	soil standard	soilstd100902	36.9	8.57	3.98	4.46	1.01	1.3	1.34	5.76	1.678004768
11	10/9/2002	soil standard	soilstd100902(2)	36.9	3.61	2.41	4.5	0.64	2.29	0.86	6.79	1.072007463
12	10/9/2002	soil standard	soilstd100902(3)	36.9	4.85	1.59	4.96	0.42	2.26	0.56	7.22	0.7
14	10/10/2002	soil standard	soilstd101002	36.9	4.24	2.72	5.22	0.71	1.63	0.96	6.85	1.1940268
23	10/11/2002	soil standard	soilstd101102	36.9	4.37	2.83	5.39	0.73	0.45	0.97	5.84	1.214001647
28	10/14/2002	soil standard	soilstd101402	36.9	1.39	2.58	5.09	0.69	2.32	0.93	7.41	1.158015544
35	10/15/2002	soil standard	soilstd101502	36.9	-3.16	2.27	6.39	0.61	2.14	0.82	8.53	1.022007828
41	10/16/2002	soil standard	soilstd101602	36.9	6.62	2.97	4.67	0.78	3.02	1.06	7.69	1.31605471
44	10/17/2002	soil standard	soilstd101702	36.9	1.56	2.63	5.18	0.7	1.21	0.92	6.39	1.156027681
51	10/18/2002	soil standard	soilstd101802	36.9	2.44	2.85	5.51	0.76	1.76	1.01	7.27	1.264001582
74	10/28/2002	soil standard	soilstd102802	36.9	1.62	2.51	5.8	0.68	0.66	0.88	6.46	1.112115102
86	10/29/2002	soil standard	soilstd102902	36.9	5.36	2.92	5.04	0.77	2	1.03	7.04	1.286001555
88	10/30/2002	soil standard	soilstd103002	36.9	4.72	2.68	5.04	0.72	2.55	0.97	7.59	1.208014901
90	11/1/2002	soil standard	soilstd11102	36.9	1.05	2.5	4.53	0.66	3.54	0.92	8.07	1.132254388
92	11/8/2002	soil standard	soilstd11802	36.9	1.06	2.25	5.75	0.6	0.8	0.8	6.55	1
100	11/11/2002	soil standard	soilstd111102	36.9	9.73	2.95	4.75	0.76	2.53	1.01	7.28	1.264001582
104	11/12/2002	soil standard	soilstd111202	36.9	2.26	3.09	4.97	0.83	3	1.13	7.97	1.402069898
110	11/13/2002	soil standard	soilstd111302	36.9	3.84	3.55	5	0.94	1.78	1.25	6.78	1.564001279
116	11/14/2002	soil standard	soilstd111402	36.9	1.84	2.94	4.58	0.8	3.06	1.08	7.64	1.344023809
125	11/15/2002	soil standard	soilstd111502	36.9	1.23	3.05	4.54	0.82	2.58	1.1	7.12	1.372005831
149	11/18/2002	soil standard	soilstd111802	36.9	5.85	3.16	4.16	0.82	2.2	1.12	6.36	1.388092216
186	11/19/2002	soil standard	soilstd111902	36.9	12.55	3.14	3.31	0.8	3.87	1.1	7.18	1.360147051
193	11/20/2002	soil standard	soilstd112002	36.9	7.39	3.61	4.19	0.93	2.84	1.25	7.03	1.558011553
195	11/21/2002	soil standard	soilstd112102	36.9	3.74	2.38	5.72	0.62	2.45	0.84	8.17	1.044030651
200	11/22/2002	soil standard	soilstd112202	36.9	3.1	2.49	4.99	0.66	1.82	0.88	6.81	1.1
202	11/25/2002	soil standard	soilstd112502	36.9	-3.26	2.72	5.67	0.76	2.18	1	7.85	1.256025477
209	11/26/2002	soil standard	soilstd112602	36.9	3.9	2.26	4.09	0.61	4.35	0.84	8.44	1.038123307
217	12/2/2002	soil standard	soilstd120202	36.9	5.39	2.42	4.9	0.63	1.27	0.84	6.17	1.05
254	12/3/2002	soil standard	soilstd120302	36.9	3.34	2.29	5.07	0.6	2.54	0.81	7.61	1.008017857
256	12/4/2002	soil standard	soilstd120402	36.9	0.95	2.25	5.04	0.6	1.8	0.81	6.84	1.008017857
258	12/5/2002	soil standard	soilstd120502	36.9	0.5	2.46	5.44	0.66	2.73	0.88	8.17	1.1
275	12/6/2002	soil standard	soilstd120602	36.9	4.18	2.73	4.9	0.72	3.15	0.97	8.05	1.208014901
302	12/9/2002	soil standard	soilstd120902	36.9	3.15	2.56	5.07	0.68	2.51	0.91	7.58	1.136001761
333	12/10/2002	soil standard	soilstd121002	36.9	2.07	3.19	6.08	0.84	0.34	1.1	6.42	1.384052022
335	12/12/2002	soil standard	soilstd121202	36.9	4.38	3.56	4.61	0.95	3.51	1.29	8.12	1.602061172

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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
341	12/13/2002	soil standard	soilstd121302	36.9	-1.58	2.57	6.14	0.7	1.51	0.91	7.65	1.148085363
346	12/16/2002	soil standard	soilstd121602	36.9	3.91	3.71	5.09	0.98	3.89	1.33	8.98	1.652059321
350	12/17/2002	soil standard	soilstd121702	36.9	-0.53	2.77	4.86	0.75	2.44	1.02	7.3	1.266056871
352	12/20/2002	soil standard	soilstd122002	36.9	7.66	4.04	4.76	1.05	2.63	1.4	7.39	1.75
357	12/23/2002	soil standard	soilstd122302	36.9	7.99	2.79	3.85	0.72	3.42	1	7.27	1.232233744
374	12/24/2002	soil standard	soilstd122402	36.9	1.41	2.53	5.44	0.67	1.26	0.89	6.7	1.114001795
384	12/26/2002	soil standard	soilstd122602	36.9	-0.7	1.96	5.11	0.53	2.27	0.71	7.38	0.886002257
396	12/27/2002	soil standard	soilstd122702	36.9	2.95	2.43	5.77	0.64	2.33	0.85	8.1	1.06400188
401	1/3/2003	soil standard	soilstd010303	36.9	6.32	2.87	5.59	0.75	2.04	0.99	7.63	1.242014493
407	1/6/2003	soil standard	soilstd010603	36.9	2.96	3.07	5.97	0.82	1.54	1.06	7.51	1.340149245
409	1/7/2003	soil standard	soilstd010703	36.9	2.06	3.06	4.73	0.82	3.76	1.1	8.49	1.372005831
417	1/8/2003	soil standard	soilstd010803	36.9	0.2	2.28	4.53	0.61	2.95	0.83	7.48	1.030048543
421	1/10/2003	soil standard	soilstd11003	36.9	8.19	2.7	3.58	0.69	3.49	0.96	7.07	1.18224363
425	1/13/2003	soil standard	soilstd11303	36.9	7.32	2.54	4.54	0.66	2.15	0.9	6.69	1.116064514
427	1/14/2003	soil standard	soilstd11403	36.9	4.25	3.17	4.88	0.84	2.67	1.12	7.55	1.4
432	1/15/2003	soil standard	soilstd11503	36.9	2	2.59	4.23	0.69	3.92	0.95	8.15	1.174137982
437	1/16/2003	soil standard	soilstd011603	36.9	-1.16	2.49	6.09	0.67	1.47	0.89	7.56	1.114001795
439	1/20/2003	soil standard	soilstd012003	36.9	-4.44	3.06	5.79	0.83	1.63	1.1	7.42	1.378005806
441	1/21/2003	soil standard	soilstd012103	36.9	3.67	2.94	5.55	0.78	2.59	1.04	8.14	1.3
445	1/22/2003	soil standard	soilstd012203	36.9	4.28	3.19	4.28	0.84	2.99	1.16	7.27	1.432201103
452	1/23/2003	soil standard	soilstd012303	36.9	3.92	3.81	3.9	1	3.05	1.36	6.95	1.688075828
454	1/24/2003	soil standard	soilstd012403	36.9	8.09	3.12	4.95	0.81	2.58	1.08	7.53	1.35
462	1/27/2003	soil standard	soilstd012703	36.9	1.31	2.82	5.8	0.75	2.26	1	8.06	1.25
468	1/28/2003	soil standard	soilstd012803	36.9	2.92	2.54	4.89	0.67	2.87	0.91	7.76	1.130044247
475	1/29/2003	soil standard	soilstd012903	36.9	2.01	3	4.75	0.8	3.7	1.1	8.45	1.360147051
492	1/30/2003	soil standard	soilstd013003	36.9	-2.08	2.64	6.17	0.72	1.65	0.94	7.82	1.184060809
500	1/31/2003	soil standard	soilstd013103	36.9	3.81	3.07	5.02	0.8	2.81	1.07	7.83	1.336001497
504	2/3/2003	soil standard	soilstd020303	36.9	6.71	2.76	4.9	0.71	3.03	0.96	7.93	1.1940268
506	2/4/2003	soil standard	soilstd020403	36.9	-10.2	4.62	6.27	1.28	4.57	1.74	10.84	2.160092591
517	2/5/2003	soil standard	soilstd020503	36.9	6.01	2.4	2.79	0.62	4.79	0.88	7.58	1.076475731
519	2/6/2003	soil standard	soilstd020603	36.9	5.56	3.47	5.64	0.91	1.55	1.18	7.19	1.490134222
527	2/7/2003	soil standard	soilstd020703	36.9	3.48	2.94	4.73	0.78	2.8	1.05	7.53	1.308013761
551	2/10/2003	soil standard	soilstd021003	36.9	6.39	2.29	4.41	0.59	3.68	0.82	8.09	1.010198
556	2/11/2003	soil standard	soilstd021103	36.9	1.22	2.27	6.16	0.61	0.25	0.79	6.41	0.998098192
558	2/12/2003	soil standard	soilstd021203	36.9	3.28	2.82	4.85	0.75	2.6	1.01	7.45	1.258014308

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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
565	2/13/2003	soil standard	soilstd021303	36.9	6.17	2.82	4.51	0.74	2.33	1	6.84	1.244025723
574	2/14/2003	soil standard	soilstd021403	36.9	3.14	2.77	5.2	0.73	2.37	0.99	7.57	1.23004065
576	2/17/2003	soil standard	soilstd021703	36.9	7.75	2.85	4.59	0.74	2.08	1.01	6.67	1.252078272
578	2/18/2003	soil standard	soilstd021803	36.9	1.47	2.97	6.03	0.8	1.63	1.05	7.66	1.320037878
583	2/19/2003	soil standard	soilstd021903	36.9	2.47	3.01	4.84	0.8	1.82	1.08	6.66	1.344023809
588	2/20/2003	soil standard	soilstd022003	36.9	4.53	2.93	4.59	0.78	2.66	1.05	7.25	1.308013761
590	2/21/2003	soil standard	soilstd022203	36.9	-1.56	2.79	5.75	0.77	2.17	1.04	7.92	1.294024729
603	2/24/2003	soil standard	soilstd0202403	36.9	0.56	2.84	3.96	0.76	3.39	1.03	7.35	1.280039062
605	2/25/2003	soil standard	soilstd0202503	36.9	3.79	2.17	3.6	0.58	4	0.8	7.6	0.988129546
611	2/26/2003	soil standard	soilstd022603	36.9	2.93	2.8	4.73	0.74	2.86	1	7.59	1.244025723
613	2/27/2003	soil standard	soilstd022703	36.9	-0.56	2.22	5.95	0.6	0.79	0.79	6.74	0.992018145
619	2/28/2003	soil standard	soilstd022803	36.9	3.19	2.18	4.03	0.58	3.89	0.79	7.92	0.980051019
625	3/3/2003	soil standard	soilstd030303	36.9	5.15	2.94	4.98	0.78	1.96	1.03	6.94	1.292013932
627	3/4/2003	soil standard	soilstd030403	36.9	6.85	2.94	4.82	0.76	2.59	1.04	7.41	1.288099375
634	3/6/2003	soil standard	soilstd030603	36.9	2.13	2.77	5.06	0.74	2.88	1	7.94	1.244025723
64	3/7/2003	soil standard	soilstd030703	36.9	-8.22	5.55	9.97	1.49	-3.06	1.84	6.91	2.367635952
643	3/7/2003	soil standard	soilstd030703	36.9	-0.42	2.51	5.8	0.68	0.83	0.9	6.63	1.128007092
647	3/10/2003	soil standard	soilstd031003	36.9	7.02	2.5	3.66	0.64	3.16	0.89	6.82	1.096220781
649	3/11/2003	soil standard	soilstd031103	36.9	4.26	3.5	5.35	0.91	1.74	1.22	7.09	1.522005256
651	3/12/2003	soil standard	soilstd031203	36.9	1.5	3.38	4.74	0.9	2.92	1.23	7.66	1.524106296
655	3/13/2003	soil standard	soilstd031303	36.9	4.65	2.88	5.01	0.75	1.66	0.99	6.67	1.242014493
657	3/14/2003	soil standard	soilstd031403	36.9	5.03	2.53	4.89	0.66	2.08	0.88	6.97	1.1
659	3/17/2003	soil standard	soilstd031703	36.9	3.57	2.22	4.69	0.58	2.04	0.79	6.73	0.980051019
662	3/18/2003	soil standard	soilstd031803	36.9	1.83	3.04	4.7	0.82	3.17	1.12	7.87	1.388092216
664	3/19/2003	soil standard	soilstd031903	36.9	1.96	3.02	5.03	0.8	1.91	1.07	6.94	1.336001497
667	3/20/2003	soil standard	soilstd032003	36.9	0.1	2.02	6.25	0.54	1.88	0.72	8.13	0.9
672	3/21/2003	soil standard	soilstd032103	36.9	5.87	2.93	4.58	0.77	2.63	1.04	7.21	1.294024729
675	3/24/2003	soil standard	soilstd032403	36.9	2.35	2.1	4.08	0.55	4.29	0.77	8.37	0.946255779
680	3/25/2003	soil standard	soilstd032503	36.9	2.67	2.93	5.36	0.78	2.04	1.02	7.4	1.284056074
685	3/26/2003	soil standard	soilstd032603	36.9	1.81	2.35	5.76	0.62	1.94	0.83	7.7	1.036001931
689	3/27/2003	soil standard	soilstd032703	36.9	12.78	3.08	5.35	0.78	0.9	1.03	6.25	1.292013932
715	3/28/2003	soil standard	soilstd032803	36.9	6.93	2.82	4.53	0.74	2.99	1	7.52	1.244025723
717	3/31/2003	soil standard	soilstd033103	36.9	0.92	3.3	4.67	0.88	3.02	1.19	7.69	1.480033783
719	4/1/2003	soil standard	soilstd040103	36.9	1.14	2.78	4.41	0.74	3.65	1.02	8.06	1.26015872
721	4/2/2003	soil standard	soilstd040203	36.9	2.23	2.35	5.57	0.64	2.6	0.85	8.17	1.06400188

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Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
726	4/3/2003	soil standard	soilstd040303	36.9	-1.82	2.19	4.62	0.6	4.15	0.82	8.77	1.016070864
737	4/4/2003	soil standard	soilstd040403	36.9	4.46	2.82	4.83	0.75	2.71	1	7.54	1.25
774	4/10/2003	soil standard	soilstd041003	36.9	0.53	2.74	4.78	0.74	3.14	0.99	7.92	1.236001618
783	4/11/2003	soil standard	soilstd041103	36.9	0.16	2.39	3.86	0.65	4.42	0.9	8.28	1.110180166

Background Calibration Runs

NUTRANL - Background Calibration Runs
Lakeshore East
221 North Columbus Drive, Chicago, IL
Summary of Lakeshore East Site Samples Through April 11, 2003

Sample ID	Sample Date	Sample Group	Description	Weight	U-238 Activity	U-238 Uncertainty	Th-232 Activity	Th-232 Uncertainty	Ra-226 Activity	Ra-226 Uncertainty	Total Radium Activity	Total Radium Uncertainty
13	10/10/2002	background	bkg101002	7.5	4.83	3.19	-0.13	0.84	-0.48	1.22	-0.61	1.481215717
22	10/11/2002	background	bkg101102	7.5	4.93	2.81	-0.57	0.73	0.18	1.09	-0.39	1.311868896
27	10/14/2002	background	bkg101402	7.5	5.64	3.8	-0.59	0.99	-0.26	1.45	-0.85	1.755733465
34	10/15/2002	background	bkg101502	7.5	0.65	3.18	1.3	0.87	-1.4	1.21	-0.1	1.490301983
40	10/16/2002	background	bkg101602	7.5	5.99	3.23	-0.79	0.85	0.38	1.25	-0.41	1.511621646
43	10/17/2002	background	bkg101702	7.5	1.24	2.76	0.12	0.73	-0.64	1.06	-0.52	1.287050893
50	10/18/2002	background	bkg101802	7.5	-1.99	2.13	-0.36	0.6	0.95	0.9	0.59	1.081665383
73	10/28/2002	background	bkg102802	7.5	2.77	2.21	-0.08	0.61	-0.22	0.89	-0.3	1.078981001
85	10/29/2002	background	bkg102902	7.5	4.41	2.47	-1.55	0.65	0.68	1.02	-0.87	1.209504031
87	10/30/2002	background	bkg103002	7.5	0.51	2.35	-1.49	0.67	0.93	1.01	-0.56	1.212023102
89	11/1/2002	background	bkg11102	7.5	2.34	2.52	0.03	0.67	-0.93	0.96	-0.9	1.170683561
91	11/8/2002	background	bkg11802	7.5	1.82	1.89	1.05	0.53	-1.55	0.74	-0.5	0.910219754
99	11/11/2002	background	bkg111102	7.5	4.06	3.03	-0.01	0.81	-0.62	1.17	-0.63	1.423024947
103	11/12/2002	background	bkg111202	7.5	0.83	2.85	0.05	0.82	-0.29	1.14	-0.24	1.404279175
109	11/13/2002	background	bkg111302	7.5	0.11	3.77	-0.25	1.12	0.95	1.71	0.7	2.04413796
115	11/14/2002	background	bkg111402	7.5	5.1	2.54	-0.71	0.67	0.99	1.03	0.28	1.228739191
124	11/15/2002	background	bkg111502	7.5	-1	0	-1	0	-1	0	-2	0
148	11/18/2002	background	bkg111802	7.5	2.52	2.8	0.08	0.77	0.52	1.13	0.6	1.367406304
185	11/19/2002	background	bkg111902	7.5	3.64	3.33	-0.09	0.89	-0.24	1.29	-0.33	1.56722685
192	11/20/2002	background	bkg112002	7.5	4.4	3.48	0.25	0.95	-0.36	1.32	-0.11	1.626314853
194	11/21/2002	background	bkg112102	7.5	0.58	3.32	1.06	0.93	-0.68	1.31	0.38	1.606549097
199	11/22/2002	background	bkg112202	7.5	1.64	1.89	0.09	0.51	-0.27	0.74	-0.18	0.898721314
201	11/25/2002	background	bkg112502	7.5	5.36	2.59	-0.56	0.66	-0.68	0.99	-1.24	1.189831921
208	11/26/2002	background	bkg112602	7.5	-0.22	2.55	-0.01	0.71	-0.73	1.05	-0.74	1.267517258
216	12/2/2002	background	bkg120202	7.5	7.57	2.33	-0.87	0.59	0.51	0.91	-0.36	1.084527547
253	12/3/2002	background	bkg120302	7.5	2.29	2.1	0.64	0.56	-1.26	0.79	-0.62	0.968349111
255	12/4/2002	background	bkg120402	7.5	0.65	2.27	1.31	0.63	-1.53	0.86	-0.22	1.06606754
257	12/5/2002	background	bkg120502	7.5	2.75	2.08	1.08	0.59	-0.61	0.81	0.47	1.0020978
274	12/6/2002	background	bkg120602	7.5	6.54	2.95	-1.13	0.76	1.25	1.18	0.12	1.403566885
301	12/9/2002	background	bkg120902	7.5	-4	2.9	0.56	0.84	0.2	1.19	0.76	1.456605643
332	12/10/2002	background	bkg121002	7.5	1.16	2.19	0.19	0.6	0.5	0.87	0.69	1.056834897
334	12/12/2002	background	bkg121202	7.5	8.53	2.91	-0.89	0.75	1.57	1.12	0.68	1.34792433
340	12/13/2002	background	bkg121302	7.5	3.97	2.38	-0.43	0.62	-0.06	0.91	-0.49	1.101135777
345	12/16/2002	background	bkg121602	7.5	1.2	2.18	0.82	0.61	-0.52	0.85	0.3	1.046231332
349	12/17/2002	background	bkg121702	7.5	1.5	2.29	-0.16	0.63	0.34	0.93	0.18	1.123298714

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351	12/20/2002	background	bkg122002	7.5	2.75	2.44	-1.51	0.67	2.76	1.03	1.25	1.228739191
356	12/23/2002	background	bkg122302	7.5	6.52	3.21	0.18	0.81	-0.69	1.19	-0.51	1.439513807
373	12/24/2002	background	bkg122402	7.5	9.78	2.73	-0.98	0.66	-0.36	1.01	-1.34	1.206523933
383	12/26/2002	background	bkg122602	7.5	4.84	3.31	0.19	0.84	-0.61	1.2	-0.42	1.464786674
395	12/27/2002	background	bkg122702	7.5	7.65	3.28	-0.65	0.82	-0.26	1.23	-0.91	1.478276023
400	1/3/2003	background	bkg010303	7.5	1.57	2.07	-0.48	0.57	1.32	0.84	0.84	1.015135459
406	1/6/2003	background	bkg010603	7.5	-1.18	3.34	0.24	0.92	0.09	1.35	0.33	1.633676835
408	1/7/2003	background	bkg010703	7.5	1.14	2.34	0.41	0.63	-0.92	0.89	-0.51	1.090412766
416	1/8/2003	background	bkg010803	7.5	6.21	2.89	-1.34	0.75	1.54	1.15	0.2	1.372953022
420	1/10/2003	background	bkg11003	7.5	2.21	2.84	0.77	0.8	-1.86	1.08	-1.09	1.344023809
424	1/13/2003	background	bkg11303	7.5	2.1	2.37	0.13	0.64	0.18	0.94	0.31	1.137189518
426	1/14/2003	background	bkg11403	7.5	3.6	3.45	0.98	0.92	-1.89	1.27	-0.91	1.568215546
431	1/15/2003	background	bkg11503	7.5	0.45	2.56	0.23	0.72	-0.15	1.06	0.08	1.281405478
436	1/16/2003	background	bkg011603	7.5	5.64	2.43	-1.3	0.65	0.49	0.96	-0.81	1.159353268
438	1/20/2003	background	bkg012003	7.5	-0.06	2.04	-0.02	0.55	-0.58	0.81	-0.6	0.979081202
440	1/21/2003	background	bkg012103	7.5	4.77	1.57	0.1	0.41	-0.67	0.59	-0.57	0.718470598
444	1/22/2003	background	bkg012203	7.5	3.01	2.42	-0.04	0.66	0.64	0.98	0.6	1.181524439
451	1/23/2003	background	bkg012303	7.5	-0.48	2.1	-0.26	0.57	0.33	0.86	0.07	1.031746093
453	1/24/2003	background	bkg012403	7.5	2.05	2.25	0.12	0.59	-0.63	0.88	-0.51	1.059481005
461	1/27/2003	background	bkg012703	7.5	3.99	2.1	-0.3	0.55	-0.21	0.82	-0.51	0.987370245
467	1/28/2003	background	bkg012803	7.5	1.69	2.58	0.38	0.7	-0.76	1.02	-0.38	1.237093368
474	1/29/2003	background	bkg012903	7.5	1.75	2.13	-0.08	0.58	-0.18	0.84	-0.26	1.020784012
491	1/30/2003	background	bkg13003	7.5	-0.51	2.33	0.27	0.65	-0.46	0.92	-0.19	1.126454615
499	1/31/2003	background	bkg013103	7.5	5.96	2.33	-0.68	0.61	1.29	0.91	0.61	1.095536398
503	2/3/2003	background	bkg020303	7.5	-1.41	2.59	-0.03	0.72	0.56	1.06	0.53	1.281405478
505	2/4/2003	background	bkg020403	7.5	3.23	1.92	-0.04	0.51	-0.34	0.75	-0.38	0.906972987
516	2/5/2003	background	bkg020503	7.5	-1.65	1.79	-0.24	0.51	0.66	0.75	0.42	0.906972987
518	2/6/2003	background	bkg020603	7.5	-0.42	1.91	0.31	0.53	0.16	0.77	0.47	0.9347727
526	2/7/2003	background	bkg020703	7.5	-2.76	2.39	0.09	0.67	0.55	1	0.64	1.203702621
550	2/10/2003	background	bkg021003	7.5	2.37	1.91	-0.2	0.51	0.51	0.76	0.31	0.915259526
555	2/11/2003	background	bkg021103	7.5	0.89	1.96	0.23	0.54	-0.34	0.78	-0.11	0.948683298
557	2/12/2003	background	bkg021203	7.5	4.19	1.71	-1.13	0.45	0.66	0.69	-0.47	0.823771813
564	2/13/2003	background	bkg021303	7.5	-0.65	1.84	-0.11	0.51	0.2	0.74	0.09	0.898721314
573	2/14/2003	background	bkg021403	7.5	2.69	2.04	0.05	0.54	-0.2	0.81	-0.15	0.973498844
575	2/17/2003	background	bkg021703	7.5	-0.63	1.96	-0.31	0.55	0.93	0.82	0.62	0.987370245
577	2/18/2003	background	bkg021803	7.5	1.99	2.46	-0.33	0.68	0.39	0.99	0.06	1.201041215

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582	2/19/2003	background	bkg021903	7.5	2.56	2.18	-0.43	0.59	0.19	0.87	-0.24	1.051189802
587	2/20/2003	background	bkg022003	7.5	2.26	1.49	-0.57	0.4	0.21	0.6	-0.36	0.721110255
589	2/21/2003	background	bkg022103	7.5	-1.1	2.08	-0.16	0.58	-0.52	0.84	-0.68	1.020784012
602	2/24/2003	background	bkg0202403	7.5	2.35	2.27	-0.27	0.62	0.66	0.89	0.39	1.084665847
604	2/25/2003	background	bkg0202503	7.5	4.12	1.93	-0.11	0.52	0.19	0.74	0.08	0.904433524
610	2/26/2003	background	bkg022603	7.5	3.83	2.06	-0.01	0.54	-0.01	0.79	-0.02	0.956922149
612	2/27/2003	background	bkg022703	7.5	2.96	1.99	-0.75	0.54	0.71	0.8	-0.04	0.965194281
618	2/28/2003	background	bkg022803	7.5	2.24	2.52	-0.53	0.69	0.83	1.02	0.3	1.231462545
624	3/3/2003	background	bkg030303	7.5	0.75	1.56	0.38	0.43	-1.19	0.61	-0.81	0.746324326
626	3/4/2003	background	bkg030403	7.5	-0.52	2.11	-0.44	0.59	0.35	0.89	-0.09	1.06780148
633	3/6/2003	background	bkg030603	7.5	1.58	2.47	-0.15	0.67	0.38	0.96	0.23	1.170683561
642	3/7/2003	background	bkg030703	7.5	1.57	2.55	-1	0.69	0.88	1.05	-0.12	1.256423495
646	3/10/2003	background	bkg031003	7.5	2.5	1.93	-0.77	0.52	1.17	0.79	0.4	0.945780101
648	3/11/2003	background	bkg031103	7.5	3.3	2.95	0.02	0.8	0.02	1.15	0.04	1.400892573
650	3/12/2003	background	bkg031203	7.5	1.35	2.46	0.6	0.65	-0.22	0.93	0.38	1.134636506
654	3/13/2003	background	bkg031303	7.5	0.43	2.1	0.3	0.58	0.3	0.83	0.6	1.012570985
656	3/14/2003	background	bkg031403	7.5	2.58	1.42	-1.17	0.38	0.96	0.58	-0.21	0.693397433
658	3/17/2003	background	bkg031703	7.5	2.37	1.47	-0.42	0.4	0.59	0.58	0.17	0.704556598
661	3/18/2003	background	bkg031803	7.5	0.09	1.78	0.29	0.49	0.62	0.7	0.91	0.854458893
663	3/19/2003	background	bkg031903	7.5	1.32	2.24	-0.56	0.6	0.65	0.89	0.09	1.073359213
666	3/20/2003	background	bkg032003	7.5	1.94	2.15	-0.69	0.58	1.6	0.89	0.91	1.062308806
671	3/21/2003	background	bkg032103	7.5	1.5	2.19	0.11	0.59	-0.44	0.85	-0.33	1.034698024
674	3/24/2003	background	bkg032403	7.5	4.46	2.04	-0.82	0.54	1.06	0.82	0.24	0.981835017
679	3/25/2003	background	bkg032503	7.5	2.61	2.73	-0.33	0.71	0.44	1.06	0.11	1.275813466
684	3/26/2003	background	bkg032603	7.5	3.14	1.77	-0.37	0.47	-0.09	0.69	-0.46	0.834865259
688	3/27/2003	background	bkg032703	7.5	3.84	2.23	0.34	0.6	0.05	0.87	0.39	1.056834897
714	3/28/2003	background	bkg032803	7.5	0.9	2.06	-1.17	0.57	1.36	0.87	0.19	1.040096149
716	3/31/2003	background	bkg033103	7.5	2.15	2.29	0.9	0.63	-1.46	0.88	-0.56	1.082266141
718	4/1/2003	background	bkg040103	7.5	5.62	2.43	-0.88	0.63	0.14	0.96	-0.74	1.148259553
720	4/2/2003	background	bkg040203	7.5	0.39	1.87	-0.14	0.51	0.27	0.74	0.13	0.898721314
725	4/3/2003	background	bkg040303	7.5	2.65	1.65	-0.69	0.44	0.77	0.66	0.08	0.793221281
736	4/4/2003	background	bkg040403	7.5	1.66	1.94	0.49	0.53	-1.13	0.76	-0.64	0.926552751
773	4/10/2003	background	bkg041003	7.5	1.1	2.8	-0.45	0.76	-0.08	1.13	-0.53	1.361800279
782	4/11/2003	background	bkg041103	7.5	-1.94	1.94	0.49	0.55	0.05	0.8	0.54	0.970824392

ii. RSSI Gamma Spectroscopy

HIGH RESOLUTION GAMMA SPECTROSCOPY
RSSI ANALYSIS TOTAL RADIUM (pCI/g)
LAKESHORE EAST

RSSI Spectrum File No.	STS Sample No.	Ra-226 (1)	Ra-228 (2)	Total Radium
023732	H - 16 (ceramic pieces) (4)	342	273	615
023797	K - O/41 - 45	ND (3)	ND	ND
023798	E - I/5 - 7	ND	ND	ND
023799	E - J/7 - 9	1.15	ND	1.15
030051	KK - LL.5/32 - 38	0.8	ND	0.8
030052	S - 9 (test pit)	19.6	91.4	111

(1) Pb-215 and Bi-214 measured as surrogates for Ra-226
(2) Ac-228 measured as surrogate for Ra-228
(3) ND = below minimum detected activity
(4) Note two data sets for spectrum 023723, one with Gamma Fraction Limit of > 71%, Library Energy Tolerance of 1.2. Second data set has Gamma Fraction Limit of >10%.

H - 16 (ceramic pieces)

RSSI High Resolution Gamma Spectroscopy Analysis

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 023732 STS PROJECT# 1-32193-XC H-16 CERAMIC PIECES

Sample Size . . . . . 8.25e+002 g	Spectrum File . . h:\pcaspec\023732.spm
Sampling Start. 00-00-00 00:00	Counting Start. 11-15-02 11:16
Sampling Stop 00-00-00 00:00	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 00-00-00 00:00	Decay Time (OFF). . . . . 0.00e+000 Hrs

Efficiency File.h:\gdr\eff\500mar.eff	Library File. . . H:\GDR\LIB\UTHACK.LIB
ID. 500mar	ID. . . .U, Th, & Ac Natural Series + K

Eff.= 1/[7.31e-002*En^-2.40e+000 + 7.89e-001*En^8.95e-001] 04-26-02 12:00

Gamma Fraction Limit >= . . . 71.00 %	Decay Limit <= . . . . 8.000 Halflives
Library Energy Tolerance. . . 1.20	

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc -- 1.00sigma (uCi/g)	Halflife (hrs)	Peaks Found
Pb-214	Average:	3.54e-004 --5.50e-007	4.67e-001	6 of 6
	74.82	3.59e-004 --6.43e-006		
	77.11	5.44e-005 --4.53e-006		
	87.30	3.59e-004 --8.23e-006		
	241.98	3.59e-004 --1.71e-006		
	295.21	3.59e-004 +-2.12e-006		
	351.92	3.59e-004 +-6.95e-007		
Pb-212	Average:	2.68e-004 --5.29e-007	1.06e-001	5 of 5
	74.62	2.72e-004 +-3.73e-006		
	77.11	2.72e-004 --2.52e-006		
	87.30	7.69e-005 +-4.78e-006		
	238.63	2.72e-004 +-5.55e-007		
	300.09	2.18e-004 +-4.18e-006		
Tl-208	Average:	7.98e-005 +-2.73e-007	5.09e-002	5 of 5
	74.97	7.89e-005 +-1.16e-005		
	277.35	7.86e-005 +-2.77e-006		
	510.84	8.63e-005 +-8.32e-007		
	583.14	7.86e-005 +-2.96e-007		
	860.37	8.66e-005 +-1.52e-006		
Ra-226	186.10	5.88e-006 +-5.56e-008	1.40e+007	1 of 1
Ac-228	Average:	2.73e-004 +-6.76e-007	6.13e+000	10 of 10
	209.28	2.19e-004 +-4.26e-006		
	270.23	2.87e-004 +-4.66e-006		
	327.64	1.97e-004 +-4.32e-006		
	338.32	2.65e-004 +-1.59e-006		
	409.51	1.87e-004 --6.95e-006		

	463.00	2.62e-004	+-3.93e-006			
	794.70	2.28e-004	+-3.99e-006			
	911.07	2.84e-004	+-1.05e-006			
	964.60	3.07e-004	+-3.30e-006			
	969.11	2.76e-004	+-1.42e-006			
Ra-224	240.98	3.11e-005	+-3.24e-006	8.69e-001	1 of	1
Bi-212	727.17	1.65e-004	+-1.84e-006	1.01e+000	1 of	2
Bi-214	Average:	3.31e-004	+-5.83e-007	3.32e-001	7 of	7
	609.31	3.22e-004	+-6.79e-007			
	768.36	2.71e-004	+-4.37e-006			
	934.06	3.06e-004	+-5.93e-006			
	1120.30	3.45e-004	+-1.86e-006			
	1238.10	3.36e-004	+-4.04e-006			
	1377.70	3.83e-004	+-6.12e-006			
	1764.50	4.02e-004	+-1.95e-006			
K-40	1460.80	3.24e-005	+-1.98e-006	1.12e+013	1 of	1

TOTAL: 1.53e-003 uCi/g

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
50.03	217.24	50333	1020	2125	157704	1.45	1.017e-003
89.83	379.61	55663	776	1456	156029	2.31	3.617e+002
93.06	392.80	24160	1130	2314	265529	1.59	1.492e-002
105.52	443.61	5796	1144	2357	279046	1.24	3.057e-001
125.96	539.24	39468	1218	2481	309232	2.47	1.762e+002
153.95	641.15	15267	1163	2377	297287	2.00	6.428e+001
216.12	894.77	2928	1285	2746	260708	1.32	1.326e+001
258.22	1066.52	10219	1038	2132	183150	3.38	5.124e+001
387.92	1595.61	9415	798	1665	104810	4.00	6.422e+001
452.54	1859.19	1917	457	949	41066	1.50	1.489e+001
454.33	1866.51	3541	581	1213	63386	2.28	2.759e+001
479.32	1970.92	4228	687	1474	67883	2.14	3.453e+001
487.01	1999.53	4773	609	1294	57857	2.08	3.948e+001
562.51	2307.80	6549	468	957	43972	2.69	6.140e+001
665.50	2727.95	12105	501	1031	43511	2.76	1.316e+002
702.78	2880.00	4477	463	960	40721	2.96	5.106e+001
720.29	2951.43	2321	556	1196	43678	2.14	2.706e+001
755.30	3094.26	7052	467	972	37268	3.03	8.574e+001
772.40	3164.02	4572	583	1253	45907	1.75	5.670e+001
785.92	3219.19	11382	427	866	33121	2.51	1.434e-002
806.29	3302.25	8545	385	781	26975	2.65	1.101e+002
835.97	3423.34	7864	381	781	24707	2.35	1.046e+002
839.83	3439.09	9715	361	730	22762	3.09	1.298e+002
904.61	3703.35	4325	422	896	25464	2.86	6.173e+001
1052.27	4305.69	1971	332	700	18050	2.76	3.219e+001
1064.37	4355.09	1597	298	621	16389	3.07	2.636e+001
1079.14	4415.31	2918	345	729	18331	2.63	4.874e+001
1094.46	4477.79	2665	311	646	16531	3.14	4.508e+001
1110.87	4544.73	1153	453	988	23960	1.93	1.977e+001
1155.50	4726.79	9744	322	647	16534	2.90	1.730e+002
1208.28	4942.10	2053	284	593	13874	3.10	3.794e+001
1247.28	5101.21	1415	384	833	18539	2.58	2.690e+001

1281.40	5240.37	7711	280	562	12906	2.74	1.502e+002
1385.94	5666.84	3289	334	713	14706	2.35	6.871e-001
1402.03	5732.48	7232	290	595	11554	3.09	1.526e+002
1408.44	5758.61	12113	295	587	11381	2.93	2.567e+002
1495.33	6117.16	2651	253	521	11540	2.40	5.931e-001
1509.78	6172.03	10082	309	624	13862	2.97	2.274e+002
1539.09	6291.59	2185	243	509	9280	2.89	5.013e+001
1543.84	6310.97	2178	244	511	9310	2.63	5.010e+001
1582.92	6470.38	5551	231	589	9653	4.82	1.306e+002
1589.78	6494.27	12703	238	440	8451	3.05	2.998e+002
1593.28	6512.62	5998	251	538	8793	3.06	1.419e+002
1621.32	6627.04	4874	256	551	10164	3.14	1.171e+002
1631.16	6667.16	5133	254	598	9812	2.39	1.240e+002
1638.99	6699.11	1216	245	523	8332	2.07	2.951e+001
1661.82	6792.23	4297	221	448	7651	2.99	1.056e-002
1693.74	6922.46	1361	215	453	6836	3.15	3.402e-001
1730.20	7071.17	16495	237	425	6650	3.25	4.202e-002
1835.71	7513.60	969	248	539	7300	2.25	2.605e-001
1848.01	7551.78	10512	252	451	5866	2.39	2.840e-002

RSSI High Resolution Gamma Spectroscopy Analysis

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 023732 STS PROJECT # 1-32193-XC 14-16 CERAMIC PIECES

Sample Size . . . . . 8.25e+002 g	Spectrum File . . h:\pcaspec\023732.spm
Sampling Start. 00-00-00 00:00	Counting Start. 11-15-02 11:16
Sampling Stop 00-00-00 00:00	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 00-00-00 00:00	Decay Time [OFF]. . . . . 0.00e+000 Hrs

Efficiency File.h:\gdr\eff\500mar.eff	Library File. . . H:\GDR\LIB\UTHACK.LIB
ID. 500mar	ID. . . .U, Th, & Ac Natural Series + K

Eff.= 1/[7.31e-002*En^-2.40e+000 + 7.89e+001*En^8.95e-001] 04-25-02 12:00

Gamma Fraction Limit >= . . . 10.00 %	Decay Limit <=. . . . 3.000 Halflives
Library Energy Tolerance. . . 2.00	

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife (hrs)	Peaks Found
Ra-223	Average:	3.77e-005 --9.91e-007	2.74e+002	3 of 7
	94.90	3.77e-005 --2.04e-006		
	154.21	3.77e-005 --2.88e-006		
	269.46	3.77e-005 +-1.23e-006		
Fr-223	Average:	1.39e-004 --2.03e-006	3.63e-001	2 of 5
	50.10	1.05e-004 +-2.13e-006		
	88.47	4.91e-004 +-6.83e-006		
U-235	Average:	3.71e-005 --3.39e-007	6.17e+012	3 of 7
	89.95	4.34e-004 --6.05e-006		
	93.35	1.48e-005 +-5.12e-006		
	185.72	3.60e-005 +-3.40e-007		
Th-227	50.10	3.96e-004 +-8.03e-006	4.49e+002	1 of 2
Th-234	Average:	2.44e-005 +-5.97e-006	5.78e+002	2 of 3
	92.38	2.42e-005 +-8.39e-006		
	92.80	2.46e-005 +-8.50e-006		
Po-214	Average:	3.54e-004 +-5.50e-007	4.47e-001	6 of 6
	74.82	3.59e-004 +-6.43e-006		
	77.11	5.44e-005 +-4.33e-006		
	87.30	3.59e-004 +-8.23e-006		
	241.98	3.59e-004 +-1.71e-006		
	295.21	3.59e-004 +-1.12e-006		
	351.92	3.59e-004 +-6.95e-007		
Pb-212	Average:	2.68e-004 +-5.29e-007	1.06e+001	5 of 5
	74.82	2.72e-004 +-3.73e-006		
	77.11	2.72e-004 +-2.52e-006		
	87.30	7.69e-005 +-4.78e-006		
	238.63	2.72e-004 +-5.55e-007		

	300.09	2.18e-004	+-4.18e-006		
Tl-208	Average:	7.98e-005	+-2.73e-007	5.09e-002	5 of 5
	74.97	7.88e-005	+-1.16e-005		
	277.35	7.86e-005	+-2.77e-006		
	510.84	8.63e-005	+-8.32e-007		
	583.14	7.88e-005	+-2.96e-007		
	860.37	8.65e-005	+-1.52e-006		
Th-228	215.98	1.81e-004	+-7.95e-005	1.68e-004	1 of 2
Pa-234	Average:	4.37e-005	+-1.45e-006	6.70e-000	2 of 14
	94.66	4.21e-006	+-1.46e-006		
	1240.50	1.70e-004	+-4.70e-005		
Ra-226	186.10	5.88e-006	+-5.56e-008	1.40e+007	1 of 1
Ac-228	Average:	2.70e-004	+-6.76e-007	6.13e+000	10 of 10
	209.28	2.19e-004	+-4.26e-006		
	270.23	1.45e-004	+-4.66e-006		
	327.64	1.97e-004	+-4.32e-006		
	338.32	2.65e-004	+-1.59e-006		
	409.51	1.87e-004	+-6.35e-006		
	463.00	2.62e-004	+-3.93e-006		
	794.70	2.28e-004	+-3.99e-006		
	911.07	2.84e-004	+ 1.05e-006		
	964.60	3.07e-004	+-3.50e-006		
	969.11	2.76e-004	+-1.42e-006		
Ra-224	240.98	3.11e-005	+-3.24e-006	8.69e+001	1 of 1
Bi-212	727.17	1.55e-004	+-1.84e-006	1.01e+000	1 of 2
Bi-214	Average:	3.31e-004	+-5.88e-007	3.32e-001	7 of 7
	609.31	3.22e-004	+-6.73e-007		
	768.36	2.71e-004	+-4.37e-006		
	934.06	3.06e-004	+-5.93e-006		
	1120.30	3.45e-004	+-1.86e-006		
	1238.10	3.22e-004	+-4.04e-006		
	1377.70	3.83e-004	+-6.12e-006		
	1764.50	4.02e-004	+-1.95e-006		
Po-216	804.90	2.00e-001	+-9.02e-003	4.08e-005	1 of 1
K-40	1460.80	3.24e-003	+-1.98e-006	1.12e-013	1 of 1

TOTAL: 2.03e-001 uCi/g

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
105.52	443.61	5796	1144	2357	279046	1.24	3.057e+001
126.96	539.24	39468	1218	2481	309232	2.47	1.762e+002
258.22	1066.52	10219	1038	2192	183150	3.38	5.124e+001
387.92	1595.61	9415	798	1685	104610	4.00	6.422e+001
452.54	1859.19	1917	457	949	41066	1.50	1.489e+001
454.33	1866.51	3541	581	1213	63386	2.26	2.759e+001
479.92	1970.92	4228	687	1474	67883	2.14	3.453e+001
487.01	1999.83	4773	609	1294	57857	2.08	3.946e+001
562.51	2307.80	6549	468	957	43972	2.69	6.140e+001
665.50	2727.95	12105	501	1031	43511	2.75	1.316e+002
702.78	2880.00	4477	463	960	40721	2.96	5.106e+001
720.29	2951.43	2321	556	1196	43678	2.14	2.708e+001
755.30	3094.26	7052	467	972	37268	3.03	8.574e+001

772.40	3164.02	4572	383	1253	45907	1.75	5.670e+001
785.92	3219.19	11332	427	866	33131	2.51	1.434e+002
835.97	3423.34	7864	381	781	24707	2.36	1.046e+002
839.83	3439.09	9715	361	730	22762	3.09	1.298e+002
904.61	3703.35	4325	422	896	25464	2.86	5.173e+001
1052.27	4305.69	1971	332	700	18050	2.76	3.219e+001
1064.87	4357.09	1597	298	621	16389	3.07	2.636e+001
1079.14	4415.31	2918	345	729	18331	2.63	4.874e+001
1094.46	4477.79	2565	311	649	16581	3.14	4.508e+001
1110.87	4544.73	1153	453	989	23960	1.93	1.977e+001
1155.50	4726.79	9744	322	647	16534	2.90	1.730e+002
1208.29	4942.13	2053	284	593	13874	3.10	3.794e+001
1247.28	5101.21	1415	384	833	16539	2.58	2.690e+001
1281.40	5240.37	7711	280	562	12906	2.74	1.502e+002
1325.94	5666.84	3289	334	713	14706	2.35	6.871e+001
1402.03	5732.48	7232	290	595	11554	3.09	1.526e+002
1408.44	5758.61	12113	298	587	11381	2.93	2.567e+002
1496.33	6117.16	2651	253	521	11540	2.40	5.931e+001
1509.78	6172.03	10282	309	624	13862	2.97	2.274e+002
1539.09	6291.59	2185	243	509	9280	2.89	5.013e+001
1543.84	6310.97	2178	244	511	9310	2.63	5.010e+001
1582.92	6470.38	5551	281	589	9653	4.82	1.306e+002
1588.78	6494.27	12703	236	440	8452	3.05	2.998e+002
1593.28	6512.62	5958	261	538	8793	3.06	1.419e+002
1621.32	6627.04	4874	266	551	10154	3.14	1.171e+002
1631.16	6667.16	5133	284	598	9812	2.39	1.240e+002
1638.99	6699.11	1216	245	523	8332	2.07	2.951e+001
1661.82	6792.23	4297	221	448	7651	2.99	1.056e+002
1693.74	6922.46	1361	215	453	6885	3.15	3.402e+001
1730.20	7071.17	16435	237	425	6550	3.25	4.202e+002
1833.71	7513.80	969	248	539	7300	2.25	2.606e+001
1848.01	7551.78	10512	232	451	5865	2.99	2.840e+002

K - O/41 - 45

RSSI High Resolution Gamma Spectroscopy Analysis

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 023797 STS P#1-32193-XC K-O/41-45

Sample Size . . . . . 9.96e+002 g	Spectrum File . . H:\PCASPEC\023797.SPM
Sampling Start. 00-00-00 00:00	Counting Start. 11-22-02 12:13
Sampling Stop 00-00-00 00:00	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 00-00-00 00:00	Decay Time [OFF]. . . . . 0.00e+000 Hrs
Efficiency File.h:\gdr\eff\500mar.eff	Library File. . . .h:\gdr\lib\nuthk.lib
ID. 500mar	ID. . . . . U & Th Natural Series + K

Eff.= 1/[7.31e-002*En^-2.40e+000 + 7.89e+001*En^8.95e-001] 04-26-02 12:00

Gamma Fraction Limit >= . . . 71.00 % | Decay Limit <=. . . . 8.000 Halflives
Library Energy Tolerance. . . 1.20

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife (hrs)	Peaks Found
K-40	1460.80	9.56e-006 +-3.33e-007	1.12e+013	1 of 1
TOTAL:		9.56e-006 uCi/g		

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
50.74	220.16	390	54	101	630	1.47	1.073e+001
238.56	986.34	2051	93	167	1338	1.89	1.376e+001
295.18	1217.29	561	56	104	543	1.80	4.338e+000
338.27	1393.05	375	48	90	427	1.84	3.218e+000
351.90	1448.68	901	54	90	411	2.26	7.979e+000
526.76	2162.00	16772700	4096	72	205	0.25	2.087e+005
583.23	2392.33	703	45	74	242	2.75	9.562e+000
609.32	2498.77	722	43	69	204	2.23	1.020e+001
911.44	3731.21	453	34	53	125	2.99	9.149e+000
969.45	3967.83	258	33	60	164	2.11	5.505e+000
1765.12	7213.62	145	16	23	22	2.85	5.285e+000

RSSI High Resolution Gamma Spectroscopy Analysis

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 023798 STS P#1-32193-XC E-I/5-7

Sample Size . . . . . 8.14e+002 g	Spectrum File . . H:\PCASPEC\023798.SPM
Sampling Start. 00-00-00 00:00	Counting Start. 11-22-02 13:37
Sampling Stop 00-00-00 00:00	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 00-00-00 00:00	Decay Time [OFF]. . . . . 0.00e+000 Hrs
Efficiency File.h:\gdr\eff\500mar.eff	Library File. . . .h:\gdr\lib\nuthk.lib
ID. 500mar	ID. . . . . U & Th Natural Series + K

Eff.= 1/[7.31e-002*En^-2.40e+000 + 7.89e+001*En^8.95e-001] 04-26-02 12:00

Gamma Fraction Limit >= . . . 71.00 % | Decay Limit <=. . . . 8.000 Halflives
Library Energy Tolerance. . . 1.20

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife (hrs)	Peaks Found
K-40	1460.80	9.47e-006 +-3.74e-007	1.12e+013	1 of 1
TOTAL:		9.47e-006 uCi/g		

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
50.88	220.72	337	58	113	676	1.58	9.214e+000
238.50	986.10	1503	86	156	1281	2.01	1.008e+001
295.17	1217.27	618	53	97	469	1.78	4.779e+000
338.36	1393.42	309	46	87	403	1.71	2.652e+000
351.88	1448.58	1184	58	95	412	2.01	1.048e+001
583.18	2392.13	530	40	67	208	2.73	7.208e+000
609.36	2498.95	846	44	68	204	2.31	1.196e+001
911.41	3731.07	387	31	50	108	2.37	7.816e+000
969.19	3966.80	164	33	62	184	2.13	3.499e+000
1120.59	4584.38	161	26	48	104	2.67	3.910e+000
1764.85	7212.52	142	14	10	5	2.89	5.175e+000

RSSI High Resolution Gamma Spectroscopy Analysis

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 023799 STS P#1-32193-XC E-J/7-9

Sample Size . . . . . 7.30e+002 g	Spectrum File . . H:\PCASPEC\023799.SPM
Sampling Start. 00-00-00 00:00	Counting Start. 11-22-02 14:41
Sampling Stop 00-00-00 00:00	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 00-00-00 00:00	Decay Time [OFF]. . . . . 0.00e+000 Hrs
Efficiency File.h:\gdr\eff\500mar.eff	Library File. . . .h:\gdr\lib\nuthk.lib
ID. 500mar	ID. . . . . U & Th Natural Series + K

Eff.= 1/[7.31e-002*En^-2.40e+000 + 7.89e+001*En^8.95e-001] 04-26-02 12:00

Gamma Fraction Limit >= . . . 71.00 % | Decay Limit <=. . . . 8.000 Halflives
Library Energy Tolerance. . . 1.20

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife (hrs)	Peaks Found
Pb-214	Average:	1.15e-006 +-4.04e-008	4.47e-001	3 of 6
	241.98	1.03e-006 +-1.45e-007		
	295.21	1.10e-006 +-8.02e-008		
	351.92	1.18e-006 +-4.94e-008		
Ra-226	186.10	2.06e-008 +-4.48e-009	1.40e+007	1 of 1
K-40	1460.80	7.33e-006 +-3.78e-007	1.12e+013	1 of 1
TOTAL:		8.50e-006 uCi/g		

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
50.82	220.48	369	45	82	439	1.71	1.011e+001
238.77	987.19	1595	78	138	844	2.45	1.071e+001
583.22	2392.29	479	36	57	146	2.18	6.515e+000
609.33	2498.79	953	46	71	212	2.25	1.347e+001
911.49	3731.41	293	29	48	100	2.18	5.918e+000
1120.71	4584.89	173	27	50	108	2.31	4.201e+000
1764.98	7213.07	161	18	25	26	2.47	5.868e+000

KK - LL.5/32 - 38

RSSI High Resolution Gamma Spectroscopy Analysis

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 030051 STS KK-LL.5/32-38

Sample Size . . . . . 8.20e+002 g	Spectrum File . . h:\pcaspec\030051.spm
Sampling Start. 00-00-00 00:00	Counting Start. 01-14-03 14:34
Sampling Stop 00-00-00 00:00	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 00-00-00 00:00	Decay Time [OFF]. . . . . 0.00e+000 Hrs
Efficiency File.h:\gdr\eff\500mar.eff	Library File. . . .h:\gdr\lib\nuthk.lib
ID. 500mar	ID. . . . . U & Th Natural Series - K

Eff.= 1/[7.31e-002*En^-2.40e+000 + 7.89e+001*En^8.95e-001] 04-26-02 12:00

Gamma Fraction Limit >= . . . 71.00 % | Decay Limit <=. . . . 8.000 Halflives
Library Energy Tolerance. . . 1.20

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife (hrs)	Peaks Found
Pb-214	Average:	8.02e-007 +-3.37e-008	4.47e-001	3 of 6
	241.98	7.85e-007 +-1.32e-007		
	295.21	8.43e-007 +-6.48e-008		
	351.92	7.87e-007 +-4.14e-008		
K-40	1460.80	9.17e-006 +-3.83e-007	1.12e+013	1 of 1
TOTAL:		9.98e-006 uCi/g		

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
51.70	218.91	464	47	85	421	2.01	1.224e+001
238.63	983.30	1163	57	117	682	1.64	7.806e+000
338.41	1391.30	250	43	83	348	1.78	2.146e+000
510.86	2096.50	131	35	65	196	1.99	1.587e+000
583.01	2391.51	322	32	54	147	1.75	4.378e+000
609.23	2498.75	749	36	47	107	1.85	1.059e+001
910.99	3732.65	220	27	45	92	1.73	4.441e+000
1120.32	4588.58	155	24	42	80	1.63	3.763e+000
1764.44	7222.30	130	16	20	17	2.59	4.737e+000

S - 9 (test pit)

RSSI High Resolution Gamma Spectroscopy Analysis

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 030052 STS S-9

Sample Size . . . . . 5.73e+002 g | Spectrum File . . H:\PCASPEC\030052.SPM
Sampling Start. . . . .00-00-00 00:00 | Counting Start. 01-14-03 15:36
Sampling Stop . . . . .00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs
Current Date. . . . . .00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs

Efficiency File.h:\gdr\eff\500mar.eff | Library File. . . .h:\gdr\lib\nuthk.lib
ID. . . . . .500mar | ID. . . . . U & Th Natural Series + K

Eff.= 1/[7.31e-002*En^-2.40e+000 + 7.89e+001*En^8.95e-001] 04-26-02 12:00

Gamma Fraction Limit >= . . . 71.00 % | Decay Limit <=. . . . 8.000 Halflives
Library Energy Tolerance. . . 1.20

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife (hrs)	Peaks Found
Bi-214	Average:	1.99e-005 +-2.28e-007	3.32e-001	8 of 10
	609.31	1.75e-005 +-2.72e-007		
	727.17	5.69e-005 +-1.05e-006		
	768.36	1.74e-005 +-1.59e-006		
	934.06	1.51e-005 +-2.41e-006		
	1120.30	1.86e-005 +-6.97e-007		
	1238.10	2.04e-005 +-1.63e-006		
	1377.70	1.76e-005 +-2.54e-006		
	1764.50	2.23e-005 +-7.82e-007		
Pb-212	Average:	8.68e-005 +-3.28e-007	1.06e+001	6 of 6
	74.82	8.22e-005 +-1.91e-006		
	77.11	6.74e-005 +-1.27e-006		
	87.30	3.65e-005 +-1.70e-006		
	115.19	9.10e-005 +-2.02e-005		
	238.63	9.07e-005 +-3.56e-007		
	300.09	8.46e-005 +-2.54e-006		
Pb-214	Average:	1.93e-005 +-2.17e-007	4.47e-001	4 of 6
	87.30	1.94e-005 +-2.93e-006		
	241.98	1.94e-005 +-9.98e-007		
	295.21	1.90e-005 +-4.68e-007		
	351.92	1.94e-005 +-2.54e-007		
Ac-228	Average:	9.14e-005 +-4.23e-007	6.13e+000	10 of 10
	89.95	1.15e-004 +-5.28e-006		
	93.35	5.18e-005 +-3.90e-006		
	209.28	7.28e-005 +-2.13e-006		
	270.23	8.82e-005 +-2.54e-006		
	327.64	7.43e-005 +-2.55e-006		

	338.32	9.15e-005 +-9.35e-007			
	463.00	8.27e-005 +-2.09e-006			
	794.70	8.22e-005 +-2.23e-006			
	911.07	9.49e-005 +-6.77e-007			
	969.11	9.58e-005 +-9.10e-007			
Ra-226	186.10	3.38e-007 +-2.73e-008	1.40e+007	1 of	1
Ra-224	240.98	1.19e-004 +-1.89e-006	8.69e+001	1 of	1
K-40	1460.80	1.51e-005 +-1.06e-006	1.12e+013	1 of	1

TOTAL: 3.52e-004 uCi/g

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
51.60	218.47	10737	255	477	12583	1.92	2.846e+002
129.08	535.31	6773	399	810	31552	1.63	4.248e+001
153.89	636.76	2293	327	662	24190	1.52	1.357e+001
277.39	1141.80	5416	325	683	14530	2.01	4.006e+001
409.44	1681.75	3120	183	362	6291	1.74	3.129e+001
510.59	2095.37	11680	200	351	5454	2.01	1.415e+002
562.41	2307.26	1195	142	286	3933	1.86	1.574e+001
583.11	2391.94	38759	249	317	4632	1.93	5.271e+002
755.15	3095.40	911	131	268	3167	1.74	1.556e+001
763.43	3129.27	384	122	256	2421	1.67	6.525e+000
772.29	3165.49	1951	116	228	2052	2.09	3.400e+001
785.71	3220.37	931	111	221	2449	1.91	1.648e+001
830.63	3404.04	508	103	214	1591	1.93	9.445e+000
835.63	3424.51	1778	93	170	1456	2.03	3.324e+001
840.19	3443.15	1205	92	180	1257	2.75	2.264e+001
860.52	3526.26	4593	116	198	1668	2.08	8.813e+001
904.44	3705.85	617	110	231	1652	2.23	1.238e+001
964.73	3952.40	4877	99	146	935	2.19	1.036e+002
1078.83	4418.94	446	73	147	923	2.69	1.047e+001
1094.19	4481.76	558	72	143	842	1.75	1.326e+001
1407.71	5763.69	348	65	132	711	2.35	1.036e+001
1495.67	6123.34	496	66	132	737	1.91	1.559e+001
1580.70	6471.03	412	66	136	519	2.60	1.361e+001
1588.12	6501.38	2316	68	99	443	2.71	7.681e+001
1592.43	6519.00	1345	67	119	457	2.43	4.471e+001
1620.49	6633.71	893	71	135	752	1.90	3.015e+001
1630.53	6674.79	965	77	154	658	2.17	3.277e+001
1638.40	6706.94	300	61	125	511	2.36	1.023e+001
1729.65	7080.04	532	52	98	378	1.70	1.904e+001
1847.49	7561.89	320	54	108	457	2.07	1.215e+001

APPENDIX I

USEPA Contract Laboratory Analytical Data

USEPA Contract Laboratory Analytical Data is to be provided by the USEPA

APPENDIX J

Air Monitoring Results

a. Perimeter Air Monitoring
b. Personal Air Monitoring

a. **Perimeter Air Monitoring**

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

341 East Ohio Street Project- Chicago, IL

North Monitor **Week #1 10/7/02-10/11/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/7/02	0	0.00E+00	0.00E+00	No Work - Training Day
10/8/02	200	9.78E-16	1.96E-13	
10/9/02	443	0.00E+00	0.00E+00	
10/10/02	251	0.00E+00	0.00E+00	
10/11/02	499	0.00E+00	0.00E+00	
	1393	9.78E-16	1.96E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 1.40E-16 uCi/ml

Percentage of Release Limit of = 3.51%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/7/02	0	0.00E+00	0.00E+00	No Work - Training Day
10/8/02	212	0.00E+00	0.00E+00	
10/9/02	455	1.05E-15	4.78E-13	
10/10/02	237	2.74E-15	6.49E-13	
10/11/02	492	8.80E-16	4.33E-13	
	1396	4.67E-15	1.56E-12	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 1.12E-15 uCi/ml

Percentage of Release Limit of = 27.94%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/7/02	0	0.00E+00	0.00E+00	No Work - Training Day
10/8/02	207	0.00E+00	0.00E+00	
10/9/02	422	0.00E+00	0.00E+00	
10/10/02	236	0.00E+00	0.00E+00	
10/11/02	489	0.00E+00	0.00E+00	
	1354	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/7/02	0	0.00E+00	0.00E+00	No Work - Training Day
10/8/02	207	0.00E+00	0.00E+00	
10/9/02	443	1.61E-15	7.13E-13	
10/10/02	254	1.84E-15	4.67E-13	
10/11/02	480	0.00E+00	0.00E+00	
	1384	3.45E-15	1.18E-12	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 8.53E-16 uCi/ml

Percentage of Release Limit of = 21.33%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 1 **October 7, 2002 - October 11, 2002**

Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	day after analysis					four day analysis					% of Limit 4.00E-15 uCi/ml
							date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	
No Work on 10/7/02 - Training Only																	
N2001	10/8/02	1:25pm	4:45pm	200	62	1.23E+07	10/9/02	39	13	0.86667	2.54E-14	10/14/02	13	12	0.033	9.78E-16	24.45%
S2001	10/8/02	1:20pm	4:52pm	212	60	1.26E+07	10/9/02	55	13	1.4	4.00E-14	10/14/02	11	12	0	0.00E+00	0.00%
E2001	10/8/02	1:23pm	4:50pm	207	47	9.64E+06	10/9/02	42	13	0.96667	3.61E-14	10/14/02	11	12	0	0.00E+00	0.00%
W1001	10/8/02	1:25pm	4:52pm	207	52	1.07E+07	10/9/02	39	13	0.86667	2.93E-14	10/14/02	10	12	0	0.00E+00	0.00%
N2002	10/9/02	7:22am	2:45pm	443	57	2.50E+07	10/10/02	241	12	7.63333	1.1E-13	10/14/02	11	12	0	0.00E+00	0.00%
S2002	10/9/02	7:05am	2:40pm	455	51	2.30E+07	10/10/02	99	12	2.9	4.546E-14	10/14/02	14	12	0.067	1.05E-15	26.13%
E2002	10/9/02	7:40am	2:42pm	422	46	1.92E+07	10/10/02	123	12	3.7	6.933E-14	10/14/02	12	12	0	0.00E+00	0.00%
W2002	10/9/02	7:24am	2:47pm	443	51	2.24E+07	10/10/02	175	12	5.43333	8.748E-14	10/14/02	15	12	0.1	1.61E-15	40.25%
N2003	10/10/02	7:13am	11:24am	251	55	1.37E+07	10/11/02	134	9	4.16667	1.098E-13	10/15/02	10	11	0	0.00E+00	0.00%
S2003	10/10/02	7:27am	11:24am	237	56	1.32E+07	10/11/02	170	9	5.36667	1.471E-13	10/15/02	14	11	0.1	2.74E-15	68.52%
E2003	10/10/02	7:27am	11:23am	236	55	1.29E+07	10/11/02	163	9	5.13333	1.439E-13	10/15/02	9	11	0	0.00E+00	0.00%
W2003	10/10/02	7:10am	11:24am	254	52	1.31E+07	10/11/02	139	9	4.33333	1.193E-13	10/15/02	13	11	0.067	1.84E-15	45.90%
N2004	10/11/02	7:00am	3:19pm	499	48	2.37E+07	10/14/02	18	12	0.2	3.037E-15	10/16/02	10	10	0	0.00E+00	0.00%
S2004	10/11/02	7:10am	3:22pm	492	56	2.73E+07	10/14/02	24	12	0.4	5.281E-15	10/16/02	12	10	0.067	8.80E-16	22.00%
E2004	10/11/02	7:12am	3:21pm	489	52	2.52E+07	10/14/02	14	12	0.06667	9.537E-16	10/16/02	9	10	0	0.00E+00	0.00%
W2004	10/11/02	7:15am	3:15pm	480	55	2.62E+07	10/14/02	18	12	0.2	2.756E-15	10/16/02	10	10	0	0.00E+00	0.00%

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

341 East Ohio Street Project- Chicago, IL

North Monitor **Week #2 10/14/02-10/18/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/14/02	408	1.26E-15	5.14E-13	
10/15/02	438	0.00E+00	0.00E+00	
10/16/02	403	6.02E-16	2.43E-13	
10/17/02	494	0.00E+00	0.00E+00	
10/18/02	362	0.00E+00	0.00E+00	
	2105	1.86E-15	7.57E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 3.59E-16 uCi/ml

Percentage of Release Limit of = 8.99%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/14/02	410	0.00E+00	0.00E+00	
10/15/02	*244*	*0.00E+00*	*0.00E+00*	*Shut down early on 10/15/02*
10/16/02	399	0.00E+00	0.00E+00	due to mechanical failure in
10/17/02	504	0.00E+00	0.00E+00	pump
10/18/02	376	0.00E+00	0.00E+00	
	1933	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/14/02	406	0.00E+00	0.00E+00	
10/15/02	446	5.78E-16	2.58E-13	
10/16/02	398	0.00E+00	0.00E+00	
10/17/02	498	0.00E+00	0.00E+00	
10/18/02	369	0.00E+00	0.00E+00	
	2117	5.78E-16	2.58E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 1.22E-16 uCi/ml

Percentage of Release Limit of = 3.04%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/14/02	408	1.71E-15	6.98E-13	
10/15/02	425	0.00E+00	0.00E+00	
10/16/02	430	5.22E-16	2.24E-13	
10/17/02	509	9.16E-16	4.66E-13	
10/18/02	372	0.00E+00	0.00E+00	
	2144	3.15E-15	1.39E-12	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 6.48E-16 uCi/ml

Percentage of Release Limit of = 16.19%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 2 **October 14, 2002 - October 18, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2005	10/14/02	7:30am	2:18pm	408	47	1.90E+07	10/15/02	77	11	2.2	4.17E-14	10/18/02	11	9	0.067	1.26E-15	31.62%
S2005	10/14/02	7:32am	2:22pm	410	52	2.11E+07	10/15/02	55	11	1.46667	2.50E-14	10/18/02	8	9	0	0.00E+00	0.00%
E2005	10/14/02	7:34am	2:20pm	406	48	1.93E+07	10/15/02	72	11	2.03333	3.80E-14	10/18/02	9	9	0	0.00E+00	0.00%
W1005	10/14/02	7:36am	2:24pm	408	52	2.10E+07	10/15/02	68	11	1.9	3.26E-14	10/18/02	12	9	0.1	1.71E-15	42.86%
N2006	10/15/02	7:27am	2:45pm	438	51	2.21E+07	10/16/02	186	10	5.86667	9.55E-14	10/21/02	8	11	0	0.00E+00	0.00%
S2006	10/15/02	7:20am	11:24am	244	52	1.26E+07	10/16/02	168	10	5.26667	1.51E-13	10/21/02	10	11	0	0.00E+00	0.00%
E2006	10/15/02	7:20am	2:46pm	446	47	2.08E+07	10/16/02	212	10	6.73333	1.17E-13	10/21/02	12	11	0.033	5.78E-16	14.46%
W2006	10/15/02	7:25am	2:30pm	425	51	2.15E+07	10/16/02	226	10	7.2	1.21E-13	10/21/02	6	11	0	0.00E+00	0.00%
N2007	10/16/02	7:40am	2:23pm	403	50	2.00E+07	10/17/02	31	10	0.7	1.26E-14	10/21/02	12	11	0.033	6.02E-16	15.04%
S2007	10/16/02	7:36am	2:15pm	399	50	1.98E+07	10/17/02	25	10	0.5	9.12E-15	10/21/02	10	11	0	0.00E+00	0.00%
E2007	10/16/02	7:37am	2:15pm	398	46	1.81E+07	10/17/02	28	10	0.6	1.19E-14	10/21/02	9	11	0	0.00E+00	0.00%
W2007	10/16/02	7:30am	2:40pm	430	54	2.30E+07	10/17/02	20	10	0.33333	5.22E-15	10/21/02	12	11	0.033	5.22E-16	13.05%
N2008	10/17/02	7:08am	3:22pm	494	52	2.55E+07	10/18/02	173	9	5.46667	7.74E-14	10/22/02	13	13	0	0.00E+00	0.00%
S2008	10/17/02	7:02am	3:26pm	504	46	2.30E+07	10/18/02	140	9	4.36667	6.85E-14	10/22/02	11	13	0	0.00E+00	0.00%
E2008	10/17/02	7:06am	3:24pm	498	47	2.32E+07	10/18/02	146	9	4.56667	7.10E-14	10/22/02	12	13	0	0.00E+00	0.00%
W2008	10/17/02	7:00am	3:29pm	509	52	2.62E+07	10/18/02	103	9	3.13333	4.31E-14	10/22/02	15	13	0.067	9.16E-16	22.91%
N2009	10/18/02	7:10am	1:12pm	362	50	1.79E+07	10/21/02	16	11	0.16667	3.35E-15	10/23/02	9	13	0	0.00E+00	0.00%
S2009	10/18/02	6:59am	1:15pm	376	60	2.24E+07	10/21/02	11	11	0	0.00E+00	10/23/02	12	13	0	0.00E+00	0.00%
E2009	10/18/02	7:05am	1:14pm	369	48	1.76E+07	10/21/02	16	11	0.16667	3.42E-15	10/23/02	13	13	0	0.00E+00	0.00%
W2009	10/18/02	6:58am	1:10pm	372	53	1.95E+07	10/21/02	14	11	0.1	1.845E-15	10/23/02	11	13	0	0.00E+00	0.00%

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #3 10/21/02-10/25/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/21/02	0	0.00E+00	0.00E+00	No Work During Week
10/22/02	0	0.00E+00	0.00E+00	of 10/21/02-10/25/02
10/23/02	0	0.00E+00	0.00E+00	
10/24/02	0	0.00E+00	0.00E+00	
10/25/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/21/02	0	0.00E+00	0.00E+00	No Work During Week
10/22/02	0	0.00E+00	0.00E+00	of 10/21/02-10/25/02
10/23/02	0	0.00E+00	0.00E+00	
10/24/02	0	0.00E+00	0.00E+00	
10/25/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/21/02	0	0.00E+00	0.00E+00	No Work During Week
10/22/02	0	0.00E+00	0.00E+00	of 10/21/02-10/25/02
10/23/02	0	0.00E+00	0.00E+00	
10/24/02	0	0.00E+00	0.00E+00	
10/25/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/21/02	0	0.00E+00	0.00E+00	No Work During Week
10/22/02	0	0.00E+00	0.00E+00	of 10/21/02-10/25/02
10/23/02	0	0.00E+00	0.00E+00	
10/24/02	0	0.00E+00	0.00E+00	
10/25/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 3 **October 21, 2002 - October 25, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
No Work during week of October 21 - 25, 2002																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #4 10/28/02-11/1/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/28/02	423	5.51E-16	2.33E-13	
10/29/02	432	0.00E+00	0.00E+00	
10/30/02	0	0.00E+00	0.00E+00	No Work 10/30-11/1
10/31/02	0	0.00E+00	0.00E+00	
11/1/02	0	0.00E+00	0.00E+00	
	855	5.51E-16	2.33E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 2.73E-16 uCi/ml

Percentage of Release Limit of = 6.82%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/28/02	432	0.00E+00	0.00E+00	
10/29/02	435	0.00E+00	0.00E+00	
10/30/02	0	0.00E+00	0.00E+00	No Work 10/30-11/1
10/31/02	0	0.00E+00	0.00E+00	
11/1/02	0	0.00E+00	0.00E+00	
	867	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/28/02	427	0.00E+00	0.00E+00	
10/29/02	413	1.17E-15	4.83E-13	
10/30/02	0	0.00E+00	0.00E+00	No Work 10/30-11/1
10/31/02	0	0.00E+00	0.00E+00	
11/1/02	0	0.00E+00	0.00E+00	
	840	1.17E-15	4.83E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 5.75E-16 uCi/ml

Percentage of Release Limit of = 14.38%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
10/28/02	418	0.00E+00	0.00E+00	
10/29/02	438	0.00E+00	0.00E+00	
10/30/02	0	0.00E+00	0.00E+00	No Work 10/30-11/1
10/31/02	0	0.00E+00	0.00E+00	
11/1/02	0	0.00E+00	0.00E+00	
	856	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 4 **October 28, 2002 - November 1, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2010	10/28/2002	7:10am	2:13pm	423	52	2.18E+07	10/29/2002	20	8	0.4	6.61E-15	11/1/2002	9	8	0.033	5.51E-16	13.78%
S2010	10/28/2002	7:03am	2:15pm	432	55	2.35E+07	10/29/2002	26	8	0.6	9.19E-15	11/1/2002	8	8	0	0.00E+00	0.00%
E2010	10/28/2002	7:05am	2:12pm	427	47	1.99E+07	10/29/2002	22	8	0.46667	8.46E-15	11/1/2002	8	8	0	0.00E+00	0.00%
W1010	10/28/2002	7:12am	2:10pm	418	47	1.95E+07	10/29/2002	24	8	0.53333	9.87E-15	11/1/2002	7	8	0	0.00E+00	0.00%
N2011	10/29/2002	7:06am	2:18pm	432	49	2.10E+07	10/30/2002	18	9	0.3	5.16E-15	11/4/2002	9	12	0	0.00E+00	0.00%
S2011	10/29/2002	7:05am	2:20pm	435	42	1.81E+07	10/30/2002	26	9	0.56667	1.13E-14	11/4/2002	10	12	0	0.00E+00	0.00%
E2011	10/29/2002	7:27am	2:20pm	413	50	2.05E+07	10/30/2002	37	9	0.93333	1.64E-14	11/4/2002	14	12	0.067	1.17E-15	29.36%
W2011	10/29/2002	7:04am	2:22pm	438	52	2.26E+07	10/30/2002	34	9	0.83333	1.33E-14	11/4/2002	9	12	0	0.00E+00	0.00%

No Work on 10/30/02

No Work on 10/31/02

No Work on 11/1/02

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #5 11/4/02-11/8/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/4/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/5/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/6/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/7/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/8/02	411	1.13E-15	4.64E-13	
	411	1.13E-15	4.64E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 1.13E-15 uCi/ml

Percentage of Release Limit of = 28.25%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/4/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/5/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/6/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/7/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/8/02	403	1.77E-15	7.13E-13	
	403	1.77E-15	7.13E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 1.77E-15 uCi/ml

Percentage of Release Limit of = 44.25%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/4/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/5/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/6/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/7/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/8/02	404	0.00E+00	0.00E+00	
	404	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/4/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/5/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/6/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/7/02	0	0.00E+00	0.00E+00	NO WORK TODAY
11/8/02	367	0.00E+00	0.00E+00	
	367	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 5 **November 4, 2002 - November 8, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
No Work on November 4, 2002																	
No Work on November 5, 2002																	
No Work on November 6, 2002																	
No Work on November 7, 2002																	
N2012	11/8/02	7:12am	2:03pm	411	52	2.12E+07	11/11/02	22	12	0.33333	5.67E-15	11/13/02	12	10	0.067	1.13E-15	28.37%
S2012	11/8/02	7:17am	2:00pm	403	51	2.04E+07	11/11/02	18	12	0.2	3.54E-15	11/13/02	13	10	0.1	1.77E-15	44.25%
E2012	11/8/02	7:19am	2:03pm	404	48	1.92E+07	11/11/02	14	12	0.06667	1.25E-15	11/13/02	8	10	0	0.00E+00	0.00%
W2012	11/8/02	7:57am	2:04pm	367	56	2.04E+07	11/11/02	13	12	0.03333	5.90E-16	11/13/02	10	10	0	0.00E+00	0.00%

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #6 11/11/02-11/15/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/11/02	452	2.02E-15	9.13E-13	
11/12/02	432	6.85E-16	2.96E-13	
11/13/02	489	0.00E+00	0.00E+00	
11/14/02	452	2.18E-15	9.85E-13	
11/15/02	470	0.00E+00	0.00E+00	
	2295	4.89E-15	2.19E-12	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 9.56E-16 uCi/ml

Percentage of Release Limit of = 23.90%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/11/02	453	0.00E+00	0.00E+00	
11/12/02	498	0.00E+00	0.00E+00	
11/13/02	488	6.72E-16	3.28E-13	
11/14/02	440	0.00E+00	0.00E+00	
11/15/02	481	5.86E-16	2.82E-13	
	2360	1.26E-15	6.10E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 2.58E-16 uCi/ml

Percentage of Release Limit of = 6.46%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/11/02	446	5.66E-16	2.52E-13	
11/12/02	501	0.00E+00	0.00E+00	
11/13/02	490	1.10E-15	5.39E-13	
11/14/02	451	1.47E-15	6.63E-13	
11/15/02	483	0.00E+00	0.00E+00	
	2371	3.14E-15	1.45E-12	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 6.13E-16 uCi/ml

Percentage of Release Limit of = 15.34%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/11/02	449	0.00E+00	0.00E+00	
11/12/02	420	5.06E-16	2.13E-13	
11/13/02	492	0.00E+00	0.00E+00	
11/14/02	440	0.00E+00	0.00E+00	
11/15/02	471	9.90E-16	4.66E-13	
	2272	1.50E-15	6.79E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (West) =	**2.99E-16 uCi/ml**
Percentage of Release Limit of =	*7.47%*

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 6 **November 11, 2002 - November 15, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2013	11/11/02	7:18am	2:50pm	452	53	2.37E+07	11/12/02	222	11	7.03333	1.07E-13	11/15/02	18	14	0.133	2.02E-15	50.61%
S2013	11/11/02	7:15am	2:48pm	453	42	1.89E+07	11/12/02	261	11	8.33333	1.59E-13	11/15/02	14	14	0	0.00E+00	0.00%
E2013	11/11/02	7:16am	2:42pm	446	48	2.12E+07	11/12/02	160	11	4.96667	8.44E-14	11/15/02	15	14	0.033	5.66E-16	14.16%
W1013	11/11/02	7:16am	2:45pm	449	53	2.36E+07	11/12/02	260	11	8.3	1.27E-13	11/15/02	13	14	0	0.00E+00	0.00%
N2014	11/12/02	8:05am	3:17pm	432	41	1.76E+07	11/13/02	117	10	3.56667	7.32E-14	11/18/02	15	14	0.033	6.85E-16	17.11%
S2014	11/12/02	6:52am	3:10pm	498	50	2.47E+07	11/13/02	123	10	3.76667	5.50E-14	11/18/02	12	14	0	0.00E+00	0.00%
E2014	11/12/02	6:54am	3:15pm	501	53	2.63E+07	11/13/02	118	10	3.6	4.93E-14	11/18/02	11	14	0	0.00E+00	0.00%
W2014	11/12/02	8:05am	3:05pm	420	57	2.37E+07	11/13/02	107	10	3.23333	4.91E-14	11/18/02	15	14	0.033	5.06E-16	12.66%
N2015	11/13/02	7:09am	3:18pm	489	47	2.28E+07	11/14/02	325	12	10.4333	1.65E-13	11/18/02	13	14	0	0.00E+00	0.00%
S2015	11/13/02	7:05am	3:13pm	488	37	1.79E+07	11/14/02	405	12	13.1	2.64E-13	11/18/02	15	14	0.033	6.72E-16	16.79%
E2015	11/13/02	7:07am	3:17pm	490	45	2.19E+07	11/14/02	380	12	12.2667	2.02E-13	11/18/02	16	14	0.067	1.10E-15	27.49%
W2015	11/13/02	7:00am	3:12pm	492	40	1.95E+07	11/14/02	301	12	9.63333	1.78E-13	11/18/02	14	14	0	0.00E+00	0.00%
N2016	11/14/02	7:05am	2:37pm	452	37	1.66E+07	11/15/02	307	14	9.76667	2.12E-13	11/19/02	14	11	0.1	2.18E-15	54.38%
S2016	11/14/02	7:07am	2:27pm	440	50	2.18E+07	11/15/02	310	14	9.86667	1.63E-13	11/19/02	11	11	0	0.00E+00	0.00%
E2016	11/14/02	7:00am	2:31pm	451	55	2.46E+07	11/15/02	285	14	9.03333	1.32E-13	11/19/02	14	11	0.1	1.47E-15	36.66%
W2016	11/14/02	7:05am	2:25pm	440	51	2.22E+07	11/15/02	265	14	8.36667	1.36E-13	11/19/02	10	11	0	0.00E+00	0.00%
N2017	11/15/02	7:09am	2:59pm	470	52	2.42E+07	11/18/02	12	14	0	0.00E+00	11/20/02	8	10	0	0.00E+00	0.00%
S2017	11/15/02	7:06am	3:07pm	481	43	2.05E+07	11/18/02	16	14	0.06667	1.17E-15	11/20/02	11	10	0.033	5.86E-16	14.66%
E2017	11/15/02	7:07am	3:10pm	483	52	2.49E+07	11/18/02	18	14	0.13333	1.93E-15	11/20/02	10	10	0	0.00E+00	0.00%
W2017	11/15/02	7:16am	3:07pm	471	52	2.43E+07	11/18/02	13	14	0	0.00E+00	11/20/02	12	10	0.067	9.90E-16	24.75%

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #7 11/18/02-11/22/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/18/02	477	1.50E-15	7.16E-13	
11/19/02	447	0.00E+00	0.00E+00	
11/20/02	458	1.65E-15	7.56E-13	
11/21/02	469	9.94E-16	4.66E-13	
11/22/02	441	5.29E-16	2.33E-13	
	2292	4.67E-15	2.17E-12	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 9.47E-16 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *23.68%*

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/18/02	489	5.06E-16	2.47E-13	
11/19/02	458	0.00E+00	0.00E+00	
11/20/02	451	0.00E+00	0.00E+00	
11/21/02	470	0.00E+00	0.00E+00	
11/22/02	438	0.00E+00	0.00E+00	
	2306	5.06E-16	2.47E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 1.07E-16 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *2.68%*

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/18/02	478	0.00E+00	0.00E+00	
11/19/02	497	0.00E+00	0.00E+00	
11/20/02	450	0.00E+00	0.00E+00	
11/21/02	466	4.91E-16	2.29E-13	
11/21/02	446	0.00E+00	0.00E+00	
	2337	4.91E-16	2.29E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 9.79E-17 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *2.45%*

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/18/02	485	5.00E-16	2.43E-13	
11/19/02	464	5.12E-16	2.38E-13	
11/20/02	458	1.02E-15	4.67E-13	
11/21/02	468	9.09E-16	4.25E-13	
11/22/02	443	0.00E+00	0.00E+00	
	2318	2.94E-15	1.37E-12	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 5.92E-16 uCi/ml

Percentage of Release Limit of = 14.80%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 7 **November 18, 2002 - November 22, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2018	11/18/02	7:05am	3:02pm	477	51	2.41E+07	11/19/02	108	11	3.23333	4.83E-14	11/22/02	15	12	0.1	1.50E-15	37.38%
S2018	11/18/02	6:52am	3:01pm	489	49	2.37E+07	11/19/02	143	11	4.4	6.68E-14	11/22/02	13	12	0.033	5.06E-16	12.65%
E2018	11/18/02	7:04am	3:02pm	478	49	2.32E+07	11/19/02	112	11	3.36667	5.23E-14	11/22/02	9	12	0	0.00E+00	0.00%
W2018	11/18/02	6:50am	2:55pm	485	50	2.40E+07	11/19/02	155	11	4.8	7.20E-14	11/22/02	13	12	0.033	5.00E-16	12.50%
N2019	11/19/02	7:12am	2:39pm	447	50	2.22E+07	11/20/02	358	10	11.6	1.89E-13	11/25/02	11	12	0	0.00E+00	0.00%
S2019	11/19/02	6:53am	2:31pm	458	48	2.18E+07	11/20/02	357	10	11.5667	1.91E-13	11/25/02	10	12	0	0.00E+00	0.00%
E2019	11/19/02	6:50am	3:07pm	497	47	2.32E+07	11/20/02	338	10	10.9333	1.70E-13	11/25/02	10	12	0	0.00E+00	0.00%
W2019	11/19/02	6:53am	2:37pm	464	51	2.35E+07	11/20/02	347	10	11.2333	1.73E-13	11/25/02	13	12	0.033	5.12E-16	12.81%
N2020	11/20/02	7:16am	2:54pm	458	48	2.18E+07	11/21/02	488	9	15.9667	2.64E-13	11/25/02	15	12	0.1	1.65E-15	41.37%
S2020	11/20/02	7:21am	2:52pm	451	48	2.15E+07	11/21/02	468	9	15.3	2.57E-13	11/25/02	11	12	0	0.00E+00	0.00%
E2020	11/20/02	7:20am	2:50pm	450	51	2.27E+07	11/21/02	385	9	12.5333	1.99E-13	11/25/02	12	12	0	0.00E+00	0.00%
W2020	11/20/02	7:15am	2:53pm	458	52	2.36E+07	11/21/02	439	9	14.3333	2.19E-13	11/25/02	14	12	0.067	1.02E-15	25.46%
N2021	11/21/02	6:38am	2:27pm	469	52	2.42E+07	11/22/02	165	12	5.1	7.61E-14	11/26/02	12	10	0.067	9.94E-16	24.86%
S2021	11/21/02	6:50am	2:40pm	470	51	2.38E+07	11/22/02	125	12	3.76667	5.72E-14	11/26/02	8	10	0	0.00E+00	0.00%
E2021	11/21/02	6:52am	2:38pm	466	53	2.45E+07	11/22/02	150	12	4.6	6.77E-14	11/26/02	11	10	0.033	4.91E-16	12.27%
W2021	11/21/02	6:37am	2:25pm	468	57	2.64E+07	11/22/02	87	12	2.5	3.41E-14	11/26/02	12	10	0.067	9.09E-16	22.73%
N2022	11/22/02	7:00am	2:21pm	441	52	2.27E+07	11/25/02	16	12	0.13333	2.11E-15	11/27/02	12	11	0.033	5.29E-16	13.22%
S2022	11/22/02	7:01am	2:19pm	438	51	2.21E+07	11/25/02	12	12	0	0.00E+00	11/27/02	11	11	0	0.00E+00	0.00%
E2022	11/22/02	6:53am	2:19pm	446	52	2.30E+07	11/25/02	15	12	0.1	1.57E-15	11/27/02	9	11	0	0.00E+00	0.00%
W2022	11/22/02	6:56am	2:19pm	443	52	2.28E+07	11/25/02	11	12	0	0.00E+00	11/27/02	11	11	0	0.00E+00	0.00%

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #8 11/25/02-11/29/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/25/02	474	1.49E-15	7.06E-13	
11/26/02	473	5.03E-16	2.38E-13	
11/27/02	437	0.00E+00	0.00E+00	
11/28/02	0	0.00E+00	0.00E+00	No work - Thanksgiving Day
11/29/02	409	0.00E+00	0.00E+00	
	1793	1.99E-15	9.44E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 5.27E-16 uCi/ml

Percentage of Release Limit of = 13.16%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/25/02	474	9.30E-16	4.41E-13	
11/26/02	466	4.65E-16	2.17E-13	
11/27/02	422	1.54E-15	6.50E-13	
11/28/02	0	0.00E+00	0.00E+00	No work - Thanksgiving Day
11/29/02	410	1.14E-15	4.67E-13	
	1772	4.08E-15	1.77E-12	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 1.00E-15 uCi/ml

Percentage of Release Limit of = 25.04%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/25/02	472	1.68E-15	7.93E-13	
11/26/02	465	0.00E+00	0.00E+00	
11/27/02	424	1.17E-15	4.96E-13	
11/28/02	0	0.00E+00	0.00E+00	No work - Thanksgiving Day
11/29/02	417	6.19E-16	2.58E-13	
	1778	3.47E-15	1.55E-12	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 8.70E-16 uCi/ml

Percentage of Release Limit of = 21.75%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
11/25/02	470	0.00E+00	0.00E+00	
11/26/02	470	0.00E+00	0.00E+00	
11/27/02	437	0.00E+00	0.00E+00	
11/28/02	0	0.00E+00	0.00E+00	No work - Thanksgiving Day
11/29/02	418	0.00E+00	0.00E+00	
	1795	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 8 **November 25, 2002 - November 29, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2023	11/25/02	6:57am	2:47pm	470	52	2.42E+07	11/26/02	38	10	0.93333	1.39E-14	11/29/02	13	10	0.1	1.49E-15	37.21%
S2023	11/25/02	6:55am	2:49pm	474	55	2.58E+07	11/26/02	58	10	1.6	2.23E-14	11/29/02	12	10	0.067	9.30E-16	23.26%
E2023	11/25/02	6:53am	2:45pm	472	46	2.15E+07	11/26/02	46	10	1.2	2.01E-14	11/29/02	13	10	0.1	1.68E-15	41.88%
W2023	11/25/02	7:00am	2:50pm	470	49	2.28E+07	11/26/02	29	10	0.63333	1.00E-14	11/29/02	9	10	0	0.00E+00	0.00%
N2024	11/26/02	6:59am	2:52pm	473	51	2.39E+07	11/27/02	38	11	0.9	1.36E-14	12/2/02	10	9	0.033	5.03E-16	12.57%
S2024	11/26/02	7:02am	2:48pm	466	56	2.59E+07	11/27/02	79	11	2.26667	3.16E-14	12/2/02	10	9	0.033	4.65E-16	11.62%
E2024	11/26/02	7:00am	2:45pm	465	50	2.30E+07	11/27/02	43	11	1.06667	1.67E-14	12/2/02	8	9	0	0.00E+00	0.00%
W2024	11/26/02	7:03am	2:53pm	470	56	2.61E+07	11/27/02	73	11	2.06667	2.86E-14	12/2/02	8	9	0	0.00E+00	0.00%
N2025	11/27/02	7:25am	2:42pm	437	50	2.17E+07	11/29/02	22	10	0.4	6.66E-15	12/2/02	9	9	0	0.00E+00	0.00%
S2025	11/27/02	7:30am	2:32pm	422	56	2.34E+07	11/29/02	29	10	0.63333	9.75E-15	12/2/02	12	9	0.1	1.54E-15	38.48%
E2025	11/27/02	7:29am	2:33pm	424	49	2.06E+07	11/29/02	30	10	0.66667	1.17E-14	12/2/02	11	9	0.067	1.17E-15	29.18%
W2025	11/27/02	7:23am	2:40pm	437	53	2.30E+07	11/29/02	18	10	0.26667	4.19E-15	12/2/02	8	9	0	0.00E+00	0.00%
No work on 11/28/02 Thanksgiving Day																	
N2026	11/29/02	7:11am	2:00pm	409	52	2.11E+07	12/2/02	26	9	0.56667	9.69E-15	12/4/02	9	9	0	0.00E+00	0.00%
S2026	11/29/02	7:10am	2:00pm	410	52	2.11E+07	12/2/02	28	9	0.63333	1.08E-14	12/4/02	11	9	0.067	1.14E-15	28.44%
E2026	11/29/02	7:05am	2:02pm	417	47	1.94E+07	12/2/02	24	9	0.5	9.28E-15	12/4/02	10	9	0.033	6.19E-16	15.47%
W2026	11/29/02	7:07am	2:05pm	418	50	2.07E+07	12/2/02	16	9	0.23333	4.06E-15	12/4/02	9	9	0	0.00E+00	0.00%

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #9 12/02/02-12/06/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/2/02	453	1.03E-15	4.67E-13	
12/3/02	354	0.00E+00	0.00E+00	
12/4/02	460	0.00E+00	0.00E+00	
12/5/02	484	0.00E+00	0.00E+00	
12/6/02	470	0.00E+00	0.00E+00	
	2221	1.03E-15	4.67E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 2.10E-16 uCi/ml

Percentage of Release Limit of = 5.25%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/2/02	445	5.14E-16	2.29E-13	
12/3/02	335	0.00E+00	0.00E+00	
12/4/02	467	0.00E+00	0.00E+00	
12/5/02	478	0.00E+00	0.00E+00	
12/6/02	461	0.00E+00	0.00E+00	
	2186	5.14E-16	2.29E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 1.05E-16 uCi/ml

Percentage of Release Limit of = 2.62%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/2/02	445	1.57E-15	6.99E-13	
12/3/02	340	7.43E-16	2.53E-13	
12/4/02	465	0.00E+00	0.00E+00	
12/5/02	476	0.00E+00	0.00E+00	
12/6/02	469	9.58E-16	4.49E-13	
	2195	3.27E-15	1.40E-12	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 6.38E-16 uCi/ml

Percentage of Release Limit of = 15.95%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/2/02	451	0.00E+00	0.00E+00	
12/3/02	353	0.00E+00	0.00E+00	
12/4/02	449	5.19E-16	2.33E-13	
12/5/02	478	0.00E+00	0.00E+00	
12/6/02	472	0.00E+00	0.00E+00	
	2203	5.19E-16	2.33E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 1.06E-16 uCi/ml

Percentage of Release Limit of = **2.64%**

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 9 **December 2, 2002 - December 6, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2027	12/2/02	7:10am	2:43pm	453	52	2.33E+07	12/3/02	41	13	0.93333	1.44E-14	12/6/02	12	10	0.067	1.03E-15	25.74%
S2027	12/2/02	7:12am	2:37pm	445	53	2.34E+07	12/3/02	44	13	1.03333	1.59E-14	12/6/02	11	10	0.033	5.14E-16	12.85%
E2027	12/2/02	7:15am	2:40pm	445	52	2.29E+07	12/3/02	67	13	1.8	2.83E-14	12/6/02	13	10	0.1	1.57E-15	39.30%
W2027	12/2/02	7:10am	2:41pm	451	55	2.46E+07	12/3/02	40	13	0.9	1.32E-14	12/6/02	10	10	0	0.00E+00	0.00%
N2028	12/3/02	7:06am	1:00pm	354	52	1.82E+07	12/4/02	24	9	0.5	9.88E-15	12/9/02	10	11	0	0.00E+00	0.00%
S2028	12/3/02	7:10am	12:45pm	335	56	1.86E+07	12/4/02	19	9	0.33333	6.46E-15	12/9/02	9	11	0	0.00E+00	0.00%
E2028	12/3/02	7:07am	12:47pm	340	48	1.62E+07	12/4/02	17	9	0.26667	5.94E-15	12/9/02	12	11	0.033	7.43E-16	18.57%
W2028	12/3/02	7:05am	12:58pm	353	55	1.92E+07	12/4/02	21	9	0.4	7.49E-15	12/9/02	10	11	0	0.00E+00	0.00%
N2029	12/4/02	6:53am	2:33pm	460	51	2.33E+07	12/5/02	26	10	0.53333	8.27E-15	12/9/02	10	11	0	0.00E+00	0.00%
S2029	12/4/02	6:50am	2:37pm	467	52	2.41E+07	12/5/02	21	10	0.36667	5.49E-15	12/9/02	8	11	0	0.00E+00	0.00%
E2029	12/4/02	6:50am	2:35pm	465	52	2.40E+07	12/5/02	19	10	0.3	4.51E-15	12/9/02	11	11	0	0.00E+00	0.00%
W2029	12/4/02	7:10am	2:39pm	449	52	2.31E+07	12/5/02	23	10	0.43333	6.75E-15	12/9/02	12	11	0.033	5.19E-16	12.98%
N2030	12/5/02	6:57am	3:01pm	484	56	2.69E+07	12/6/02	66	10	1.86667	2.51E-14	12/10/02	7	10	0	0.00E+00	0.00%
S2030	12/5/02	7:01am	2:59pm	478	54	2.56E+07	12/6/02	83	10	2.43333	3.43E-14	12/10/02	9	10	0	0.00E+00	0.00%
E2030	12/5/02	7:04am	3:00pm	476	52	2.45E+07	12/6/02	67	10	1.9	2.79E-14	12/10/02	7	10	0	0.00E+00	0.00%
W2030	12/5/02	7:00am	2:58pm	478	52	2.46E+07	12/6/02	57	10	1.56667	2.29E-14	12/10/02	10	10	0	0.00E+00	0.00%
N2031	12/6/02	7:00am	2:50pm	470	47	2.19E+07	12/9/02	28	11	0.56667	9.33E-15	12/11/02	9	10	0	0.00E+00	0.00%
S2031	12/6/02	7:11am	2:52pm	461	52	2.38E+07	12/9/02	24	11	0.43333	6.58E-15	12/11/02	8	10	0	0.00E+00	0.00%
E2031	12/6/02	7:05am	2:54pm	469	54	2.51E+07	12/9/02	30	11	0.63333	9.10E-15	12/11/02	12	10	0.067	9.58E-16	23.94%
W2031	12/6/02	6:58am	2:50pm	472	56	2.62E+07	12/9/02	29	11	0.6	8.26E-15	12/11/02	10	10	0	0.00E+00	0.00%

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #10 12/09/02-12/13/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/9/02	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
12/10/02	0	0.00E+00	0.00E+00	
12/11/02	0	0.00E+00	0.00E+00	
12/12/02	0	0.00E+00	0.00E+00	
12/13/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/9/02	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
12/10/02	0	0.00E+00	0.00E+00	
12/11/02	0	0.00E+00	0.00E+00	
12/12/02	0	0.00E+00	0.00E+00	
12/13/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/9/02	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
12/10/02	0	0.00E+00	0.00E+00	
12/11/02	0	0.00E+00	0.00E+00	
12/12/02	0	0.00E+00	0.00E+00	
12/13/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/9/02	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
12/10/02	0	0.00E+00	0.00E+00	
12/11/02	0	0.00E+00	0.00E+00	
12/12/02	0	0.00E+00	0.00E+00	
12/13/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 10 **December 9, 2002 - December 13, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
No Area Air Monitoring This Week																	
PAM's ONLY																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #11 12/16/02-12/20/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/16/02	0	0.00E+00	0.00E+00	**Area Air Monitoring on 12/19/02**
12/17/02	0	0.00E+00	0.00E+00	**Only**
12/18/02	0	0.00E+00	0.00E+00	
12/19/02	449	0.00E+00	0.00E+00	
12/20/02	0	0.00E+00	0.00E+00	
	449	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/16/02	0	0.00E+00	0.00E+00	**Area Air Monitoring on 12/19/02**
12/17/02	0	0.00E+00	0.00E+00	**Only**
12/18/02	0	0.00E+00	0.00E+00	
12/19/02	447	6.16E-16	2.75E-13	
12/20/02	0	0.00E+00	0.00E+00	
	447	6.16E-16	2.75E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 6.16E-16 uCi/ml

Percentage of Release Limit of = 15.40%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/16/02	0	0.00E+00	0.00E+00	**Area Air Monitoring on 12/19/02**
12/17/02	0	0.00E+00	0.00E+00	**Only**
12/18/02	0	0.00E+00	0.00E+00	
12/19/02	442	0.00E+00	0.00E+00	
12/20/02	0	0.00E+00	0.00E+00	
	442	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/16/02	0	0.00E+00	0.00E+00	**Area Air Monitoring on 12/19/02**
12/17/02	0	0.00E+00	0.00E+00	**Only**
12/18/02	0	0.00E+00	0.00E+00	
12/19/02	459	0.00E+00	0.00E+00	
12/20/02	0	0.00E+00	0.00E+00	
	459	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 11 **December 16, 2002 - December 20, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2032	12/19/02	7:35am	3:04pm	449	42	1.87E+07	12/20/02	161	11	5	9.64E-14	12/24/02	11	12	0	0.00E+00	0.00%
S2032	12/19/02	7:36am	3:03pm	447	44	1.95E+07	12/20/02	145	11	4.46667	8.26E-14	12/24/02	13	12	0.033	6.16E-16	15.41%
E2032	12/19/02	7:37am	2:59pm	442	40	1.75E+07	12/20/02	186	11	5.83333	1.20E-13	12/24/02	10	12	0	0.00E+00	0.00%
W2032	12/19/02	7:27am	3:06pm	459	47	2.14E+07	12/20/02	179	11	5.6	9.44E-14	12/24/02	11	12	0	0.00E+00	0.00%

Thursday, December 19, 2002 was the only day during this week that thorium contaminated soil was handled and packaged. Area air monitoring will resume, if additional contamination above the cleanup threshold is encountered and excavated.

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #12 12/23/02-12/27/02** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/23/02	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
12/24/02	0	0.00E+00	0.00E+00	
12/25/02	0	0.00E+00	0.00E+00	
12/26/02	0	0.00E+00	0.00E+00	
12/27/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/23/02	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
12/24/02	0	0.00E+00	0.00E+00	
12/25/02	0	0.00E+00	0.00E+00	
12/26/02	0	0.00E+00	0.00E+00	
12/27/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/23/02	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
12/24/02	0	0.00E+00	0.00E+00	
12/25/02	0	0.00E+00	0.00E+00	
12/26/02	0	0.00E+00	0.00E+00	
12/27/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/23/02	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
12/24/02	0	0.00E+00	0.00E+00	
12/25/02	0	0.00E+00	0.00E+00	
12/26/02	0	0.00E+00	0.00E+00	
12/27/02	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = *#DIV/0!*

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 12 **December 23, 2002 - December 27, 2002**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
No Area Air Monitoring This Week																	
PAM's ONLY																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #13 12/30/02-1/3/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/30/02	0	0.00E+00	0.00E+00	
12/31/02	0	0.00E+00	0.00E+00	
1/1/03	0	0.00E+00	0.00E+00	
1/2/03	371	5.73E-16	2.13E-13	
1/3/03	473	0.00E+00	0.00E+00	
	844	5.73E-16	2.13E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 2.52E-16 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *6.30%*

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/30/02	0	0.00E+00	0.00E+00	
12/31/02	0	0.00E+00	0.00E+00	
1/1/03	0	0.00E+00	0.00E+00	
1/2/03	371	0.00E+00	0.00E+00	
1/3/03	424	0.00E+00	0.00E+00	
	795	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *0.00%*

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/30/02	0	0.00E+00	0.00E+00	
12/31/02	0	0.00E+00	0.00E+00	
1/1/03	0	0.00E+00	0.00E+00	
1/2/03	370	1.19E-15	4.40E-13	
1/3/03	424	1.10E-15	4.66E-13	
	794	2.29E-15	9.07E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 1.14E-15 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *28.55%*

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
12/30/02	0	0.00E+00	0.00E+00	
12/31/02	0	0.00E+00	0.00E+00	
1/1/03	0	0.00E+00	0.00E+00	
1/2/03	365	0.00E+00	0.00E+00	
1/3/03	466	0.00E+00	0.00E+00	
	831	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 13 **December 30, 2002 - January 3, 2003**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2033	1/2/03	8:27am	2:38pm	371	57	2.10E+07	1/3/02	29	13	0.53333	9.17E-15	1/7/03	14	13	0.033	5.73E-16	14.33%
S2033	1/2/03	8:25am	2:36pm	371	44	1.62E+07	1/3/02	20	13	0.23333	5.20E-15	1/7/03	11	13	0	0.00E+00	0.00%
E2033	1/2/03	8:28am	2:38pm	370	55	2.02E+07	1/3/02	26	13	0.43333	7.75E-15	1/7/03	15	13	0.067	1.19E-15	29.79%
W2033	1/2/03	8:31am	2:36pm	365	50	1.81E+07	1/3/02	21	13	0.26667	5.32E-15	1/7/03	12	13	0	0.00E+00	0.00%
N2034	1/3/03	7:10am	3:03pm	473	45	2.11E+07	1/6/03	15	12	0.1	1.71E-15	1/8/03	10	11	0	0.00E+00	0.00%
S2034	1/3/03	8:01am	3:05pm	424	54	2.27E+07	1/6/03	16	12	0.13333	2.12E-15	1/8/03	11	11	0	0.00E+00	0.00%
E2034	1/3/03	7:53am	2:57pm	424	52	2.19E+07	1/6/03	14	12	0.06667	1.10E-15	1/8/03	13	11	0.067	1.10E-15	27.50%
W2034	1/3/03	7:15am	3:01pm	466	57	2.63E+07	1/6/03	17	12	0.16667	2.28E-15	1/8/03	9	11	0	0.00E+00	0.00%

Thursday 1/2/03 and Friday 1/3/03 were the only days during this week when thorium contaminated material was excavated and loaded. GAH

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #14 1/6/03-1/10/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/6/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
1/7/03	0	0.00E+00	0.00E+00	
1/8/03	0	0.00E+00	0.00E+00	
1/9/03	0	0.00E+00	0.00E+00	
1/10/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/6/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
1/7/03	0	0.00E+00	0.00E+00	
1/8/03	0	0.00E+00	0.00E+00	
1/9/03	0	0.00E+00	0.00E+00	
1/10/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/6/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
1/7/03	0	0.00E+00	0.00E+00	
1/8/03	0	0.00E+00	0.00E+00	
1/9/03	0	0.00E+00	0.00E+00	
1/10/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/6/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
1/7/03	0	0.00E+00	0.00E+00	
1/8/03	0	0.00E+00	0.00E+00	
1/9/03	0	0.00E+00	0.00E+00	
1/10/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = **#DIV/0!** **uCi/ml**

Percentage of Release Limit of = *#DIV/0!*

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 14 **January 6, 2003 - January 10, 2003**

Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	day after analysis					four day analysis					% of Limit 4.00E-15 uCi/ml
							date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	
No Area Air Monitoring This Week																	
PAM's ONLY																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #15 1/13/03-1/17/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/13/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
1/14/03	0	0.00E+00	0.00E+00	
1/15/03	0	0.00E+00	0.00E+00	
1/16/03	0	0.00E+00	0.00E+00	
1/17/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/13/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
1/14/03	0	0.00E+00	0.00E+00	
1/15/03	0	0.00E+00	0.00E+00	
1/16/03	0	0.00E+00	0.00E+00	
1/17/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/13/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
1/14/03	0	0.00E+00	0.00E+00	
1/15/03	0	0.00E+00	0.00E+00	
1/16/03	0	0.00E+00	0.00E+00	
1/17/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/13/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
1/14/03	0	0.00E+00	0.00E+00	
1/15/03	0	0.00E+00	0.00E+00	
1/16/03	0	0.00E+00	0.00E+00	
1/17/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 15 **January 13, 2003 - January 17, 2003**

Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	day after analysis					four day analysis					% of Limit 4.00E-15 uCi/ml
							date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	
No Area Air Monitoring This Week																	
PAM's ONLY																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #16 1/20/03-1/24/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/20/03	458	1.32E-15	6.05E-13	
1/21/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/22/03	419	0.00E+00	0.00E+00	
1/23/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/24/03	471	0.00E+00	0.00E+00	
	1348	1.32E-15	6.05E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 4.48E-16 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *11.21%*

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/20/03	470	0.00E+00	0.00E+00	
1/21/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/22/03	398	1.11E-15	4.42E-13	
1/23/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/24/03	461	0.00E+00	0.00E+00	
	1329	1.11E-15	4.42E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 3.32E-16 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *8.31%*

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/20/03	461	1.52E-15	7.01E-13	
1/21/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/22/03	416	0.00E+00	0.00E+00	
1/23/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/24/03	474	0.00E+00	0.00E+00	
	1351	1.52E-15	7.01E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 5.19E-16 uCi/ml

Percentage of Release Limit of = 4E-15uCi/ml *12.97%*

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/20/03	480	0.00E+00	0.00E+00	
1/21/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/22/03	445	0.00E+00	0.00E+00	
1/23/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/24/03	462	2.07E-15	9.56E-13	
	1387	2.07E-15	9.56E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = **6.90E-16 uCi/ml**

Percentage of Release Limit of = *17.24%*

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 16 **January 20, 2003 - January 24, 2003**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2035	1/20/03	7:23am	3:01pm	458	40	1.82E+07	1/21/03	55	12	1.43333	2.85E-14	1/24/03	13	11	0.067	1.32E-15	33.09%
S2035	1/20/03	7:15am	3:05pm	470	50	2.33E+07	1/21/03	28	12	0.53333	8.26E-15	1/24/03	11	11	0	0.00E+00	0.00%
E2035	1/20/03	7:22am	3:03pm	461	52	2.38E+07	1/21/03	51	12	1.3	1.97E-14	1/24/03	14	11	0.1	1.52E-15	37.94%
W2035	1/20/03	7:04am	3:04pm	480	57	2.71E+07	1/21/03	24	12	0.4	5.32E-15	1/24/03	10	11	0	0.00E+00	0.00%
N2036	1/22/03	7:29am	2:28pm	419	42	1.74E+07	1/23/03	46	12	1.13333	2.34E-14	1/27/03	12	12	0	0.00E+00	0.00%
S2036	1/22/03	7:52am	2:30pm	398	55	2.17E+07	1/23/03	31	12	0.63333	1.05E-14	1/27/03	14	12	0.067	1.11E-15	27.70%
E2036	1/22/03	7:30am	2:26pm	416	62	2.56E+07	1/23/03	40	12	0.93333	1.32E-14	1/27/03	12	12	0	0.00E+00	0.00%
W2036	1/22/03	7:25am	2:50pm	445	55	2.43E+07	1/23/03	50	12	1.26667	1.88E-14	1/27/03	11	12	0	0.00E+00	0.00%
N2037	1/24/03	7:17am	3:08pm	471	47	2.19E+07	1/27/03	20	12	0.26667	4.38E-15	1/29/03	10	11	0	0.00E+00	0.00%
S2037	1/24/03	7:22am	3:03pm	461	42	1.92E+07	1/27/03	19	12	0.23333	4.38E-15	1/29/03	11	11	0	0.00E+00	0.00%
E2037	1/24/03	7:07am	3:01pm	474	55	2.58E+07	1/27/03	24	12	0.4	5.58E-15	1/29/03	11	11	0	0.00E+00	0.00%
W2037	1/24/03	7:23am	3:05pm	462	38	1.74E+07	1/27/03	18	12	0.2	4.14E-15	1/29/03	14	11	0.1	2.07E-15	51.80%

Mon 1/20/03, Wed 1/22/03, and Friday 1/24/03 were the only days during this week when thorium contaminated material was excavated and loaded. GAH

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #17 1/27/03-1/31/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/27/03	418	1.00E-15	4.18E-13	
1/28/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/29/03	442	0.00E+00	0.00E+00	
1/30/03	398	5.34E-16	2.13E-13	
1/31/03	0	0.00E+00	0.00E+00	No contaminated loading today
	1258	1.53E-15	6.31E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 5.01E-16 uCi/ml

Percentage of Release Limit of = 12.53%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/27/03	420	5.66E-16	2.38E-13	
1/28/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/29/03	439	7.46E-16	3.27E-13	
1/30/03	389	0.00E+00	0.00E+00	
1/31/03	0	0.00E+00	0.00E+00	No contaminated loading today
	1248	1.31E-15	5.65E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 4.53E-16 uCi/ml

Percentage of Release Limit of = 11.32%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/27/03	425	0.00E+00	0.00E+00	
1/28/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/29/03	416	1.06E-15	4.41E-13	
1/30/03	398	0.00E+00	0.00E+00	
1/31/03	0	0.00E+00	0.00E+00	No contaminated loading today
	1239	1.06E-15	4.41E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 3.56E-16 uCi/ml

Percentage of Release Limit of = 8.90%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
1/27/03	422	5.22E-16	2.20E-13	
1/28/03	0	0.00E+00	0.00E+00	No contaminated loading today
1/29/03	445	0.00E+00	0.00E+00	
1/30/03	383	0.00E+00	0.00E+00	
1/31/03	0	0.00E+00	0.00E+00	No contaminated loading today
	1250	5.22E-16	2.20E-13	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 1.76E-16 uCi/ml

Percentage of Release Limit of = 4.41%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 17 **January 27, 2003 - January 31, 2003**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2038	1/27/03	7:27am	2:25pm	418	58	2.40E+07	1/28/03	83	10	2.43333	3.65E-14	1/31/03	14	12	0.067	1.00E-15	25.01%
S2038	1/27/03	7:23am	2:23pm	420	51	2.12E+07	1/28/03	80	10	2.33333	3.96E-14	1/31/03	13	12	0.033	5.66E-16	14.15%
E2038	1/27/03	7:25am	2:30pm	425	55	2.32E+07	1/28/03	71	10	2.03333	3.16E-14	1/31/03	11	12	0	0.00E+00	0.00%
W2038	1/27/03	7:20am	2:22pm	422	55	2.30E+07	1/28/03	89	10	2.63333	4.13E-14	1/31/03	13	12	0.033	5.22E-16	13.06%
N2039	1/29/03	7:05am	2:27pm	442	55	2.41E+07	1/30/03	22	13	0.3	4.49E-15	2/3/03	11	11	0	0.00E+00	0.00%
S2039	1/29/03	7:01am	2:20pm	439	37	1.61E+07	1/30/03	33	13	0.66667	1.49E-14	2/3/03	12	11	0.033	7.46E-16	18.66%
E2039	1/29/03	7:24am	2:20pm	416	55	2.27E+07	1/30/03	27	13	0.46667	7.42E-15	2/3/03	13	11	0.067	1.06E-15	26.50%
W2039	1/29/03	7:00am	2:25pm	445	51	2.25E+07	1/30/03	26	13	0.43333	6.95E-15	2/3/03	11	11	0	0.00E+00	0.00%
N2040	1/30/03	7:10am	1:48pm	398	57	2.25E+07	1/31/03	106	12	3.13333	5.02E-14	2/4/03	11	10	0.033	5.34E-16	13.36%
S2040	1/30/03	7:25am	1:54pm	389	50	1.93E+07	1/31/03	84	12	2.4	4.49E-14	2/4/03	10	10	0	0.00E+00	0.00%
E2040	1/30/03	7:10am	1:48pm	398	55	2.17E+07	1/31/03	84	12	2.4	3.99E-14	2/4/03	10	10	0	0.00E+00	0.00%
W2040	1/30/03	7:28am	1:51pm	383	43	1.63E+07	1/31/30	79	12	2.23333	4.93E-14	2/4/03	9	10	0	0.00E+00	0.00%

Mon 1/27/03, Wed 1/29/03, and Thurs 1/30/03 were the only days during this week when thorium contaminated material was excavated and loaded. GAH

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #18 2/3/03-2/7/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/3/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/4/03	0	0.00E+00	0.00E+00	
2/5/03	0	0.00E+00	0.00E+00	
2/6/03	0	0.00E+00	0.00E+00	
2/7/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/3/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/4/03	0	0.00E+00	0.00E+00	
2/5/03	0	0.00E+00	0.00E+00	
2/6/03	0	0.00E+00	0.00E+00	
2/7/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/3/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/4/03	0	0.00E+00	0.00E+00	
2/5/03	0	0.00E+00	0.00E+00	
2/6/03	0	0.00E+00	0.00E+00	
2/7/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/3/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/4/03	0	0.00E+00	0.00E+00	
2/5/03	0	0.00E+00	0.00E+00	
2/6/03	0	0.00E+00	0.00E+00	
2/7/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 18 **February 3, 2003 - February 7, 2003**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
No Area Air Monitoring This Week																	
PAM's ONLY																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #19 2/10/03-2/14/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/10/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/11/03	0	0.00E+00	0.00E+00	
2/12/03	0	0.00E+00	0.00E+00	
2/13/03	0	0.00E+00	0.00E+00	
2/14/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/10/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/11/03	0	0.00E+00	0.00E+00	
2/12/03	0	0.00E+00	0.00E+00	
2/13/03	0	0.00E+00	0.00E+00	
2/14/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/10/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/11/03	0	0.00E+00	0.00E+00	
2/12/03	0	0.00E+00	0.00E+00	
2/13/03	0	0.00E+00	0.00E+00	
2/14/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/10/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/11/03	0	0.00E+00	0.00E+00	
2/12/03	0	0.00E+00	0.00E+00	
2/13/03	0	0.00E+00	0.00E+00	
2/14/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = *#DIV/0!*

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 19 **February 10, 2003 - February 14, 2003**

Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	day after analysis					four day analysis					% of Limit
							date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
No Area Air Monitoring This Week																	
PAM's ONLY																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #20 2/17/03-2/21/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/17/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/18/03	0	0.00E+00	0.00E+00	
2/19/03	0	0.00E+00	0.00E+00	
2/20/03	0	0.00E+00	0.00E+00	
2/21/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/17/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/18/03	0	0.00E+00	0.00E+00	
2/19/03	0	0.00E+00	0.00E+00	
2/20/03	0	0.00E+00	0.00E+00	
2/21/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/17/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/18/03	0	0.00E+00	0.00E+00	
2/19/03	0	0.00E+00	0.00E+00	
2/20/03	0	0.00E+00	0.00E+00	
2/21/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = **#DIV/0! uCi/ml**

Percentage of Release Limit of = 4E-15uCi/ml *#DIV/0!*

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/17/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/18/03	0	0.00E+00	0.00E+00	
2/19/03	0	0.00E+00	0.00E+00	
2/20/03	0	0.00E+00	0.00E+00	
2/21/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 20 **February 17, 2003 - February 21, 2003**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
No Area Air Monitoring This Week																	
PAM's ONLY																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #21 2/24/03-2/28/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/24/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/25/03	0	0.00E+00	0.00E+00	
2/26/03	0	0.00E+00	0.00E+00	
2/27/03	0	0.00E+00	0.00E+00	
2/28/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/24/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/25/03	0	0.00E+00	0.00E+00	
2/26/03	0	0.00E+00	0.00E+00	
2/27/03	0	0.00E+00	0.00E+00	
2/28/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/24/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/25/03	0	0.00E+00	0.00E+00	
2/26/03	0	0.00E+00	0.00E+00	
2/27/03	0	0.00E+00	0.00E+00	
2/28/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
2/24/03	0	0.00E+00	0.00E+00	**No Area Air Monitoring This Week**
2/25/03	0	0.00E+00	0.00E+00	
2/26/03	0	0.00E+00	0.00E+00	
2/27/03	0	0.00E+00	0.00E+00	
2/28/03	0	0.00E+00	0.00E+00	
	0	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = #DIV/0! uCi/ml

Percentage of Release Limit of = #DIV/0!

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 21 **February 24, 2003 - February 28, 2003**

							day after analysis					four day analysis					% of Limit
Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
No Area Air Monitoring This Week																	
PAM's ONLY																	

Area Air Monitoring Summary Sheet - Weekly Effluent Concentration Report

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

North Monitor **Week #22 3/3/03-3/7/03** **(High Volume)**

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
3/3/03	0	0.00E+00	0.00E+00	
3/4/30	203	1.49E-15	3.02E-13	
3/5/03	0	0.00E+00	0.00E+00	
3/6/03	0	0.00E+00	0.00E+00	
3/7/03	0	0.00E+00	0.00E+00	
	203	1.49E-15	3.02E-13	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (North) = 1.49E-15 uCi/ml

Percentage of Release Limit of = 37.25%
4E-15uCi/ml

South Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
3/3/03	0	0.00E+00	0.00E+00	
3/4/03	234	0.00E+00	0.00E+00	
3/5/03	0	0.00E+00	0.00E+00	
3/6/03	0	0.00E+00	0.00E+00	
3/7/03	0	0.00E+00	0.00E+00	
	234	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (South) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

East Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
3/3/03	0	0.00E+00	0.00E+00	
3/4/03	201	0.00E+00	0.00E+00	
3/5/03	0	0.00E+00	0.00E+00	
3/6/03	0	0.00E+00	0.00E+00	
3/7/03	0	0.00E+00	0.00E+00	
	201	0.00E+00	0.00E+00	

$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$

Eq A.9 NUREG 1400

Time Weighted Weekly Effluent Concentration (East) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%
4E-15uCi/ml

West Monitor

Date	Time Sampled (minutes)	Effluent Concentration in uCi/ml	Concentration x Sample Min / Day	Comments
3/3/03	0	0.00E+00	0.00E+00	
3/4/03	229	0.00E+00	0.00E+00	
3/5/03	0	0.00E+00	0.00E+00	
3/6/03	0	0.00E+00	0.00E+00	
3/7/03	0	0.00E+00	0.00E+00	
	229	0.00E+00	0.00E+00	

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

Eq A.9 NUREG 1400

Time Weighted Weekly
Effluent Concentration (West) = 0.00E+00 uCi/ml

Percentage of Release Limit of = 0.00%

Area Air Monitoring Summary Sheet - Staplex High Volume Pumps (Daily Analysis)

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

Week 22 **March 3, 2003 - March 7, 2003**

Sample ID	date sampled	start time	stop time	total time sampled	cubic ft/ min (CFM)	sample volume analyzed	day after analysis					four day analysis					% of Limit
							date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	date analyzed	gross counts	bkg counts	net cpm	Concentration in uCi/ml	4.00E-15 uCi/ml
N2041	3/4/03	8:16am	11:39am	203	40	8.05E+06	3/6/03	18	11	0.23333	1.05E-14	3/10/03	14	13	0.033	1.49E-15	37.33%
S2041	3/4/03	7:51am	11:45am	234	42	9.74E+06	3/6/03	14	11	0.1	3.70E-15	3/10/03	11	13	0	0.00E+00	0.00%
E2041	3/4/03	8:20am	11:41am	201	38	7.57E+06	3/6/03	16	11	0.16667	7.94E-15	3/10/03	13	13	0	0.00E+00	0.00%
W2041	3/4/03	7:53am	11:42am	229	47	1.07E+07	3/6/03	21	11	0.33333	1.13E-14	3/10/03	13	13	0	0.00E+00	0.00%

Tuesday March 4 was the only day during this week when thorium contaminated material was excavated and loaded. Day after analysis was not performed until 3/6/03 because of snow day (no work) on 3/5/03. GAH

b. **Personal Air Monitoring**

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 1 October 7 - October 11, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
10/8/02	Roger Petty	PAM2001	002-574	2.5	220	550000	10/9/02	10	13	0.00	0.00E+00	
10/8/02	Jerry Krane	PAM2002	002-675	2.5	220	550000	10/9/02	12	13	0.00	0.00E+00	
10/9/02	Roger Petty	PAM2003	002-766	2.5	477	1192500	10/10/02	14	12	0.07	1.41E-14	*
10/9/02	Jerry Krane	PAM2004	002-574	2.5	310	775000	10/10/02	19	12	0.23	7.60E-14	*
10/9/02	Lindsay Aschim	PAM2005	002-574	2.5	136	340000	10/10/02	11	12	0.00	0.00E+00	
10/10/02	W. Concepcion	PAM2006	002-574	2.5	260	650000	10/11/02	15	9	0.20	7.76E-14	*
10/10/02	Jerry Krane	PAM2007	002-766	2.5	165	412500	10/11/02	9	9	0.00	0.00E+00	
10/10/02	Lindsay Aschim	PAM2008	002-766	2.5	84	210000	10/11/02	9	9	0.00	0.00E+00	
10/11/02	W. Concepcion	PAM2009	006-234	2.5	505	1262500	10/14/02	12	12	0.00	0.00E+00	
10/11/02	Lindsay Aschim	PAM2010	002-675	2.5	500	1250000	10/14/02	10	12	0.00	0.00E+00	
10/11/02	Jerry Krane	PAM2011	002-574	2.5	150	375000	10/14/02	9	12	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 1 October 7 - October 11, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
10/9/02	Roger Petty	PAM2003	002-766	2.5	477	1192500	10/14/02	9	12	0.00	0.00E+00	0.00%
10/9/02	Jerry Krane	PAM2004	002-574	2.5	310	775000	10/14/02	12	12	0.00	0.00E+00	0.00%
10/10/02	W. Concepcion	PAM2006	002-574	2.5	260	650000	10/15/02	11	11	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 2 October 14 - October 18, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
10/14/02	Roger Petty	PAM2012	002-675	2.5	470	1175000	10/15/02	14	11	0.10	2.15E-14	*
10/14/02	Lindsay Aschim	PAM2013	006-234	2.5	453	1132500	10/15/02	20	11	0.30	6.68E-14	*
10/14/02	Jerry Krane	PAM2014	002-574	2.5	135	337500	10/15/02	11	11	0.00	0.00E+00	
10/15/02	Roger Petty	PAM2015	002-574	2.5	386	965000	10/16/02	18	10	0.27	6.97E-14	*
10/15/02	Jerry Krane	PAM2016	002-675	2.5	330	825000	10/16/02	14	10	0.13	4.08E-14	*
10/15/02	Lindsay Aschim	PAM2017	002-675	2.5	150	375000	10/16/02	9	10	0.00	0.00E+00	
10/16/02	Roger Petty	PAM2018	002-574	2.5	452	1130000	10/17/02	8	10	0.00	0.00E+00	
10/16/02	Lindsay Aschim	PAM2019	006-234	2.5	443	1107500	10/17/02	10	10	0.00	0.00E+00	
10/16/02	Jerry Krane	PAM2020	002-675	2.5	150	375000	10/17/02	9	10	0.00	0.00E+00	
10/17/02	Jerry Krane	PAM2021	002-675	2.5	366	915000	10/18/02	15	9	0.20	5.52E-14	*
10/17/02	Roger Petty	PAM2022	002-766	2.5	346	865000	10/18/02	13	9	0.13	3.89E-14	*
10/18/02	Roger Petty	PAM2023	002-766	2.5	310	775000	10/21/02	17	11	0.20	6.51E-14	*
10/18/02	Jerry Krane	PAM2024	002-675	2.5	310	775000	10/21/02	9	11	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 2 October 14 - October 18, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
10/14/02	Roger Petty	PAM2012	002-675	2.5	470	1175000	10/18/02	8	9	0.00	0.00E+00	0.00%
10/14/02	Lindsay Aschim	PAM2013	006-234	2.5	453	1132500	10/18/02	9	9	0.00	0.00E+00	0.00%
10/15/02	Roger Petty	PAM2015	002-574	2.5	386	965000	10/21/02	8	11	0.00	0.00E+00	0.00%
10/15/02	Jerry Krane	PAM2016	002-675	2.5	330	825000	10/21/02	9	11	0.00	0.00E+00	0.00%
10/17/02	Jerry Krane	PAM2021	002-675	2.5	366	915000	10/22/02	13	13	0.00	0.00E+00	0.00%
10/17/02	Roger Petty	PAM2022	002-766	2.5	346	865000	10/22/02	11	13	0.00	0.00E+00	0.00%
10/18/02	Roger Petty	PAM2023	002-766	2.5	310	775000	10/23/02	10	13	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 3 October 21 - October 25, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)
No Work During Week of October 21 - 25, 2002											

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 3 October 21 - October 25, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
No Work During Week of October 21 - 25, 2002												

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 4 October 28 - November 1, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)
10/28/2002	Lindsay Aschim	PAM2025	002-675	2.5	435	1087500	10/29/2002	10	8	0.07	1.55E-14 *
10/28/2002	W .Concepcion	PAM2026	002-766	2.5	435	1087500	10/29/2002	6	8	0.00	0.00E+00
10/28/2002	Jerry Krane	PAM2027	002-574	2.5	105	262500	10/29/2002	7	8	0.00	0.00E+00

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 4 October 28 - November 1, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
10/28/2002	Lindsay Aschim	PAM2025	002-675	2.5	435	1087500	11/1/2002	8	8	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 5 November 4 - November 8, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)
11/8/02	Roger Petty	PAM2028	002-766	2.5	475	1187500	11/11/02	8	12	0.00	0.00E+00
11/8/02	Lindsay Aschim	PAM2029	002-574	2.5	493	1232500	11/11/02	10	12	0.00	0.00E+00

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 5 November 4 - November 8, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
No 4 Day Analysis Required During This Week												

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 6 November 11 - November 15, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
11/11/02	Lindsay Aschim	PAM2030	002-574	2.5	487	1217500	11/15/02	16	14	0.07	1.38E-14	2.76%
11/11/02	W. Concepcion	PAM2031	002-766	2.5	487	1217500	11/15/02	11	14	0.00	0.00E+00	0.00%
11/12/02	Lindsay Aschim	PAM2032	002-766	2.5	494	1235000	11/18/02	13	14	0.00	0.00E+00	0.00%
11/12/02	W. Concepcion	PAM2033	002-574	2.5	494	1235000	11/18/02	14	14	0.00	0.00E+00	0.00%
11/13/02	Lindsay Aschim	PAM2034	002-766	2.5	488	1220000	11/18/02	15	14	0.03	6.89E-15	1.38%
11/13/02	W. Concepcion	PAM2035	002-574	2.5	484	1210000	11/18/02	14	14	0.00	0.00E+00	0.00%
11/14/02	W. Concepcion	PAM2036	002-766	2.5	450	1125000	11/19/02	11	11	0.00	0.00E+00	0.00%
11/14/02	Lindsay Aschim	PAM2037	006-234	2.5	390	975000	11/19/02	12	11	0.03	8.63E-15	1.73%
11/14/02	Jerry Krane	PAM2038	002-574	2.5	120	300000	11/19/02	9	11	0.00	0.00E+00	0.00%
11/15/02	Lindsay Aschim	PAM2040	002-766	2.5	230	575000	11/20/02	10	10	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 6 November 11 - November 15, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
11/11/02	Lindsay Aschim	PAM2030	002-574	2.5	487	1217500	11/12/02	29	11	0.60	1.24E-13	*
11/11/02	W. Concepcion	PAM2031	002-766	2.5	487	1217500	11/12/02	31	11	0.67	1.38E-13	*
11/12/02	Lindsay Aschim	PAM2032	002-766	2.5	494	1235000	11/13/02	32	10	0.73	1.50E-13	*
11/12/02	W. Concepcion	PAM2033	002-574	2.5	494	1235000	11/13/02	18	10	0.27	5.45E-14	*
11/13/02	Lindsay Aschim	PAM2034	002-766	2.5	488	1220000	11/14/02	26	12	0.47	9.65E-14	*
11/13/02	W. Concepcion	PAM2035	002-574	2.5	484	1210000	11/14/02	34	12	0.73	1.53E-13	*
11/14/02	W. Concepcion	PAM2036	002-766	2.5	450	1125000	11/15/02	38	14	0.80	1.79E-13	*
11/14/02	Lindsay Aschim	PAM2037	006-234	2.5	390	975000	11/15/02	24	14	0.33	8.63E-14	*
11/14/02	Jerry Krane	PAM2038	002-574	2.5	120	300000	11/15/02	23	14	0.30	2.52E-13	*
11/15/02	W. Concepcion	PAM2039	002-574	2.5	490	1225000	11/18/02	13	14	0.00	0.00E+00	
11/15/02	Lindsay Aschim	PAM2040	002-766	2.5	230	575000	11/18/02	16	14	0.07	2.93E-14	*
11/15/02	Jerry Krane	PAM2041	006-234	2.5	235	587500	11/18/02	14	14	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 7 November 18 - November 22, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
11/18/02	Roger Petty	PAM2043	002-766	2.5	490	1225000	11/22/02	12	12	0.00	0.00E+00	0.00%
11/19/02	Jerry Krane	PAM2044	006-234	2.5	481	1202500	11/25/02	12	12	0.00	0.00E+00	0.00%
11/19/02	W. Concepcion	PAM2045	002-675	2.5	480	1200000	11/25/02	9	12	0.00	0.00E+00	0.00%
11/20/02	Lindsay Aschim	PAM2046	002-675	2.5	153	382500	11/25/02	11	12	0.00	0.00E+00	0.00%
11/20/02	Roger Petty	PAM2047	006-234	2.5	487	1217500	11/25/02	12	12	0.00	0.00E+00	0.00%
11/20/02	Jerry Krane	PAM2048	002-675	2.5	300	750000	11/25/02	10	12	0.00	0.00E+00	0.00%
11/21/02	Roger Petty	PAM2049	002-675	2.5	465	1162500	11/26/02	7	10	0.00	0.00E+00	0.00%
11/21/02	Lindsay Aschim	PAM2050	006-234	2.5	465	1162500	11/26/02	11	10	0.03	7.24E-15	1.45%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 7 November 18 - November 22, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
11/18/02	Lindsay Aschim	PAM2042	002-675	2.5	485	1212500	11/19/02	11	11	0.00	0.00E+00	
11/18/02	Roger Petty	PAM2043	002-766	2.5	490	1225000	11/19/02	15	11	0.13	2.75E-14	*
11/19/02	Jerry Krane	PAM2044	006-234	2.5	481	1202500	11/20/02	26	10	0.53	1.12E-13	*
11/19/02	W. Concepcion	PAM2045	002-675	2.5	480	1200000	11/20/02	27	10	0.57	1.19E-13	*
11/20/02	Lindsay Aschim	PAM2046	002-675	2.5	153	382500	11/21/02	16	9	0.23	1.54E-13	*
11/20/02	Roger Petty	PAM2047	006-234	2.5	487	1217500	11/21/02	38	9	0.97	2.00E-13	*
11/20/02	Jerry Krane	PAM2048	002-675	2.5	300	750000	11/21/02	19	9	0.33	1.12E-13	*
11/21/02	Roger Petty	PAM2049	002-675	2.5	465	1162500	11/22/02	21	12	0.30	6.51E-14	*
11/21/02	Lindsay Aschim	PAM2050	006-234	2.5	465	1162500	11/22/02	19	12	0.23	5.07E-14	*
11/22/02	Lindsay Aschim	PAM2051	002-574	2.5	455	1137500	11/25/02	8	12	0.00	0.00E+00	
11/22/02	Roger Petty	PAM2052	006-234	2.5	455	1137500	11/25/02	10	12	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 8 November 25 - November 29, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
11/25/02	W. Concepcion	PAM2053	002-574	2.5	481	1202500	11/26/02	8	10	0.00	0.00E+00	
11/25/02	Lindsay Aschim	PAM2054	002-766	2.5	458	1145000	11/26/02	10	10	0.00	0.00E+00	
11/26/02	W. Concepcion	PAM2055	002-766	2.5	460	1150000	11/27/02	16	11	0.17	3.66E-14	*
11/26/02	Lindsay Aschim	PAM2056	002-574	2.5	495	1237500	11/27/02	16	11	0.17	3.40E-14	*
11/27/02	Tim O'Brien	PAM2057	002-766	2.5	255	637500	11/29/02	8	10	0.00	0.00E+00	
11/27/02	Lindsay Aschim	PAM2058	006-234	2.5	125	312500	11/29/02	10	10	0.00	0.00E+00	
11/27/02	W. Concepcion	PAM2059	002-574	2.5	420	1050000	11/29/02	8	10	0.00	0.00E+00	
11/29/02	Lindsay Aschim	PAM2060	006-234	2.5	453	1132500	12/2/02	8	9	0.00	0.00E+00	
11/29/02	Roger Petty	PAM2061	002-766	2.5	452	1130000	12/2/02	12	9	0.10	2.23E-14	*

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 8 November 25 - November 29, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
11/26/02	W. Concepcion	PAM2055	002-766	2.5	460	1150000	12/2/02	8	9	0.00	0.00E+00	0.00%
11/26/02	Lindsay Aschim	PAM2056	002-574	2.5	495	1237500	12/2/02	9	9	0.00	0.00E+00	0.00%
11/29/02	Roger Petty	PAM2061	002-766	2.5	452	1130000	12/4/02	8	9	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 9 December 2 - December 6, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)
12/2/02	Roger Petty	PAM2062	002-574	2.5	458	1145000	12/3/02	17	13	0.13	2.94E-14 *
12/2/02	Lindsay Aschim	PAM2063	002-766	2.5	457	1142500	12/3/02	15	13	0.07	1.47E-14 *
12/3/02	Lindsay Aschim	PAM2064	002-766	2.5	365	912500	12/4/02	8	9	0.00	0.00E+00
12/3/02	Roger Petty	PAM2065	002-574	2.5	445	1112500	12/4/02	8	9	0.00	0.00E+00
12/4/02	Roger Petty	PAM2066	002-574	2.5	457	1142500	12/5/02	9	10	0.00	0.00E+00
12/4/02	Lindsay Aschim	PAM2067	002-766	2.5	465	1162500	12/5/02	8	10	0.00	0.00E+00

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 9 December 2 - December 6, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
12/2/02	Roger Petty	PAM2062	002-574	2.5	458	1145000	12/6/02	8	10	0.00	0.00E+00	0.00%
12/2/02	Lindsay Aschim	PAM2063	002-766	2.5	457	1142500	12/6/02	10	10	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 10 December 9 - December 13, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
12/9/02	Jerry Krane	PAM2068	002-675	2.5	460	1150000	12/10/02	8	10	0.00	0.00E+00	
12/9/02	Lindsay Aschim	PAM2069	002-766	2.5	447	1117500	12/10/02	15	10	0.17	3.76E-14	*
12/10/02	Lindsay Aschim	PAM2070	002-766	2.5	467	1167500	12/11/02	9	10	0.00	0.00E+00	
12/10/02	Tim O'Brien	PAM2071	002-574	2.5	462	1155000	12/11/02	10	10	0.00	0.00E+00	
12/11/02	Tim O'Brien	PAM2072	002-574	2.5	473	1182500	12/12/02	30	10	0.67	1.42E-13	*
12/11/02	Jerry Krane	PAM2073	002-766	2.5	474	1185000	12/12/02	33	10	0.77	1.63E-13	*
12/12/02	Jerry Krane	PAM2074	002-766	2.5	459	1147500	12/13/02	13	13	0.00	0.00E+00	
12/12/02	Lindsay Aschim	PAM2075	002-574	2.5	459	1147500	12/13/02	54	13	1.37	3.01E-13	*
12/13/02	Jerry Krane	PAM2076	002-574	2.5	463	1157500	12/16/02	10	10	0.00	0.00E+00	
12/13/02	Lindsay Aschim	PAM2077	002-766	2.5	459	1147500	12/16/02	9	10	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 10 December 9 - December 13, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
12/9/02	Lindsay Aschim	PAM2069	002-766	2.5	460	1150000	12/13/02	10	13	0.00	0.00E+00	0.00%
12/11/02	Tim O'Brien	PAM2072	002-574	2.5	473	1182500	12/16/02	9	10	0.00	0.00E+00	0.00%
12/11/02	Jerry Krane	PAM2073	002-766	2.5	474	1185000	12/16/02	9	10	0.00	0.00E+00	0.00%
12/12/02	Lindsay Aschim	PAM2075	002-574	2.5	459	1147500	12/17/02	8	9	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 11 December 16 - December 20, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)
12/16/02	Lindsay Aschim	PAM2078	002-675	2.5	476	1190000	12/17/02	8	9	0.00	0.00E+00
12/16/02	Jerry Krane	PAM2079	002-574	2.5	472	1180000	12/17/02	9	9	0.00	0.00E+00
12/17/02	Lindsay Aschim	PAM2080	002-574	2.5	469	1172500	12/18/02	11	11	0.00	0.00E+00
12/17/02	Jerry Krane	PAM2081	002-766	2.5	505	1262500	12/18/02	10	11	0.00	0.00E+00
No PAM's on 12/18/02. Work stopped due to heavy rain											
12/19/02	Odell Morgan	PAM2082	002-574	2.5	405	1012500	12/20/02	17	11	0.20	4.98E-14 *
12/19/02	Jerry Krane	PAM2083	006-234	2.5	515	1287500	12/20/02	9	11	0.00	0.00E+00
12/20/02	Jerry Krane	PAM2084	006-234	2.5	521	1302500	12/23/02	11	13	0.00	0.00E+00
12/20/02	Lindsay Aschim	PAM2085	002-574	2.5	517	1292500	12/23/02	13	13	0.00	0.00E+00

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 11 December 16 - December 20, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
12/19/02	Odell Morgan	PAM2082	002-574	2.5	405	1012500	12/23/02	11	13	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 12 December 23 - December 27, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
12/23/02	Joel Ahrweiler	PAM2086	006-234	2.5	484	1210000	12/24/02	21	12	0.30	6.26E-14	*
12/23/02	Jerry Krane	PAM2087	002-574	2.5	475	1187500	12/24/02	26	12	0.47	9.92E-14	*
No PAM's on 12/24/02 - Christmas Eve												
No PAM's on 12/25/02 - Christmas Day												
12/26/02	Jerry Krane	PAM2088	002-574	2.5	470	1175000	12/27/02	21	12	0.30	6.44E-14	*
12/26/02	Lindsay Aschim	PAM2089	006-234	2.5	480	1200000	12/27/02	15	12	0.10	2.10E-14	*
12/27/02	Lindsay Aschim	PAM2090	002-574	2.5	456	1140000	12/30/02	9	11	0.00	0.00E+00	
12/27/02	Jerry Krane	PAM2091	006-234	2.5	458	1145000	12/30/02	11	11	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 12 December 23 - December 27, 2002

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
12/23/02	Joel Ahrweiler	PAM2086	006-234	2.5	484	1210000	12/27/02	13	12	0.03	6.95E-15	1.39%
12/23/02	Jerry Krane	PAM2087	002-574	2.5	475	1187500	12/27/02	10	12	0.00	0.00E+00	0.00%
12/26/02	Jerry Krane	PAM2088	002-574	2.5	470	1175000	12/30/02	11	11	0.00	0.00E+00	0.00%
12/26/02	Lindsay Aschim	PAM2089	006-234	2.5	480	1200000	12/30/02	12	11	0.03	7.01E-15	1.40%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 13 December 30 - January 3, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)
12/30/02	Tim O'Brien	PAM2092	002-574	2.5	470	1175000	1/2/03	9	11	0.00	0.00E+00
12/30/02	Jerry Krane	PAM2093	006-234	2.5	468	1170000	1/2/03	10	11	0.00	0.00E+00
No PAM's on 12/31/02 - New Year's Eve											
No PAM's on 1/1/03 - New Year's Day											
1/2/03	Ray Booker	PAM2094	006-234	2.5	462	1155000	1/3/02	11	13	0.00	0.00E+00
1/2/03	Jerry Krane	PAM2095	002-574	2.5	475	1187500	1/3/02	15	13	0.07	1.42E-14 *
1/3/03	Ray Booker	PAM2096	002-574	2.5	405	1012500	1/6/03	10	12	0.00	0.00E+00
1/3/03	Lindsay Aschim	PAM2097	006-234	2.5	355	887500	1/6/03	12	12	0.00	0.00E+00
1/3/03	Jerry Krane	PAM2098	006-234	2.5	121	302500	1/6/03	11	12	0.00	0.00E+00

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis) **Week 13 December 30 - January 3, 2003**

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
1/2/03	Jerry Krane	PAM2095	002-574	2.5	475	1187500	1/7/03	11	13	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 14 January 6 - January 10, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
1/6/03	Jerry Krane	PAM2099	002-675	2.5	483	1207500	1/7/03	11	13	0.00	0.00E+00	
1/7/03	Jerry Krane	PAM2100	002-675	2.5	467	1167500	1/8/03	22	11	0.37	7.93E-14	*
1/7/03	Lindsay Aschim	PAM2101	002-574	2.5	470	1175000	1/8/03	20	11	0.30	6.44E-14	*
1/8/03	Lindsay Aschim	PAM2102	002-675	2.5	458	1145000	1/9/03	26	12	0.47	1.03E-13	*
1/8/03	Jerry Krane	PAM2103	002-766	2.5	467	1167500	1/9/03	33	12	0.70	1.51E-13	*
1/9/03	Tim O'Brien	PAM2104	002-574	2.5	462	1155000	1/10/03	18	9	0.30	6.55E-14	*
1/9/03	Jerry Krane	PAM2105	006-234	2.5	463	1157500	1/10/03	24	9	0.50	1.09E-13	*
1/10/03	Jerry Krane	PAM2106	002-766	2.5	471	1177500	1/13/03	12	10	0.07	1.43E-14	*
1/10/03	Lindsay Aschim	PAM2107	002-675	2.5	469	1172500	1/13/03	9	10	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 14 January 6 - January 10, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
1/7/03	Jerry Krane	PAM2100	002-675	2.5	467	1167500	1/13/03	9	10	0.00	0.00E+00	0.00%
1/7/03	Lindsay Aschim	PAM2101	002-574	2.5	470	1175000	1/13/03	10	10	0.00	0.00E+00	0.00%
1/8/03	Lindsay Aschim	PAM2102	002-675	2.5	458	1145000	1/13/03	10	10	0.00	0.00E+00	0.00%
1/8/03	Jerry Krane	PAM2103	002-766	2.5	467	1167500	1/13/03	7	10	0.00	0.00E+00	0.00%
1/9/03	Tim O'Brien	PAM2104	002-574	2.5	462	1155000	1/14/03	9	12	0.00	0.00E+00	0.00%
1/9/03	Jerry Krane	PAM2105	006-234	2.5	463	1157500	1/14/03	11	12	0.00	0.00E+00	0.00%
1/10/03	Jerry Krane	PAM2106	002-766	2.5	471	1177500	1/15/03	10	11	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 15 January 13 - January 17, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
1/13/03	Tim O'Brien	PAM2108	002-675	2.5	472	1180000	1/14/03	12	12	0.00	0.00E+00	
1/13/03	Lindsay Aschim	PAM2109	002-766	2.5	470	1175000	1/14/03	9	12	0.00	0.00E+00	
1/14/03	Tim O'Brien	PAM2110	006-234	2.5	477	1192500	1/15/03	14	11	0.10	2.12E-14	*
1/14/03	Lindsay Aschim	PAM2111	002-766	2.5	476	1190000	1/15/03	12	11	0.03	7.07E-15	*
1/15/03	Jerry Krane	PAM2112	002-766	2.5	467	1167500	1/16/03	14	9	0.17	3.60E-14	*
1/15/03	Tim O'Brien	PAM2113	006-234	2.5	477	1192500	1/16/03	9	9	0.00	0.00E+00	
1/16/03	Lindsay Aschim	PAM2114	002-574	2.5	480	1200000	1/17/03	16	12	0.13	2.80E-14	*
1/16/03	Jerry Krane	PAM2115	006-234	2.5	490	1225000	1/17/03	12	12	0.00	0.00E+00	
1/17/03	Tim O'Brien	PAM2116	006-234	2.5	469	1172500	1/20/03	10	10	0.00	0.00E+00	
1/17/03	Jerry Krane	PAM2117	002-766	2.5	473	1182500	1/20/03	10	10	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 15 January 13 - January 17, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
1/14/03	Tim O'Brien	PAM2110	006-234	2.5	477	1192500	1/20/03	10	10	0.00	0.00E+00	0.00%
1/14/03	Lindsay Aschim	PAM2111	002-766	2.5	476	1190000	1/20/03	11	10	0.03	7.07E-15	1.41%
1/15/03	Jerry Krane	PAM2112	006-234	2.5	477	1192500	1/20/03	8	10	0.00	0.00E+00	0.00%
1/16/03	Lindsay Aschim	PAM2114	002-574	2.5	480	1200000	1/21/03	10	12	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 16 January 20 - January 24, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
1/20/03	Lindsay Aschim	PAM2118	006-234	2.5	469	1172500	1/21/03	11	12	0.00	0.00E+00	
1/20/03	Jerry Krane	PAM2119	002-675	2.5	491	1227500	1/21/03	13	12	0.03	6.85E-15	*
1/20/03	Armando Ruiz	PAM2120	002-574	2.5	500	1250000	1/21/03	8	12	0.00	0.00E+00	
1/21/03	Tim O'Brien	PAM2121	002-574	2.5	485	1212500	1/22/03	18	13	0.17	3.47E-14	*
1/21/03	Jerry Krane	PAM2122	006-234	2.5	492	1230000	1/22/03	19	13	0.20	4.10E-14	*
1/22/03	Tim O'Brien	PAM2123	002-574	2.5	515	1287500	1/23/03	28	12	0.53	1.05E-13	*
1/22/03	Lindsay Aschim	PAM2124	006-234	2.5	514	1285000	1/23/03	24	12	0.40	7.86E-14	*
1/22/03	Armando Ruiz	PAM2125	002-675	2.5	495	1237500	1/23/03	19	12	0.23	4.76E-14	*
1/23/03	Tim O'Brien	PAM2126	006-234	2.5	470	1175000	1/24/03	14	11	0.10	2.15E-14	*
1/23/03	Jerry Krane	PAM2127	002-675	2.5	485	1212500	1/24/03	11	11	0.00	0.00E+00	
1/24/03	Glenn Huber	PAM2128	006-234	2.5	384	960000	1/27/03	12	12	0.00	0.00E+00	
1/24/03	Armando Ruiz	PAM2129	002-574	2.5	491	1227500	1/27/03	11	12	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 16 January 20 - January 24, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
1/20/03	Jerry Krane	PAM2119	002-675	2.5	491	1227500	1/24/03	11	11	0.00	0.00E+00	0.00%
1/21/03	Tim O'Brien	PAM2121	002-574	2.5	485	1212500	1/27/03	10	12	0.00	0.00E+00	0.00%
1/21/03	Jerry Krane	PAM2122	006-234	2.5	492	1230000	1/27/03	12	12	0.00	0.00E+00	0.00%
1/22/03	Tim O'Brien	PAM2123	002-574	2.5	515	1287500	1/27/03	14	12	0.07	1.31E-14	2.61%
1/22/03	Lindsay Aschim	PAM2124	006-234	2.5	514	1285000	1/27/03	9	12	0.00	0.00E+00	0.00%
1/22/03	Armando Ruiz	PAM2125	002-675	2.5	495	1237500	1/27/03	11	12	0.00	0.00E+00	0.00%
1/23/03	Tim O'Brien	PAM2126	006-234	2.5	470	1175000	1/28/03	9	10	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 17 January 27 - January 31, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
1/27/03	Jerry Krane	PAM2130	002-574	2.5	484	1210000	1/28/03	17	10	0.23	4.87E-14	*
1/27/03	Lindsay Aschim	PAM2131	002-675	2.5	483	1207500	1/28/30	21	10	0.37	7.66E-14	*
1/27/03	Armando Ruiz	PAM2132	006-234	2.5	482	1205000	1/28/03	16	10	0.20	4.19E-14	*
1/28/03	Lindsay Aschim	PAM2133	006-234	2.5	486	1215000	1/29/03	38	11	0.90	1.87E-13	*
1/28/03	Jerry Krane	PAM2134	002-574	2.5	485	1212500	1/29/03	24	11	0.43	9.02E-14	*
1/29/03	Tim O'Brien	PAM2135	002-574	2.5	470	1175000	1/30/03	13	13	0.00	0.00E+00	
1/29/03	Lindsay Aschim	PAM2136	002-675	2.5	160	400000	1/30/03	12	13	0.00	0.00E+00	
1/29/03	Armando Ruiz	PAM2137	002-766	2.5	480	1200000	1/30/03	9	13	0.00	0.00E+00	
1/30/03	Jerry Krane	PAM2138	006-234	2.5	467	1167500	1/31/03	14	12	0.07	1.44E-14	*
1/30/03	Armando Ruiz	PAM2139	002-574	2.5	497	1242500	1/31/03	12	12	0.00	0.00E+00	
1/31/03	Lindsay Aschim	PAM2140	002-766	2.5	467	1167500	2/3/03	10	11	0.00	0.00E+00	
1/31/03	Jerry Krane	PAM2141	002-574	2.5	492	1230000	2/3/03	10	11	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 17 January 27 - January 31, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
1/27/03	Jerry Krane	PAM2130	002-574	2.5	484	1210000	1/31/03	10	12	0.00	0.00E+00	0.00%
1/27/03	Lindsay Aschim	PAM2131	002-675	2.5	483	1207500	1/31/03	13	12	0.03	6.97E-15	1.39%
1/27/03	Armando Ruiz	PAM2132	006-234	2.5	482	1205000	1/31/03	12	12	0.00	0.00E+00	0.00%
1/28/03	Lindsay Aschim	PAM2133	006-234	2.5	486	1215000	2/3/03	9	11	0.00	0.00E+00	0.00%
1/28/03	Jerry Krane	PAM2134	002-574	2.5	485	1212500	2/3/03	11	11	0.00	0.00E+00	0.00%
1/30/03	Jerry Krane	PAM2138	006-234	2.5	467	1167500	2/4/03	10	10	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 18 February 3 - February 7, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
2/3/03	Tim O'Brien	PAM2142	002-675	2.5	474	1185000	2/4/03	16	10	0.20	4.26E-14	*
2/3/03	Lindsay Aschim	PAM2143	002-766	2.5	483	1207500	2/4/03	14	10	0.13	2.79E-14	*
2/4/03	Lindsay Aschim	PAM2144	002-675	2.5	345	862500	2/5/03	12	13	0.00	0.00E+00	
2/4/03	Jerry Krane	PAM2145	002-574	2.5	492	1230000	2/5/03	13	13	0.00	0.00E+00	
2/5/03	Jerry Krane	PAM2146	002-574	2.5	456	1140000	2/6/03	17	11	0.20	4.43E-14	*
2/5/03	Lindsay Aschim	PAM2147	002-766	2.5	455	1137500	2/6/03	14	11	0.10	2.22E-14	*
2/6/03	Tim O'Brien	PAM2148	002-766	2.5	449	1122500	2/7/03	13	13	0.00	0.00E+00	
2/6/03	Jerry Krane	PAM2149	006-234	2.5	475	1187500	2/7/03	16	13	0.10	2.13E-14	*
2/7/03	Lindsay Aschim	PAM2150	002-766	2.5	478	1195000	2/10/03	13	12	0.03	7.04E-15	*
2/7/03	Jerry Krane	PAM2151	002-675	2.5	473	1182500	2/10/03	11	12	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 18 February 3 - February 7, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
2/3/03	Tim O'Brien	PAM2142	002-675	2.5	474	1185000	2/7/03	11	13	0.00	0.00E+00	0.00%
2/3/03	Lindsay Aschim	PAM2143	002-766	2.5	483	1207500	2/7/03	13	13	0.00	0.00E+00	0.00%
2/5/03	Jerry Krane	PAM2146	002-574	2.5	456	1140000	2/10/03	10	12	0.00	0.00E+00	0.00%
2/5/03	Lindsay Aschim	PAM2147	002-766	2.5	455	1137500	2/10/03	9	12	0.00	0.00E+00	0.00%
2/6/03	Jerry Krane	PAM2149	006-234	2.5	475	1187500	2/11/03	11	10	0.03	7.08E-15	1.42%
2/7/03	Lindsay Aschim	PAM2150	002-766	2.5	478	1195000	2/12/03	10	10	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 19 February 10 - February 14, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
2/10/03	Tim O'Brien	PAM2152	006-234	2.5	475	1187500	2/11/03	21	10	0.37	7.79E-14	*
2/10/03	Lindsay Aschim	PAM2153	002-766	2.5	502	1255000	2/11/03	17	10	0.23	4.69E-14	*
2/11/03	Lindsay Aschim	PAM2154	006-234	2.5	429	1072500	2/12/03	26	10	0.53	1.25E-13	*
2/11/03	Jerry Krane	PAM2155	002-766	2.5	456	1140000	2/12/03	35	10	0.83	1.84E-13	*
2/12/03	Lindsay Aschim	PAM2156	006-234	2.5	478	1195000	2/13/03	21	11	0.33	7.04E-14	*
2/12/03	Tim O'Brien	PAM2157	002-766	2.5	460	1150000	2/13/03	19	11	0.27	5.85E-14	*
2/13/03	Jerry Krane	PAM2158	006-234	2.5	491	1227500	2/14/03	19	12	0.23	4.80E-14	*
2/13/03	Lindsay Aschim	PAM2159	002-766	2.5	480	1200000	2/14/03	24	12	0.40	8.41E-14	*
2/14/03	Jerry Krane	PAM2160	002-766	2.5	149	372500	2/17/03	9	13	0.00	0.00E+00	
2/14/03	Tim O'Brien	PAM2161	006-234	2.5	151	377500	2/17/03	12	13	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 19 February 10 - February 14, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
2/10/03	Tim O'Brien	PAM2152	006-234	2.5	475	1187500	2/14/03	11	12	0.00	0.00E+00	0.00%
2/10/03	Lindsay Aschim	PAM2153	002-766	2.5	502	1255000	2/14/03	12	12	0.00	0.00E+00	0.00%
2/11/03	Lindsay Aschim	PAM2154	006-234	2.5	429	1072500	2/17/03	13	13	0.00	0.00E+00	0.00%
2/11/03	Jerry Krane	PAM2155	002-766	2.5	456	1140000	2/17/03	11	13	0.00	0.00E+00	0.00%
2/12/03	Lindsay Aschim	PAM2156	006-234	2.5	478	1195000	2/17/03	9	13	0.00	0.00E+00	0.00%
2/12/03	Tim O'Brien	PAM2157	002-766	2.5	460	1150000	2/17/03	12	13	0.00	0.00E+00	0.00%
2/13/03	Jerry Krane	PAM2158	006-234	2.5	491	1227500	2/18/03	10	11	0.00	0.00E+00	0.00%
2/13/03	Lindsay Aschim	PAM2159	002-766	2.5	480	1200000	2/18/03	10	11	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 20 February 17 - February 21, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)
2/17/03	Tim O'Brien	PAM2162	006-234	2.5	453	1132500	2/18/03	18	11	0.23	5.20E-14 *
2/17/03	Jerry Krane	PAM2163	002-766	2.5	473	1182500	2/18/03	11	11	0.00	0.00E+00
2/18/03	Lindsay Aschim	PAM2164	002-766	2.5	490	1225000	2/19/03	10	10	0.00	0.00E+00
2/18/03	Tim O'Brien	PAM2165	006-234	2.5	492	1230000	2/19/03	9	10	0.00	0.00E+00
2/19/03	Jerry Krane	PAM2166	006-234	2.5	484	1210000	2/20/03	8	11	0.00	0.00E+00
2/19/03	Lindsay Aschim	PAM2167	002-766	2.5	365	912500	2/20/03	11	11	0.00	0.00E+00
2/20/03	Jerry Krane	PAM2168	006-234	2.5	482	1205000	2/21/03	11	11	0.00	0.00E+00
2/20/03	Tim O'Brien	PAM2169	002-766	2.5	481	1202500	2/21/03	9	11	0.00	0.00E+00
2/21/03	Lindsay Aschim	PAM2170	002-766	2.5	375	937500	2/24/03	9	10	0.00	0.00E+00
2/21/03	Jerry Krane	PAM2171	006-234	2.5	463	1157500	2/24/03	10	10	0.00	0.00E+00

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 20 February 17 - February 21, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
2/17/03	Tim O'Brien	PAM2162	006-234	2.5	453	1132500	2/21/03	8	11	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 21 February 24 - February 28, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	
2/24/03	Lindsay Aschim	PAM2172	006-234	2.5	349	872500	2/25/03	9	12	0.00	0.00E+00	
2/24/03	Jerry Krane	PAM2173	002-766	2.5	501	1252500	2/25/03	11	12	0.00	0.00E+00	
2/25/03	Jerry Krane	PAM2174	002-574	2.5	471	1177500	2/26/03	10	11	0.00	0.00E+00	
2/25/03	Tim O'Brien	PAM2175	002-766	2.5	474	1185000	2/26/03	14	11	0.10	2.13E-14	*
2/26/03	Lindsay Aschim	PAM2176	002-766	2.5	473	1182500	2/27/03	17	9	0.27	5.69E-14	*
2/26/03	Tim O'Brien	PAM2177	006-234	2.5	283	707500	2/27/03	19	9	0.33	1.19E-13	*
2/27/03	Tim O'Brien	PAM2178	002-574	2.5	479	1197500	2/28/03	13	13	0.00	0.00E+00	
2/27/03	Jerry Krane	PAM2179	006-234	2.5	477	1192500	2/28/03	10	13	0.00	0.00E+00	
2/28/03	Lindsay Aschim	PAM2180	002-766	2.5	495	1237500	3/3/03	11	12	0.00	0.00E+00	
2/28/03	Jerry Krane	PAM2181	006-234	2.5	492	1230000	3/3/03	10	12	0.00	0.00E+00	

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 21 February 24 - February 28, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
2/25/03	Tim O'Brien	PAM2175	002-766	2.5	474	1185000	3/3/03	11	12	0.00	0.00E+00	0.00%
2/26/03	Lindsay Aschim	PAM2176	002-766	2.5	473	1182500	3/3/03	9	12	0.00	0.00E+00	0.00%
2/26/03	Tim O'Brien	PAM2177	006-234	2.5	283	707500	3/3/03	12	12	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

Personal Air Monitoring Summary Sheet (PAM's -Daily Analysis)

Week 22 March 3 - March 7, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

*** All PAM's with elevated counts on day after analysis are recounted after 4 days (see attached)

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)
3/3/03	Lindsay Aschim	PAM2182	006-234	2.5	511	1277500	3/4/03	10	12	0.00	0.00E+00
3/3/03	Tim O'Brien	PAM2183	002-766	2.5	511	1277500	3/4/03	12	12	0.00	0.00E+00
3/4/03	Odell Morgan	PAM2184	002-574	2.5	195	487500	3/6/03	10	11	0.00	0.00E+00
3/4/03	Lindsay Aschim	PAM2185	006-234	2.5	178	445000	3/6/03	11	11	0.00	0.00E+00
3/4/03	Jerry Krane	PAM2186	002-766	2.5	473	1182500	3/6/03	14	11	0.10	2.13E-14 *
No Work on 3/5/03 - Snow Day											
3/6/03	Tim O'Brien	PAM2187	002-574	2.5	507	1267500	3/7/03	16	10	0.20	3.98E-14 *
3/6/03	Jerry Krane	PAM2188	002-766	2.5	498	1245000	3/7/03	17	10	0.23	4.73E-14 *
3/7/03	Jerry Krane	PAM2189	002-766	2.5	495	1237500	3/10/03	12	13	0.00	0.00E+00
3/7/03	Lindsay Aschim	PAM2190	002-574	2.5	495	1237500	3/10/03	16	13	0.10	2.04E-14 *

Note: Official airborne Th-232 concentrations are obtained from 4 Day Analysis.
See attached 4 Day Analysis Form for Occupational Dose Limit Information.

Personal Air Monitoring Summary Sheet (PAM's -4 Day Analysis)

Week 22 March 3 - March 7, 2003

Lakeshore East Project - 221 North Columbus Drive, Chicago, IL

***Note: All samples on this page were analyzed after 4 days to allow for thorium daughter decay

Date Collected	Name	Sample ID	PAM #	Flow Rate (lpm)	Total Time Sampled	Total Sample Volume (ml)	Analysis Date	Gross Counts (30 min)	Bkg Counts (30 min)	Net CPM	Sample Concentration (uCi/ml)	% of DAC
3/4/03	Jerry Krane	PAM2186	002-766	2.5	473	1182500	3/10/03	10	13	0.00	0.00E+00	0.00%
3/6/03	Tim O'Brien	PAM2187	002-574	2.5	507	1267500	3/11/03	11	12	0.00	0.00E+00	0.00%
3/6/03	Jerry Krane	PAM2188	002-766	2.5	498	1245000	3/11/03	11	12	0.00	0.00E+00	0.00%
3/7/03	Lindsay Aschim	PAM2190	002-766	2.5	495	1237500	3/12/03	11	12	0.00	0.00E+00	0.00%

Occupational Dose Limit for Occupational Radiation Exposure = 5 rem Total Effective Dose Equivalent

2000 DAC-Hours = 5 rem

DAC (Derived Air Concentration) for Th-232 = 5E-13uCi/ml

Administrative Site Limit for Occupational Exposure = 30% Th-232 DAC = 1.5E-13 uCi/ml

APPENDIX K

Field Gamma Survey Results

Gamma Survey Summary for Site Grubbing
Lakeshore East LLC.

Grid ID	Maximum Value[1] (counts/min)	Comments
1	6,500	
2	7,600	
3	6,700	
4	6,500	
5	5,900	
6		See Note 2
7	9,100	
8	8,100	
9	10,100	
10	12,100	
11	8,800	
12	9,500	
13	10,300	
14		See Note 2
15	6,400	
16 and 17		See Note 3
18	8,300	
19	9,700	
20	10,300	
21	9,400	
22	10,200	
23		See Note 2
24	7,800	
25 and 26		See Note 3
27	8,500	
28	10,800	
29	9,300	
30	10,600	
31	8,100	
32		See Note 2
33	8,500	
34 through 40		See Note 3

Notes:

1 - The action level is meter specific, but ranged from 20,352 to 22,523 cpm.

2 - Grid is located outside of the current property boundary.

3 - Remediation of known contamination or lift survey completed prior to grubbing.

STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

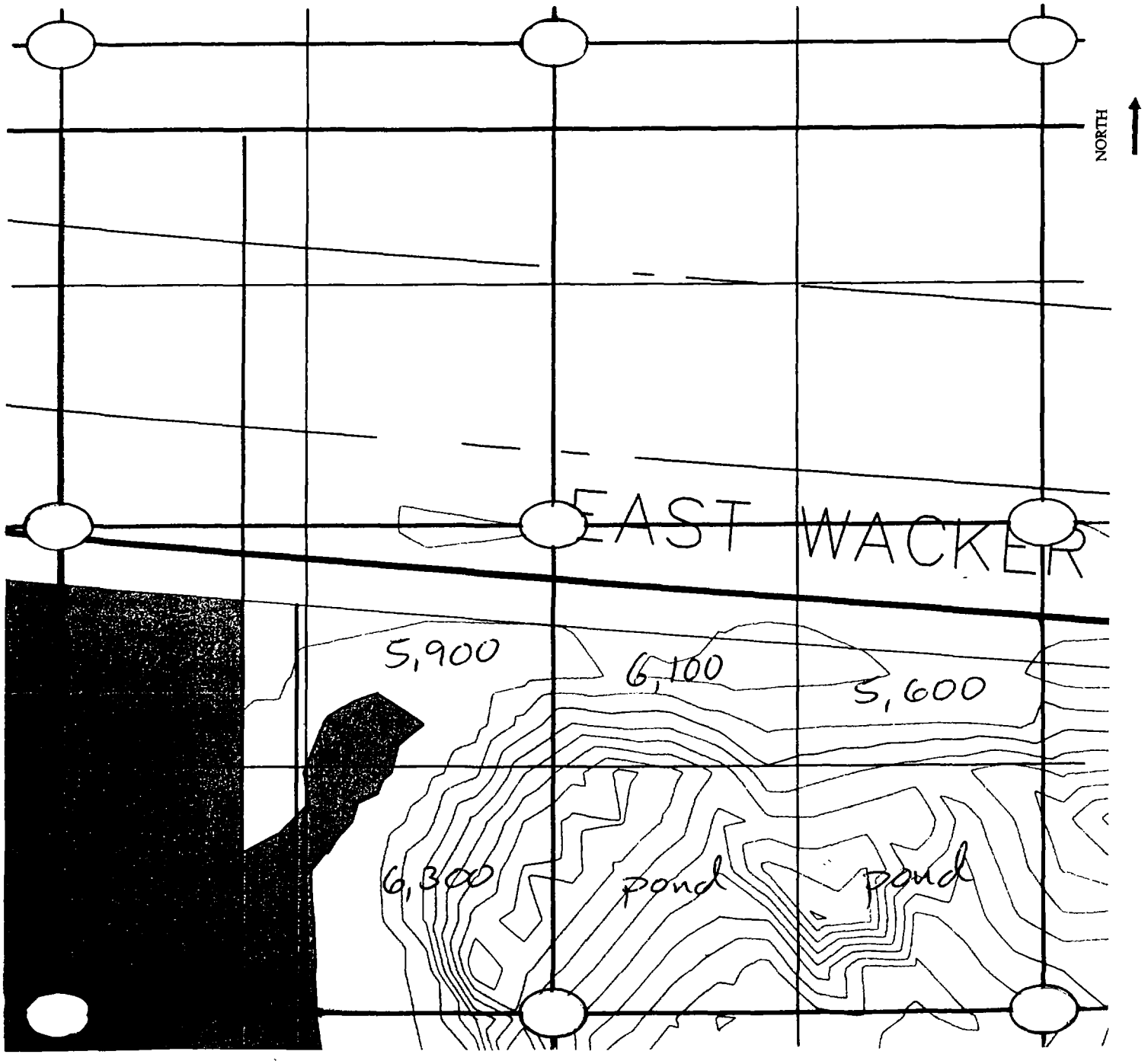
Project # _____ Project Name Lakeshore East Sheet Grubbing of _____

Date 12/23/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 1

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

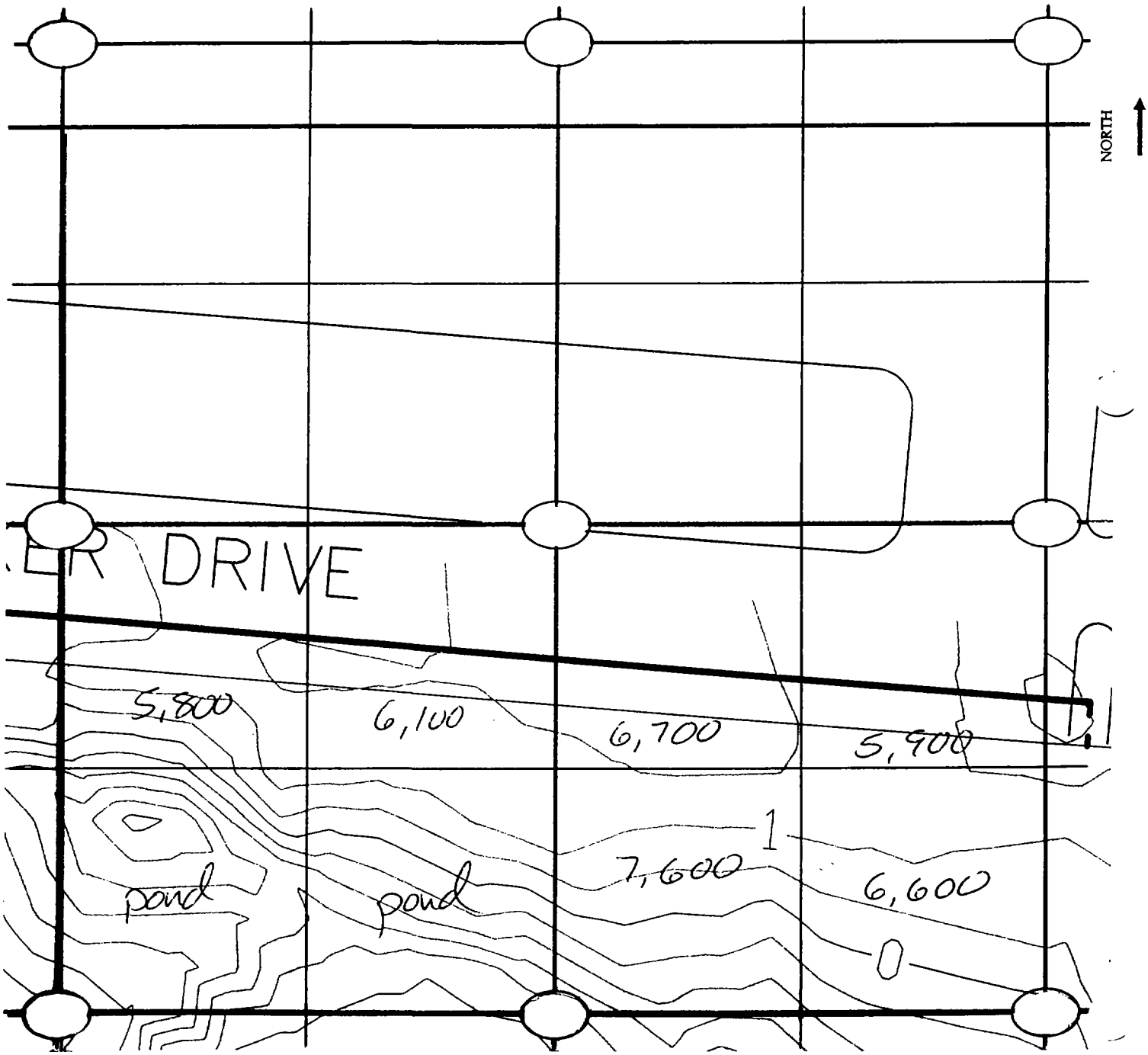
Project # _____ Project Name Lakeshore East Sheet Grubbing of _____

Date 12/23/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 2

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

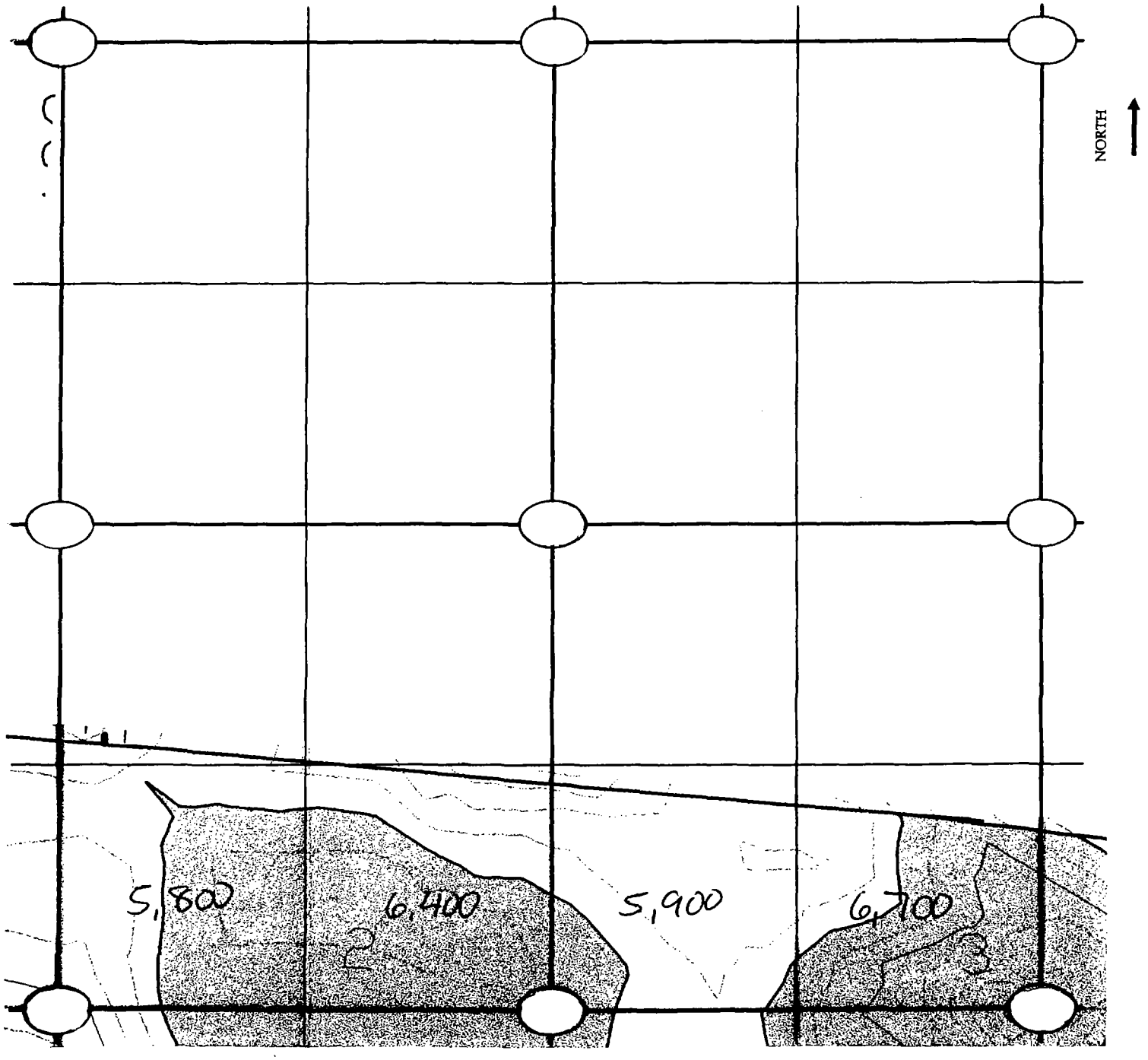
Project # _____ Project Name Lakeshore East Sheet Grubbing of ____

Date 12/23/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 3

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

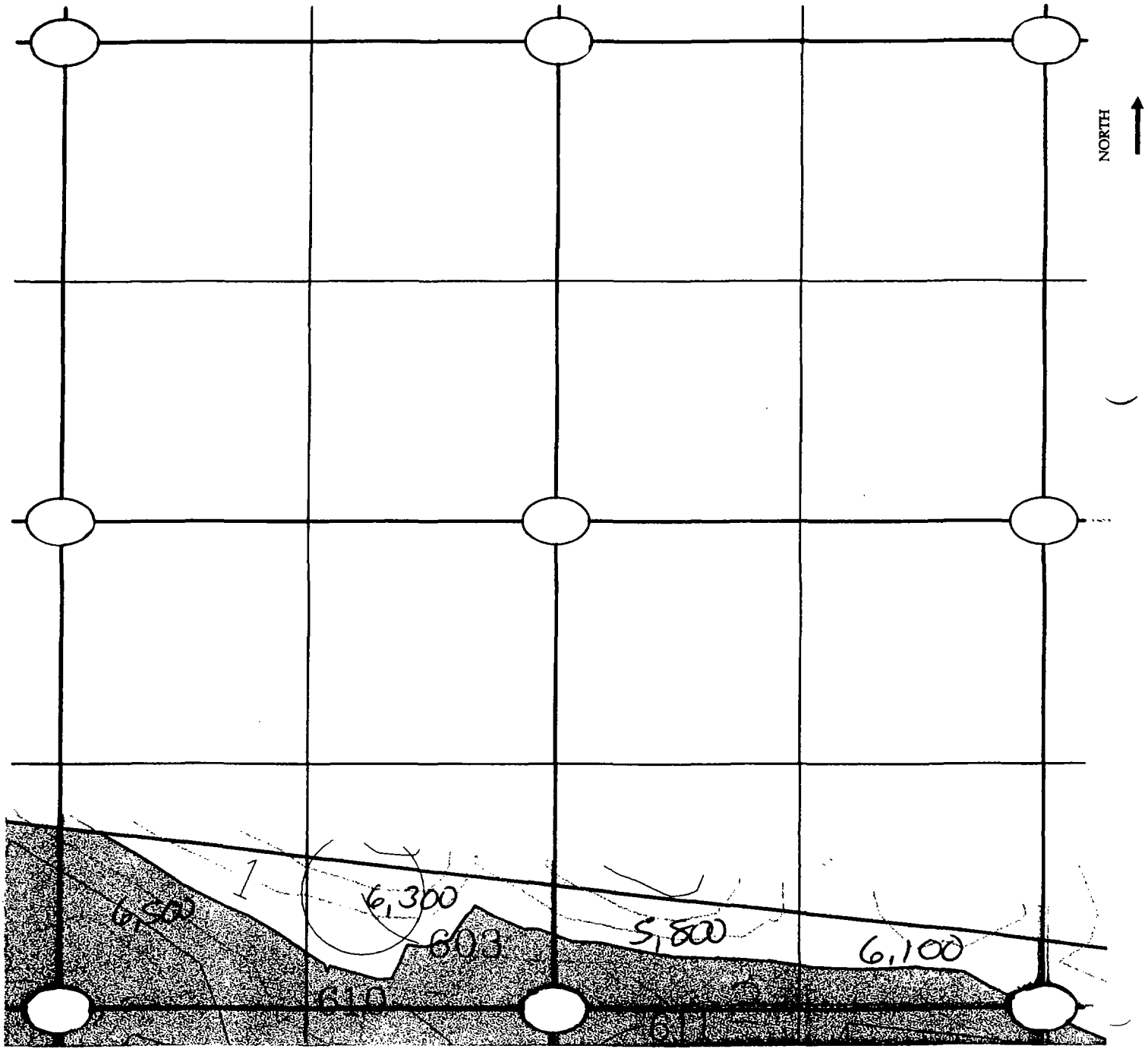
Project # _____ Project Name Lakeshore East Sheet Grubbing of _____

Date 12/23/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 131542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 4

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

Project # _____ Project Name Lakeshore East Sheet _____ of _____

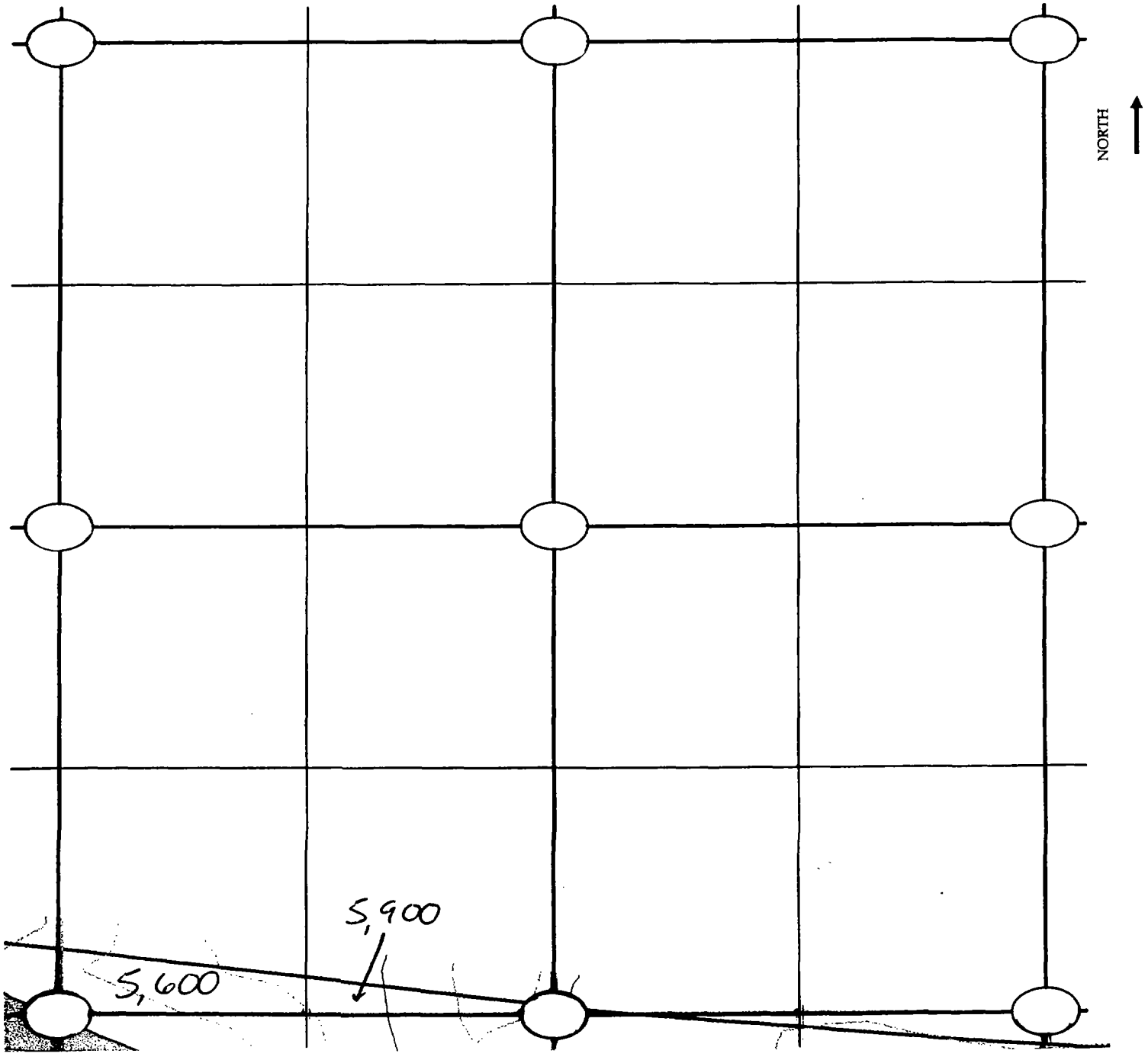
Grubbing

Date 12/23/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 5

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

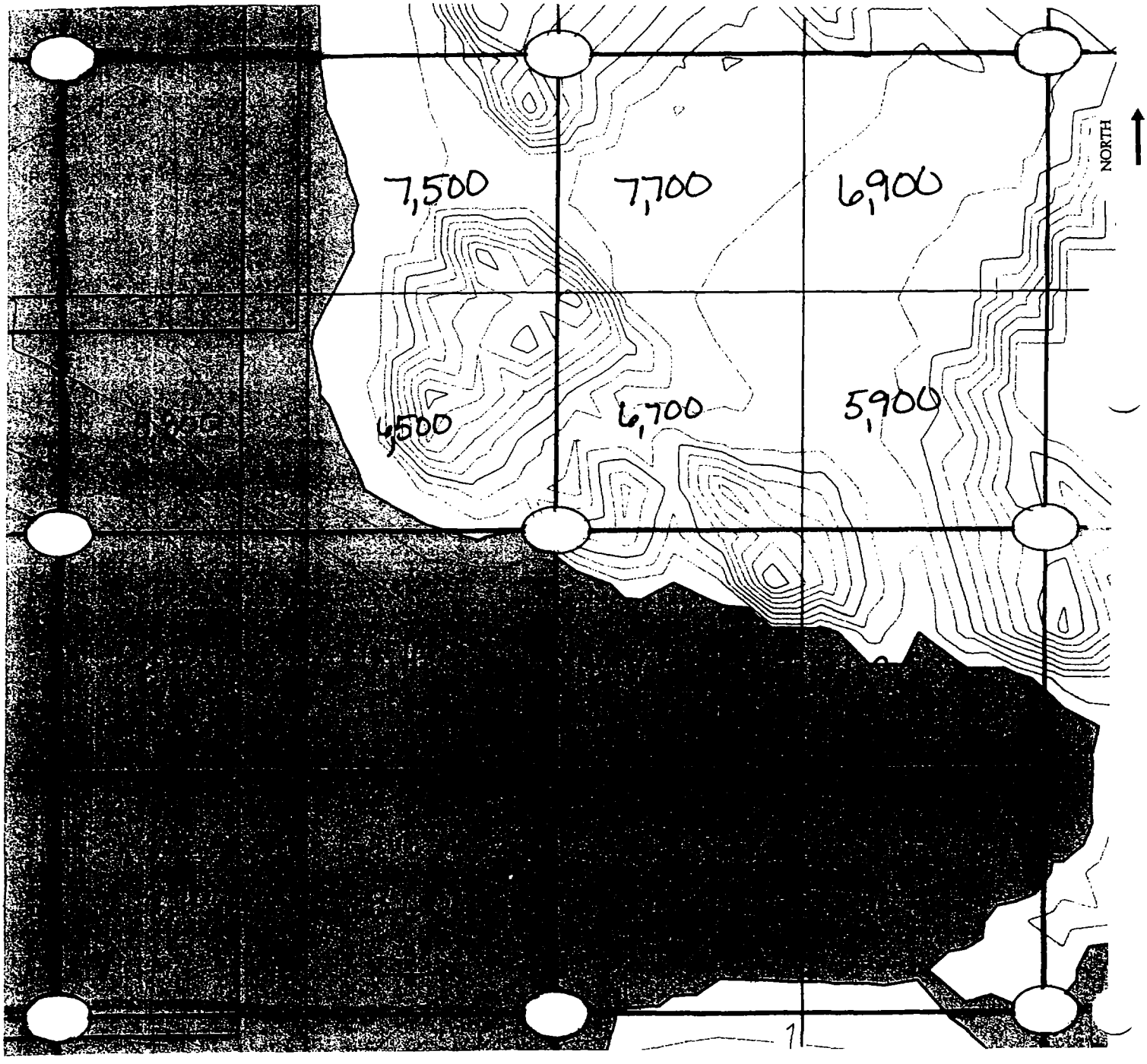
Project # _____ Project Name Lakeshore East Sheet Grubbing of ____

Date 12/24/2002 Technician L. Aschim

Inst. Model Ludlum 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 7

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

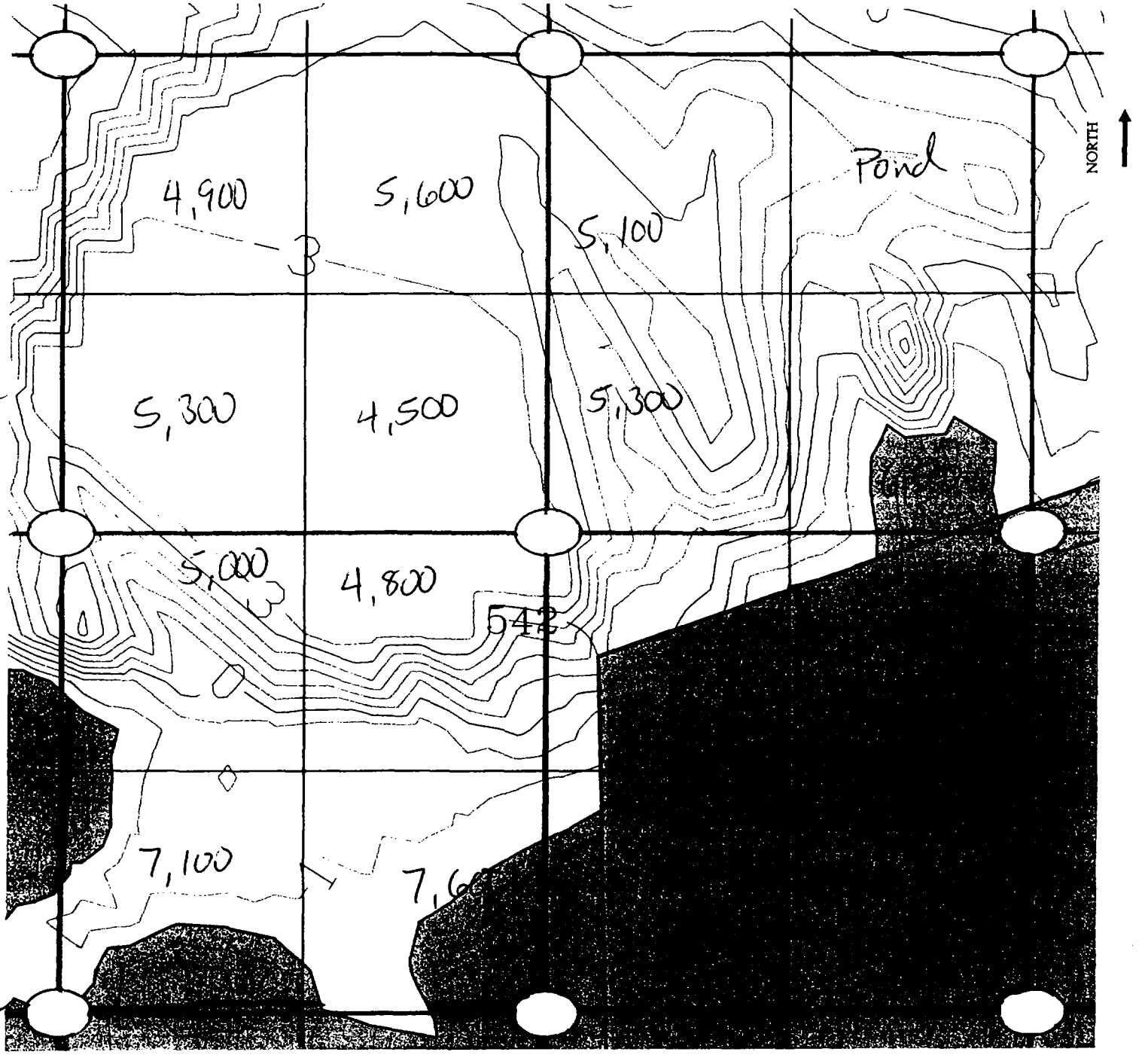
Project # _____ Project Name Lakeshore East Sheet Combbing of _____

Date 12/23/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 8

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

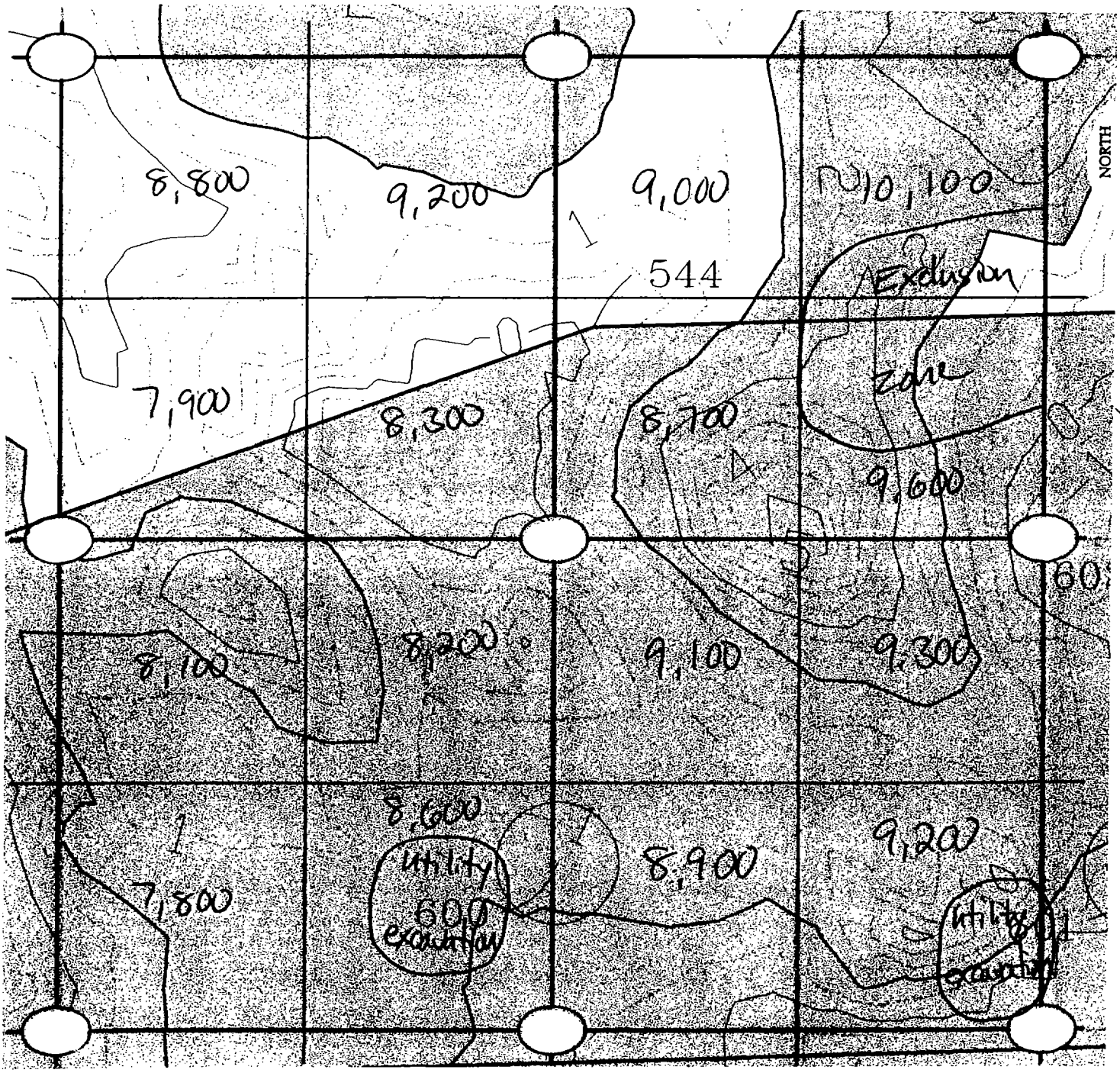
Project # _____ Project Name Lakeshore East Sheet Grubbing of _____

Date 12/23/02 Technician Jerry Krave

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 9

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

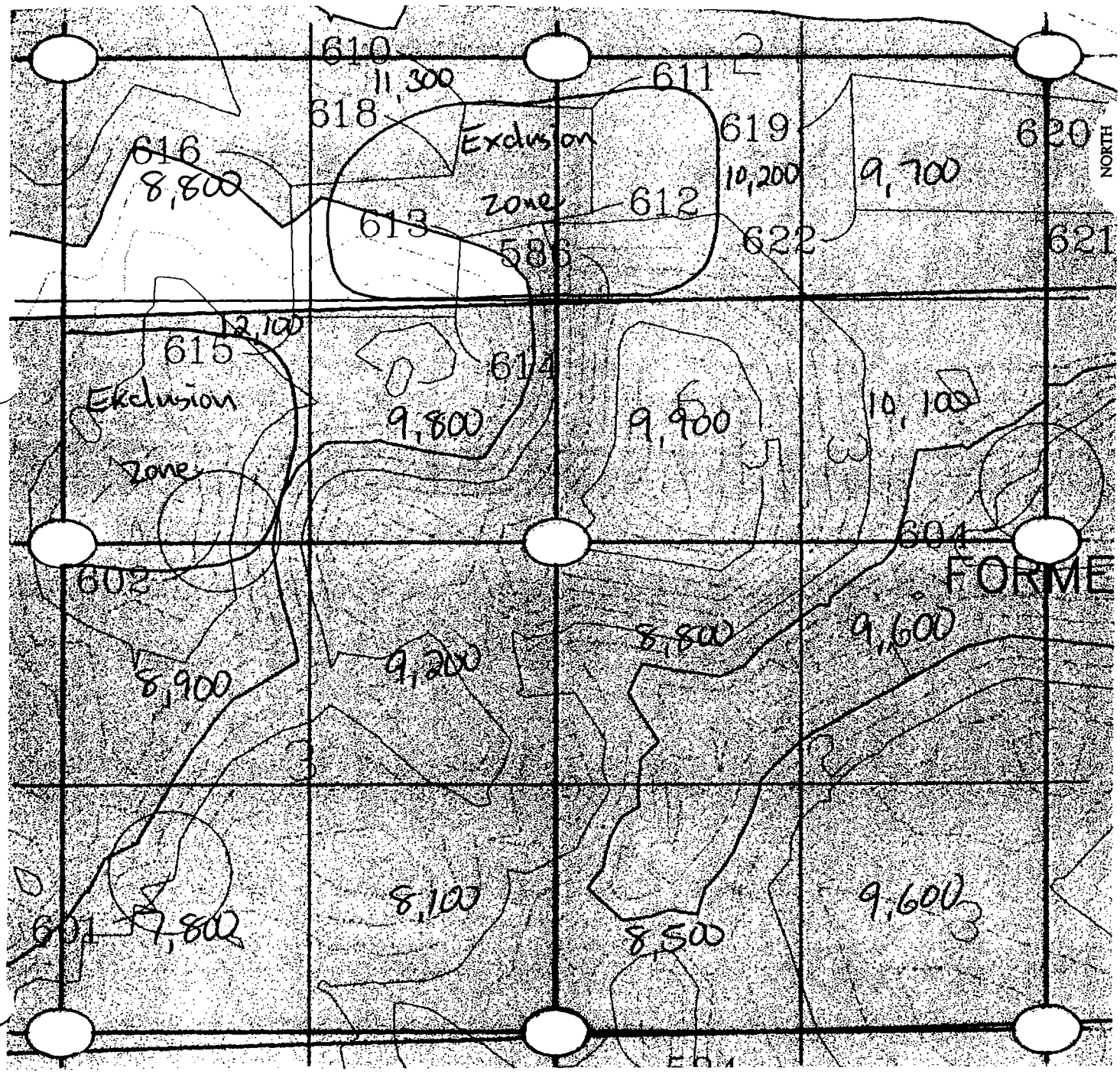
Project # _____ Project Name Lakeshore East Sheet (Grubbly) of ____

Date 12/23/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 10

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

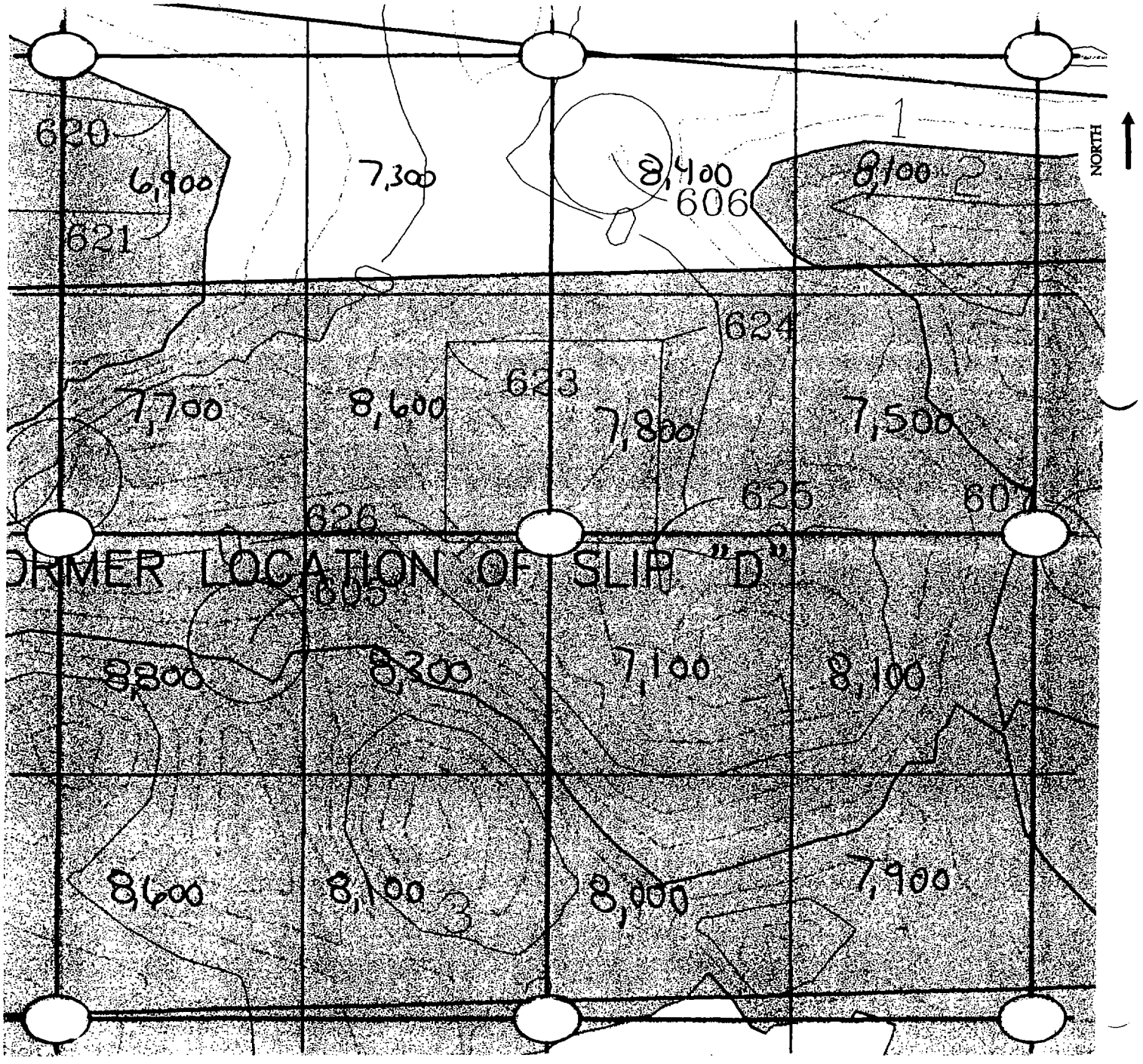
Project # 32193 - xc Project Name Lakeshore East Sheet Grubbing of ____

Date 12/19/02 12/20/02 Technician J. Kraus

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 11

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

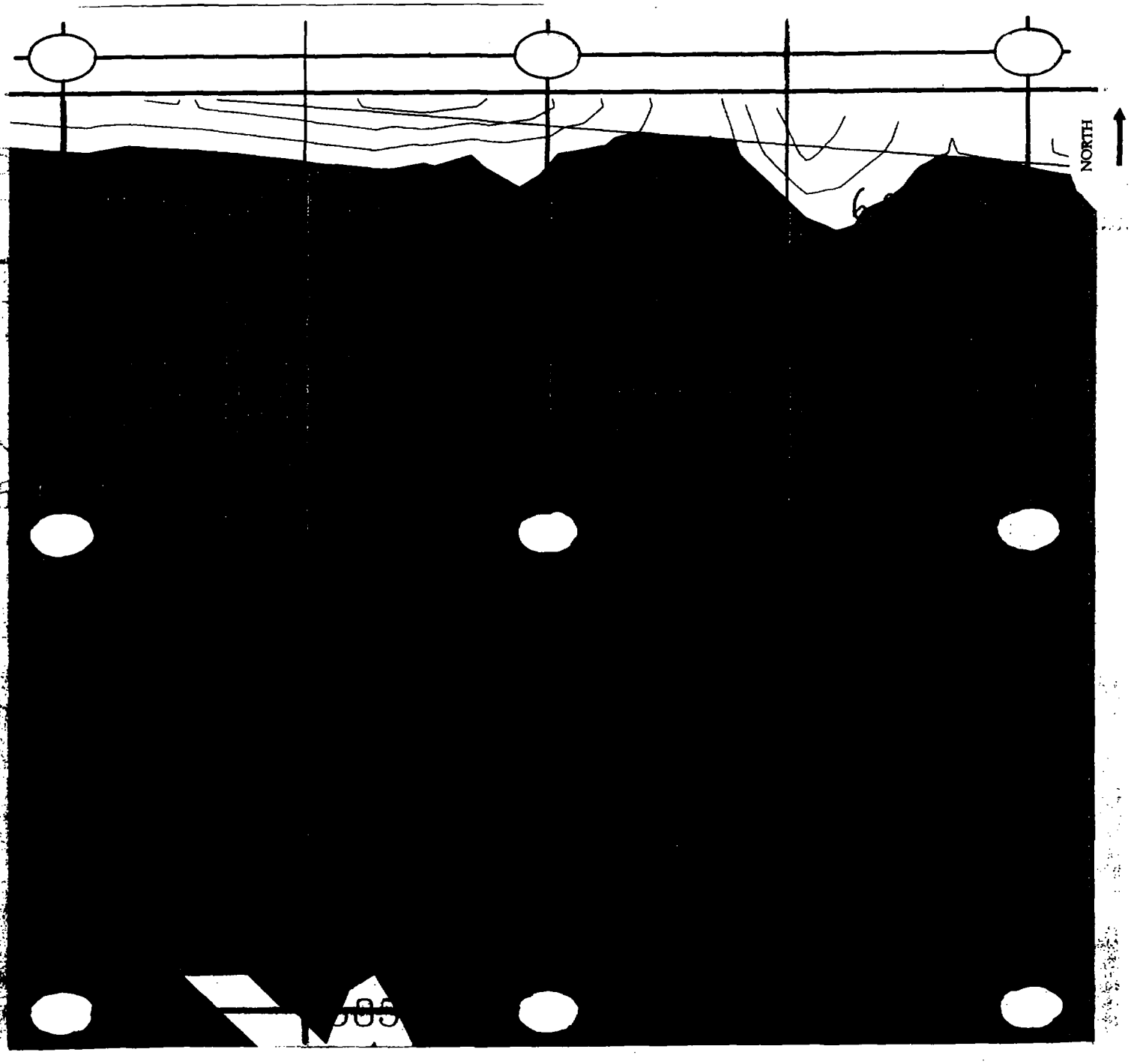
Project # 132193xc Project Name Lakeshore East Sheet Grubbing of

Date 12/19/02 Technician Jerry Kraus

Inst. Model 2221 Serial No. 127242

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 12

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

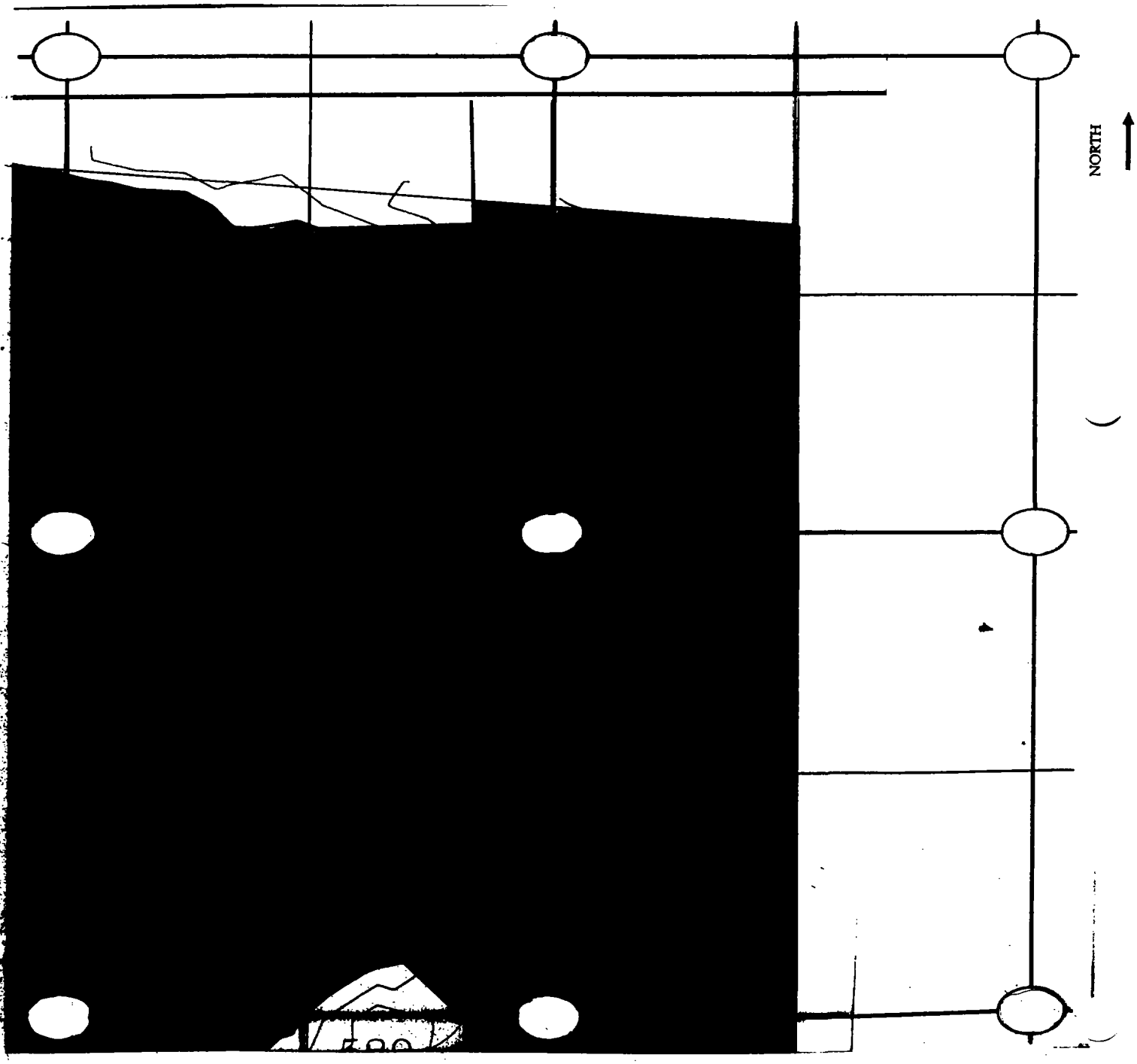
Project # 132193xc Project Name Lakeshore East Sheet Grubbing of

Date 12/19/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 127242

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 13

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM ~~GRADING~~ Grubbing

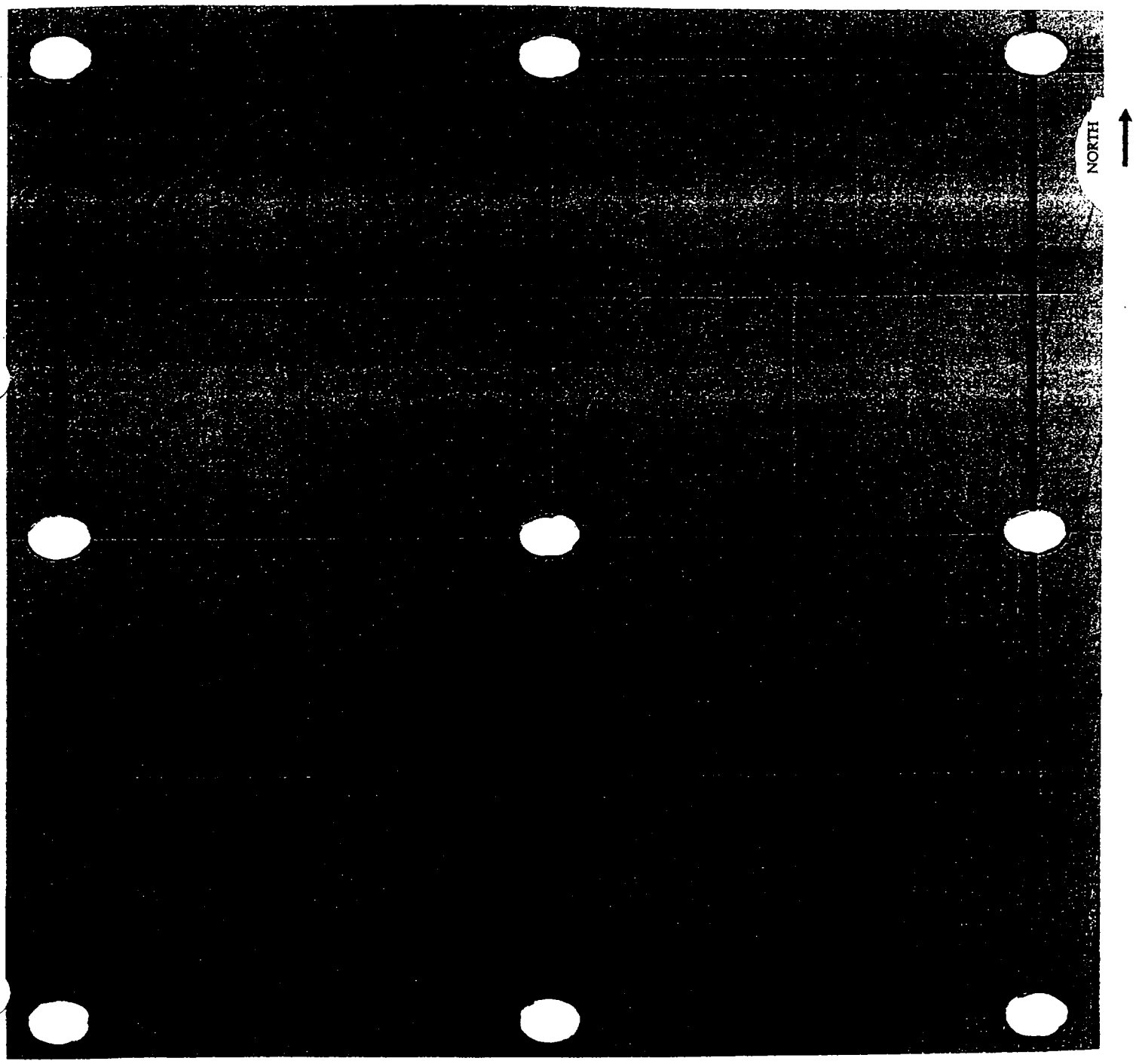
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 2/21/03 Technician J. Krane

Inst. Model 2221 Serial No. meter # 132844 probe # 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 15 Grubbing

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

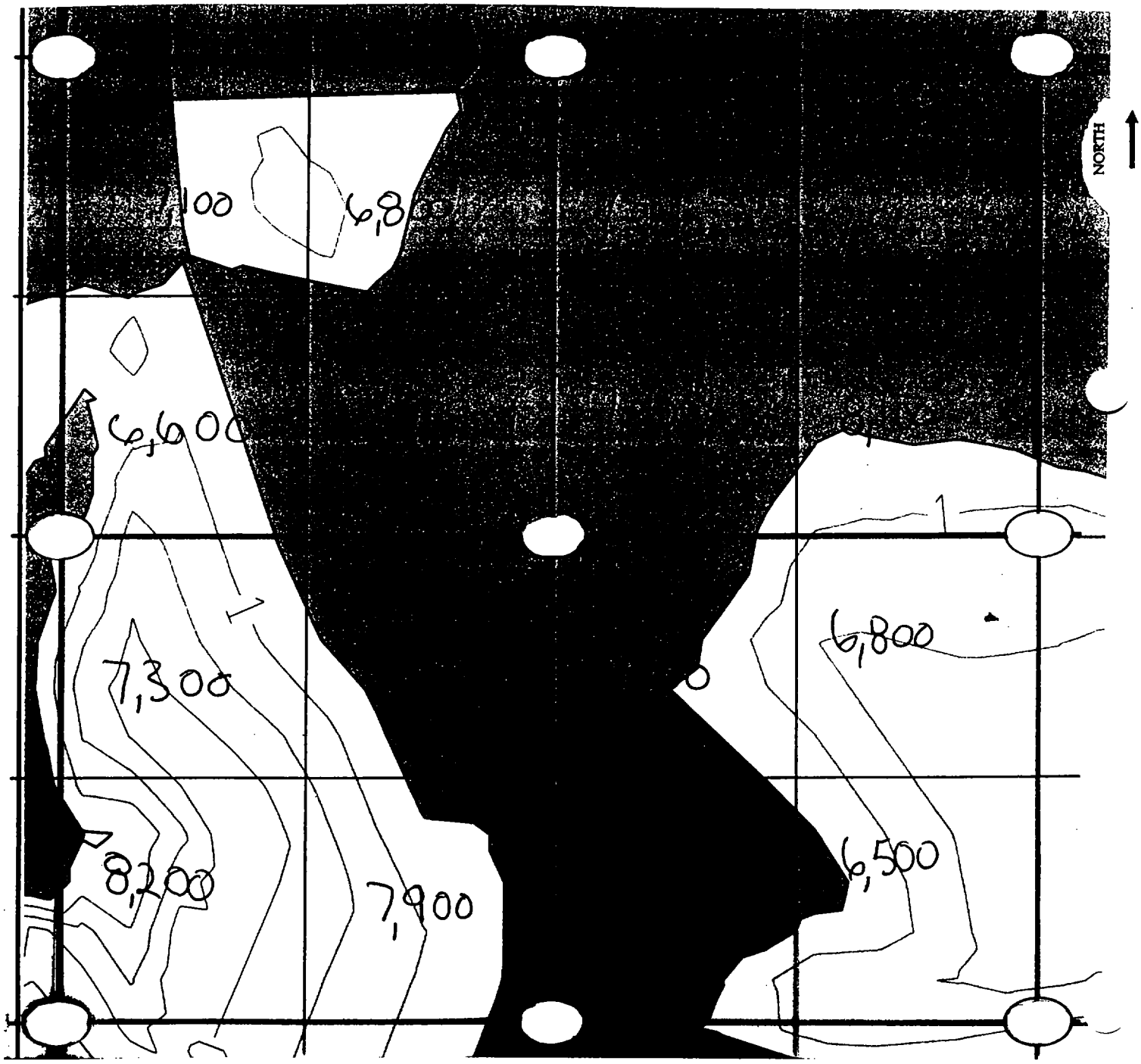
Project # 32193-XC Project Name Lakeshore East Sheet Combining of

Date 12/19/02 12/20/02 Technician J. Krane

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 18

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

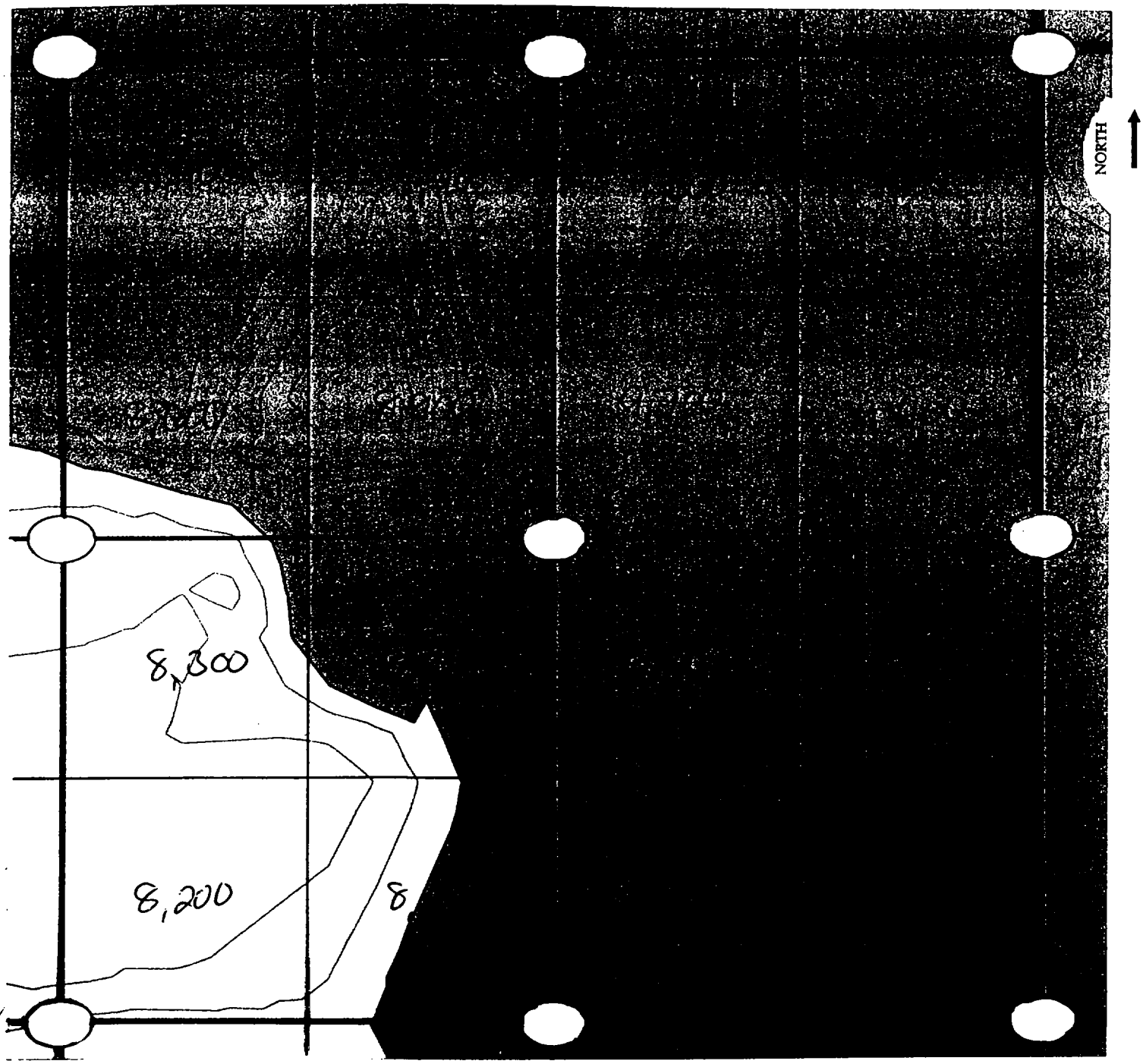
Project # _____ Project Name Lakeshore East Sheet Grubbing of _____

Date 12/23/02 Technician Jerry Krane

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 19

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

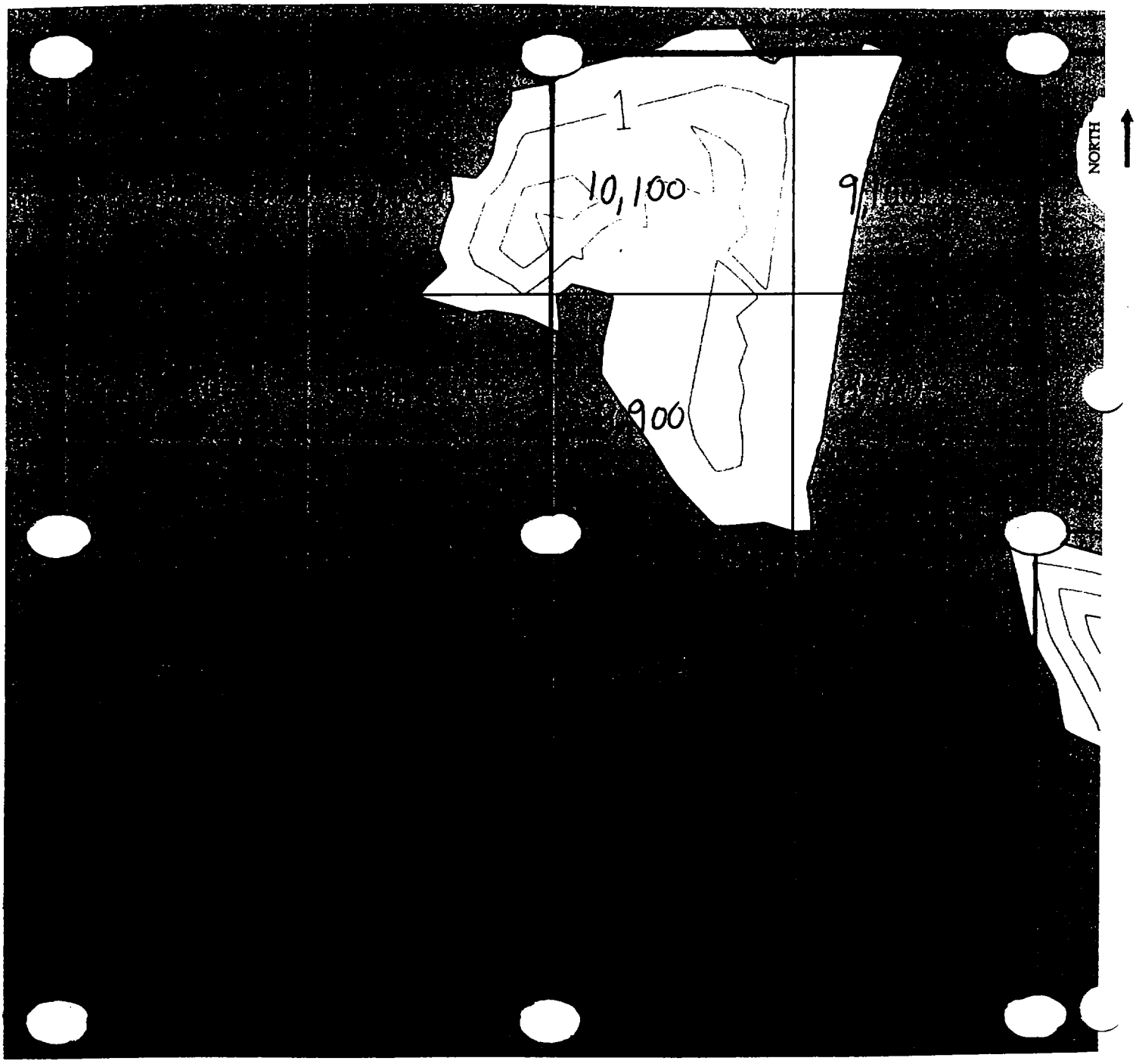
Project # 32193-XC Project Name Lakeshore East Sheet Grubbing of

Date 12/19/02 12/20/02 Technician J. Kraus

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 20

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

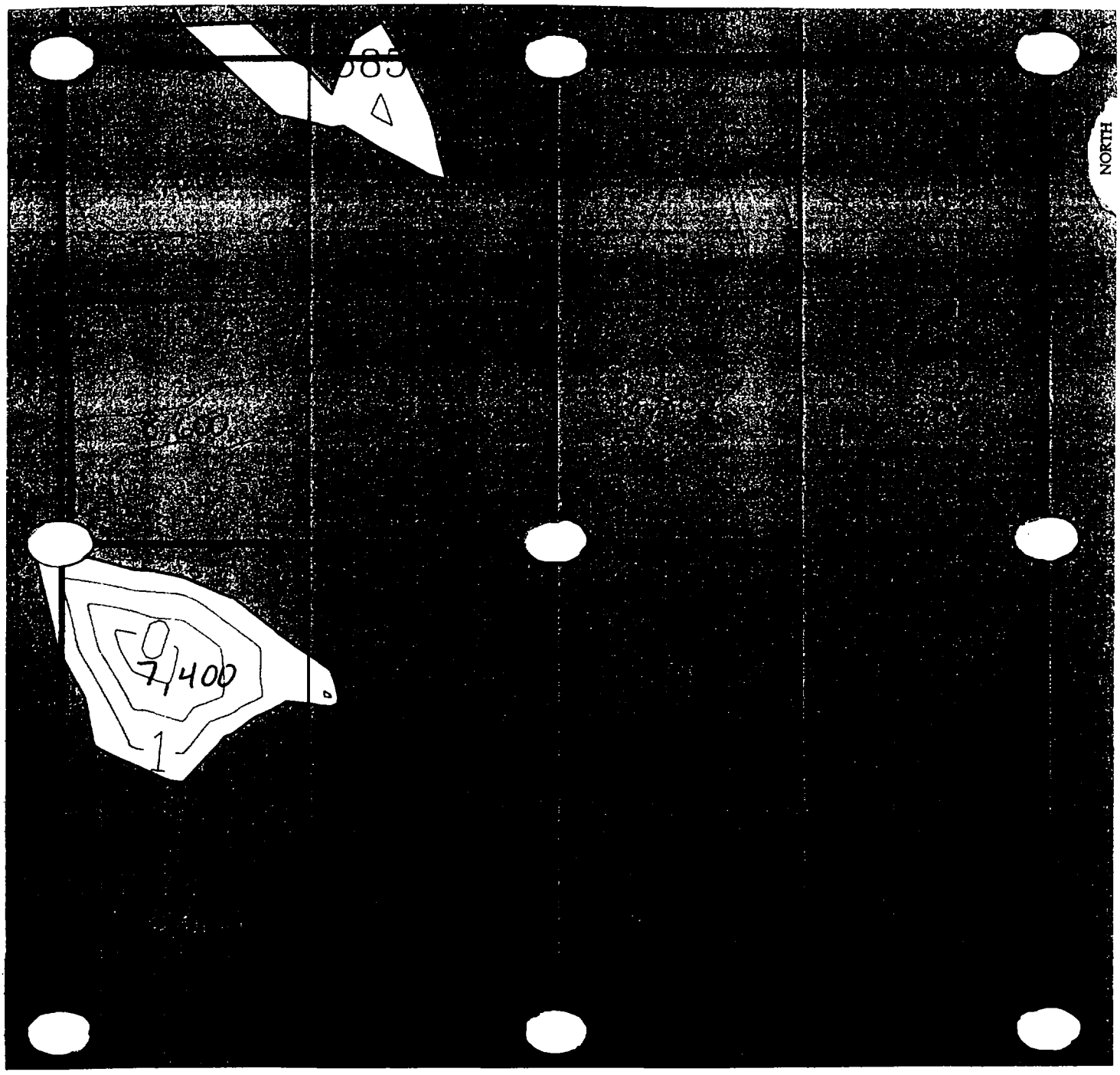
Project # _____ Project Name Lakeshore East Sheet Grubbing of _____

Date 12/19/02 Technician Jerry Krane

Inst. Model 2221 Serial No. 127242

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z1

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

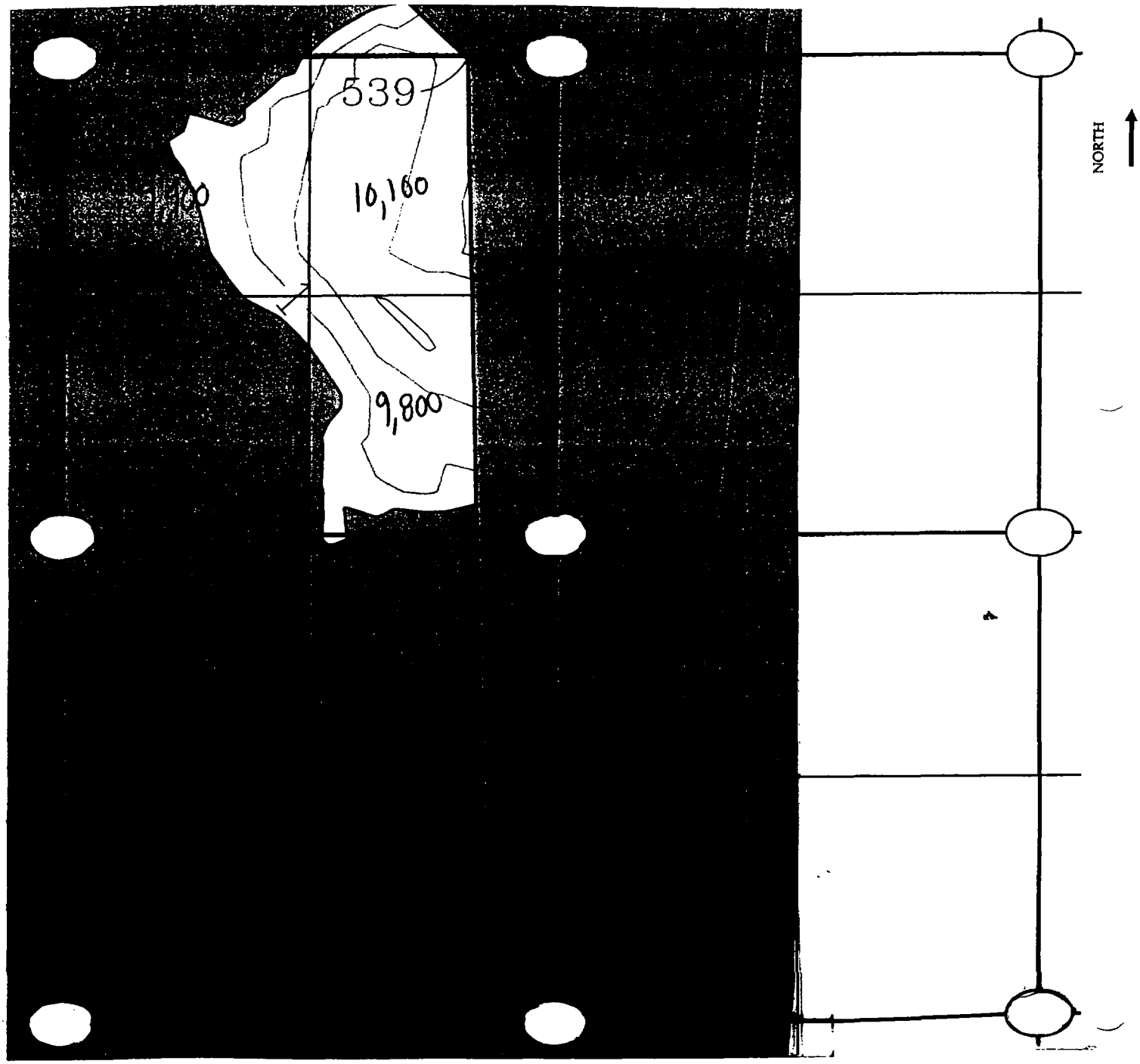
Project # 132193xc Project Name Lakeshore East Sheet Grubbing of

Date 12/19/02 Technician Jerry Krause

Inst. Model 2221 Serial No. 127242

Inst. Calibrated (Y/N)? yes Location ID/Lift Elevation 22

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – ~~GRADING~~ Grubbing

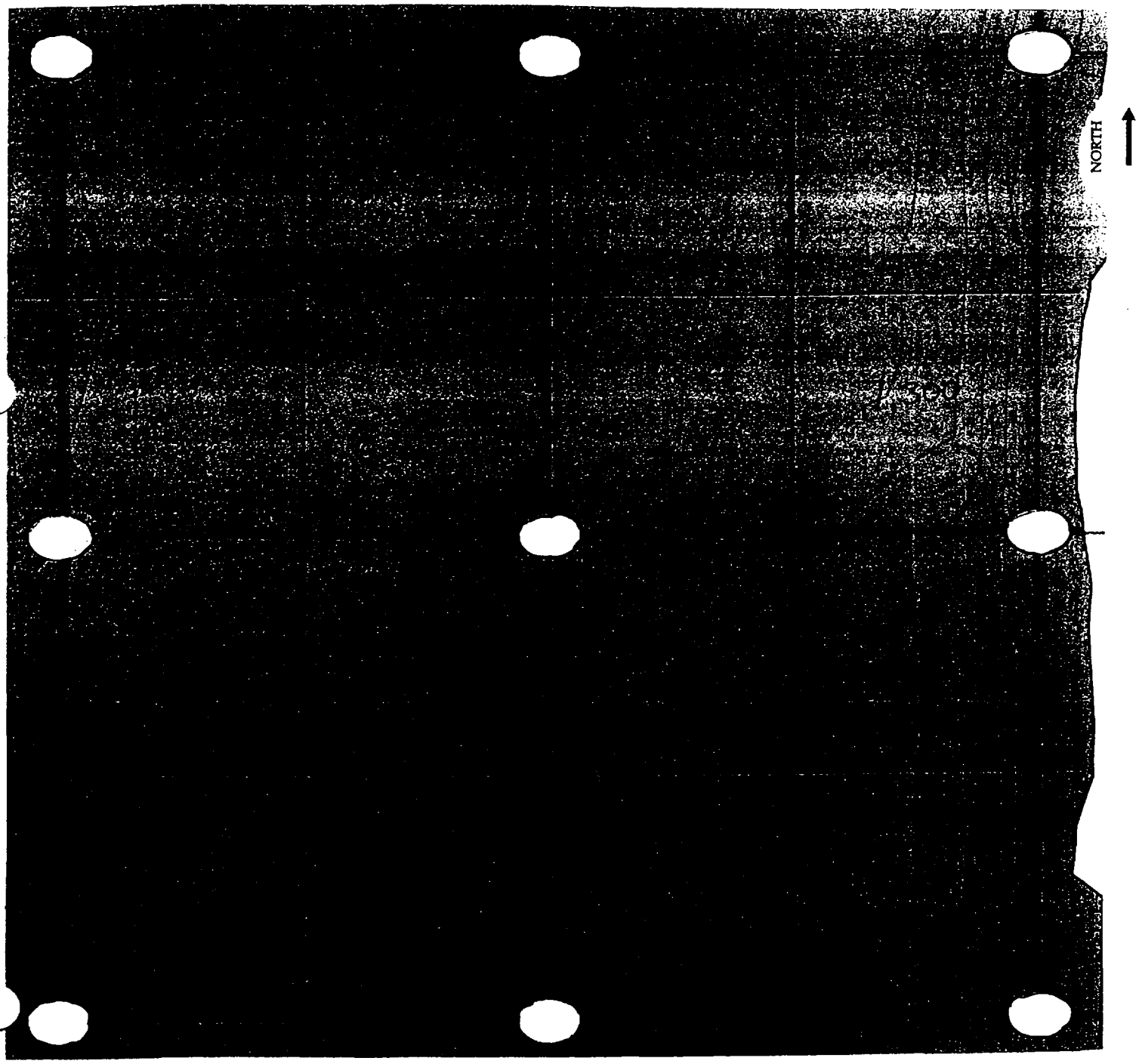
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 2/21/03 Technician J. Krane

Inst. Model 2221 Serial No. meter #132844 probe #168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z4 Grubbing

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

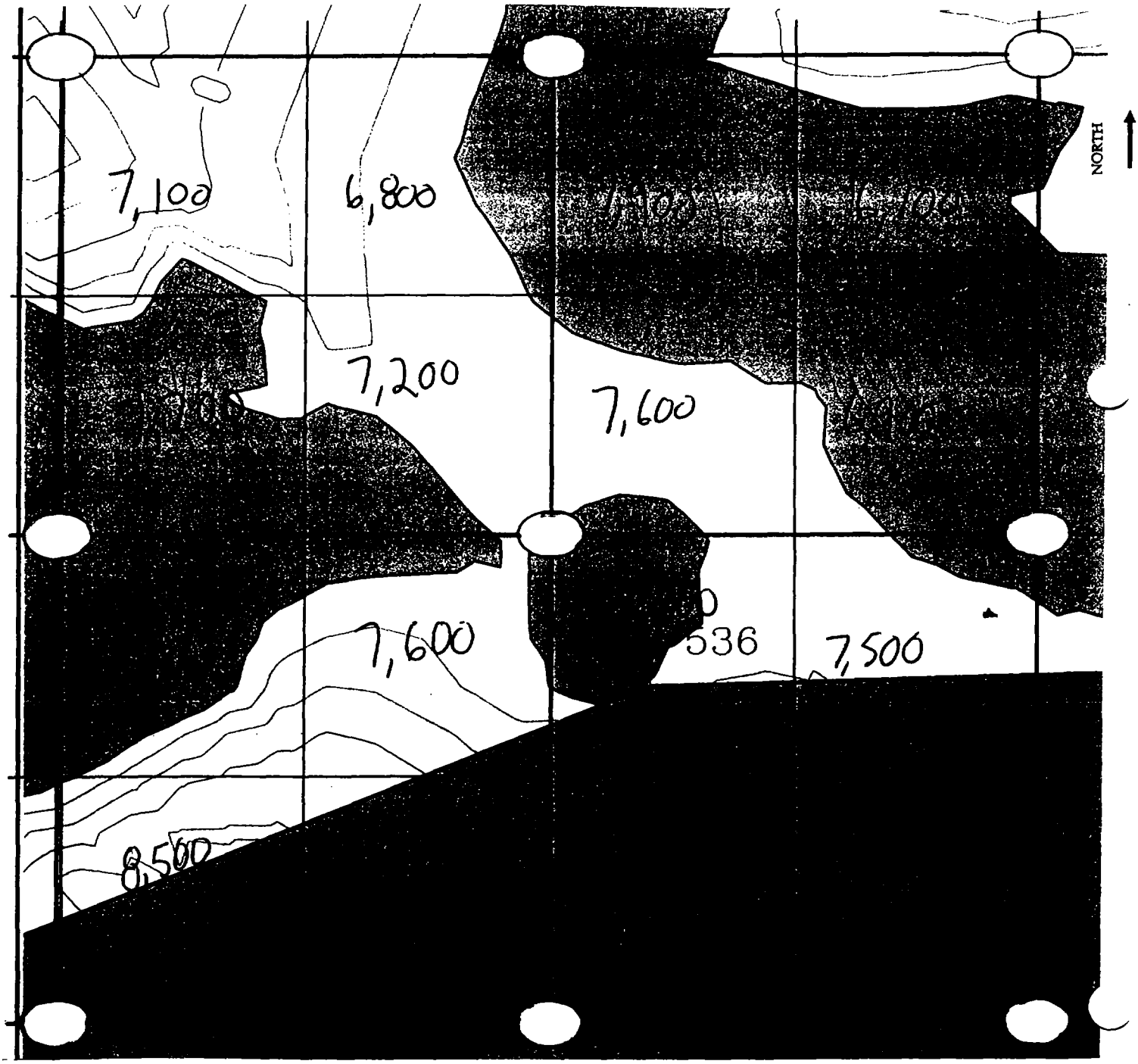
Project # 32193-XC Project Name Lakeshore East Sheet Grubbing of

Date 12/13/02 12/20/02 Technician J. Kraus

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 27

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

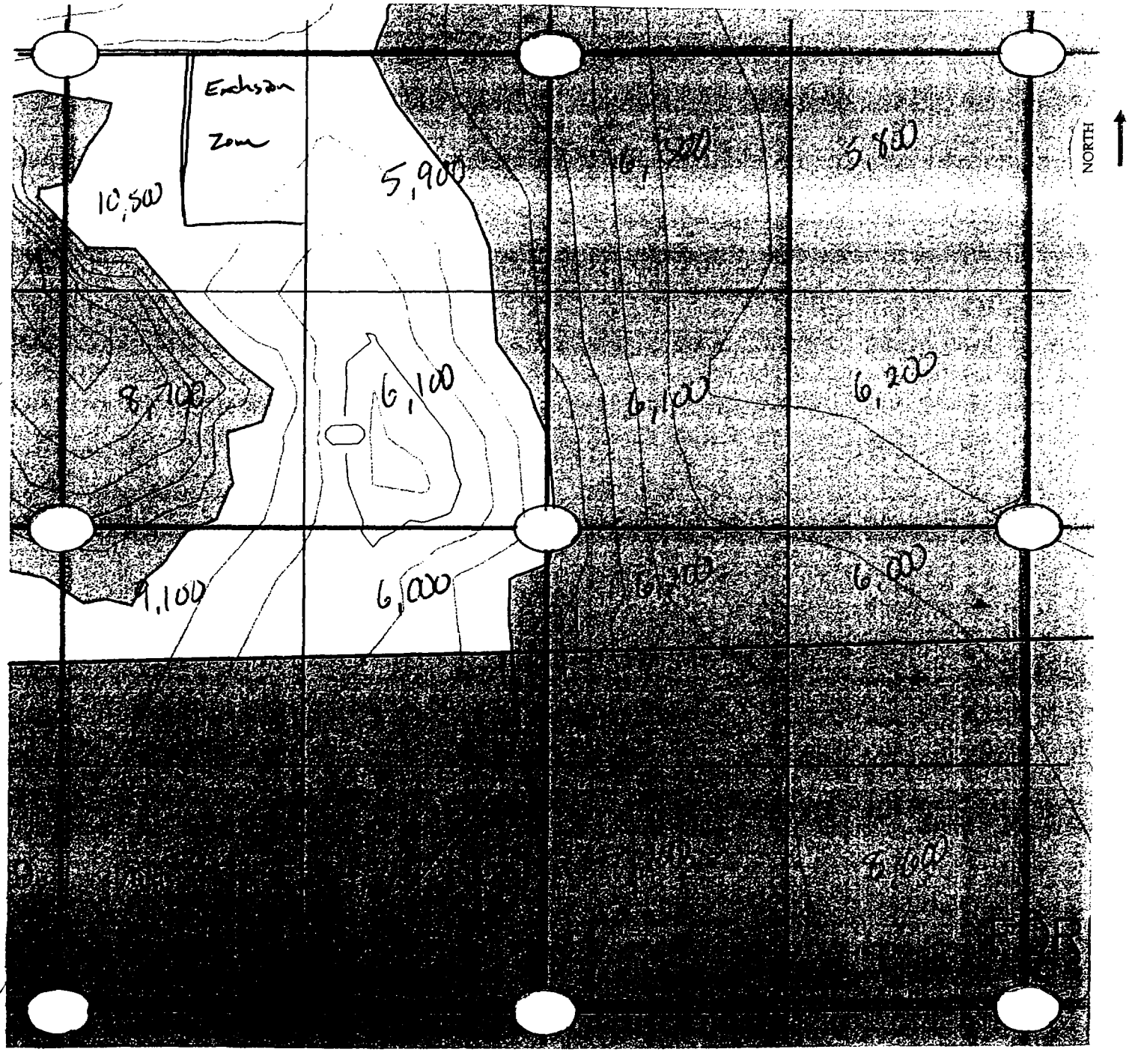
Project # 32193xc Project Name Lakeshore East Sheet Grubbing of

Date 12/13/02 Technician J Krane

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 28

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – ~~GRADING~~ Grubbing

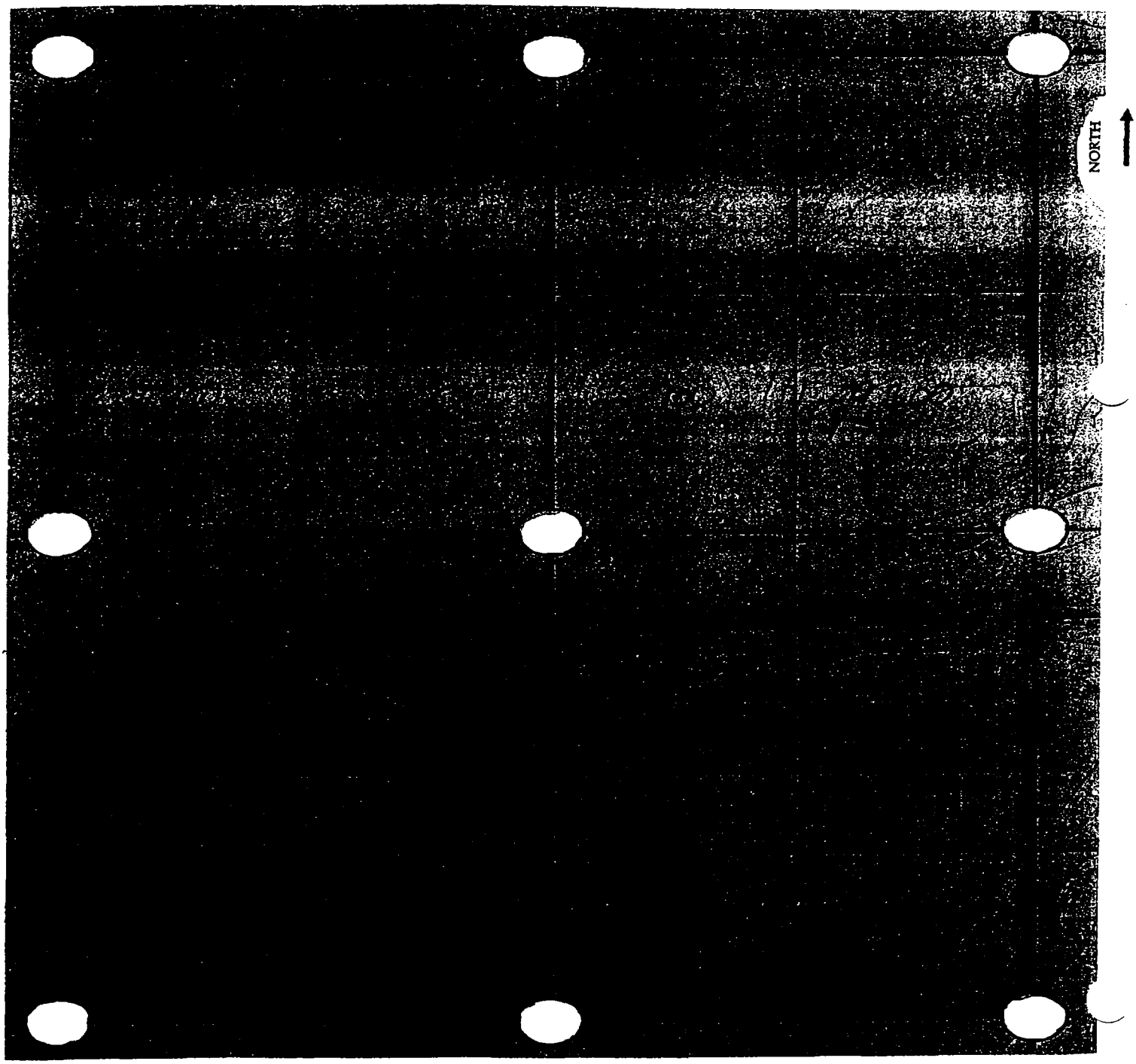
Project # 32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 12/13/02 Technician Jerry Krause

Inst. Model 2221 Serial No. meter # 134542 probe # 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 29

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



Chain Link Fence Removal/Grubbing

STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

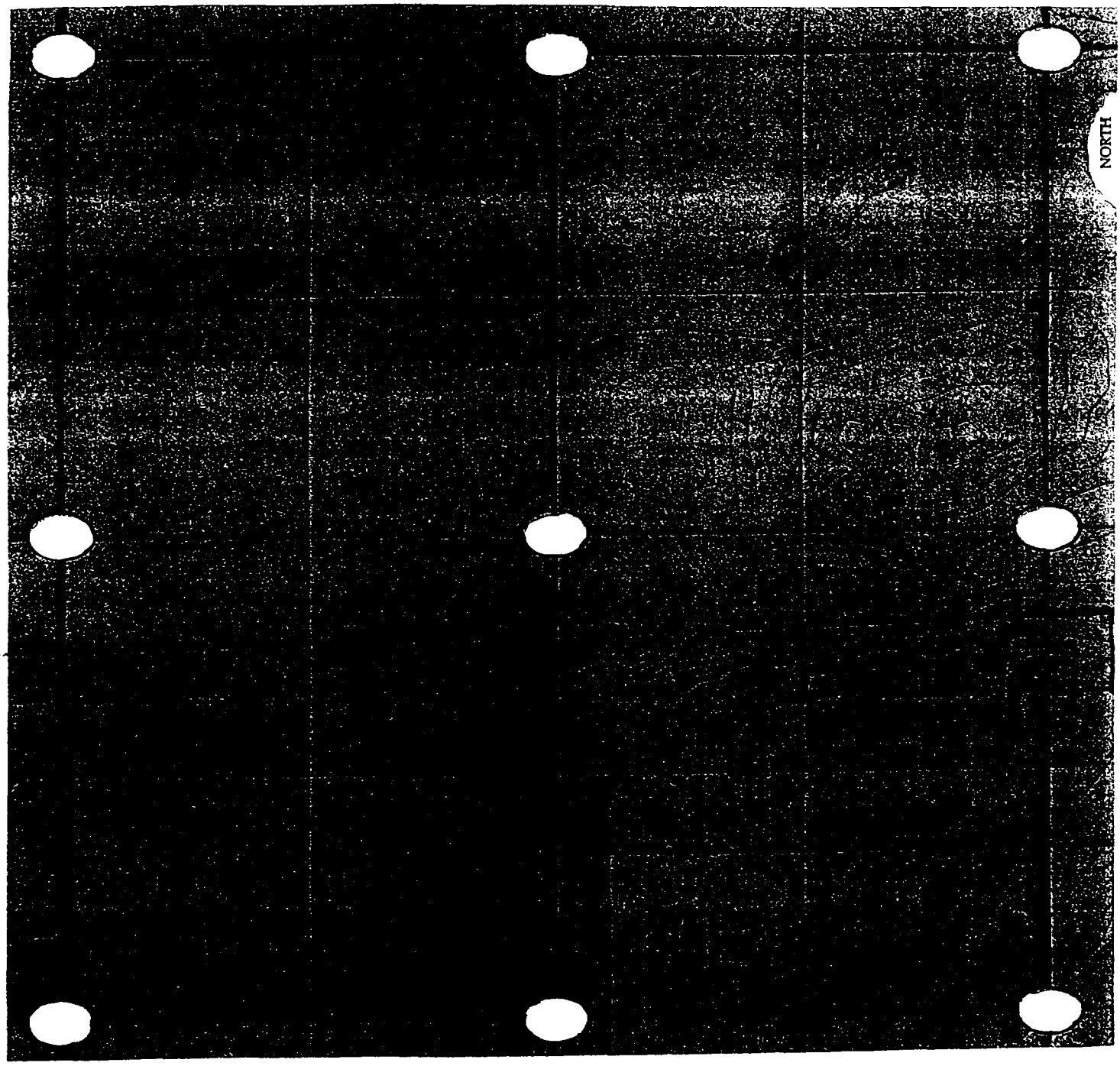
Project # 32193-xc Project Name ~~River~~ Lakeshore East Sheet 1 of 1

Date 1/14/03 Technician L. Aschim

Inst. Model Ludlum 2221 Serial No. 132844-168148

Inst. Calibrated (Y/N)? Y Location ID/Lift Elevation 29

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM ~~- GRADING~~ Grubbing

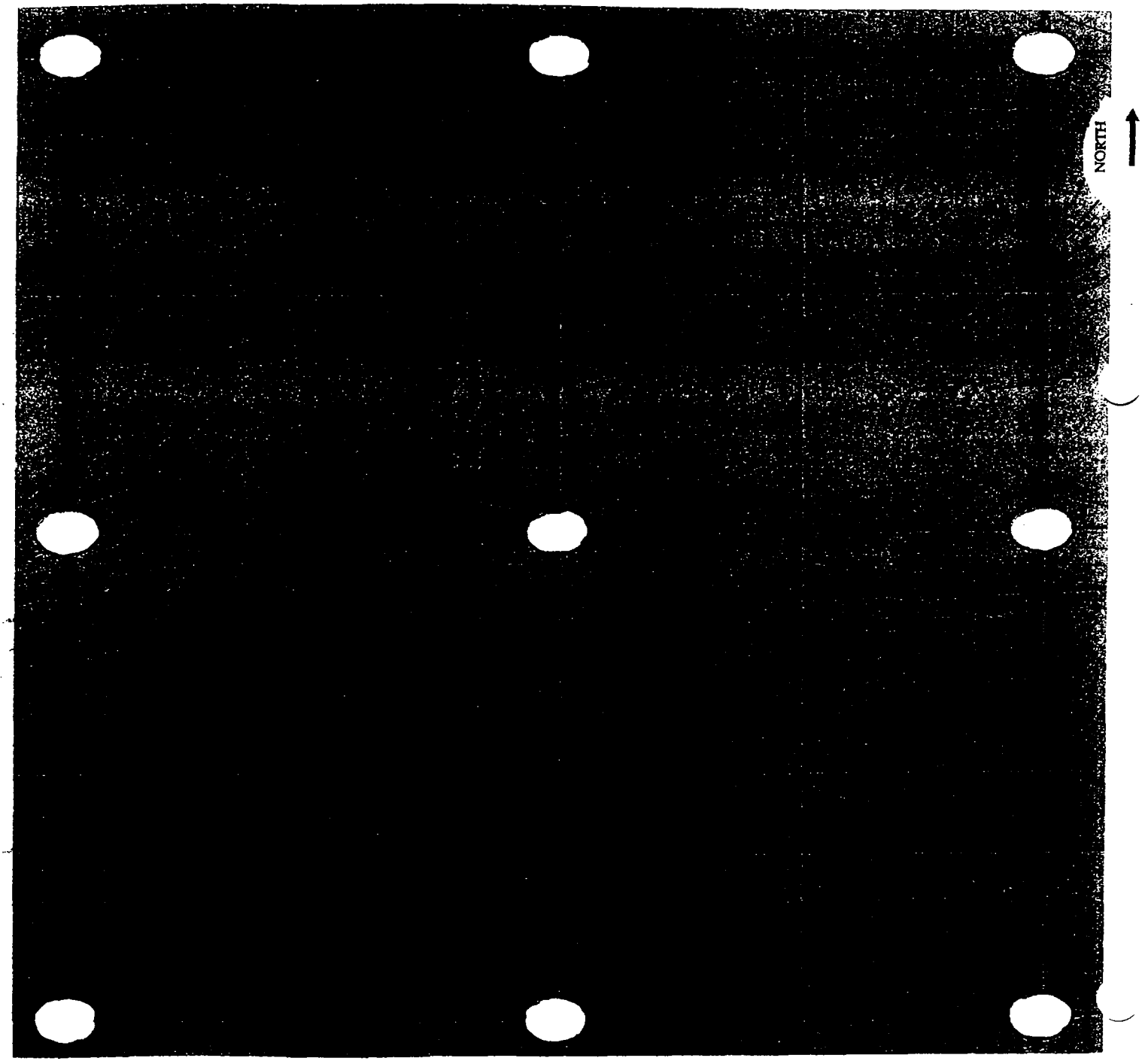
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 12/17 - 12/18 - 12/19 Technician Jerry Krause

Inst. Model 2221 Serial No. #127242 #168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 30

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



Chain Link Fence Removal / Grubbing

STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

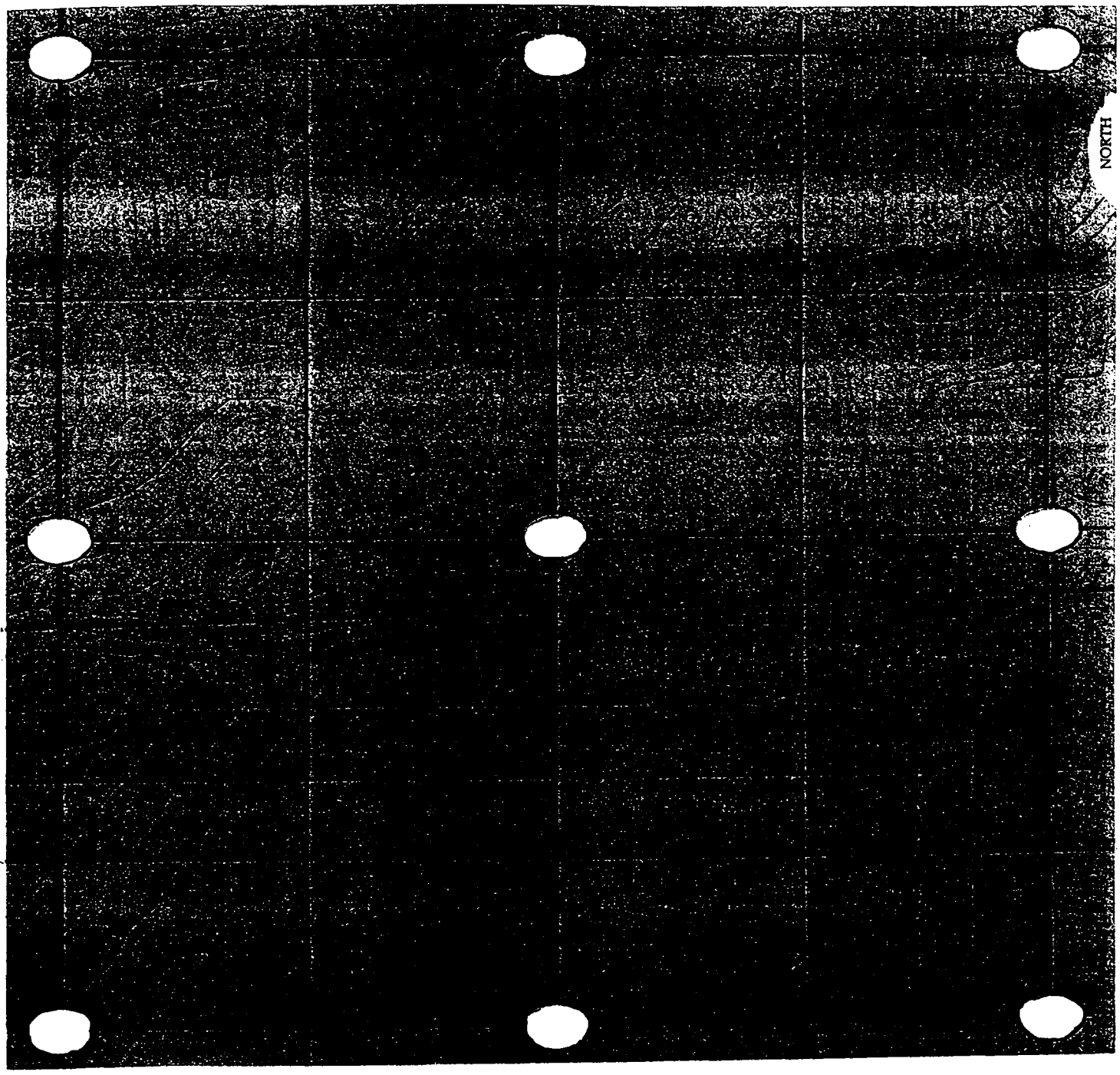
Project # 32B3-xc Project Name ~~River~~ Lakeshore East Sheet 1 of 1

Date 1/14/03 Technician L. Aschim

Inst. Model Ludlum 2221 Serial No. 132844-168148

Inst. Calibrated (Y/N)? Y Location ID/Lift Elevation 30

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM ~~GRADING~~ Grubbing

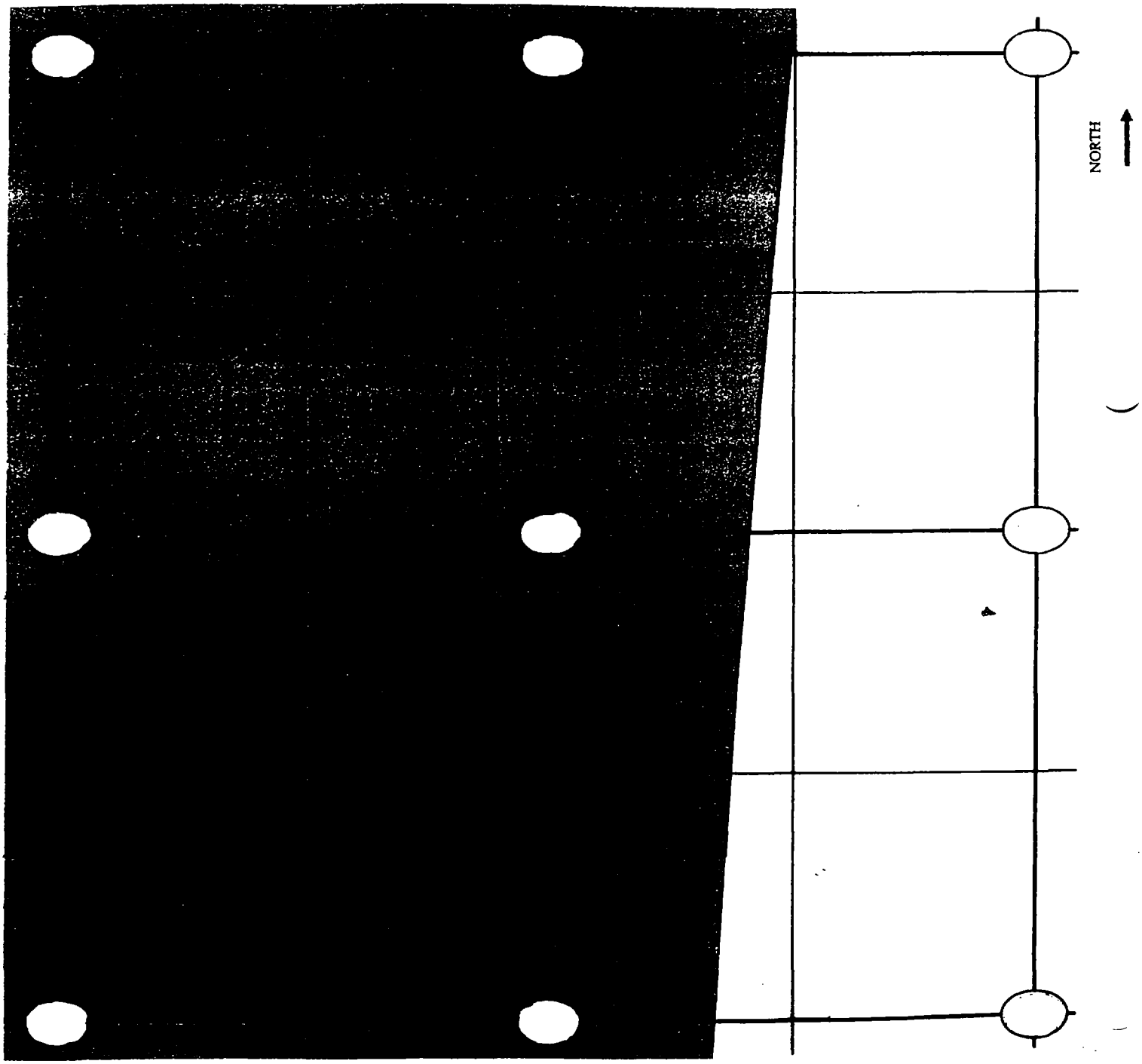
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 12/17 - 12/18 - 12/19 Technician Jerry Krause

Inst. Model 2221 Serial No. meter # 122242 probe # 168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 31

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



Chain Link Fence Removal / Grubbing

STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

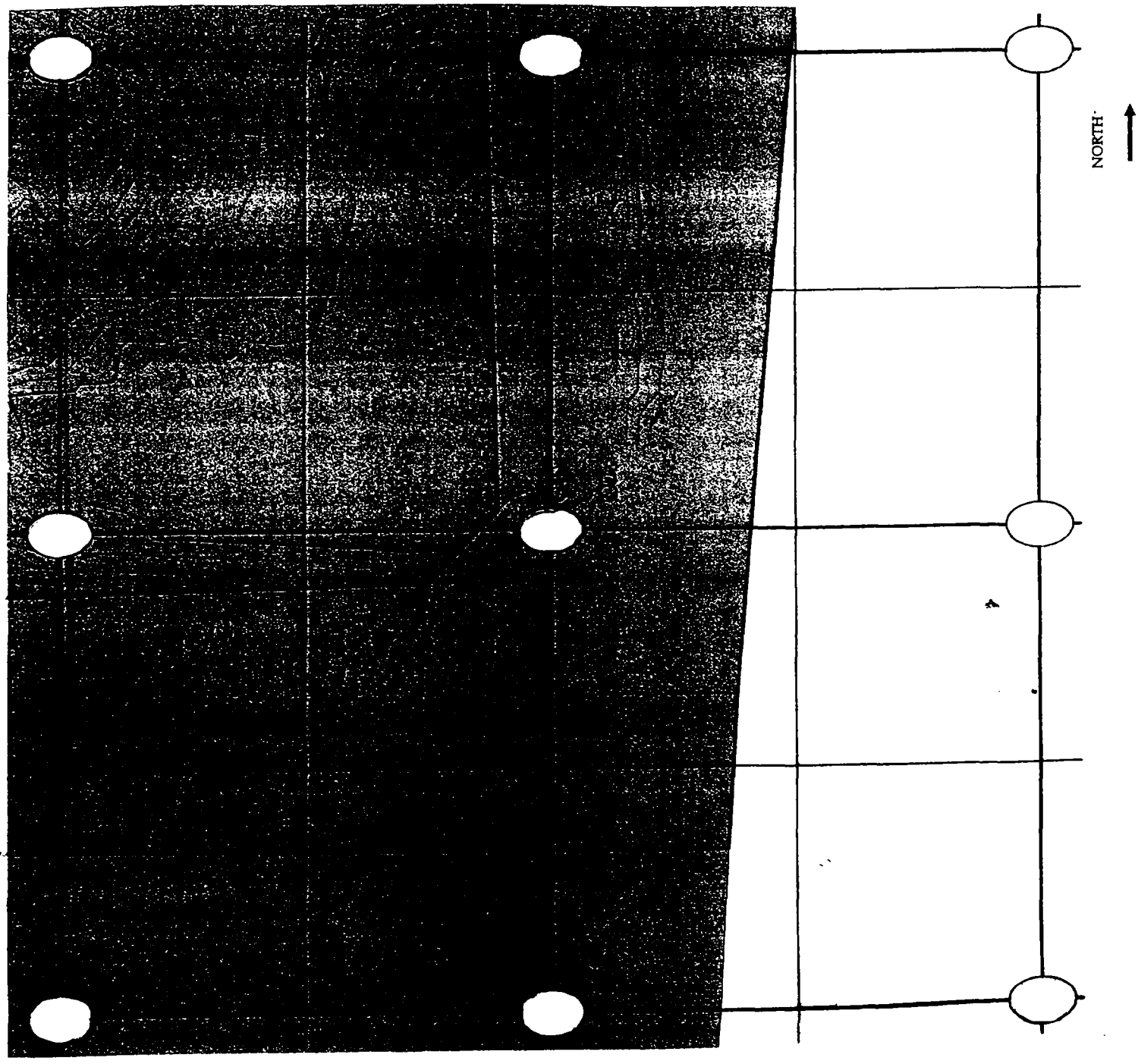
Project # 32193-xc Project Name ~~Pima East~~ Lakeshore Sheet 1 of 1

Date 1/14/03 Technician L Aschim

Inst. Model Ludlum 2221 Serial No. 132844- 168148

Inst. Calibrated (Y/N)? Y Location ID/Lift Elevation 31

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – ~~GRADING~~ Grubbing

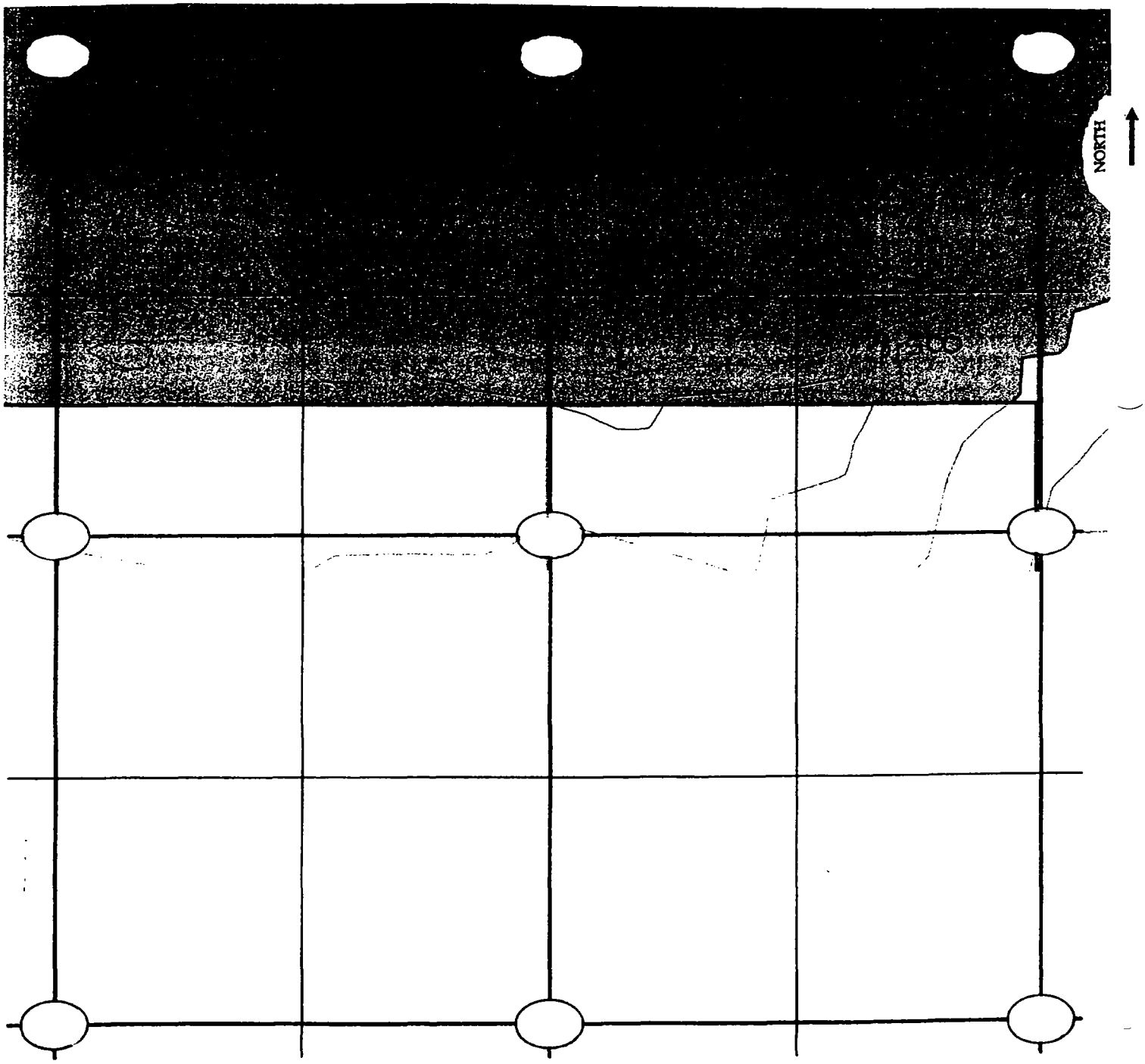
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 2/21/03 Technician J. Krane

Inst. Model 2221 Serial No. meter #132844 probe #168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 33 Grubbing

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



Gamma Summary of Lift Surveys
Lakeshore East LLC.

Grid ID	# of Lifts Surveys	Maximum Value[1] (counts/min)	Comments
1	1	11,300	
2	0		See Note 2
3	2	7,800	
4	1	10,200	
5	0		See Note 2
6	0		See Note 3
7	2	14,300	
8	1	9,500	
9	1	7,400	
10	1	10,000	
11	1	9,100	
12	2	13,200	
13	1	9,200	
14	0		See Note 3
15	2	11,300	
16	2	11,400	
17	2	11,600	
18	1	10,400	
19	2	12,200	
20	2	12,600	
21	5	13,600	
22	4	10,400	
23	0		See Note 3
24	2	11,200	
25	2	11,600	
26	4	11,900	
27	3	13,800	
28	3	13,600	
29	3	12,800	
30	3	15,600	
31	4	13,100	
33	3	11,800	
34	3	11,400	
35	5	13,200	
36	2	12,900	
37	2	14,300	
38	3	11,800	
39	2	9,200	
40	2	10,100	

Notes:

1 - The action level is meter specific, but ranged from 20,352 to 22,523 cpm.

2 - Post 1900 historical fill absent, no lift surveys required.

3 - Grid is located outside of the current property boundary.

STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

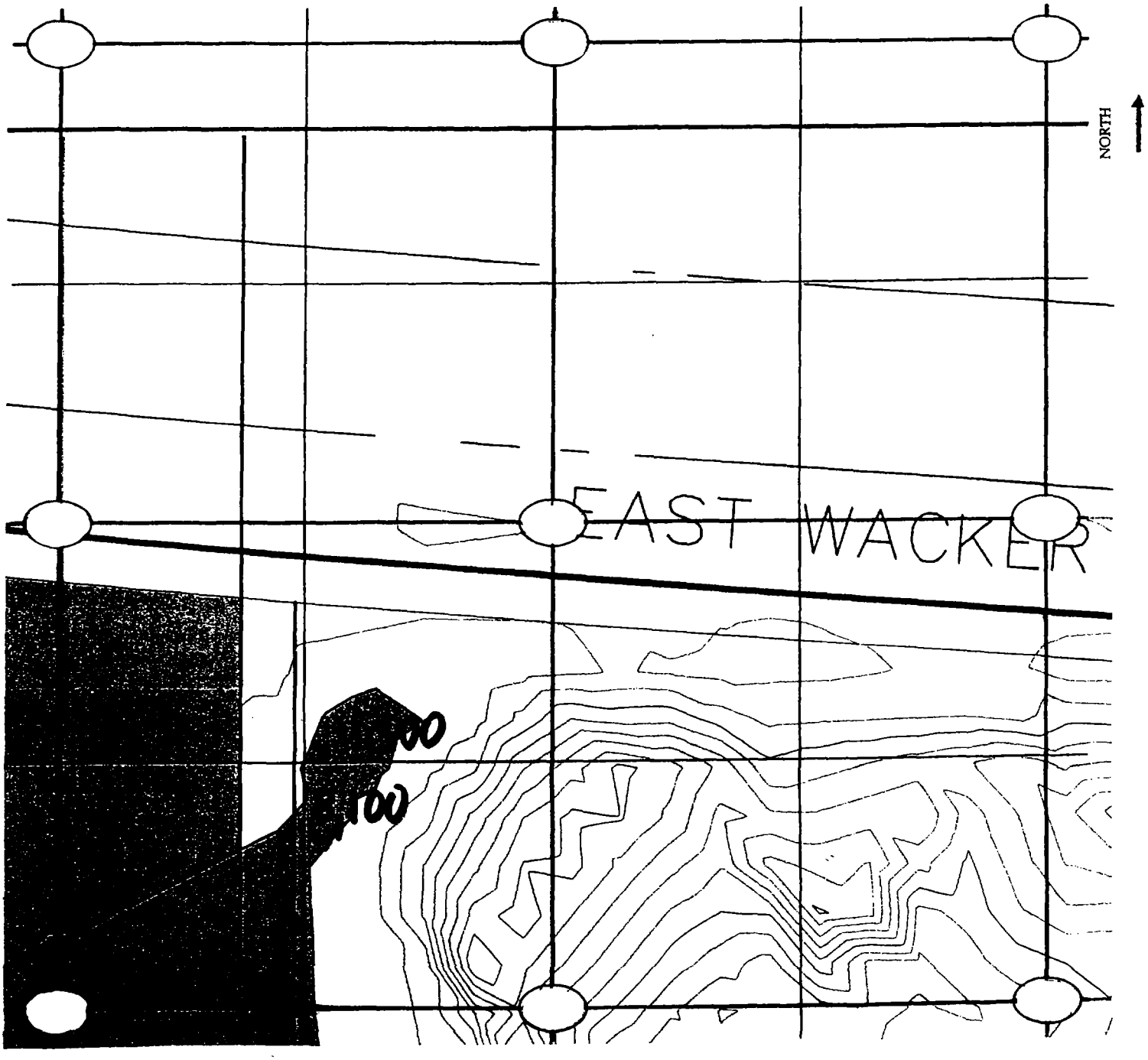
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 2/4/03 Technician L. Aschim

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 1 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

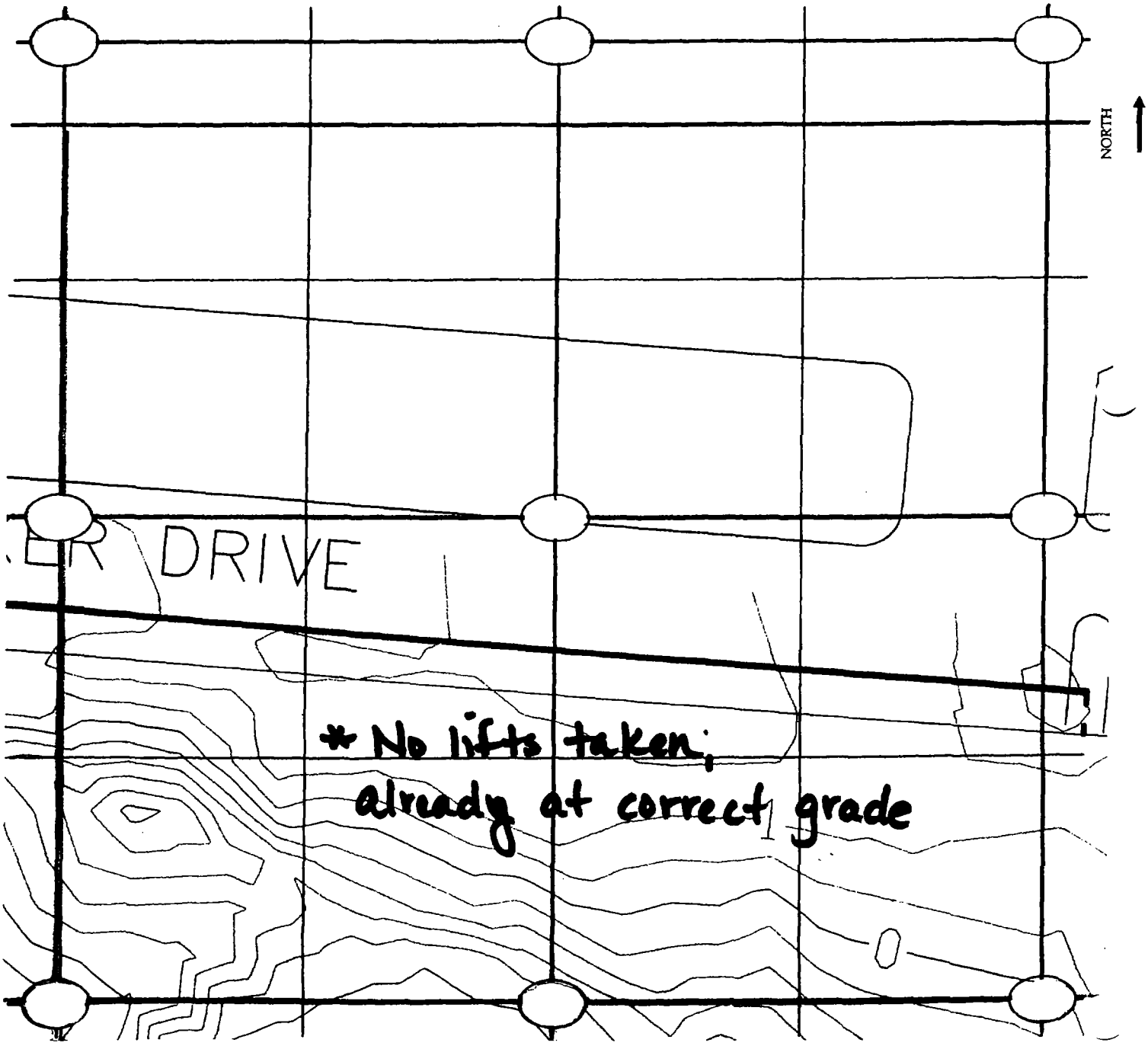
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 2/4/03 Technician —

Inst. Model Ludlum 2221 Serial No. —

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 2 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

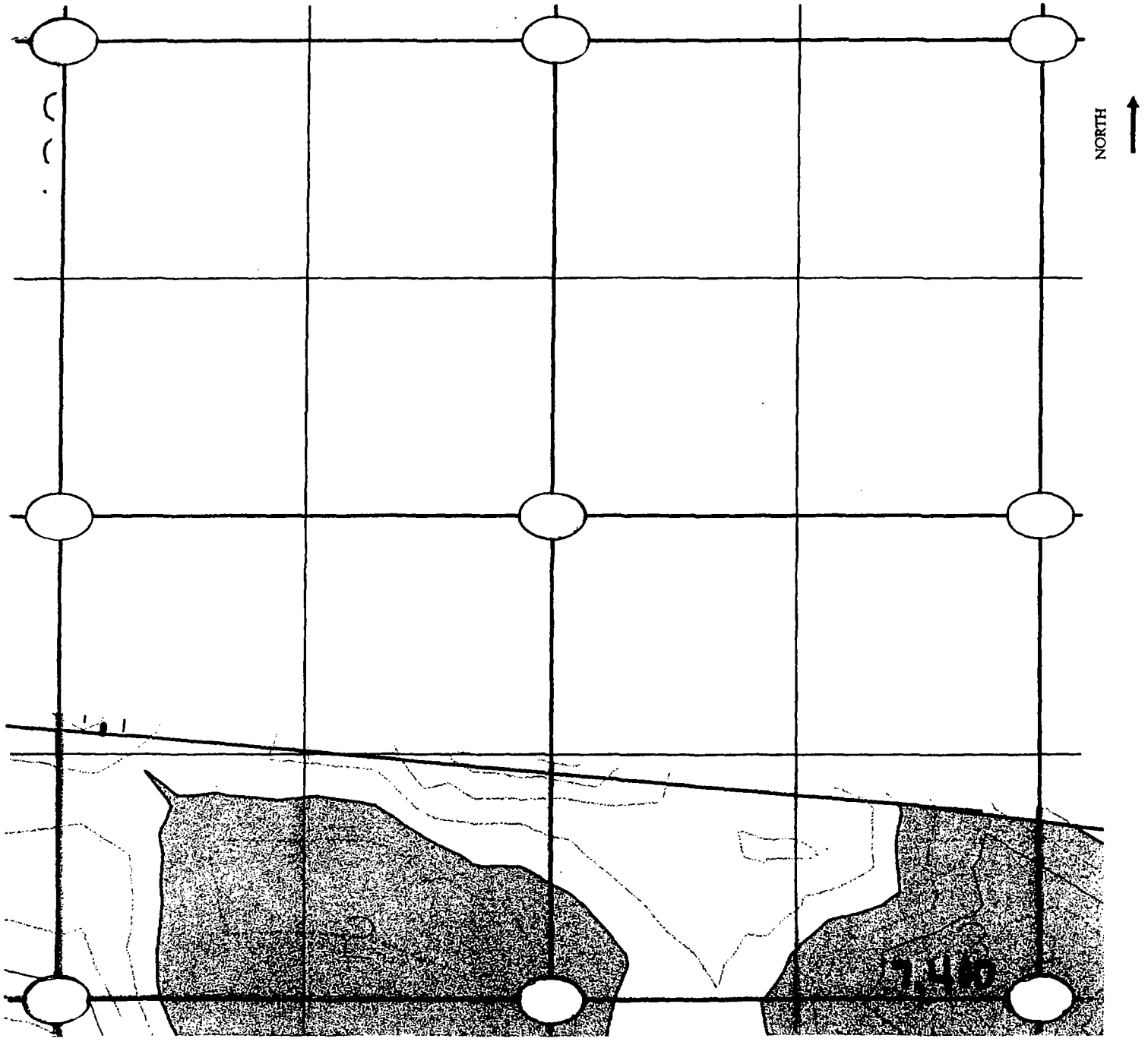
Project # 1-32193-xc Project Name Lakeshore East Sheet 1 of 2

Date 2/4/03 Technician J. Krane

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 3 - 3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

Project # 1-32193-XC

Project Name Lakeshore East

Sheet 2 of 2

Date 2/4/03

Technician J. Krane

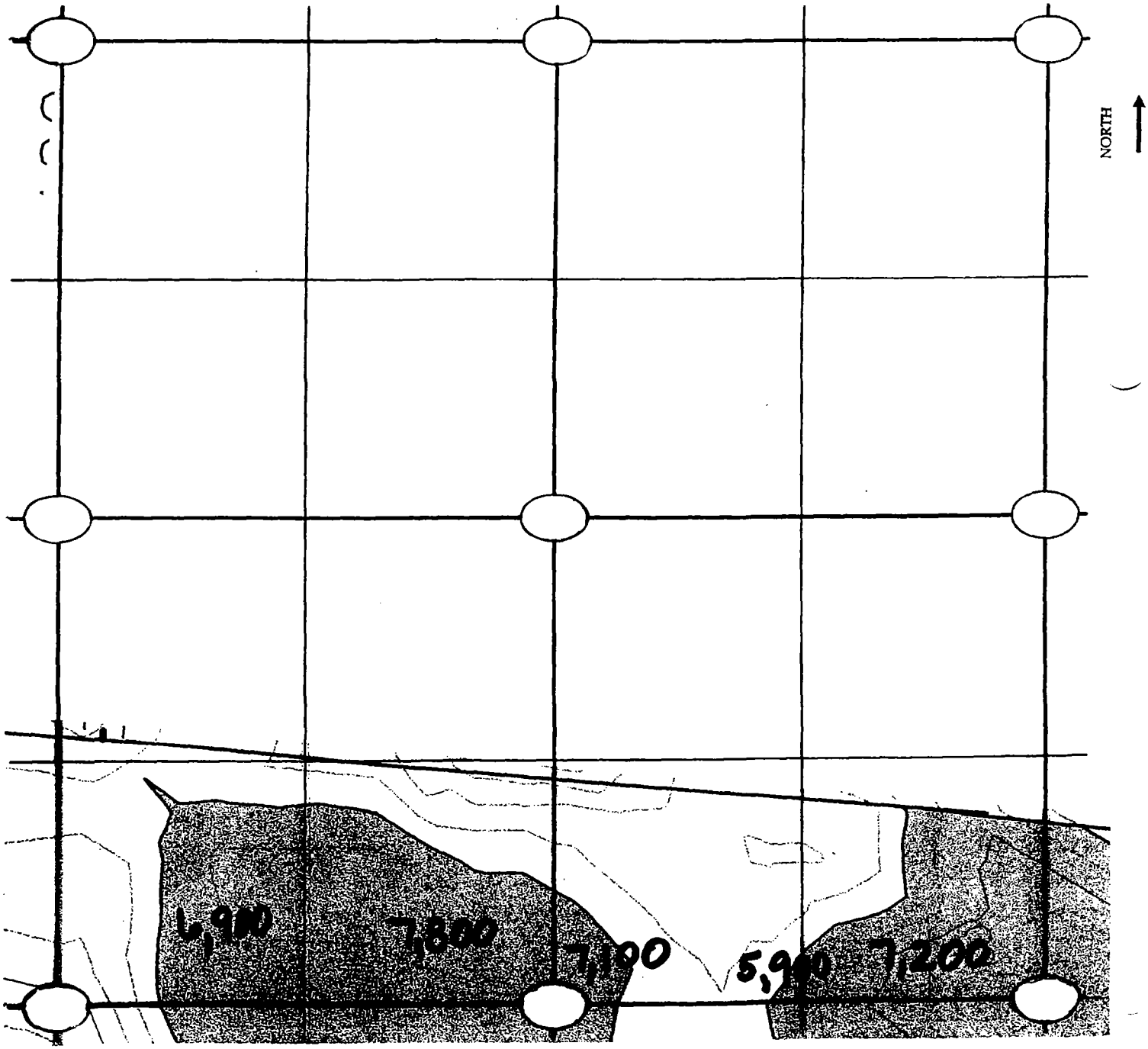
Inst. Model Ludlum 2221

Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes

Location ID/Lift Elevation 3 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

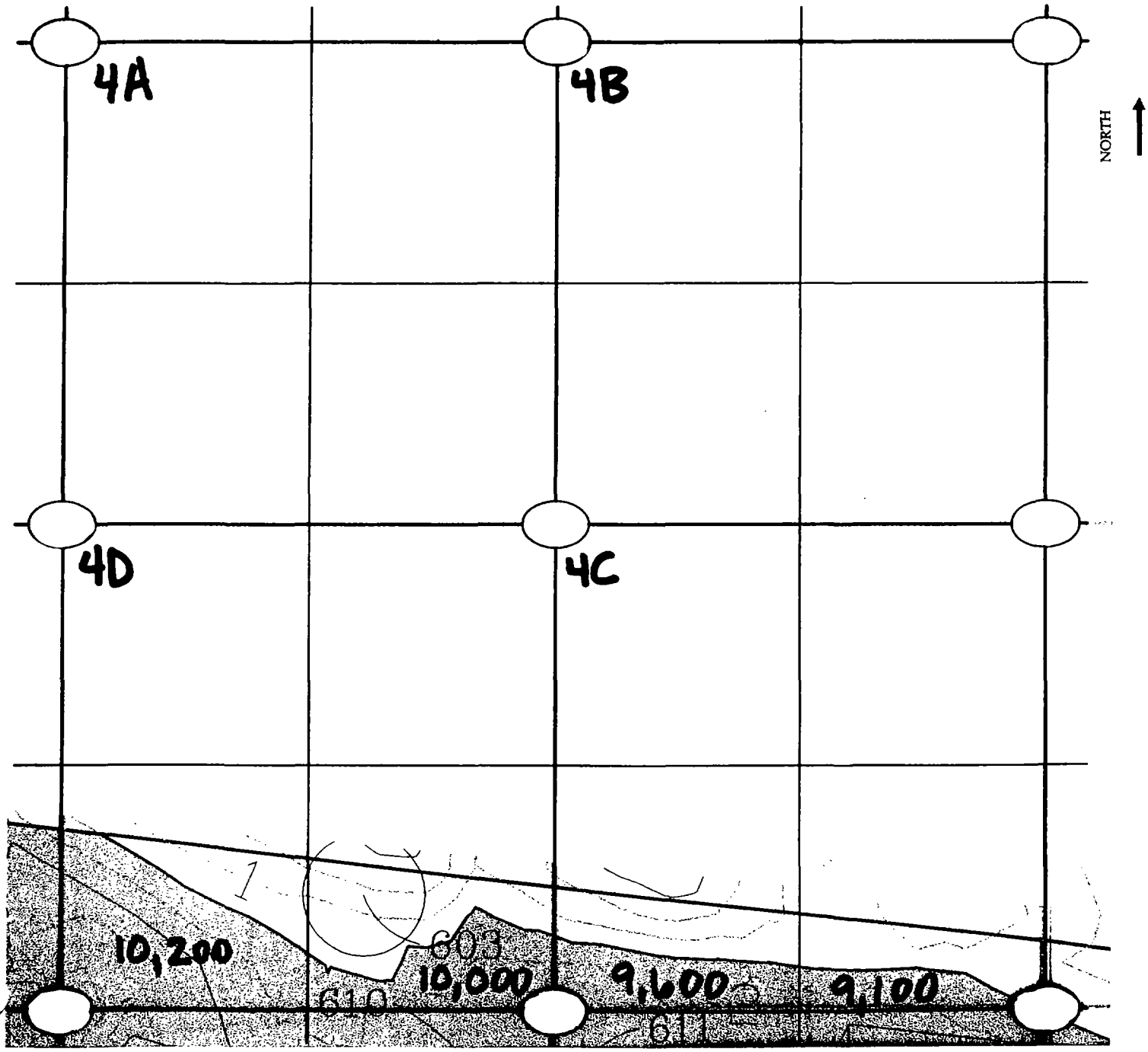
Project # 1-32193-xC Project Name Lakeshore East Sheet 1 of 1

Date 2/4/03 & 2/13/03 Technician L. Aschim / J. Kranc

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 4 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

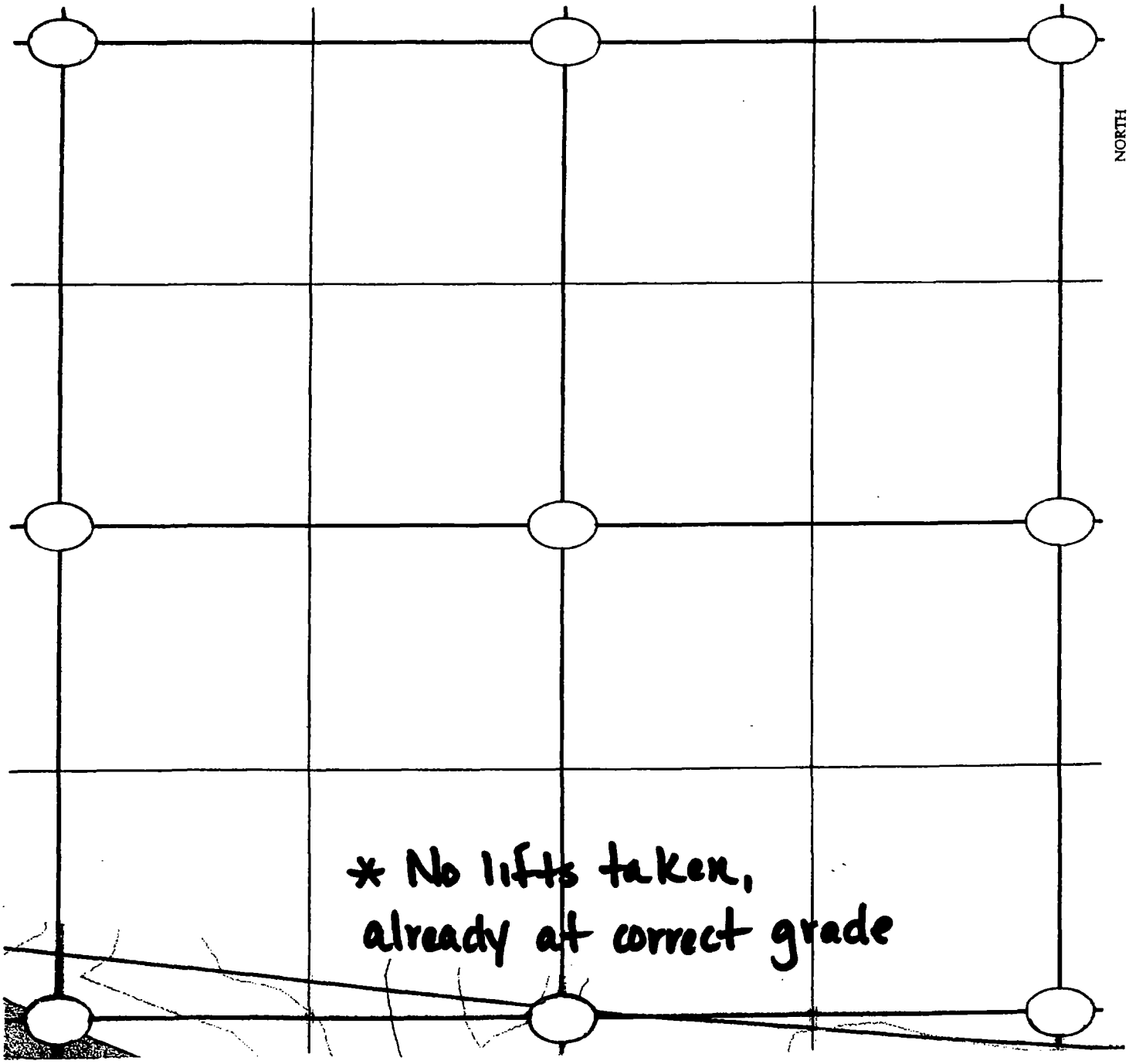
Project #1-32193-xc Project Name Lakeshore East Sheet 1 of 1

Date 2/4/03 Technician —

Inst. Model — Serial No. —

Inst. Calibrated (Y/N)? — Location ID/Lift Elevation 5 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

Project # 1-32193-xc

Project Name Lakeshore East 221 N. Columbus Dr.

Sheet 1 of 2

Date 2/5/03, 2/6/03 & 3/4/03

Technician J. Krane / L. Aschim

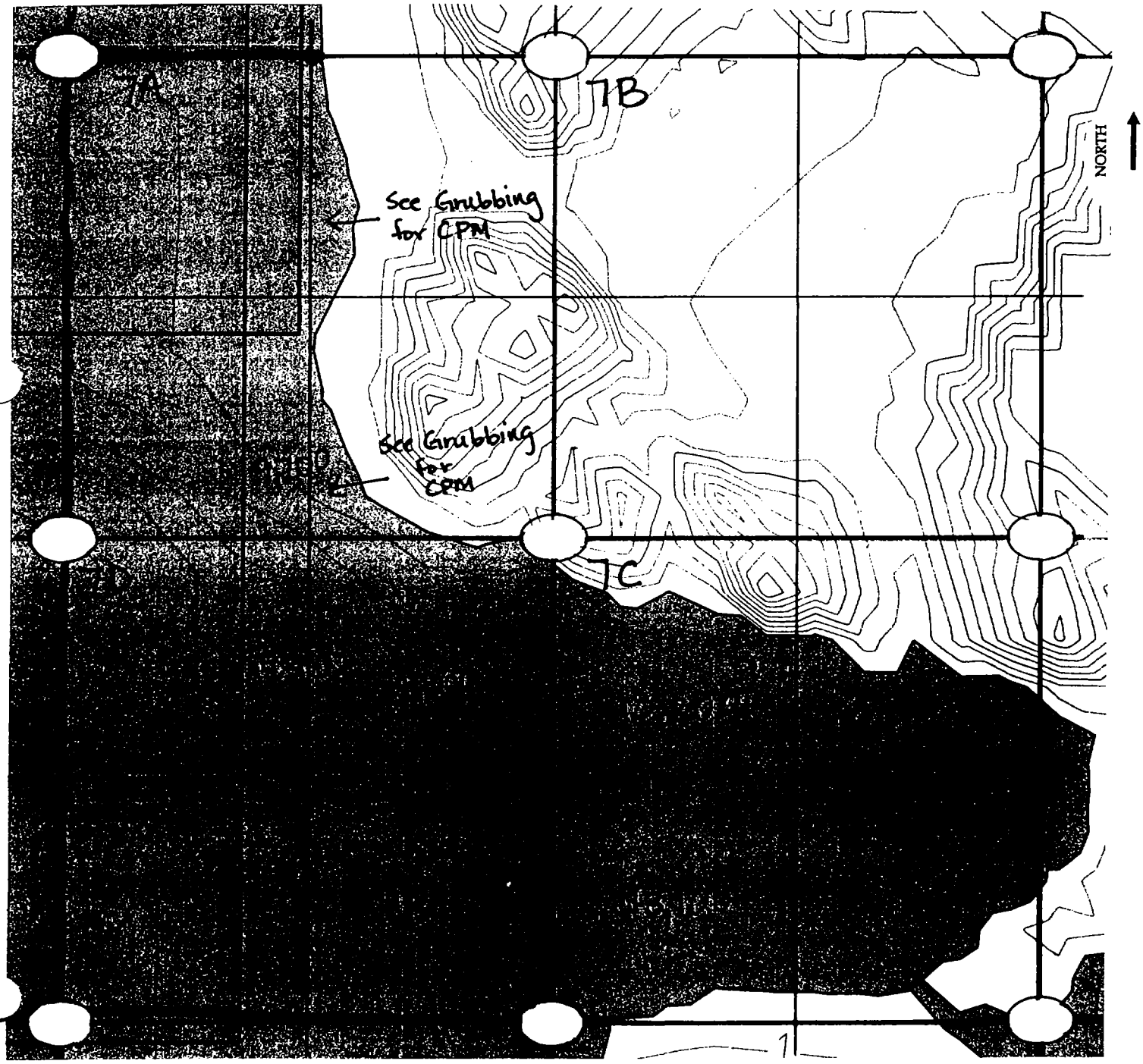
Inst. Model Ludlum 2221

Serial No. 132844

Inst. Calibrated (Y/N)? Yes

Location ID/Lift Elevation 7 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

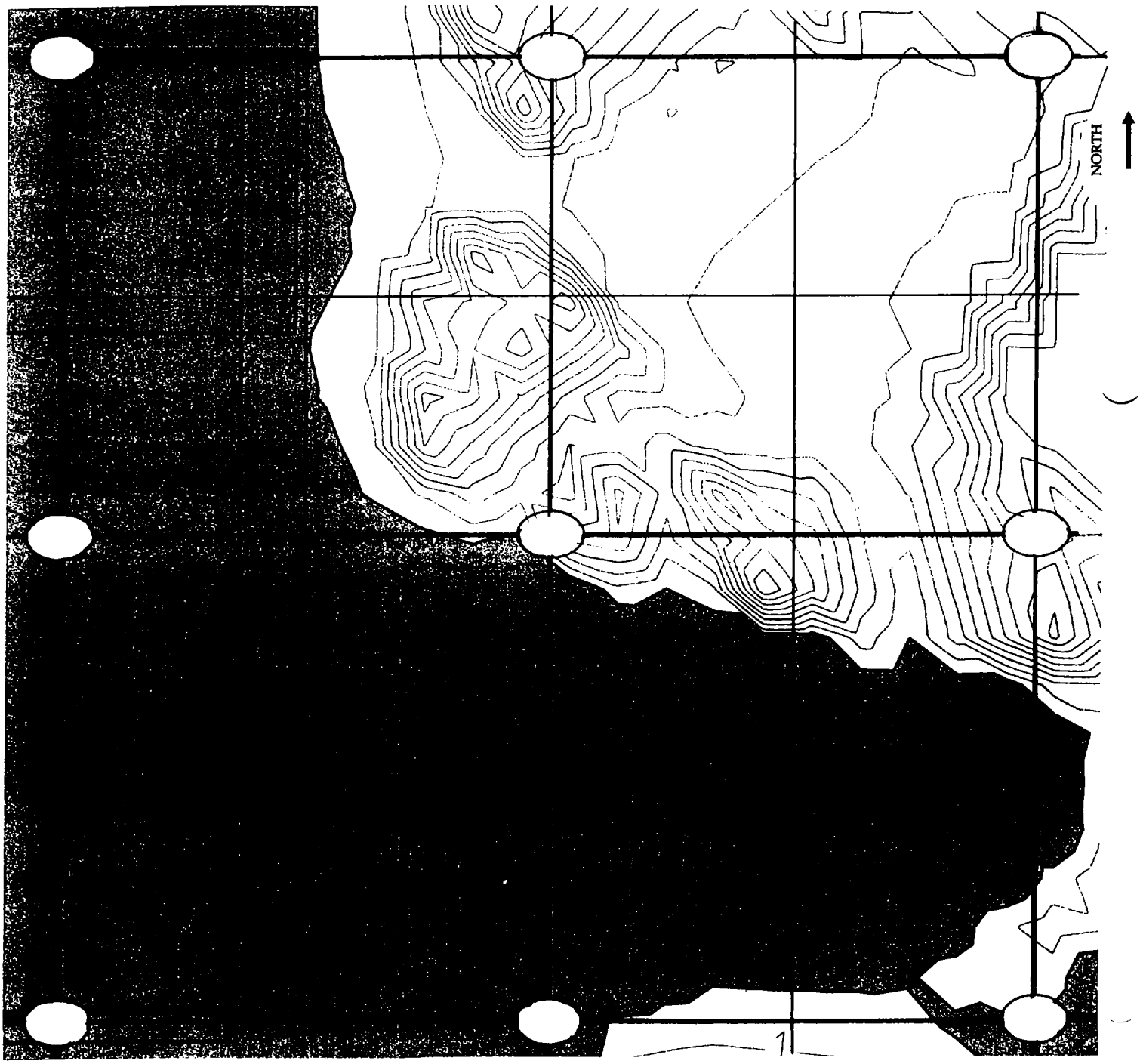
Project # 1-32193-XC Project Name Lakeshore East 221 N. Columbus Dr. Sheet 2 of 2

Date 2/5/03 ; 2/6/03 ; 3/4/03 Technician J. Krane / L. Aschim

Inst. Model Ludlum 2221 Serial No. 132844

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 7 - 3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

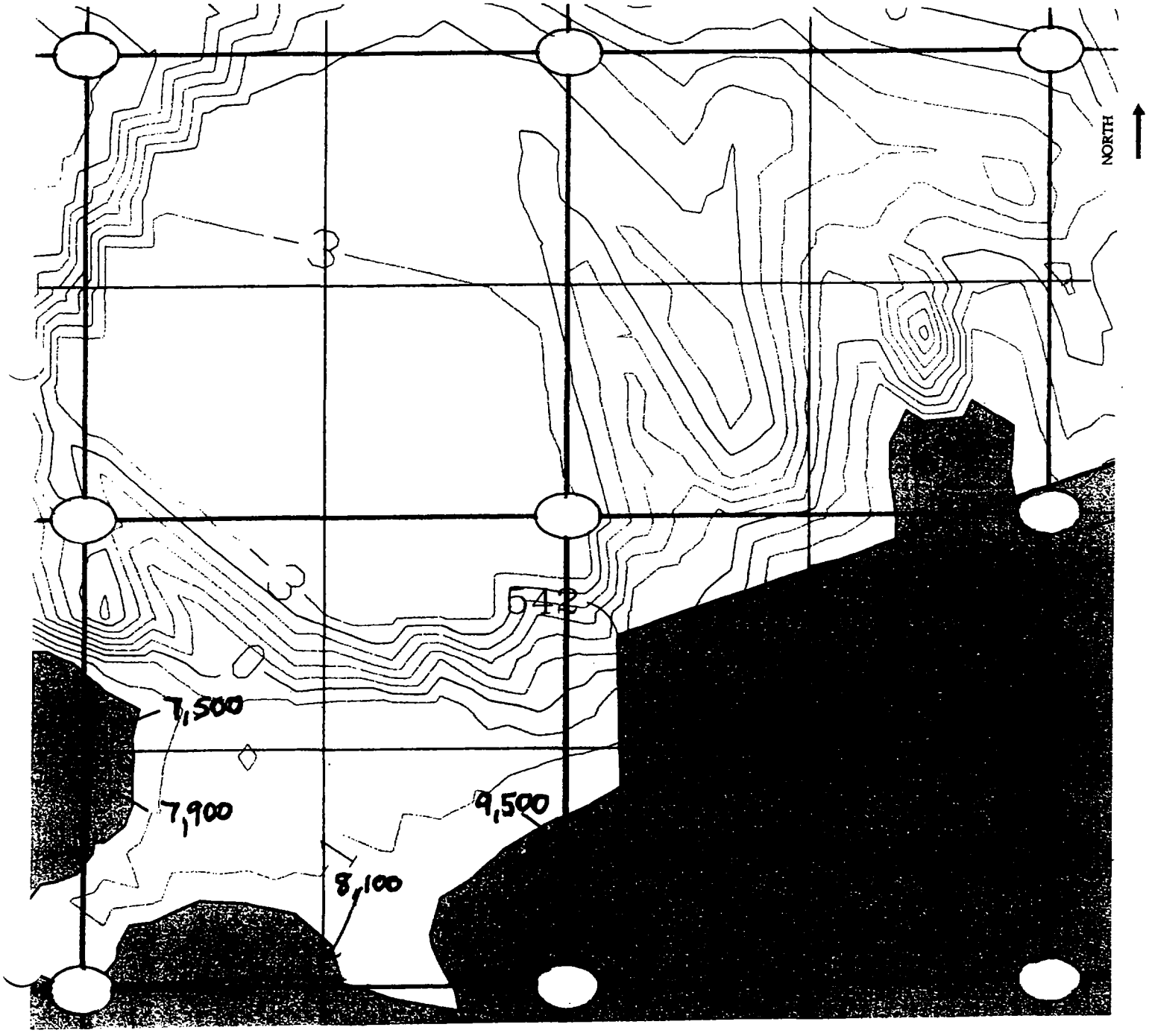
Project # 1-32193-XC Project Name Lakeshore East 2221 N. Columbus Dr Sheet 1 of 1

Date 02/05/03 Technician Jerry Krause

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 8 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

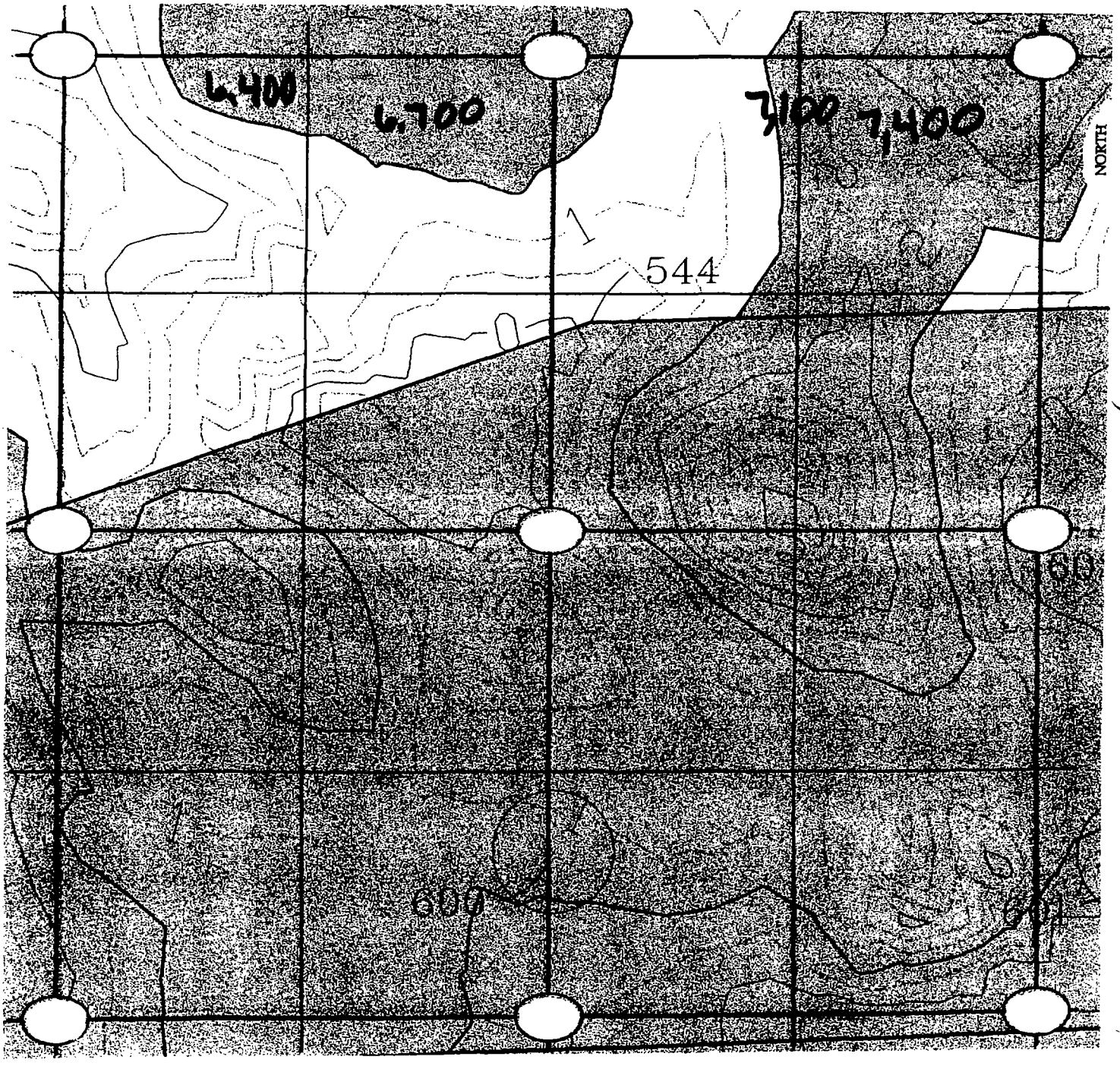
Project # 1-32193-xc Project Name Lakeshore East Sheet 1 of 1

Date 2/4/03 Technician J. Krane

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 9 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

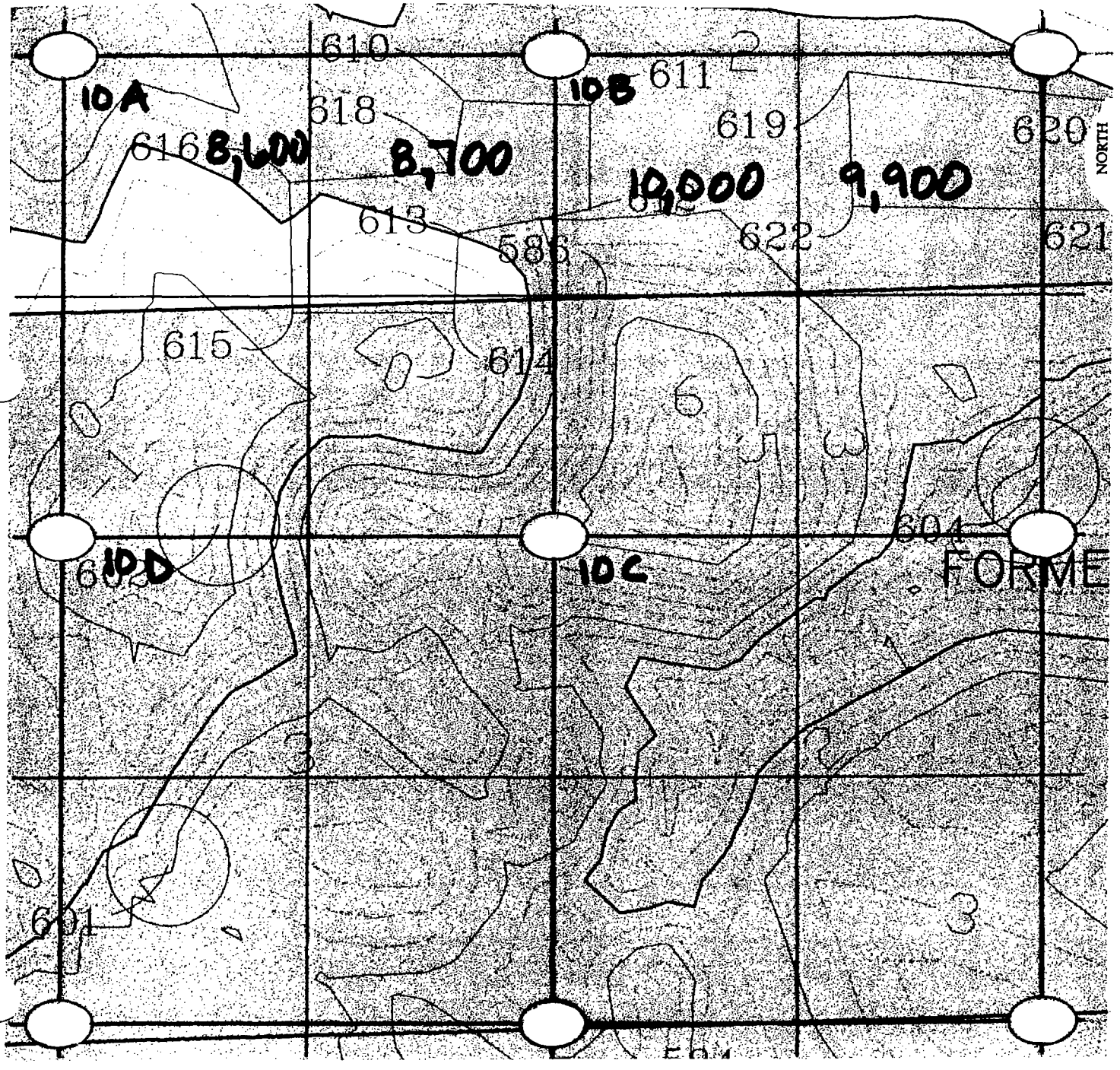
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 2/13/03 Technician L. Aschim

Inst. Model Ludlum 2221 Serial No. 126496 / 014211

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 10 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

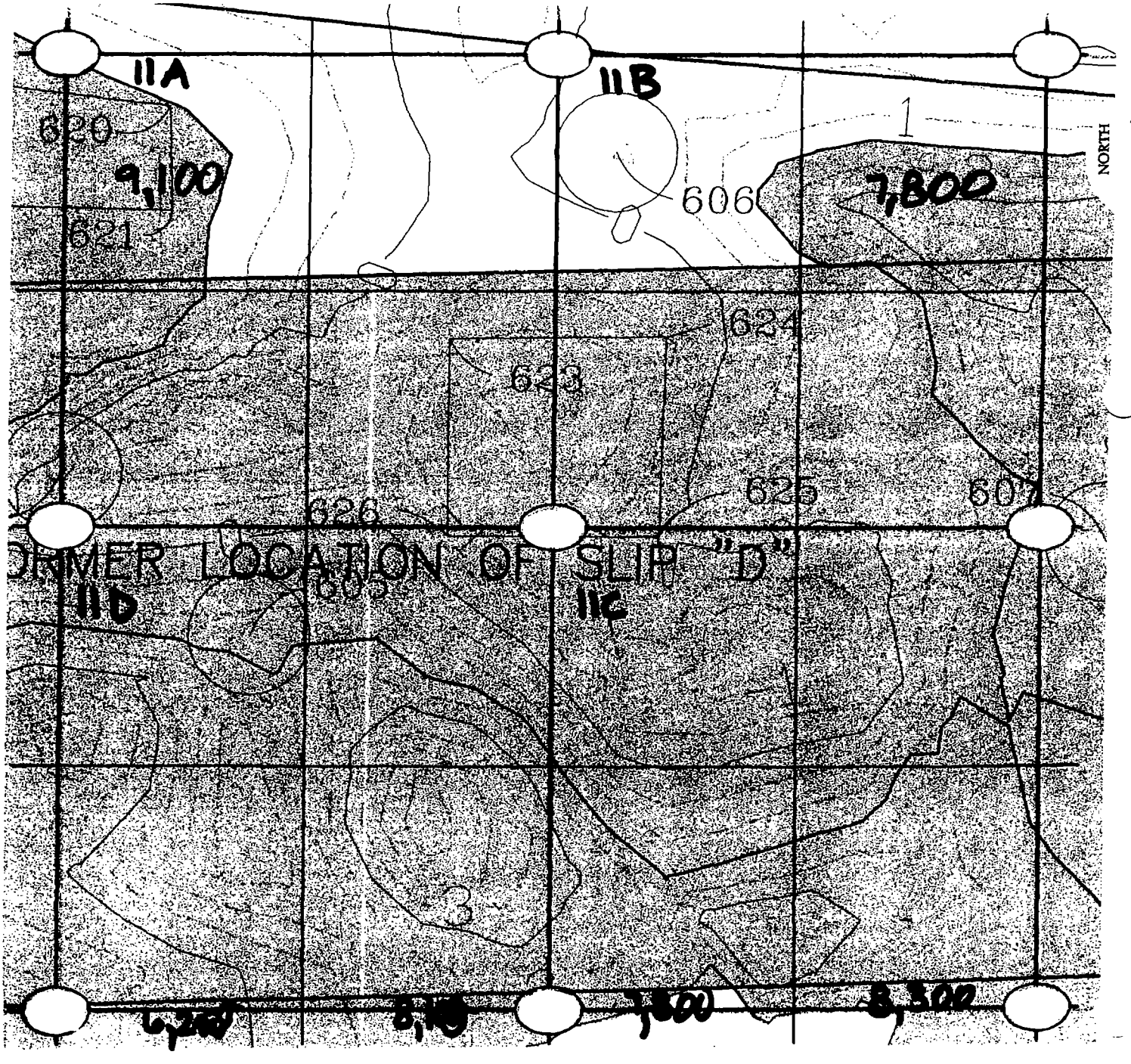
Project # 1-32193-xc Project Name Lakeshore East Sheet 1 of 1

Date 2/13/03 Technician L. Aschim

Inst. Model Ludlum 2221 Serial No. 126496 / 014211

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 11 (1.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

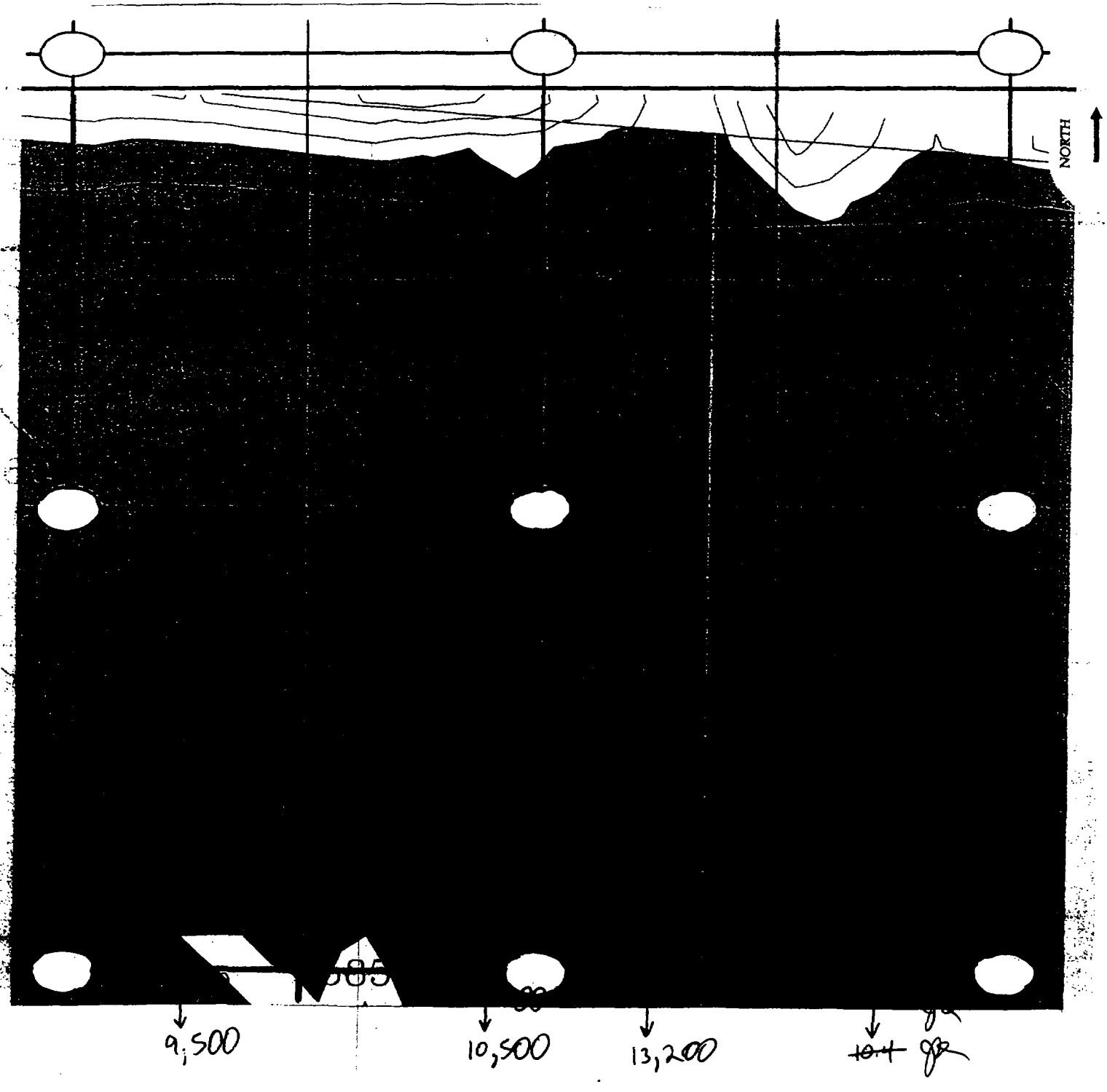
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 2

Date 1/23/03 2/3/03 Technician Jerry Krane, Tim O'Brien

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 12 3.0'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

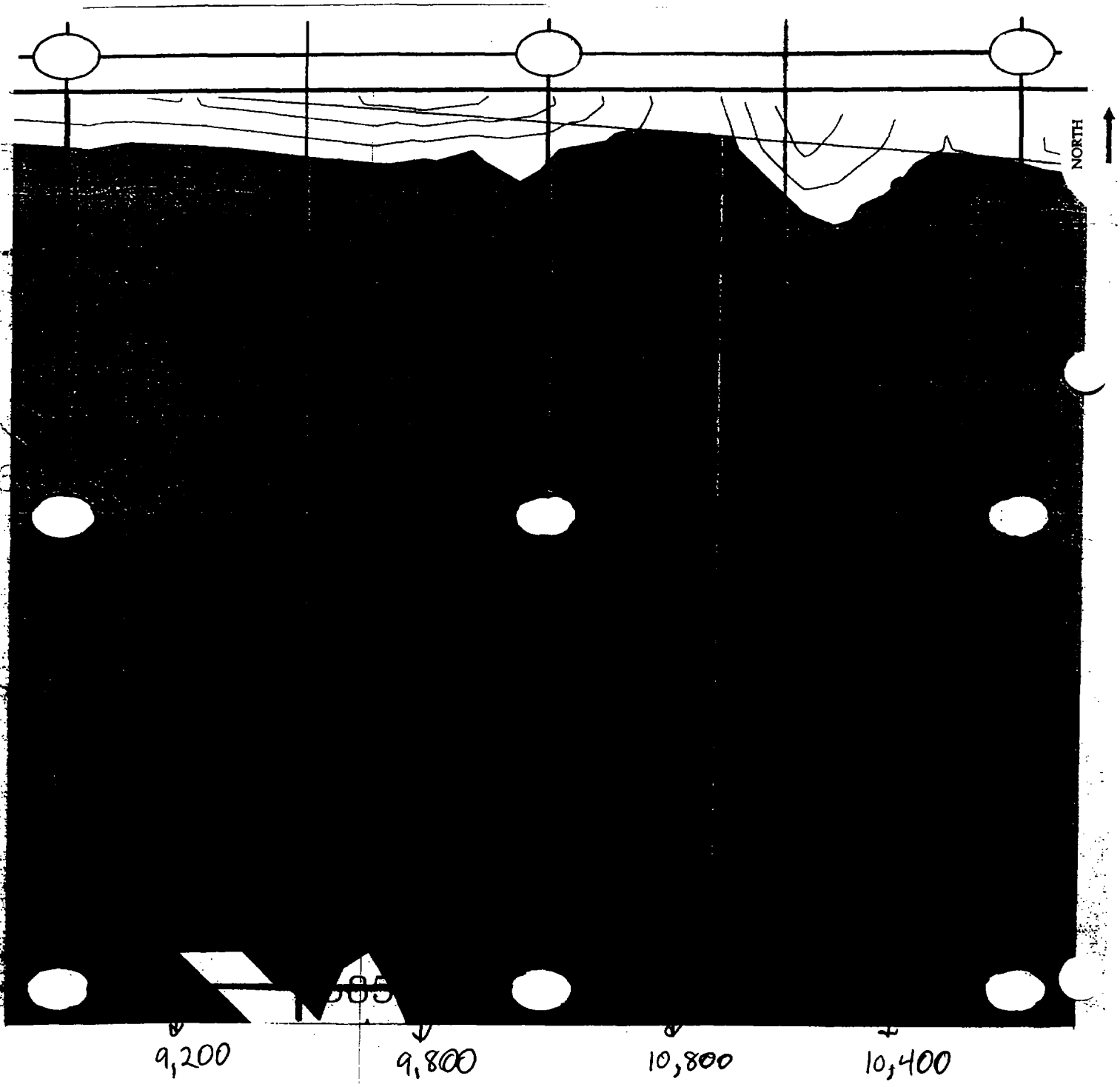
Project # 32193 - XC Project Name Lakeshore East Sheet 2 of 2

Date 1/23/03 2/3/03 Technician Jerry Krane, Tim O'brien

Inst. Model 2221 Serial No. 134542

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 12 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

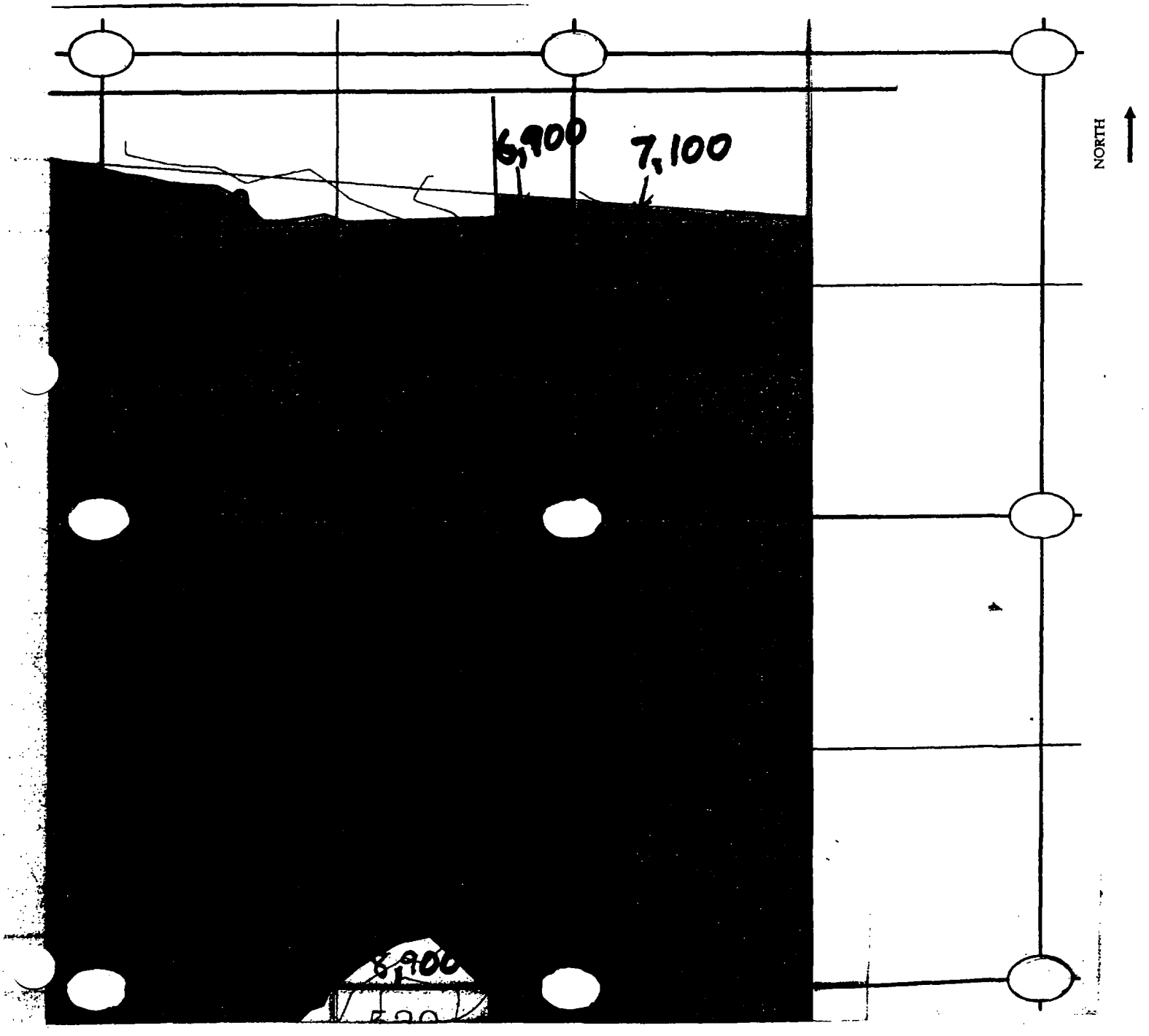
Project # 32193-XC Project Name Lakeshore East Sheet 1 of 1

Date 1/24/03 Technician Jerry Krause

Inst. Model 2221 Serial No. 132344

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 13 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

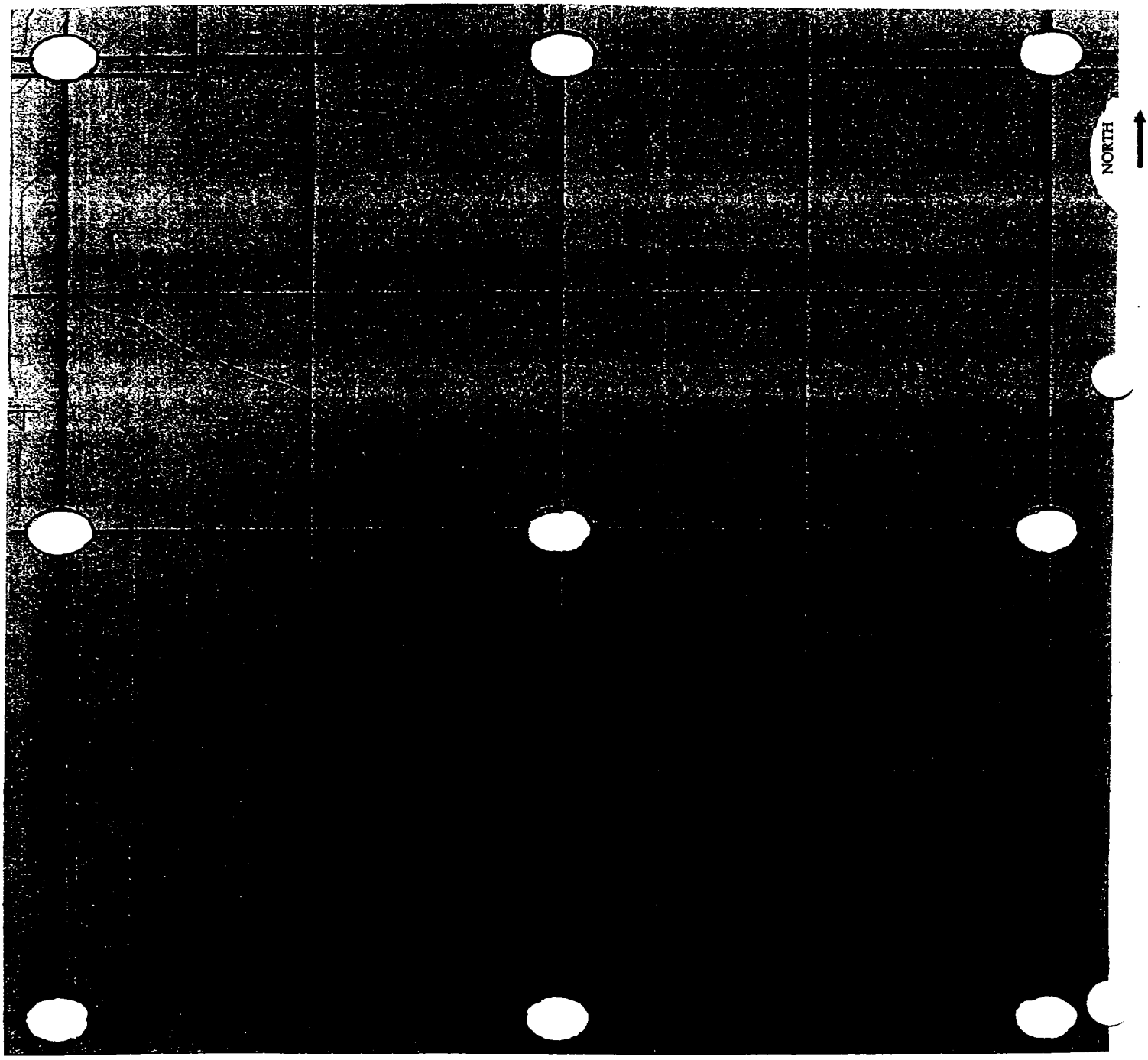
Project # 32193-XC Project Name Lake Shore East Sheet 1 of 2

Date 3/6/03 & 3/7/03 Technician J. Krane, L. Aschim, T. O'Brien

Inst. Model Ludlum 2221 Serial No. 134542 / 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 15 (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

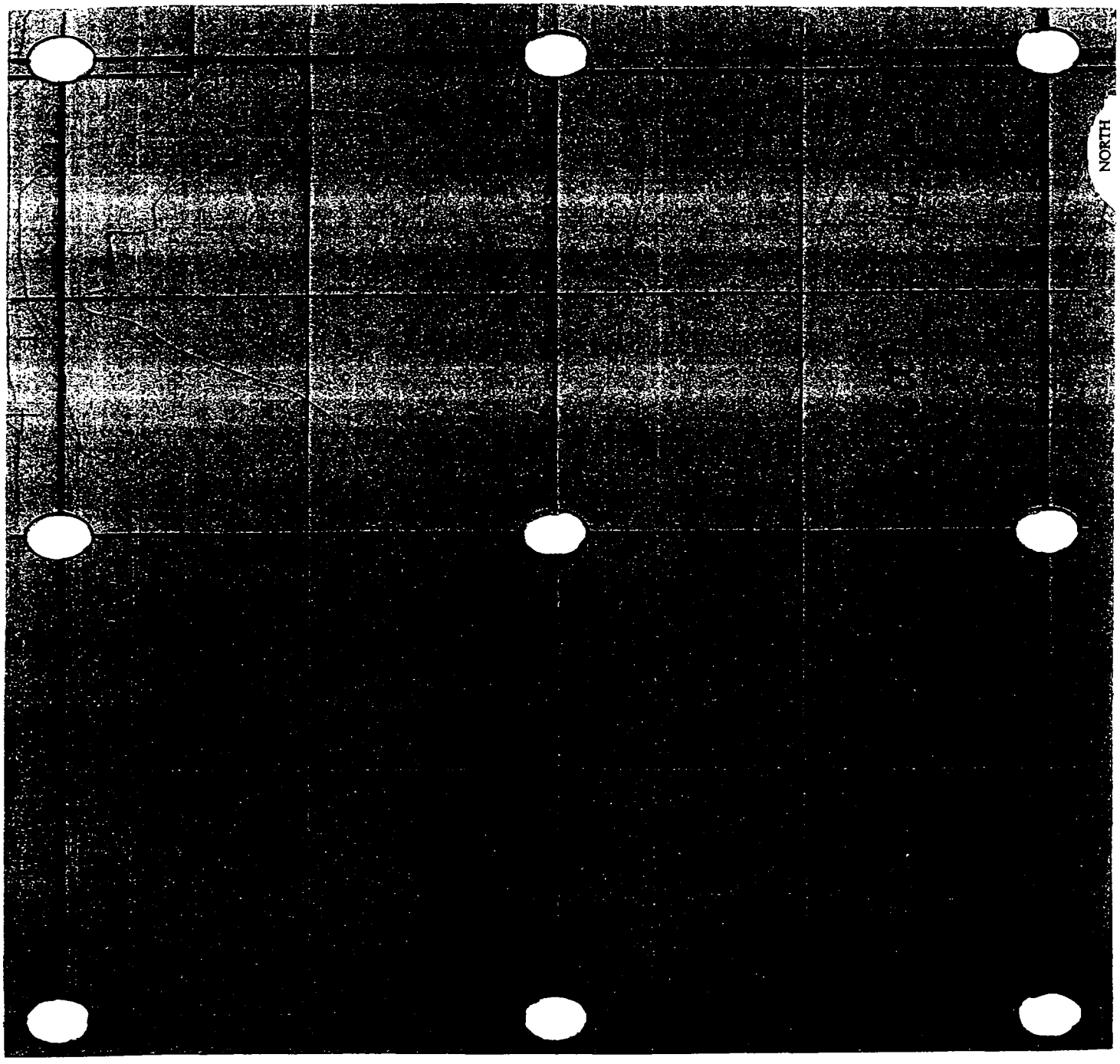
Project # 32193-xc Project Name Lake Shore East Sheet 2 of 2

Date 3/6/03 + 3/7/03 Technician J. Krane, L. Aschim, T. O'Brien

Inst. Model Ludlum 2221 Serial No. 134542 / 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 15 (1½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

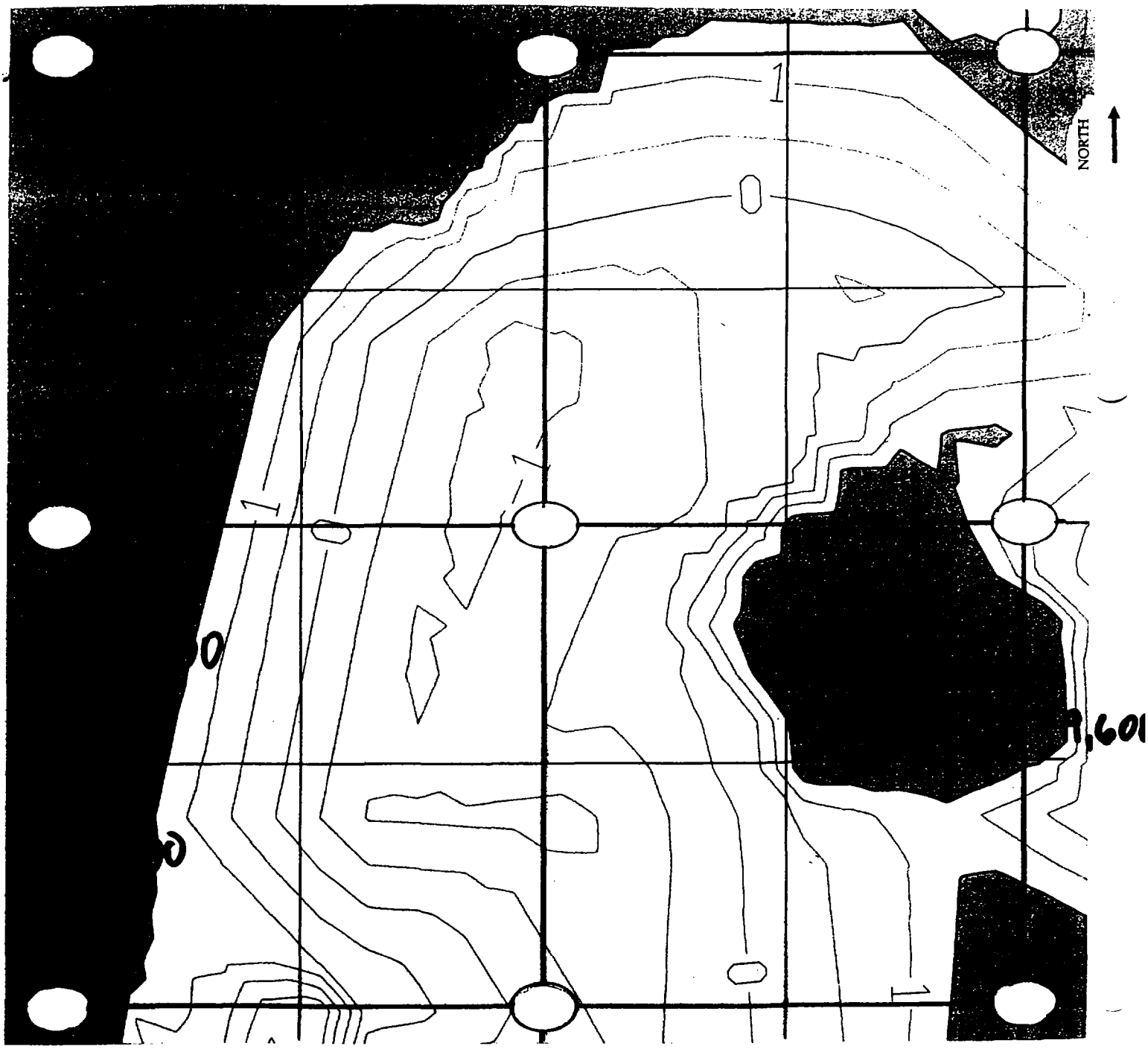
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 2

Date 12/5/02 Technician Jerry Krane

Inst. Model Ludlum 2221 Serial No. 134542-168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 16 (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

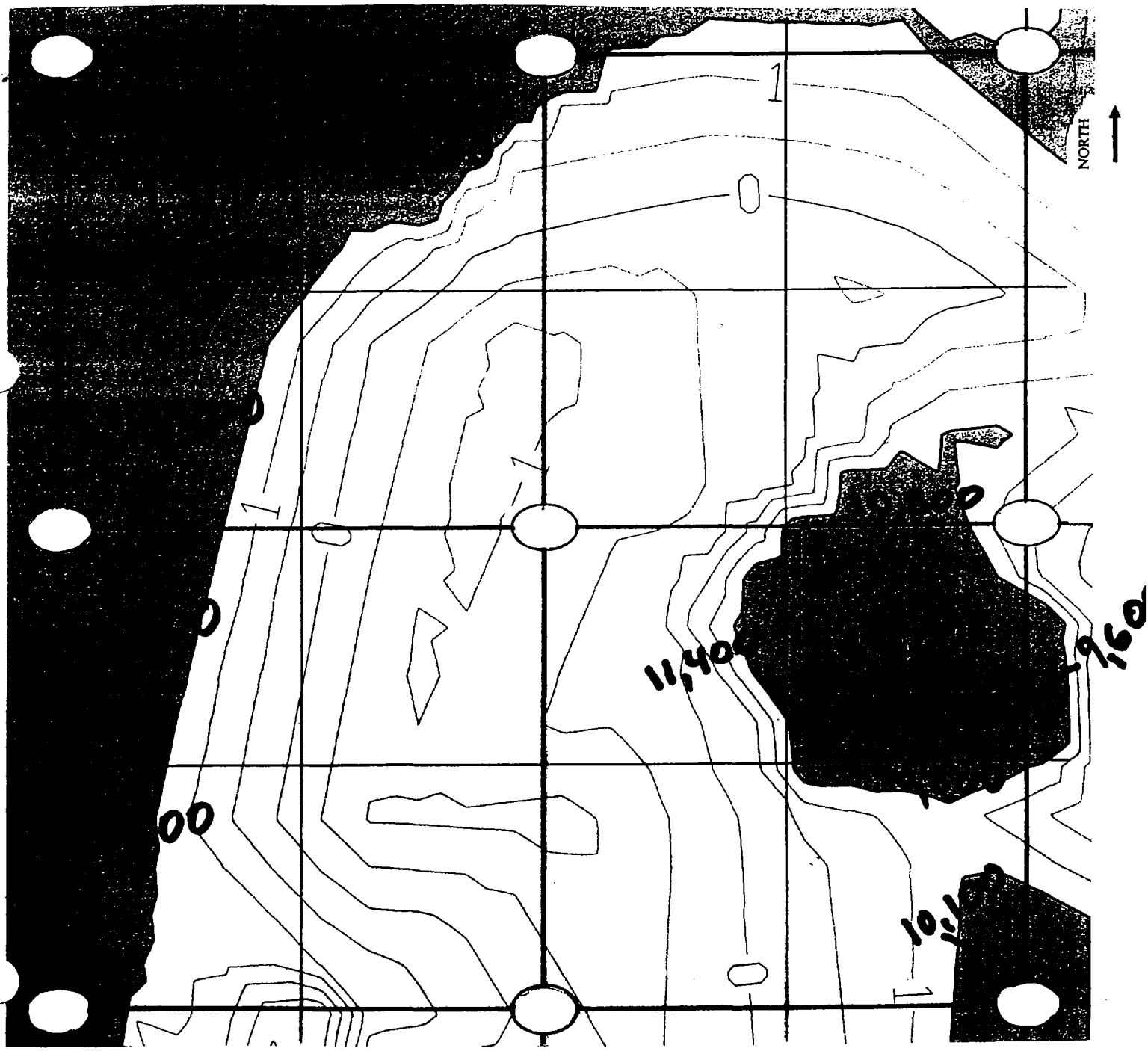
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 2

Date 12/5/02 Technician Jerry Krane

Inst. Model Ludlum 2221 Serial No. 134542-168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 16 (1.5')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

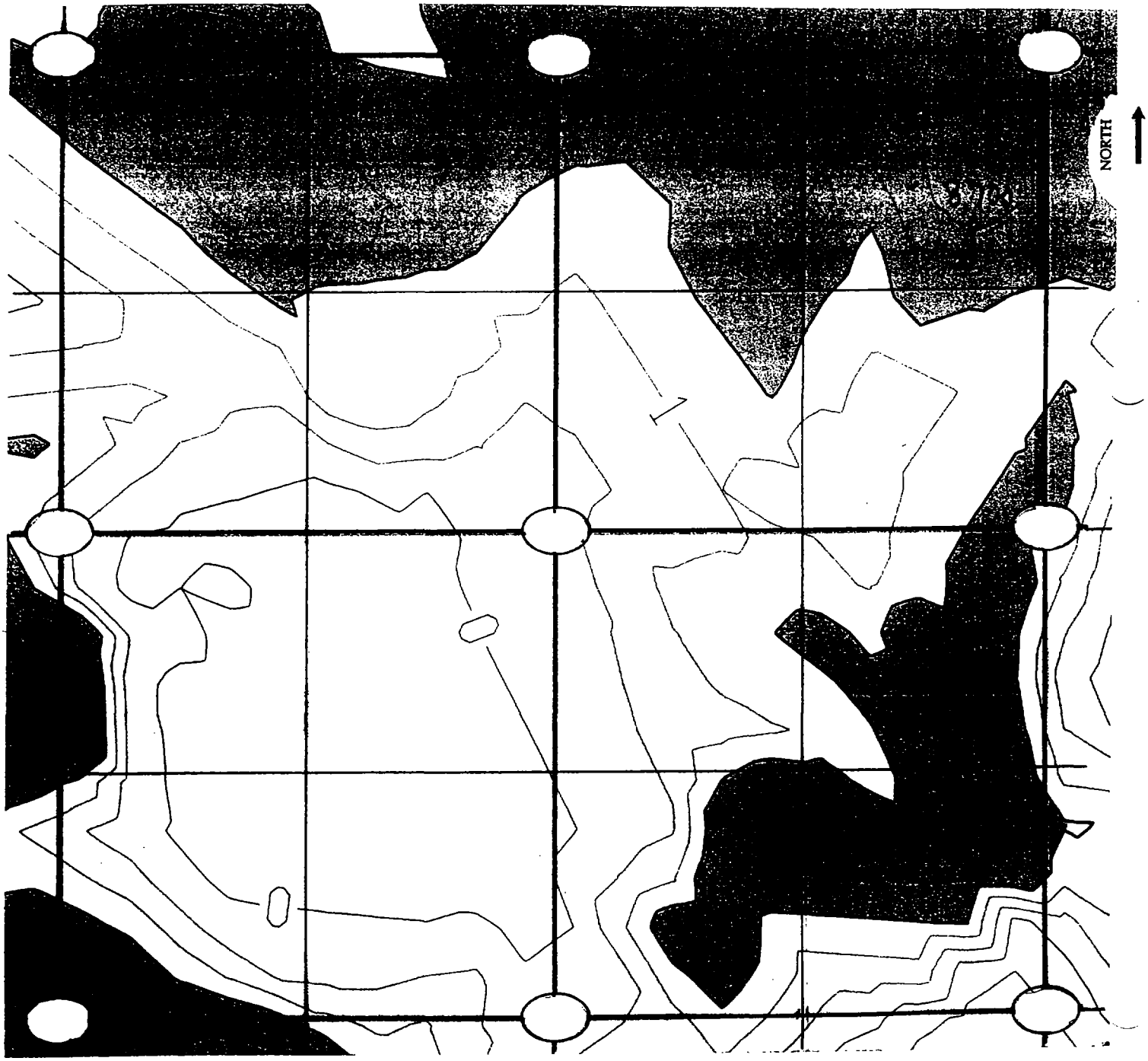
Project # 32193xc Project Name Lakeshore East Sheet 1 of 2

Date 12/10/02 + 12/26/02 Technician Lincisay Aschim

Inst. Model 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 17 (3.0)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

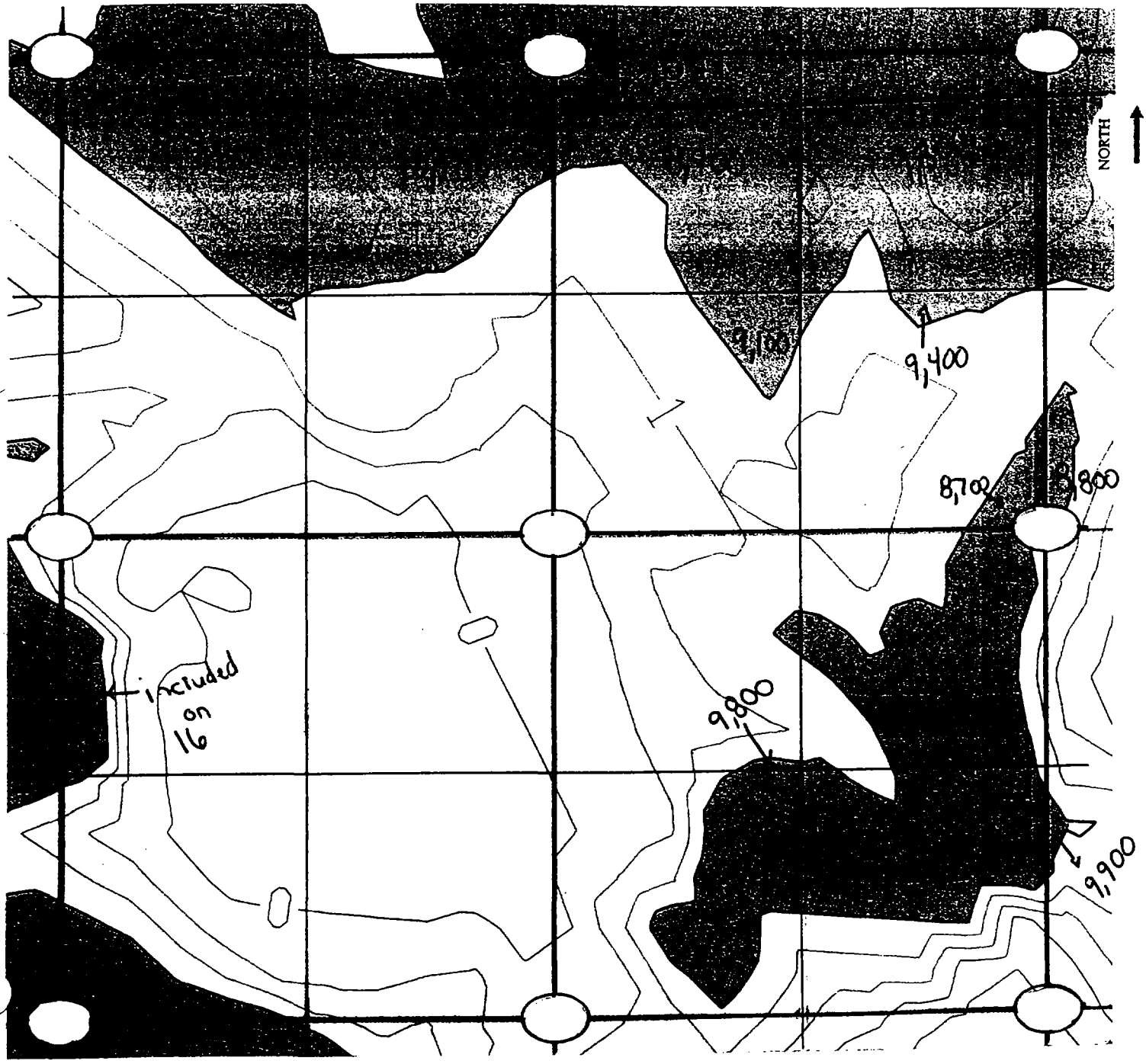
STS Consultants, Ltd. Project # 32193xc Project Name Lakeshore East Sheet 2 of 2

Date 12/10/02 + 12/26/02 Technician Jerry Kraus

Inst. Model 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 17 (1.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

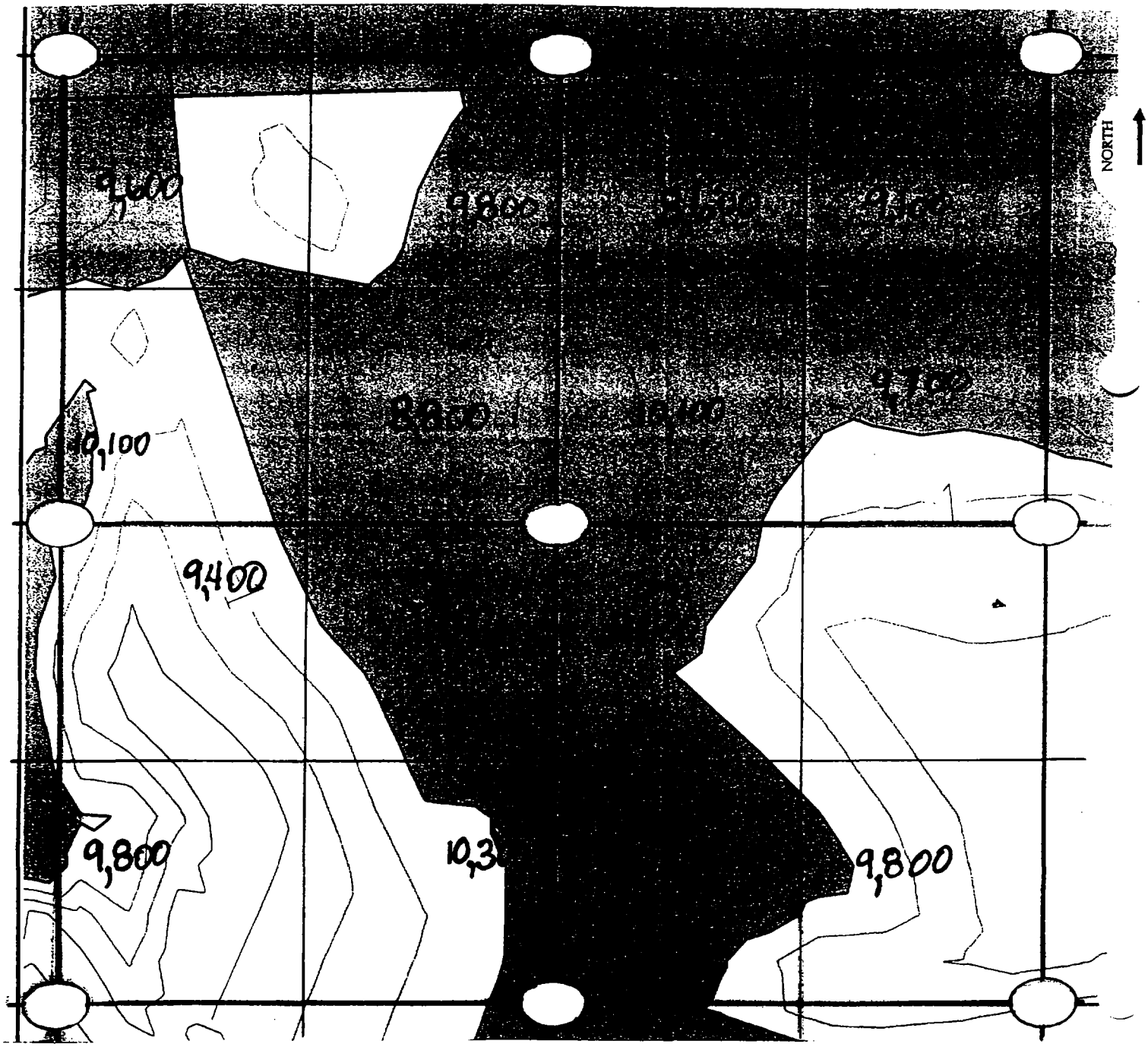
Project # 1-32193-xc Project Name Lakeshore East Sheet 1 of 2

Date 2/27/03 & 2/26/03 Technician L. Aschim, J. Krane, T. O'Brien

Inst. Model Ludlum 2221 Serial No. 126496/168143 & 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 18 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

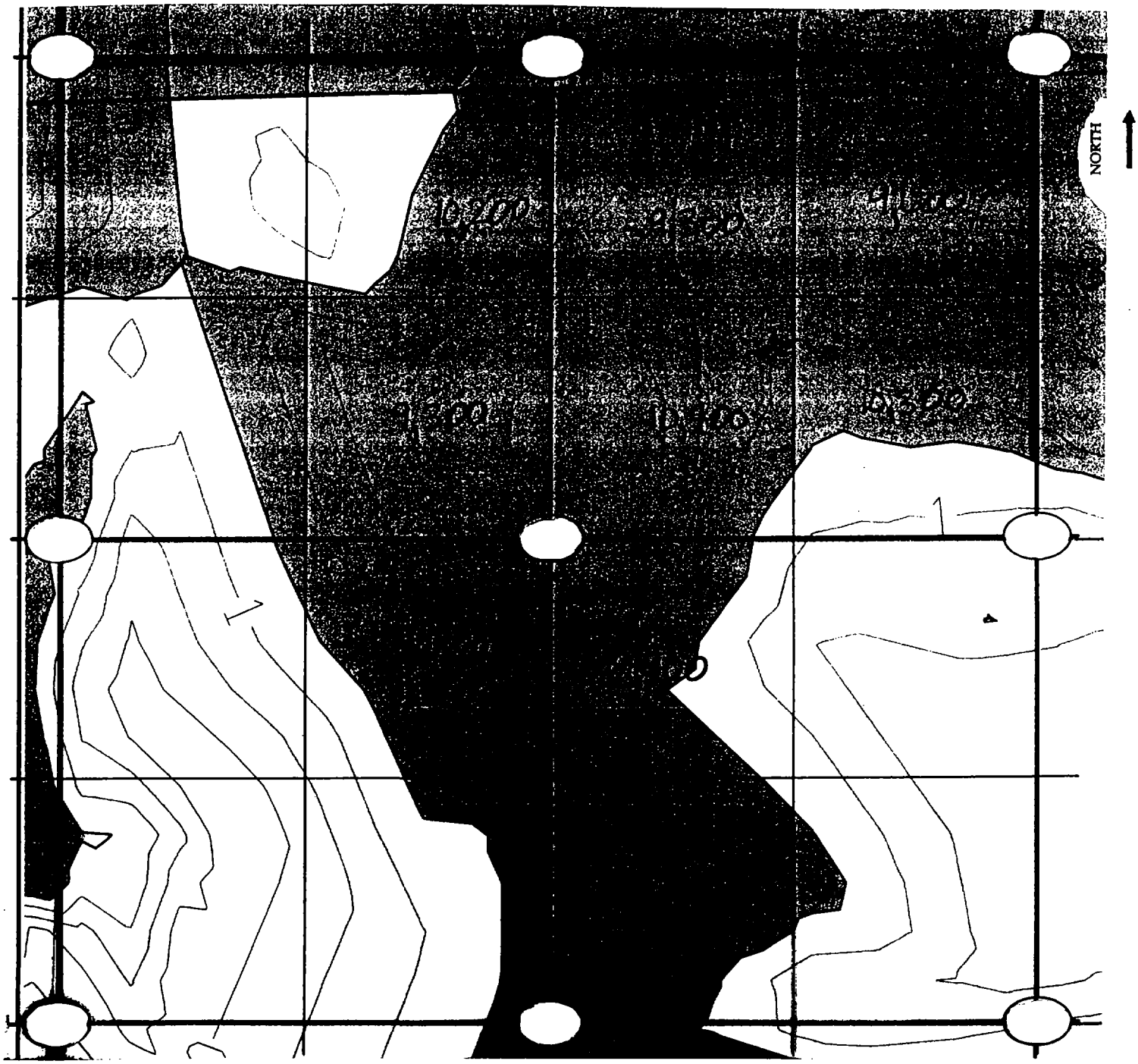
Project # 1-32193-XC Project Name Lakeshore East Sheet 2 of 2

Date 2/26/03 & 2/27/03 Technician L. Aschim / J. Krause / T. O'Brien

Inst. Model Ludlum 2221 Serial No. 126496/168143 & 132844/168148

Inst. Calibrated (Y/N)? yes Location ID/Lift Elevation 18 - 3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

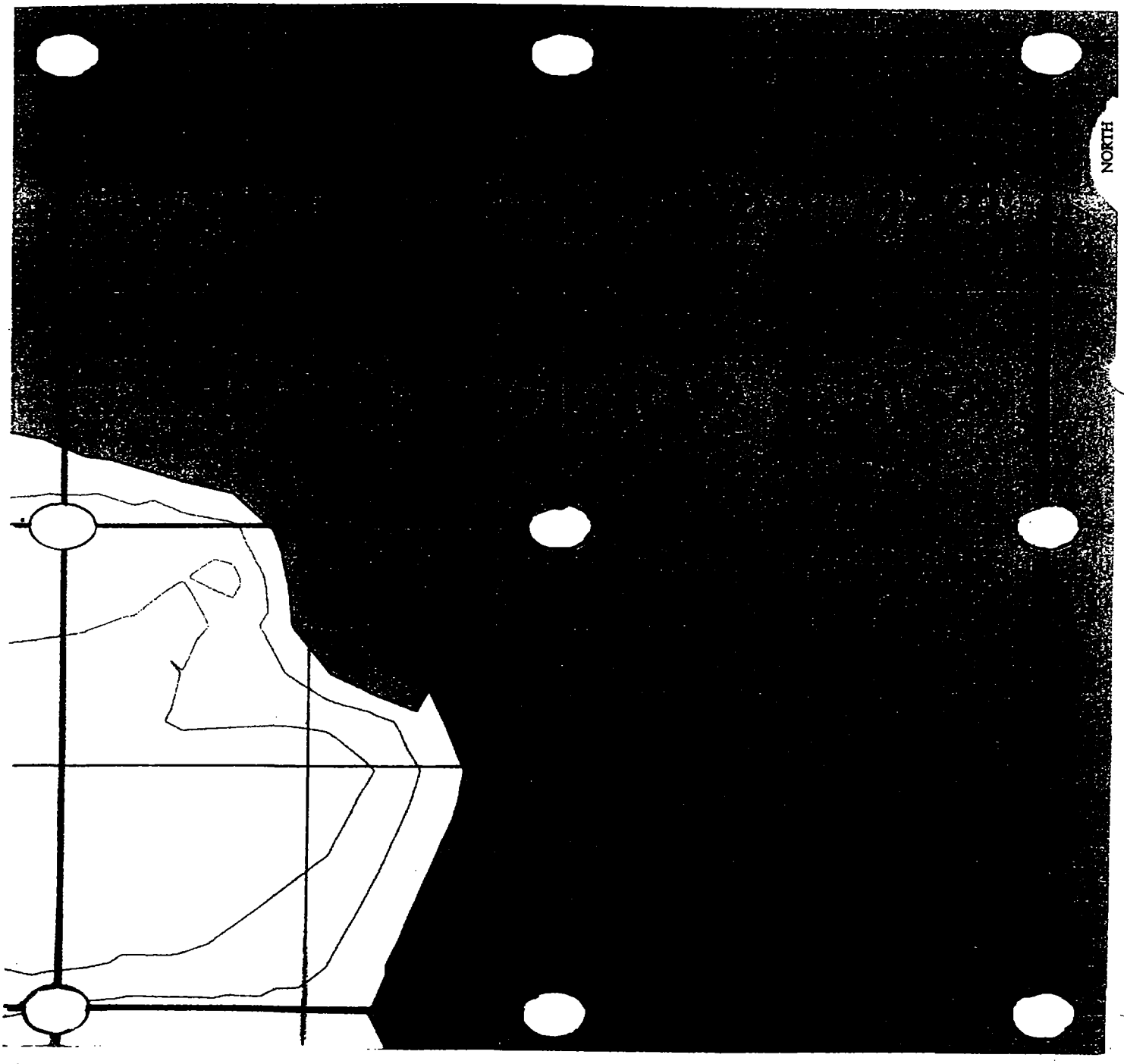
Project # 1-32198-XC Project Name Lakeshore East Sheet 1 of 2

Date 2/19/03 - 2/24/03 Technician LAschim/T. O'Brian/J. Krano

Inst. Model Ludlum 2221 Serial No. 134542/168143 & 126496/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 19 - 3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

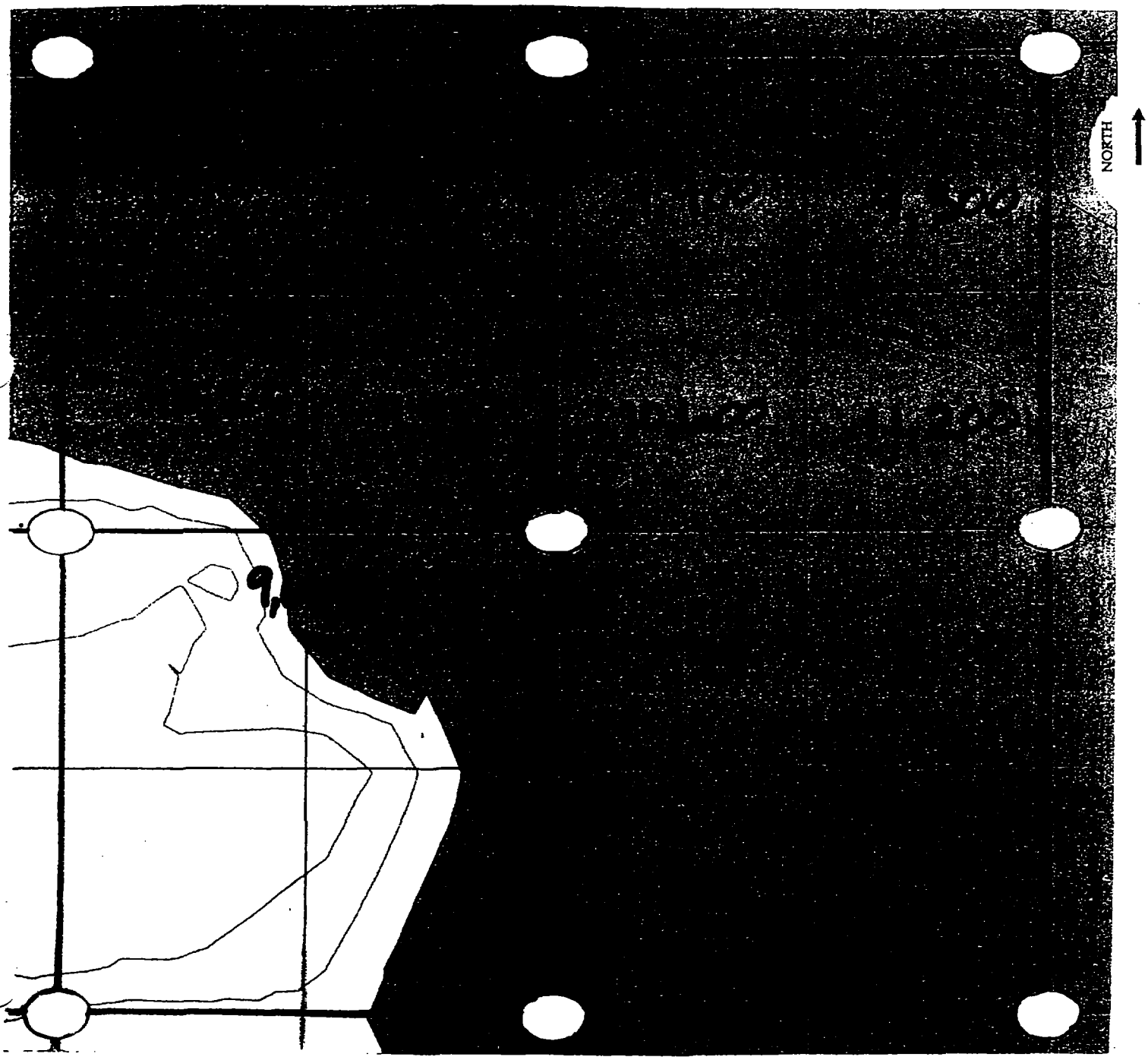
Project # 1-32193-XC Project Name Lakeshore East Sheet 2 of 2

Date 2/19/03 - 2/24/03 Technician L. Aschim / T. O'Brian / J. Krane

Inst. Model Ludlum 2221 Serial No. 134542/168143 & 126496/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 19 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

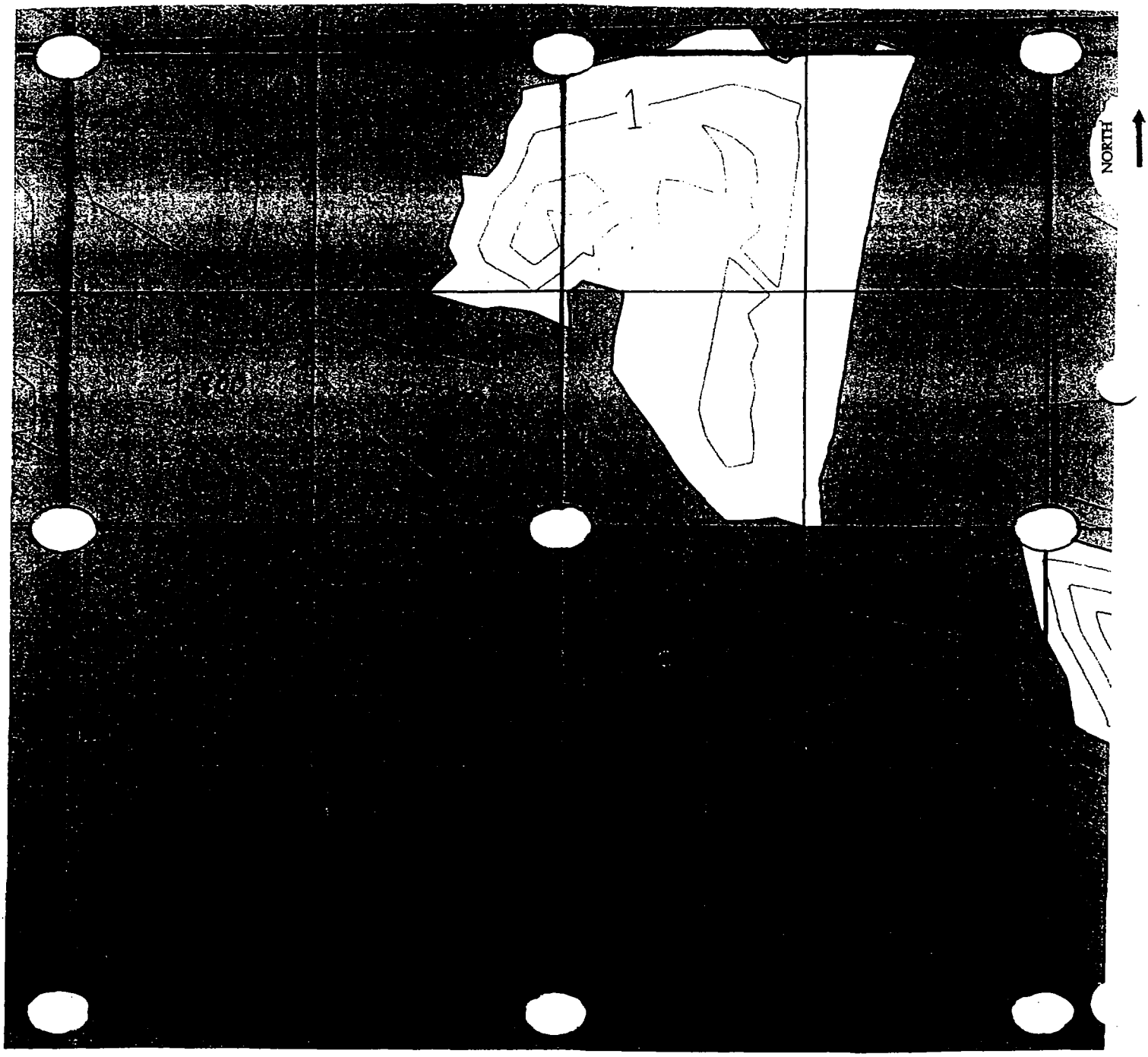
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 2

Date 2/11 - 2/12 - 2/13 - 2/14 Technician Jerry Krause / Tim O'Brien / Lindsay Ke

Inst. Model 2221 Serial No. #132844 #168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation ZO 3.0'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

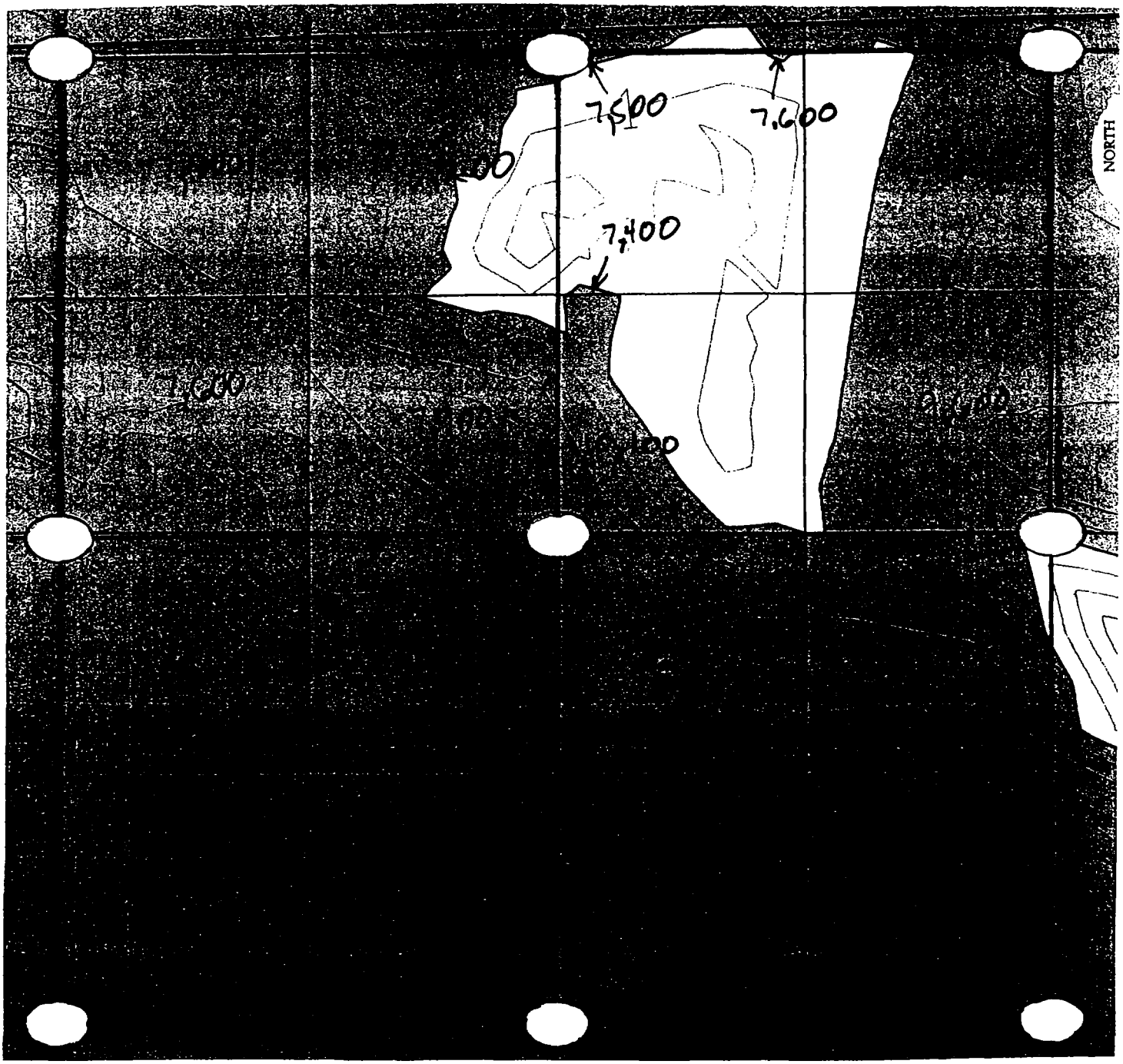
Project # 1-32193-XC Project Name Lakeshore East Sheet 2 of 2

Date 2/11 - 2/12 - 2/13 - 2/14 Technician Jerry Krause / Tim O'Brien / Lindsay [illegible]

Inst. Model 2221 Serial No. #132844 #168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 20 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

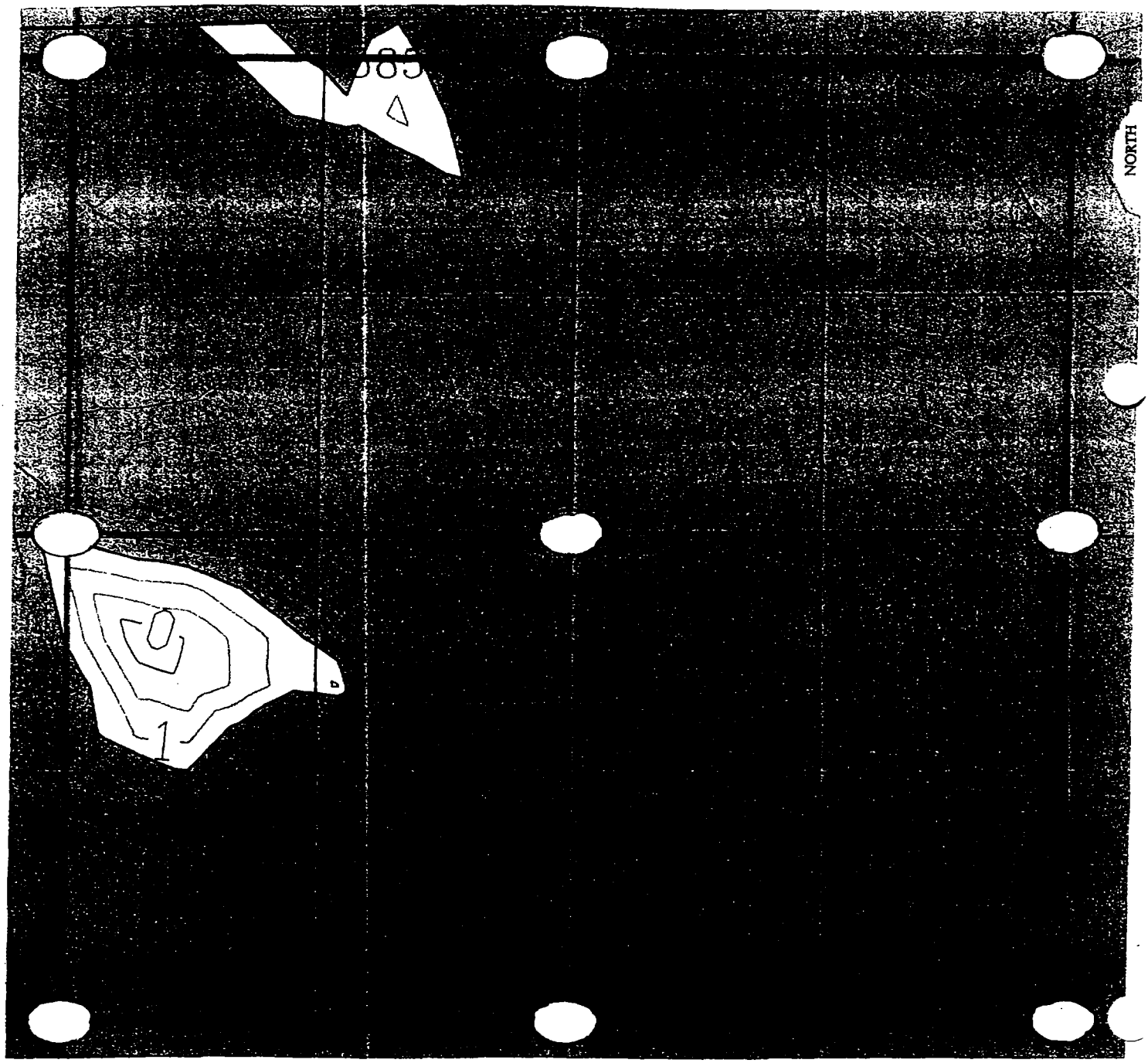
Project # 32193-XC Project Name Lakeshore East Sheet 1 of 5

Date 1/23/03, 1/24/03, 1/27/03-1/31/03, 2/3/03-2/7/03 Technician T. O'Brien, J. Krane

Inst. Model Ludlum 2221 Serial No. 134542, 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 21 (7½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

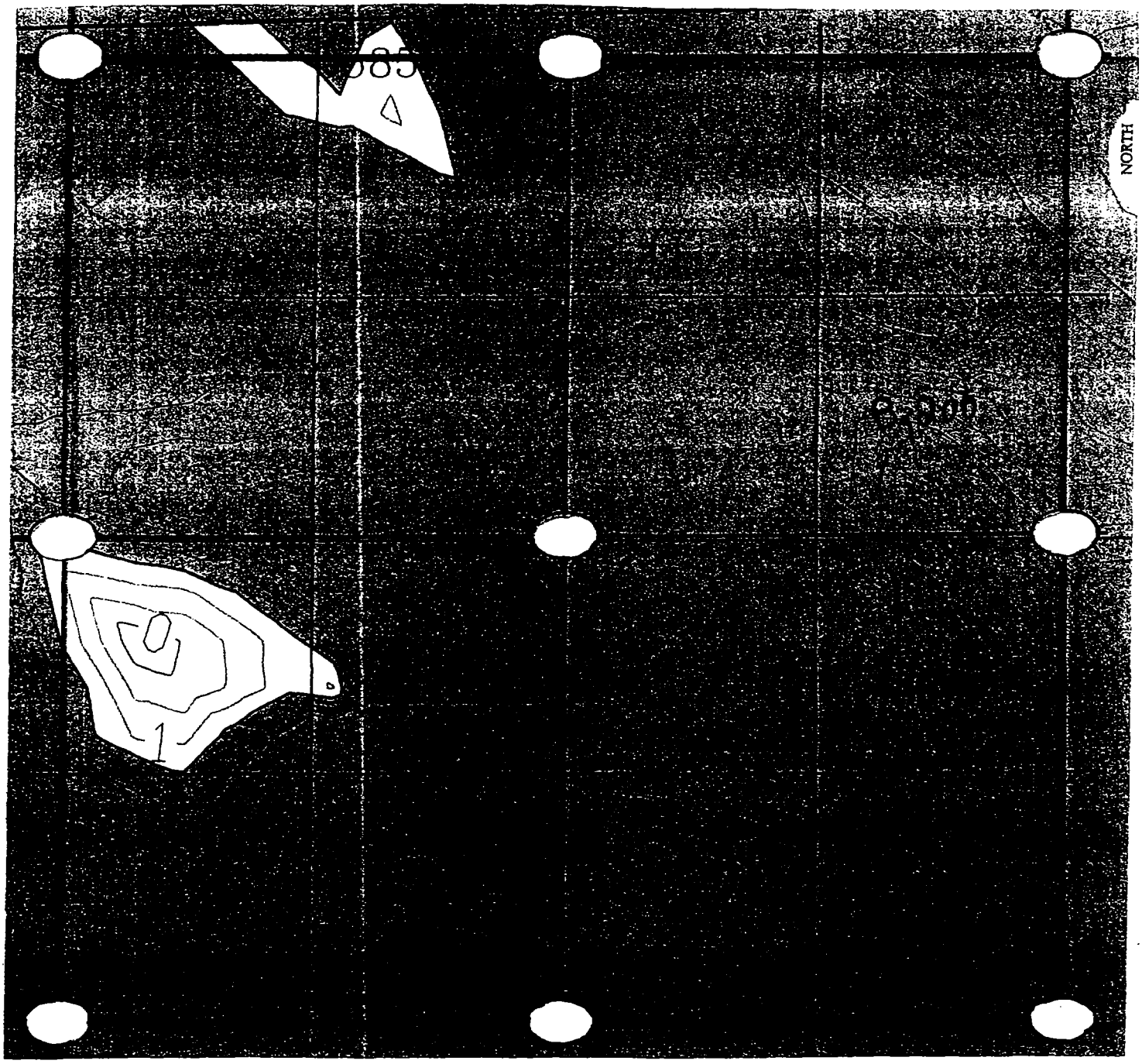
Project # 32193-XC Project Name Lakeshore East Sheet 2 of 5

Date 1/23/03, 1/24/03, 1/27/03-1/31/03, 2/3/03-2/7/03 Technician T. O'Brien, J. Krane

Inst. Model Ludlum 2221 Serial No. 134542, 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 21 (6')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

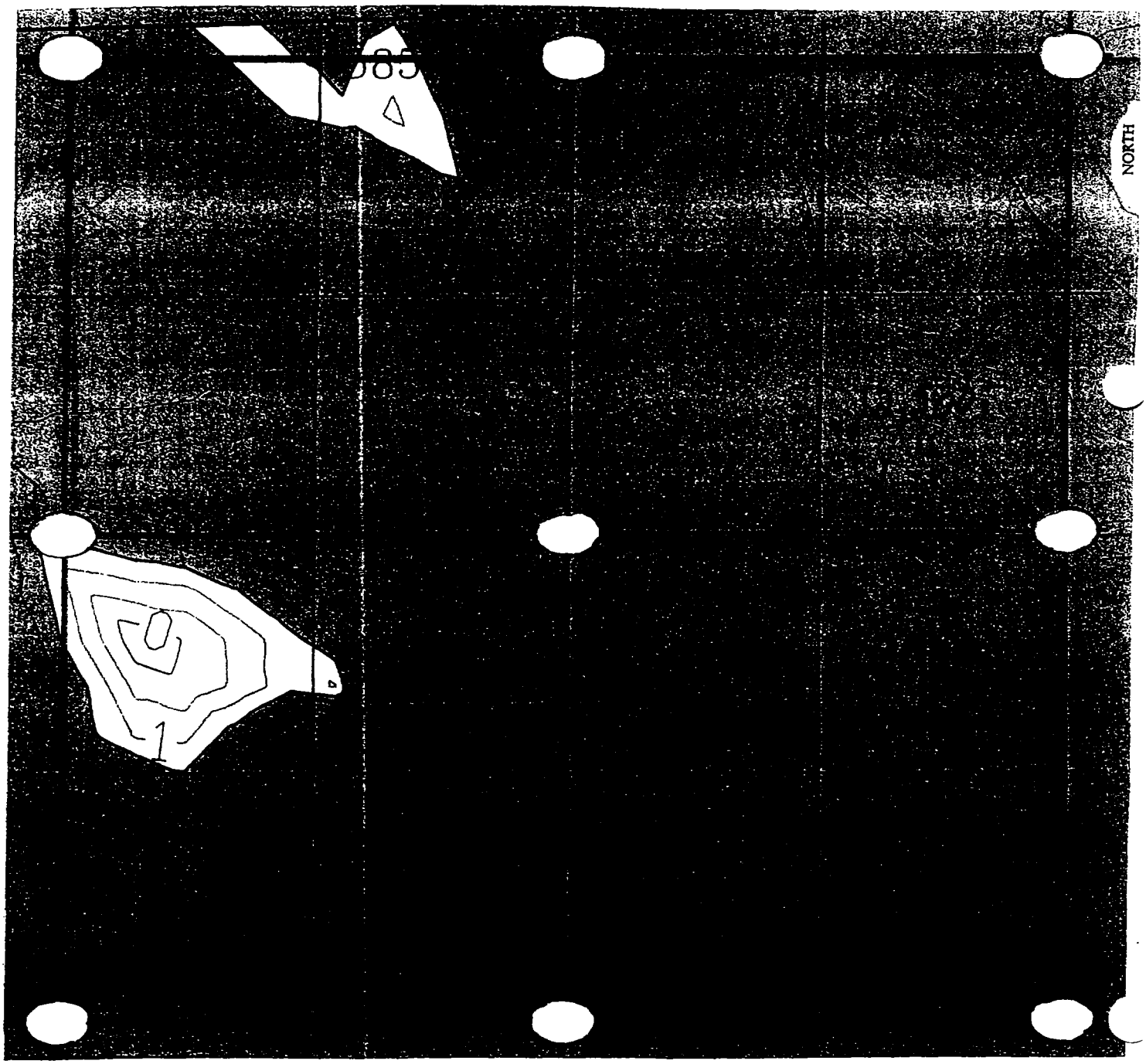
Project # 32193-xc Project Name Lakeshore East Sheet 3 of 5

Date 1/23/03, 1/24/03, 1/27/03-1/31/03, 2/3/03-2/7/03 Technician T. O'Brien, J. Krane

Inst. Model Ludlum 2221 Serial No. 134542, 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 21 (4½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

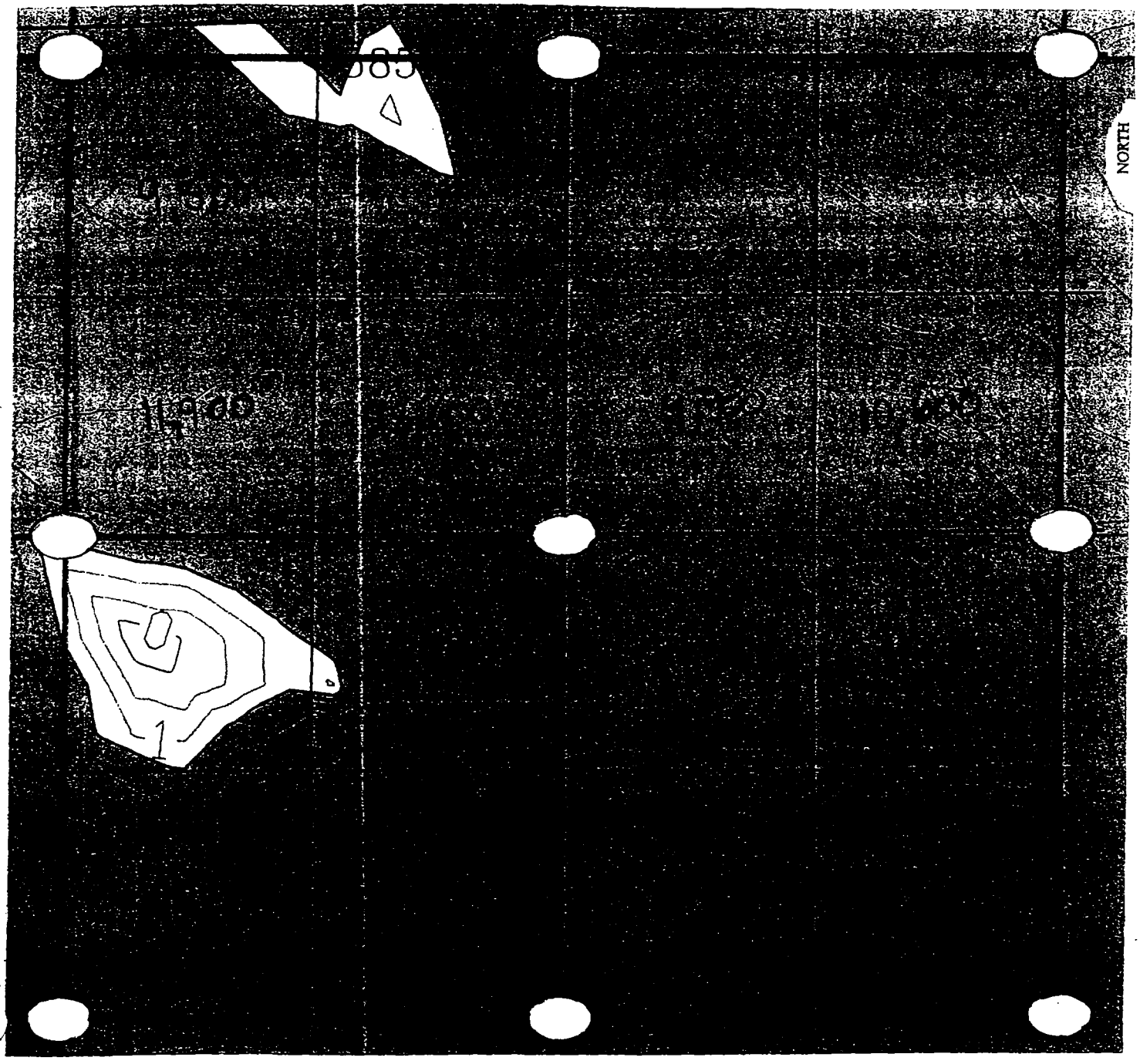
Project # 32193-XC Project Name Lakeshore East Sheet 4 of 5

Date 1/23/03, 1/24/03, 1/27/03-1/31/03, 2/3/03-2/4/03 Technician T. O'Brien, J. Krane

Inst. Model Ludlum 2221 Serial No. 134542, 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z1 (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

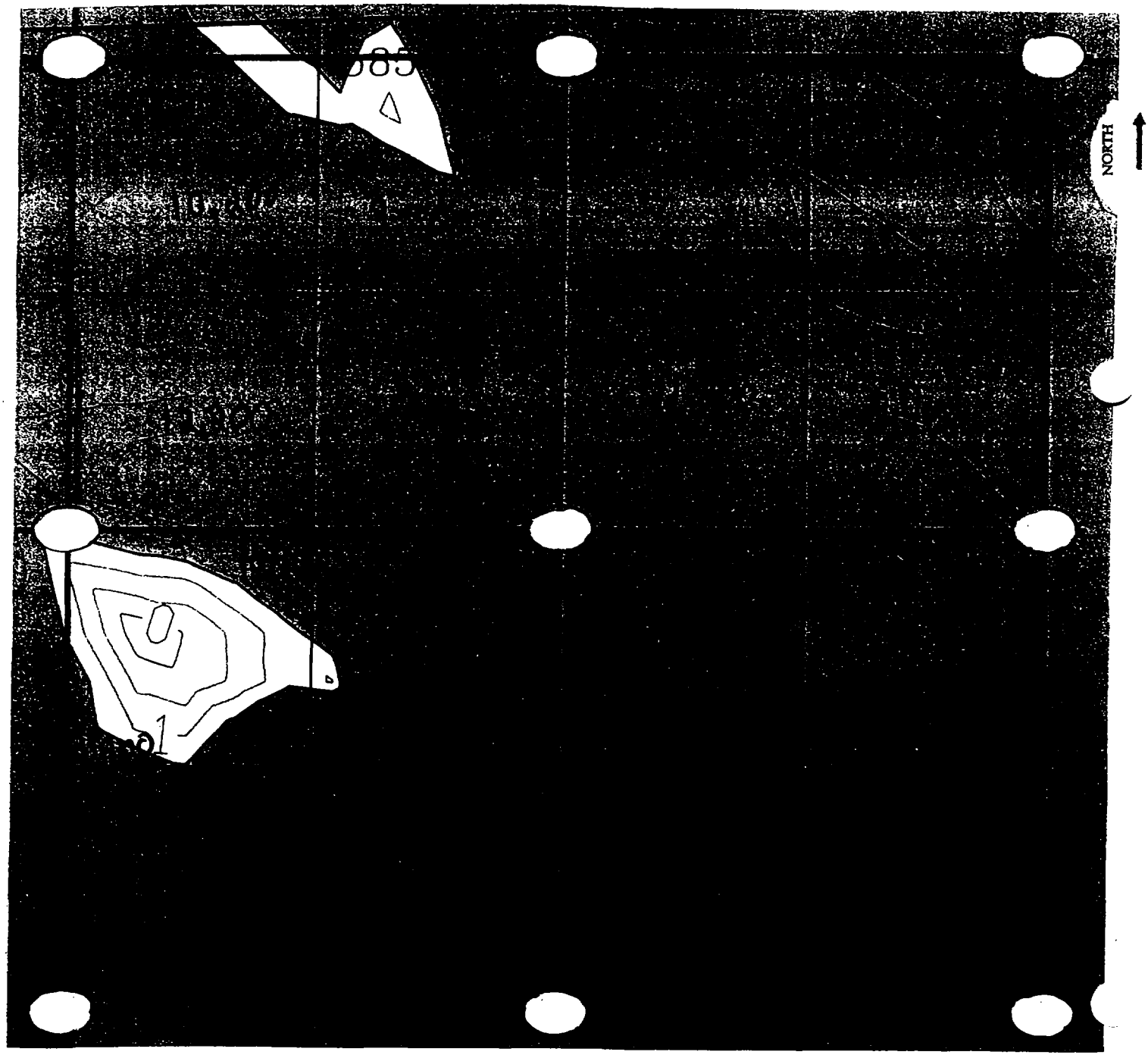
Project # 32193-xc Project Name Lakeshore East Sheet 5 of 5

Date 1/23/03, 1/24/03, 1/27/03 - 1/31/03, 2/3/03-2/7/03 Technician T. O'Brien, J. Krane

Inst. Model Ludlum 2221 Serial No. 134542, 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 21 (1½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

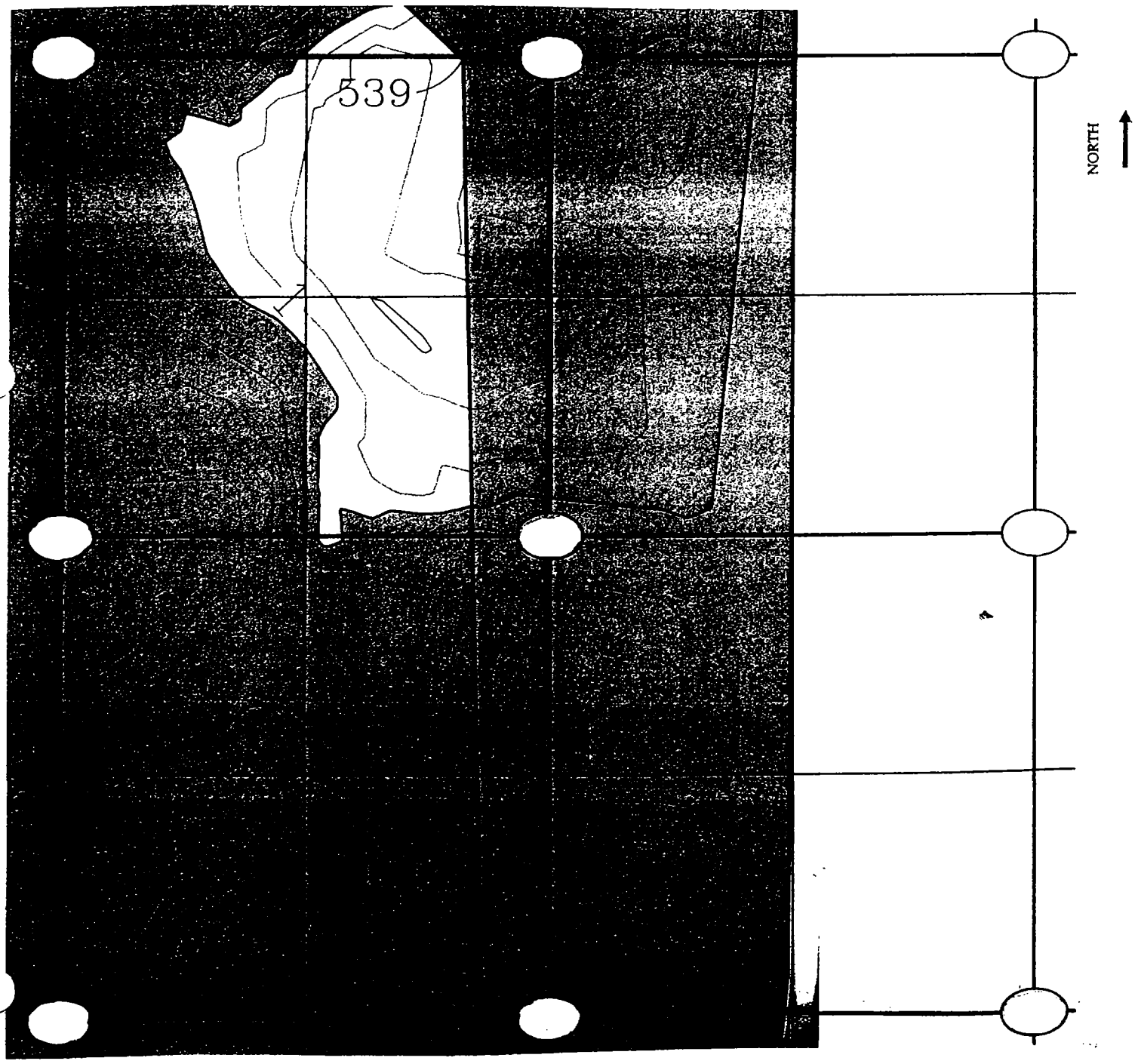
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 4

Date 1/17/03, 1/20/03-1/24/03 Technician Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation ZZ (6')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

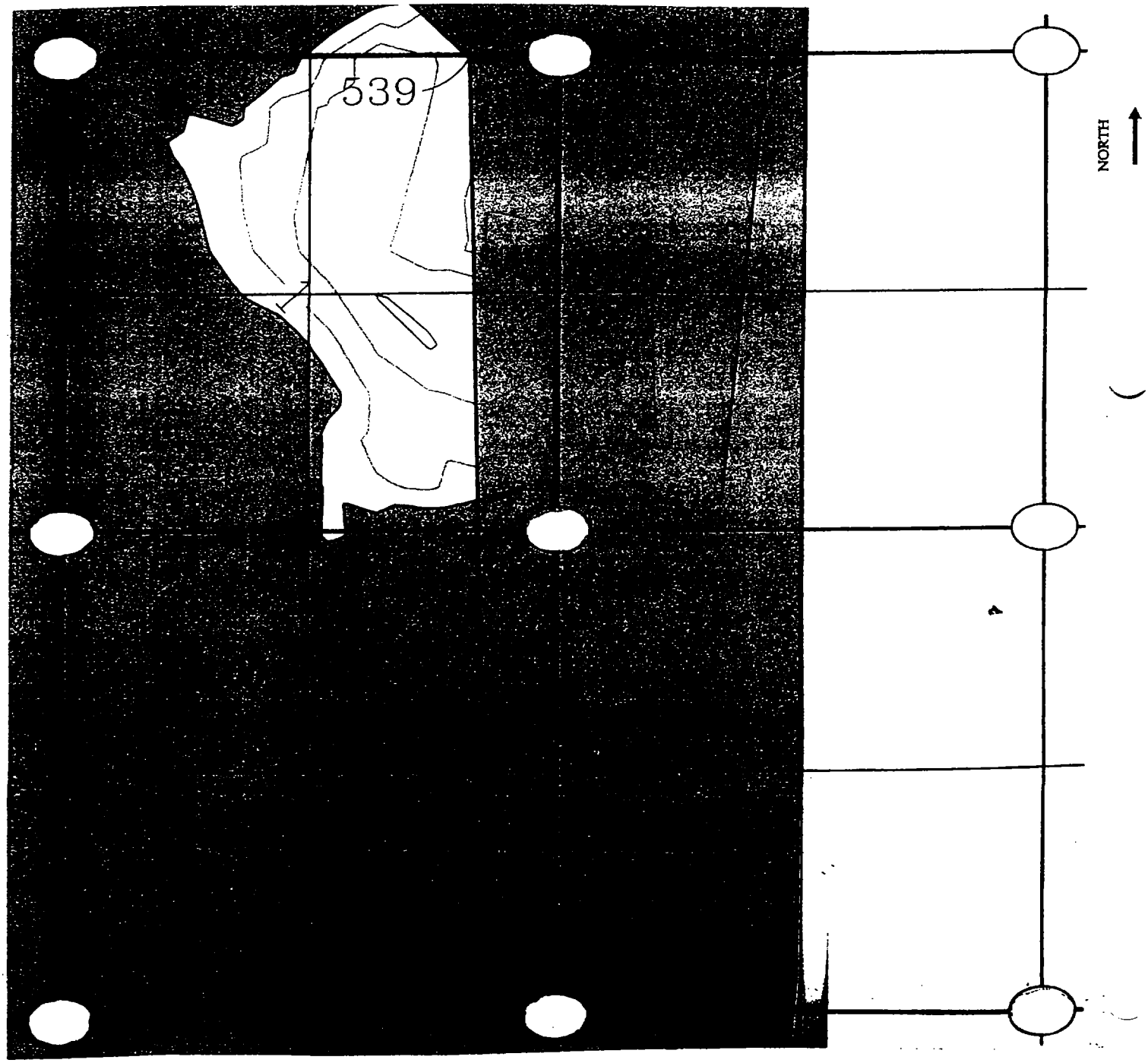
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 4

Date 1/17/03, 1/20/03-1/24/03 Technician Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation ZZ (4½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

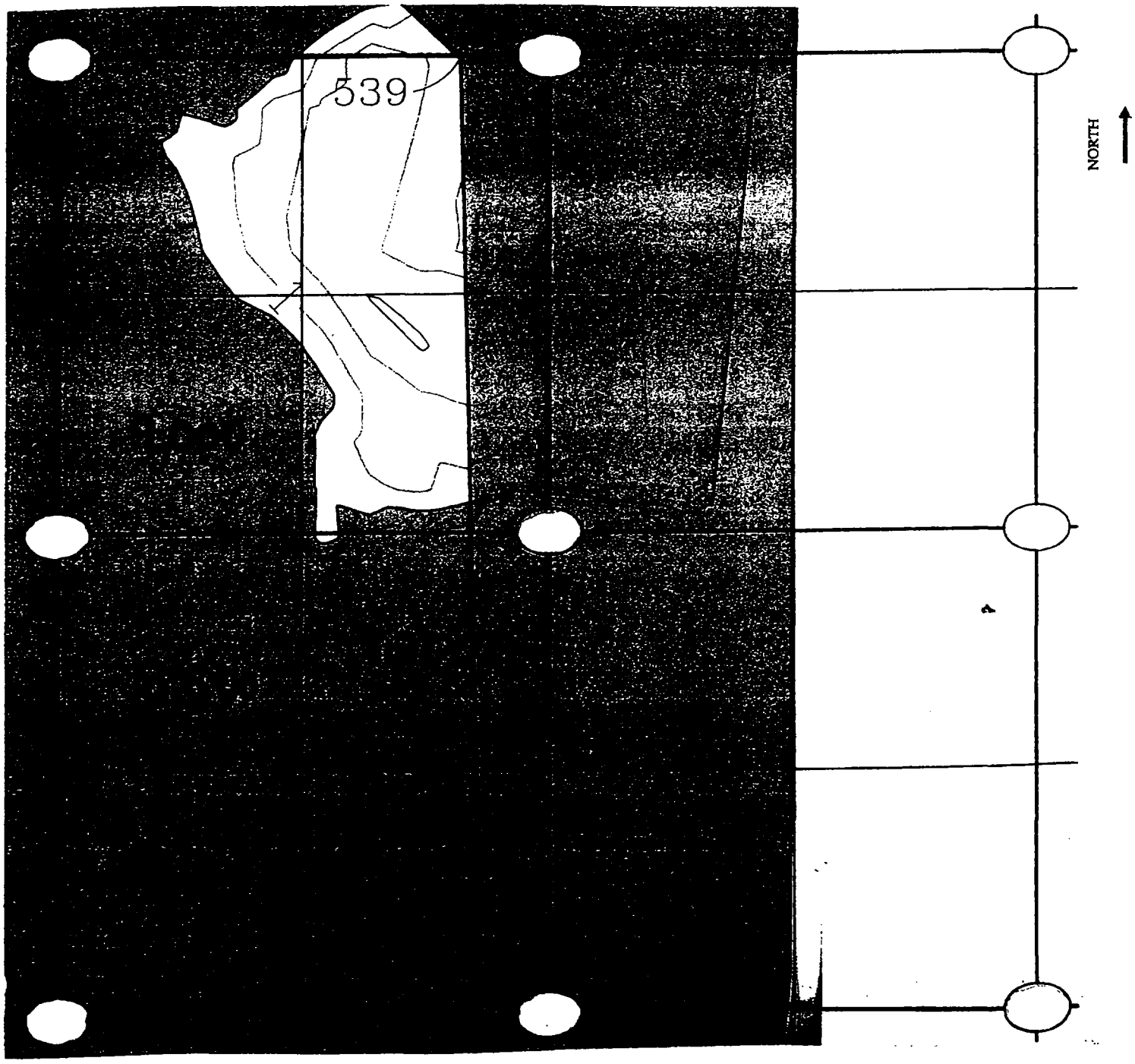
Project # 32193-xc Project Name Lakeshore East Sheet 3 of 4

Date 1/17/03, 1/20/03, 1/21/03, 1/22/03, 1/23/03, 1/24/03 Technician Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation ZZ (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

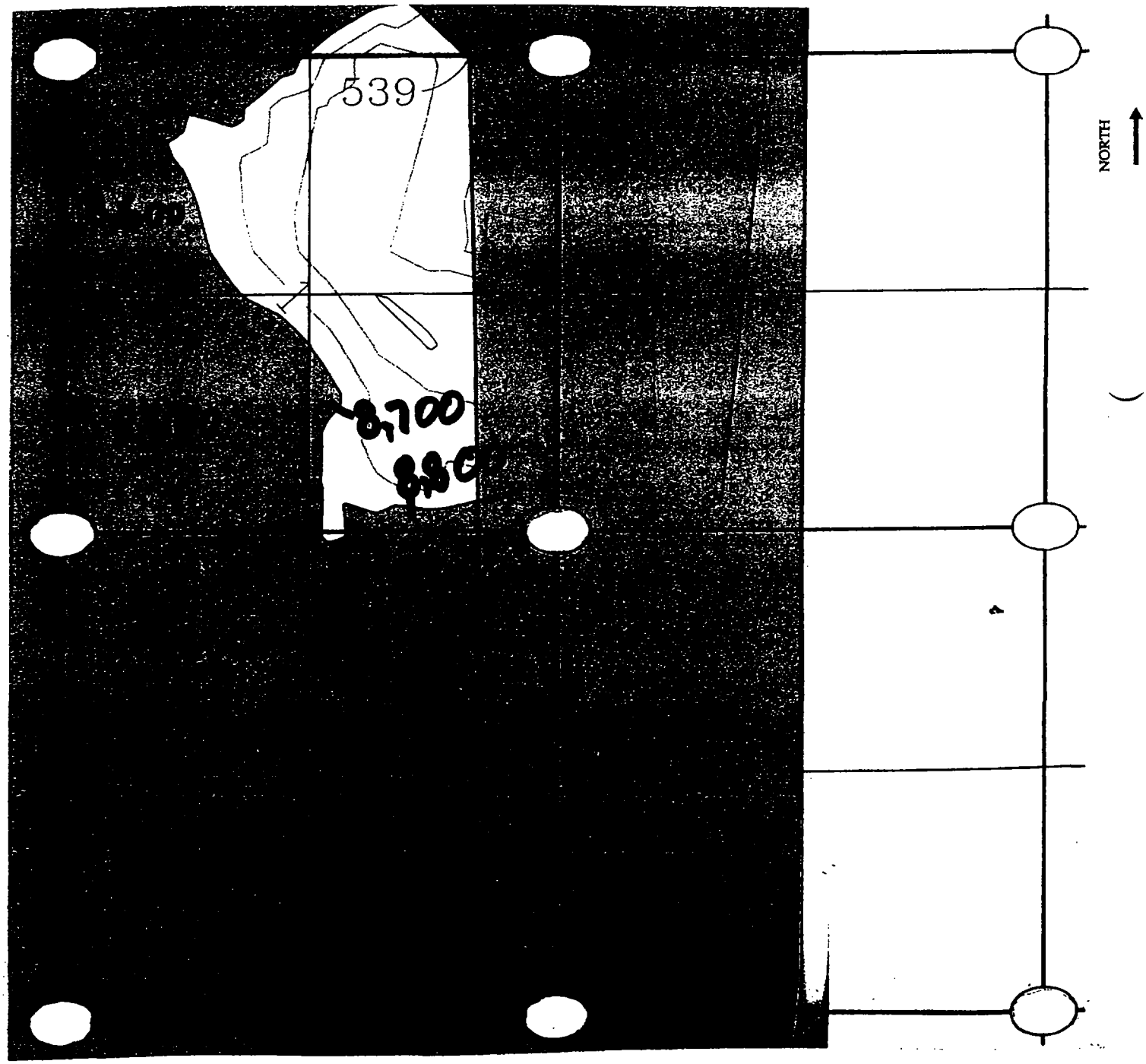
Project # 32193-xc Project Name Lakeshore East Sheet 4 of 4

Date 1/17/03, 1/20/03-1/24/03 Technician Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation ZZ (1½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

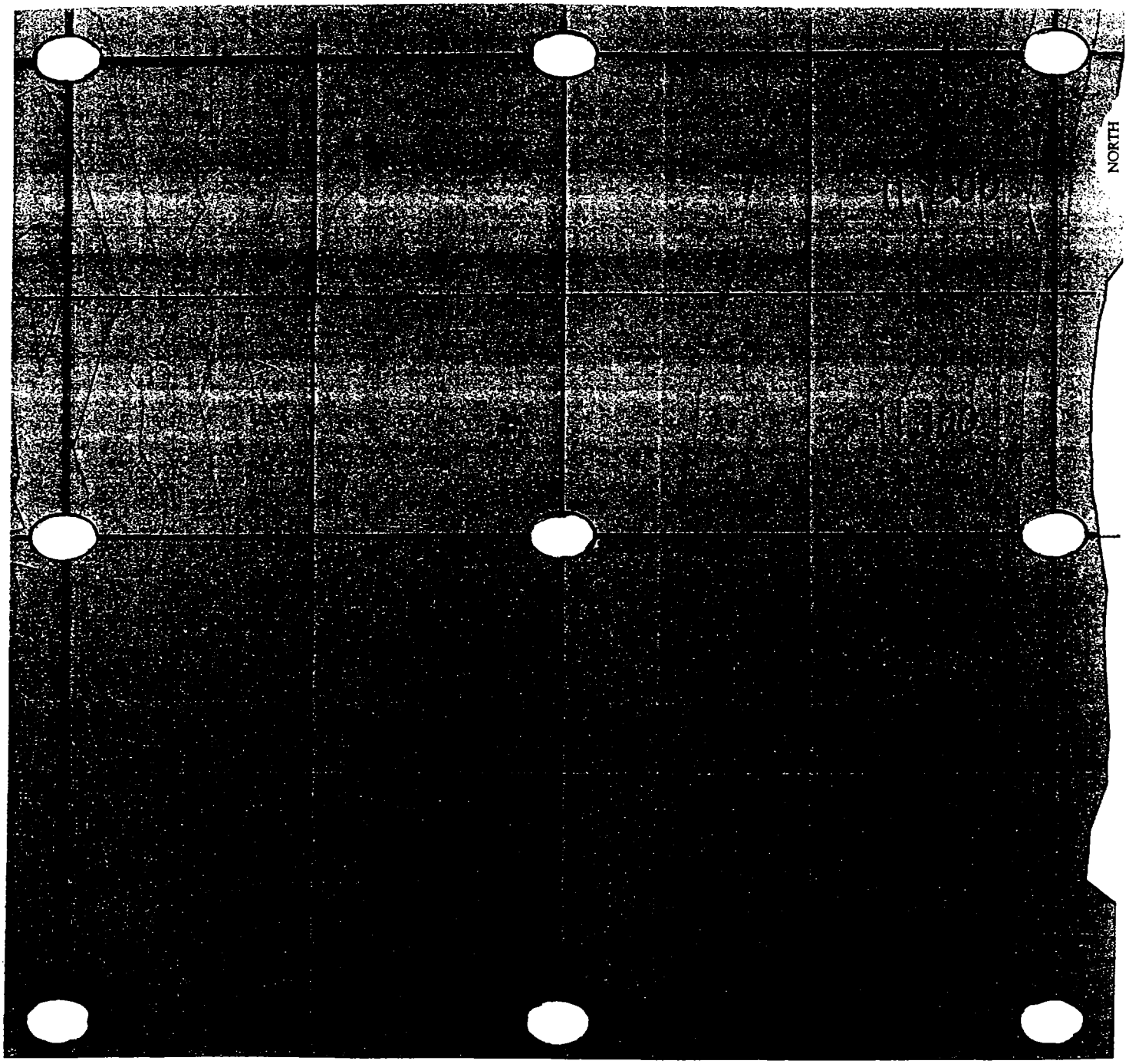
Project # 1-32193-xc Project Name Lakeshore East Sheet 1 of 2

Date 3/4/03 Technician L.Aschim/J.Krane/T.O'Brien

Inst. Model Ludlum 2221 Serial No. 132542/168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z4 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

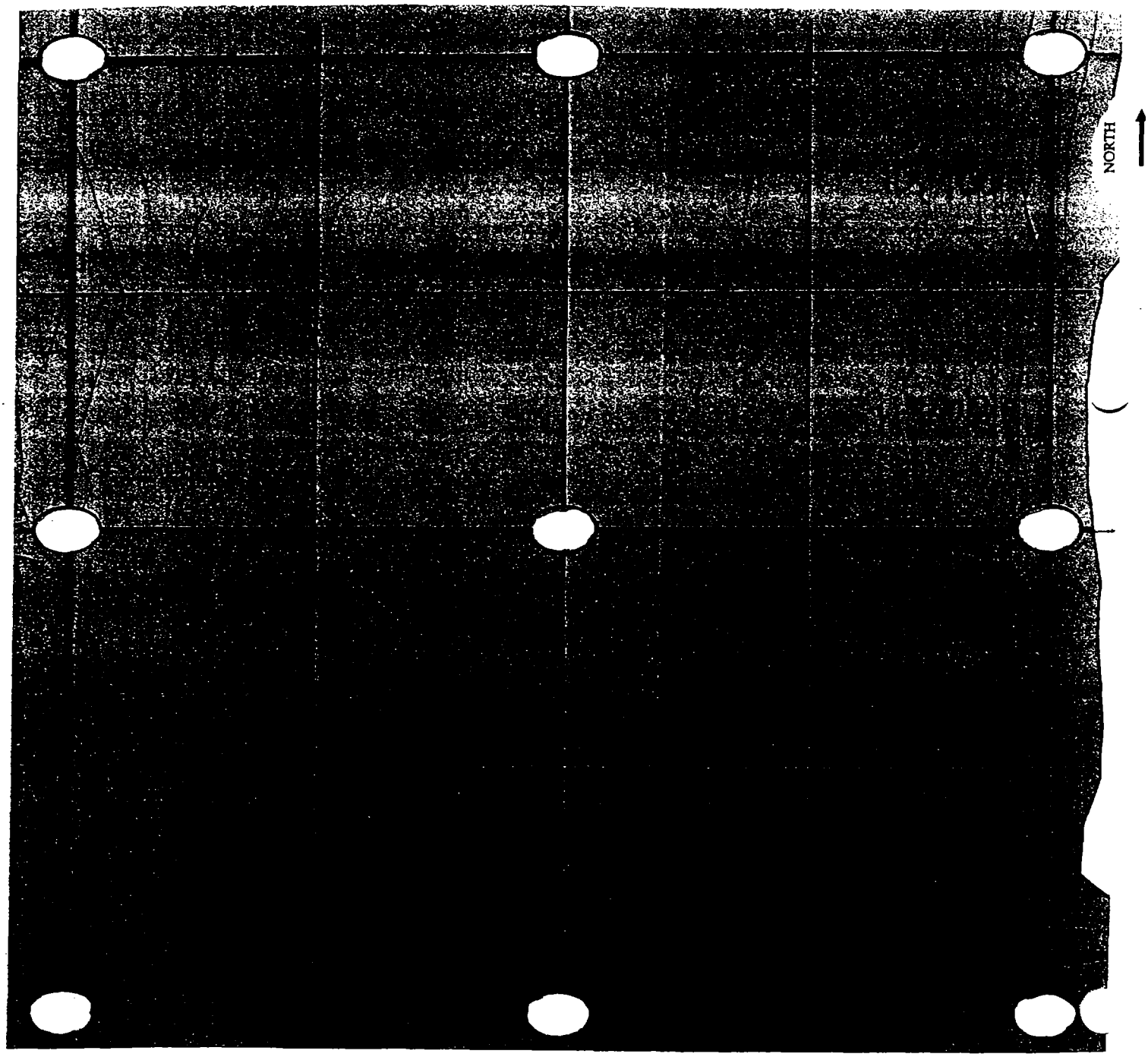
Project # 1-32193-xc Project Name Lakeshore East Sheet 2 of 2

Date 3/4/03 Technician L.Aschim/J.Krane/T. O'Brien

Inst. Model Ludlum 2221 Serial No. 134542 / 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z4 - 3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

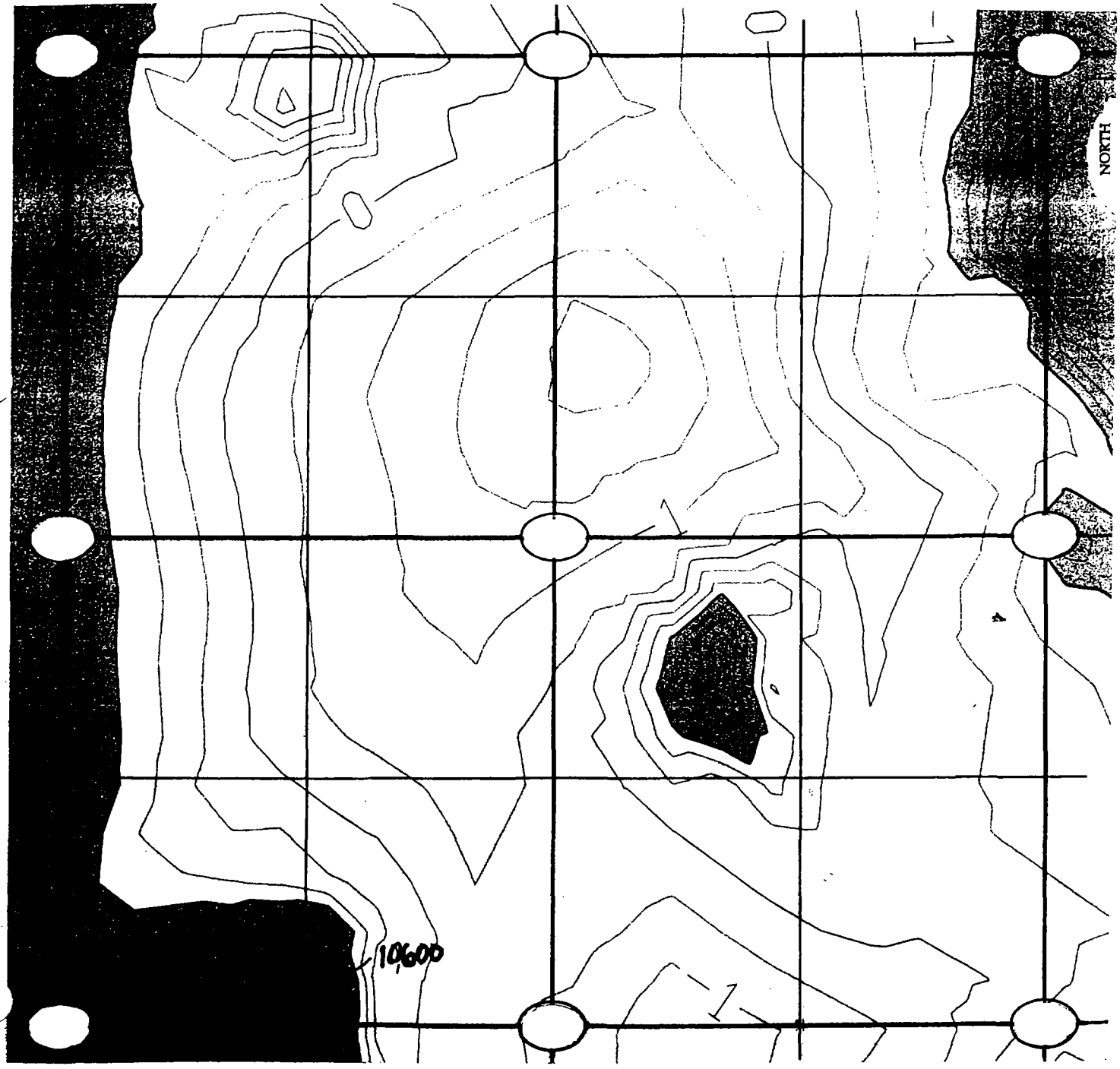
Project # 32183-xc Project Name Lakeshore East Sheet 1 of 2

Date 12/3/02 Technician Jerry Krane

Inst. Model 2221 Serial No. 127242

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 25, 3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

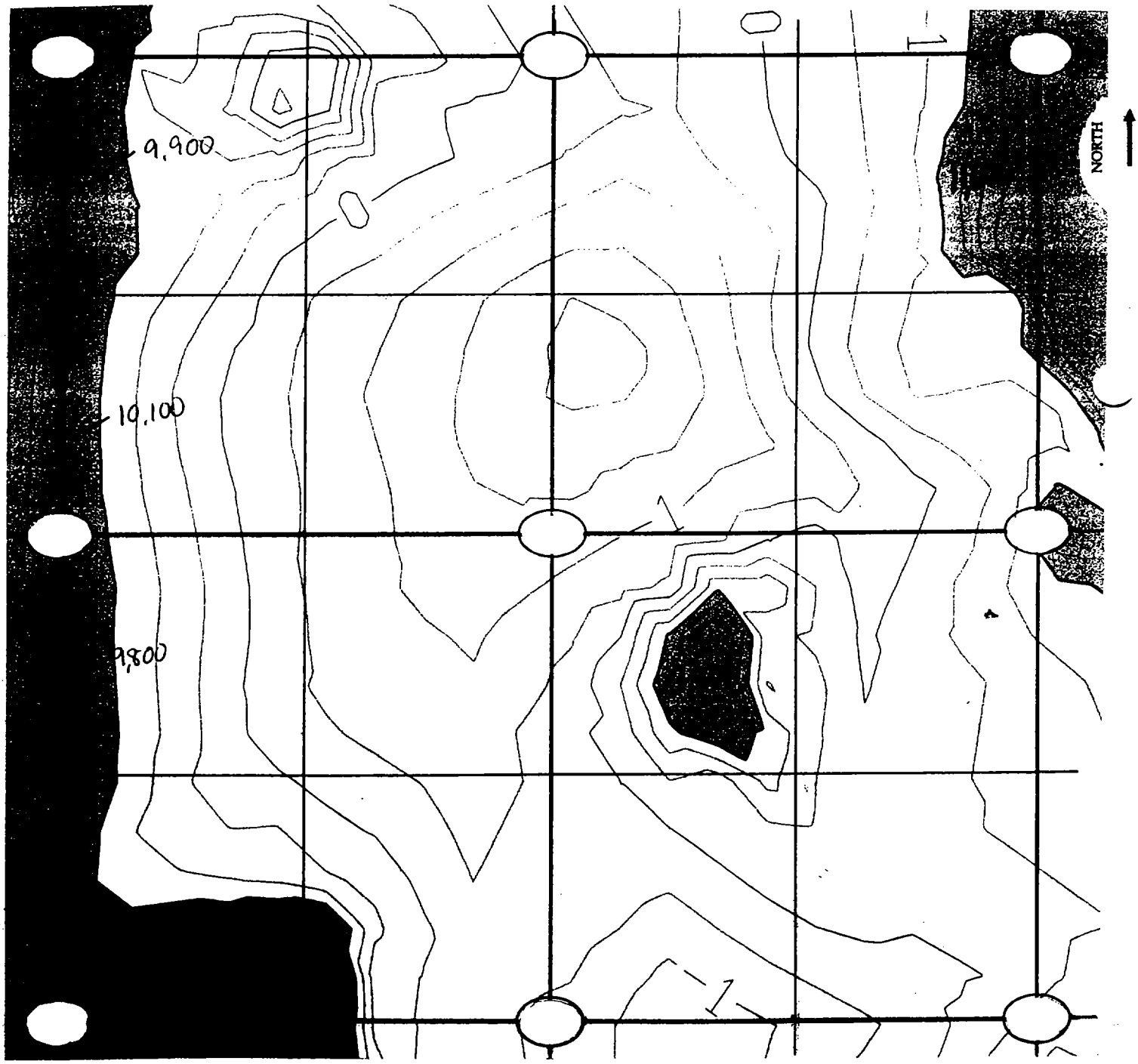
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 2

Date 12/3/02 Technician Jerry Kram

Inst. Model 2221 Serial No. 127242

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 25 1.0'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

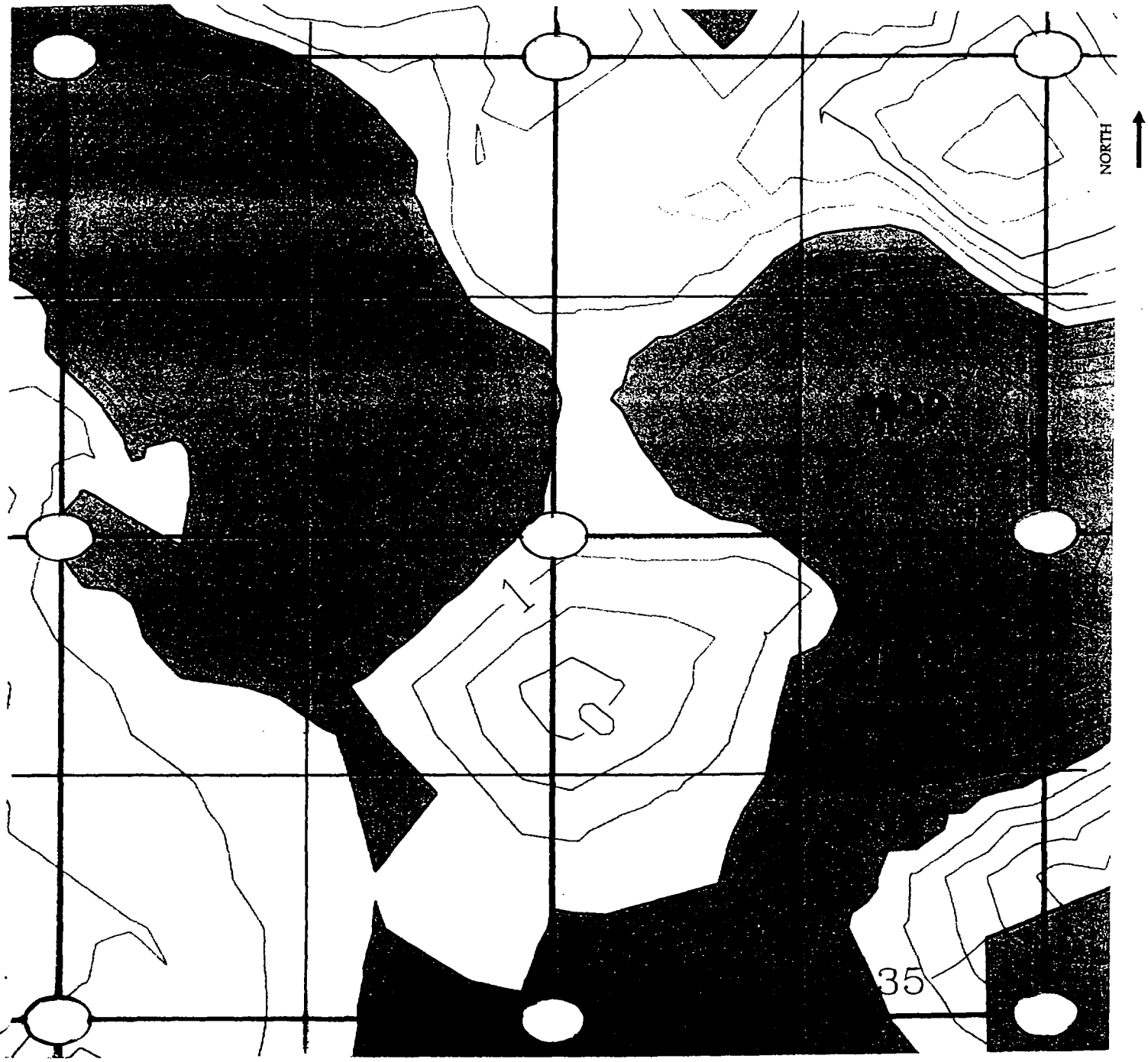
Project # 32133-xc Project Name Lakeshore East Sheet 1 of 4

Date 12/10; 12/11; 12/12/2002 Technician Lindsay Ascrum/Jerry Krane

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z6 - 6'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

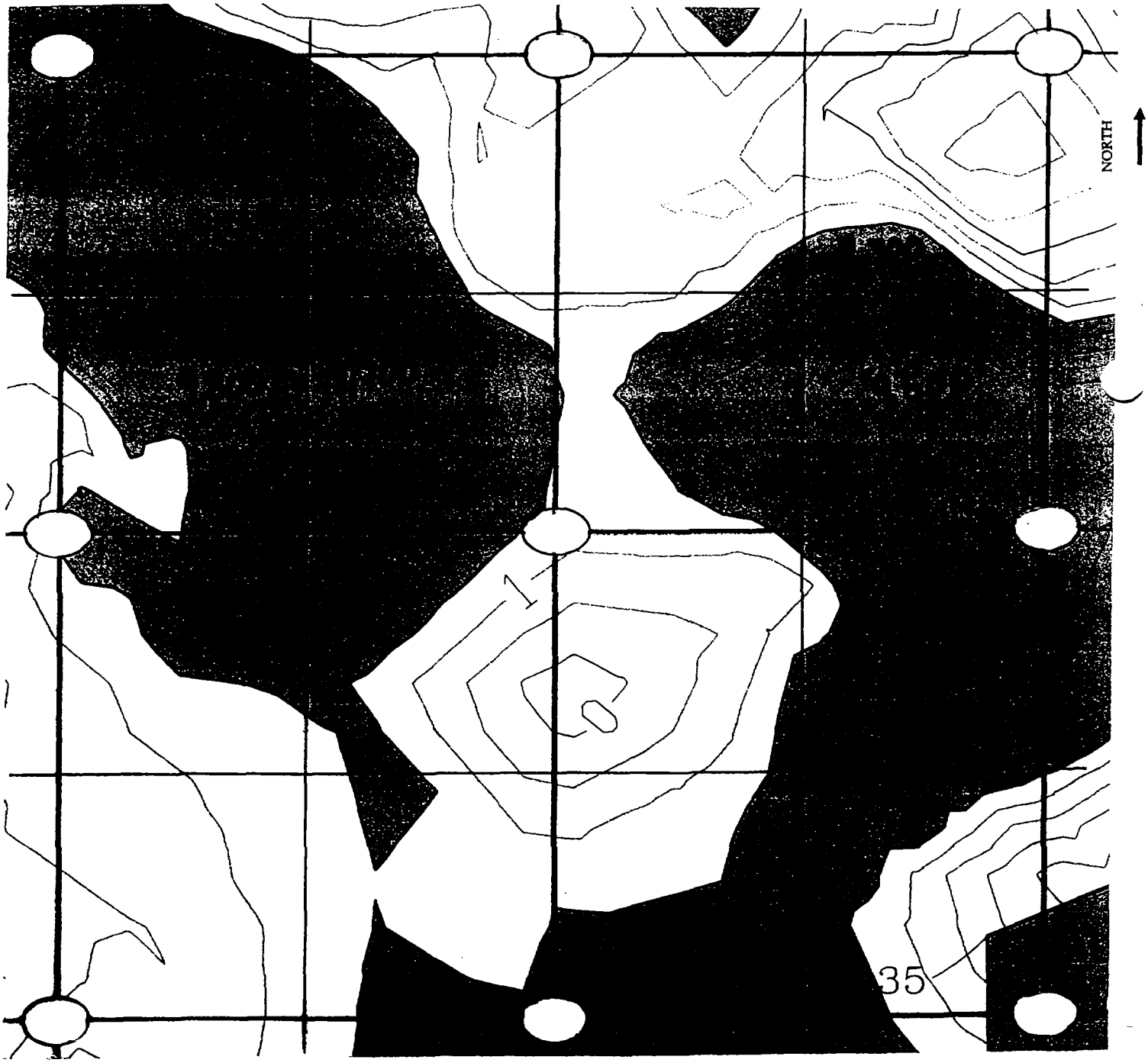
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 4

Date 12/10/02 : 12/11/02 : 12/12/02 Technician Lindsay Aschim

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z6 - 4.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

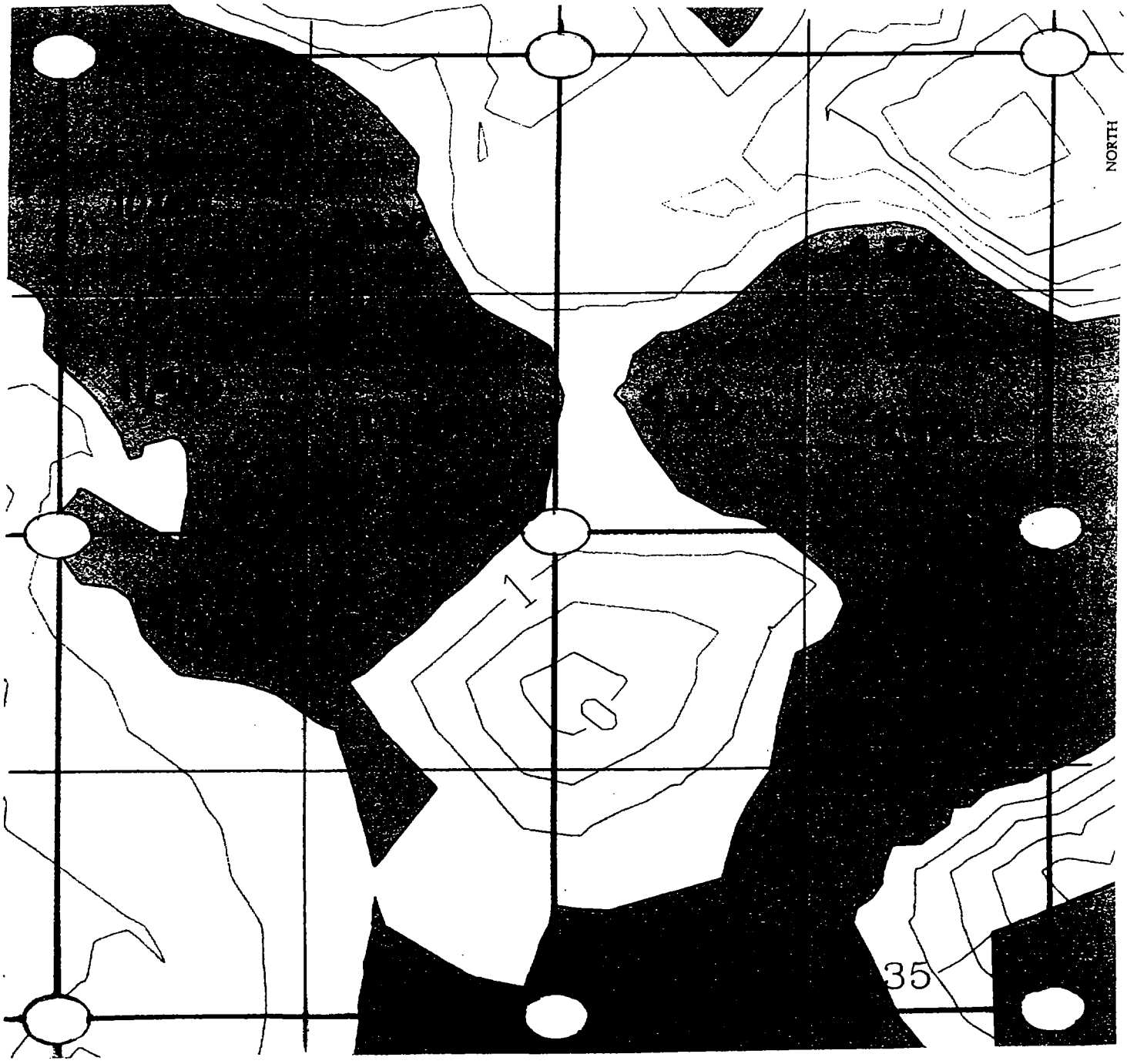
Project # 32193-xc Project Name Lakeshore East Sheet 3 of 4

Date 12/10; 12/11; 12/12/2002 Technician Lindsay Aschim

Inst. Model Ludlum 2221 Serial No. 132844 PU8148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z6-3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

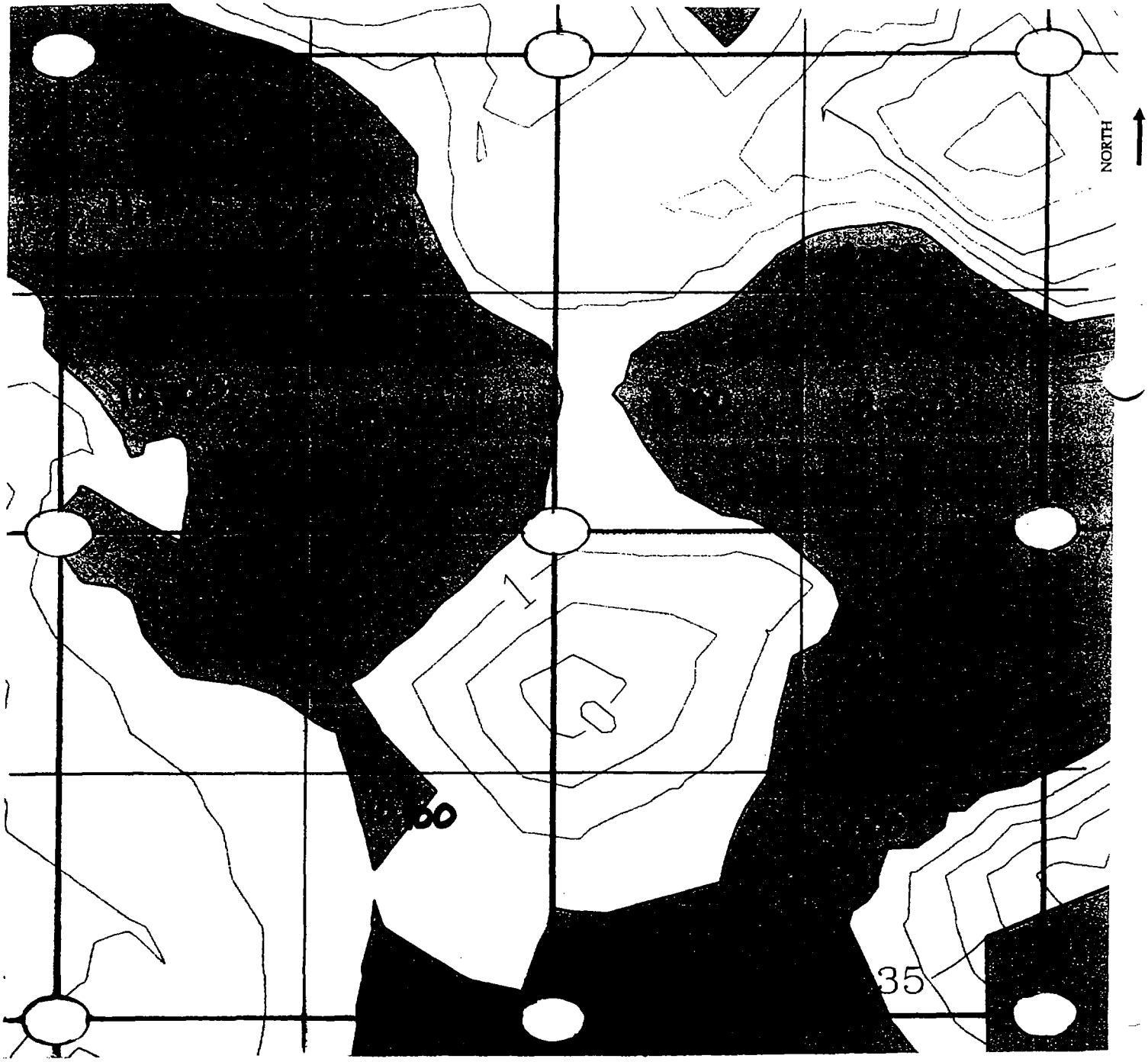
Project # 32193-xc Project Name Lakeshore East Sheet 4 of 4

Date 12/10/02; 12/11/02; 12/12/02 Technician Lindsay Aschim

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation Z6 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



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STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

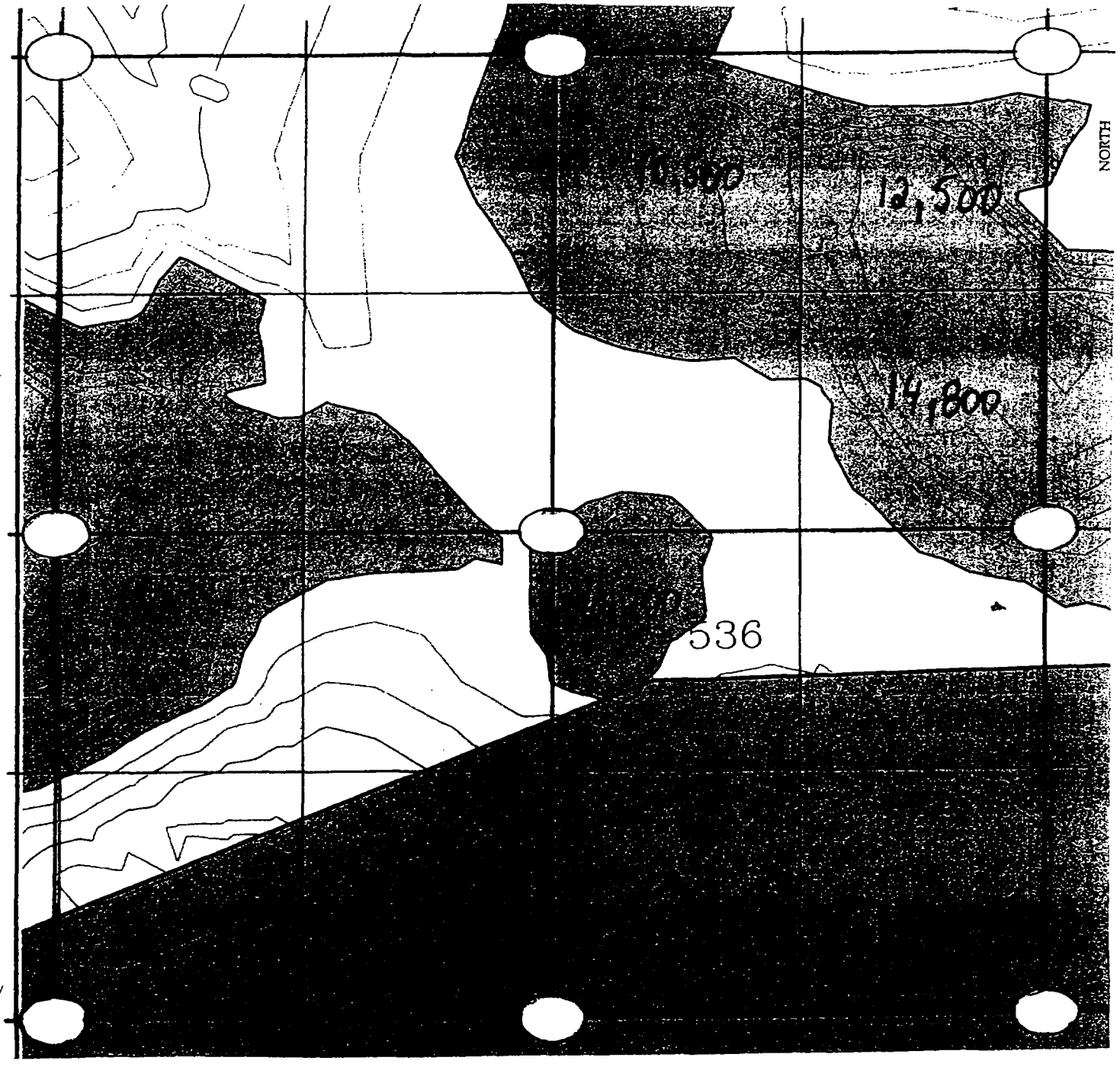
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 3

Date 12/26/02 - 1/2/03 Technician Lindsay Aschim / Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 27 (4.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

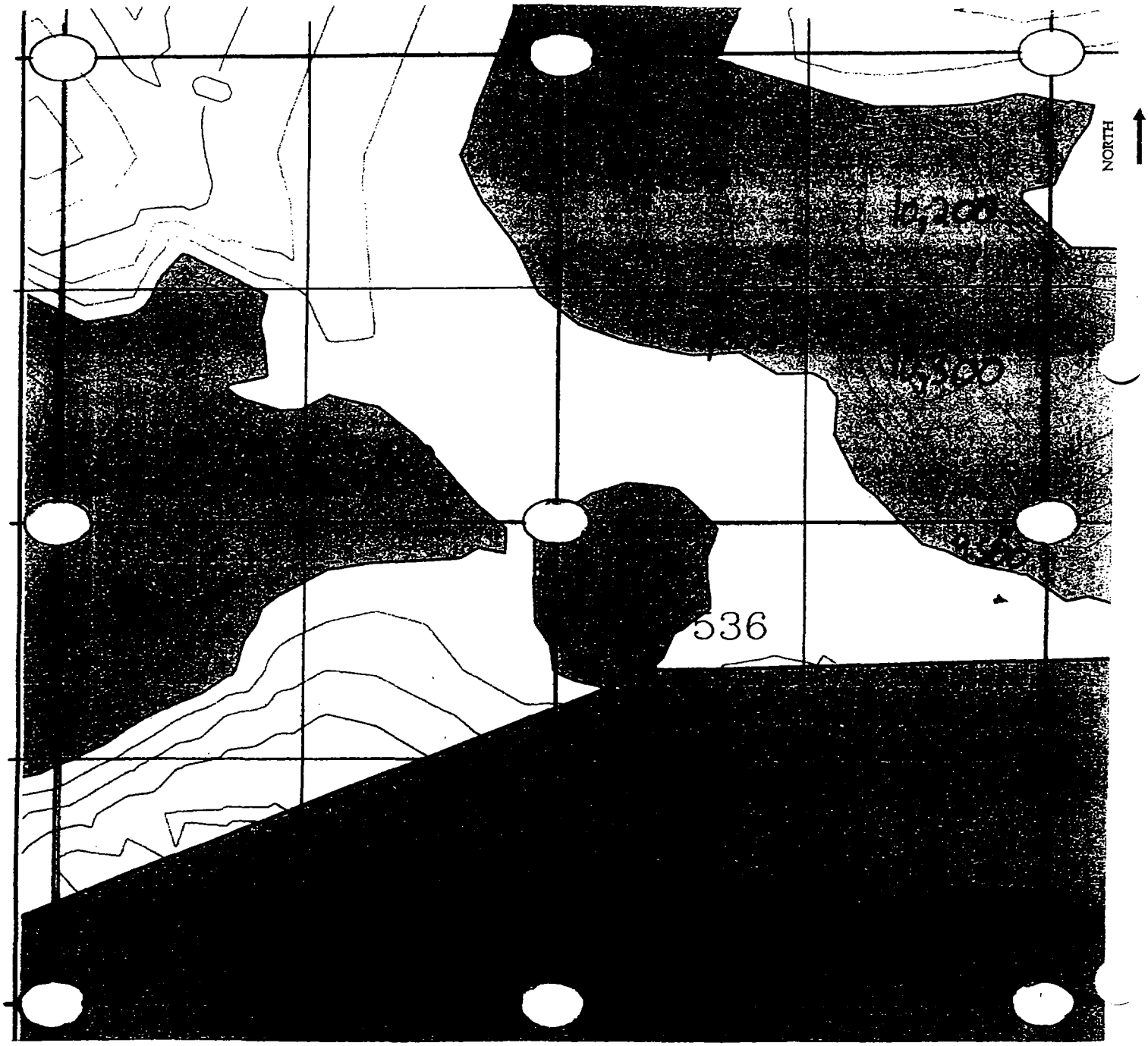
Project # 32193-xc Project Name Lakshor East Sheet 2 of 3

Date 12/26/02 - 1/2/03 Technician Lindsay Aschim / Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 27 (3.0)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

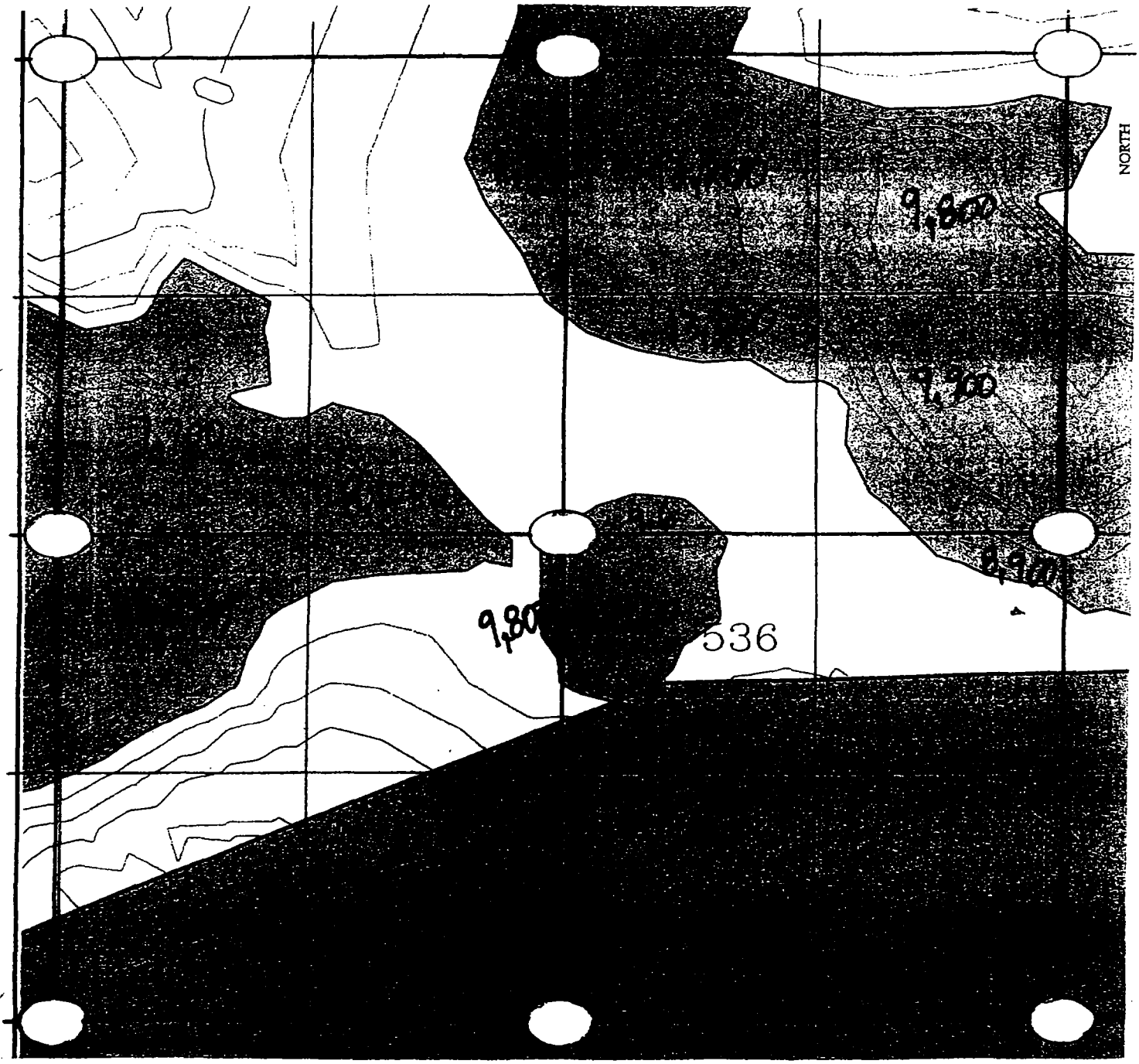
Project # 32193-XC Project Name Lakeshore East Sheet 3 of 3

Date 12/26/02 - 1/2/03 Technician Lindsay Aschim / Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 27 (1.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

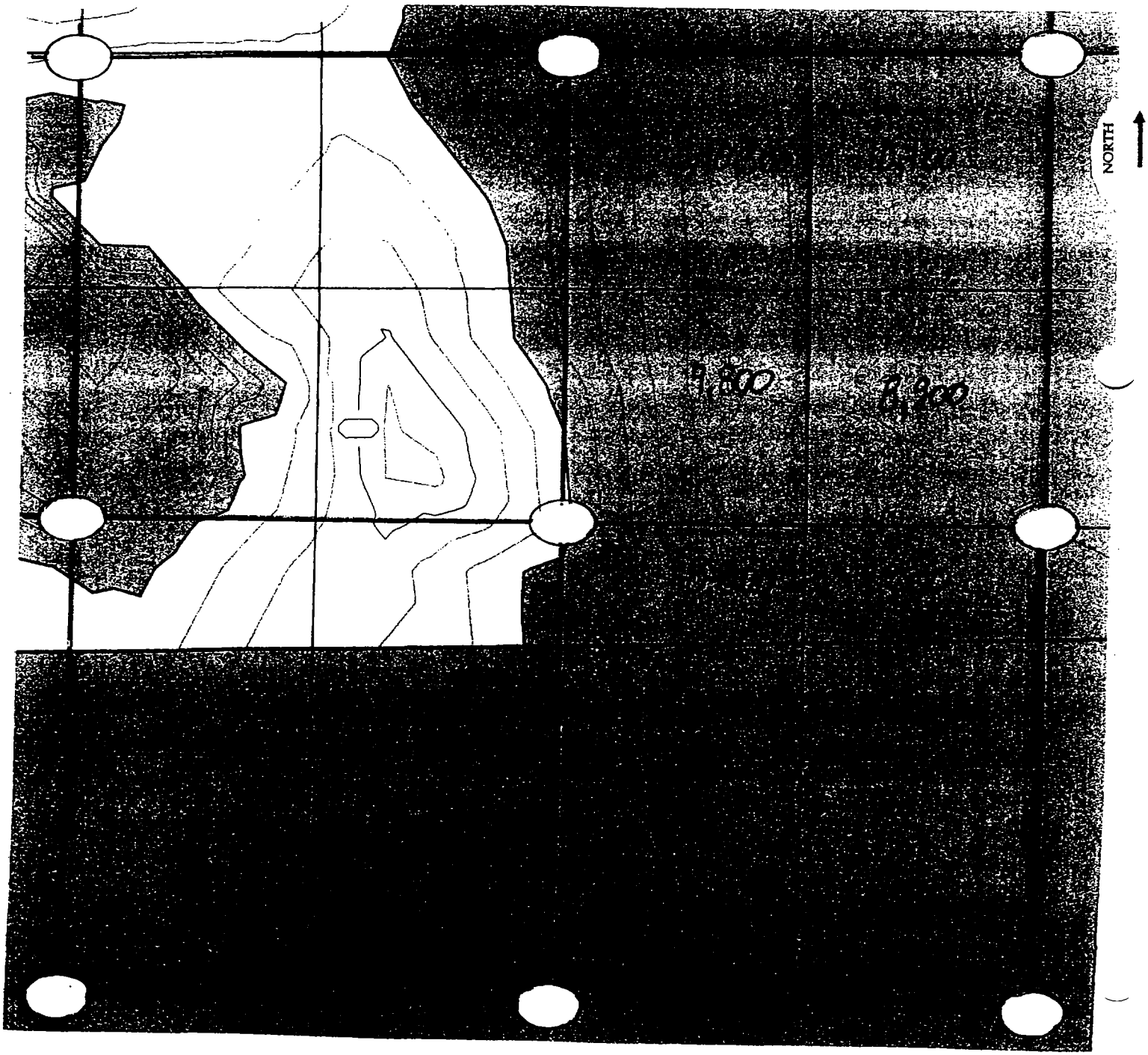
Project # 32193-XC Project Name Lakeshore East Sheet 1 of 3

Date 1/2/03, 1/3/03, 1/6/03 Technician Tim O'Brien / Jerry Krane

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 28 (4.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

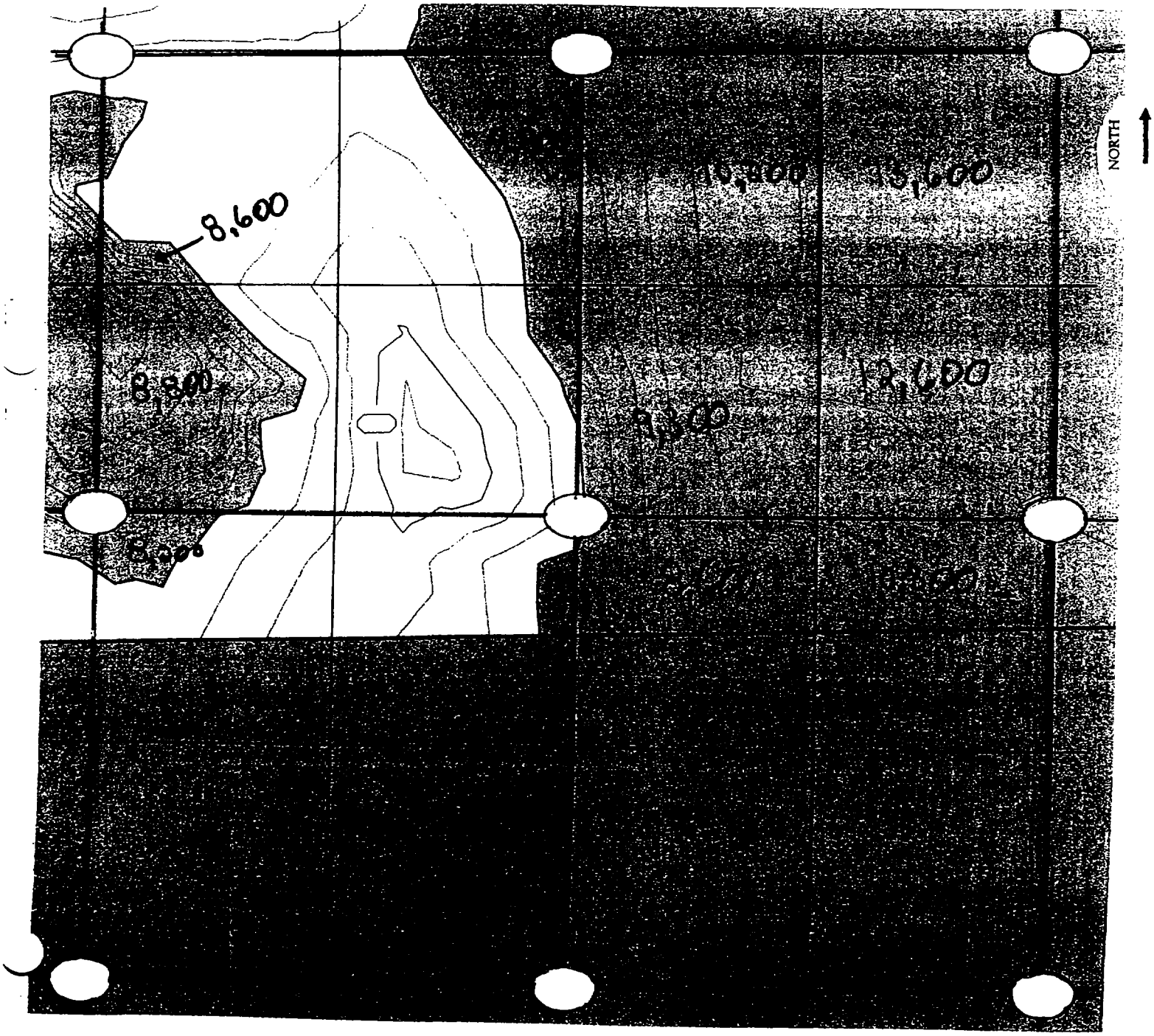
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 3

Date 1/2/03, 1/3/03, 1/6/03 Technician Tim O'Brien / Jerry Krane

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 28 (3.0)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

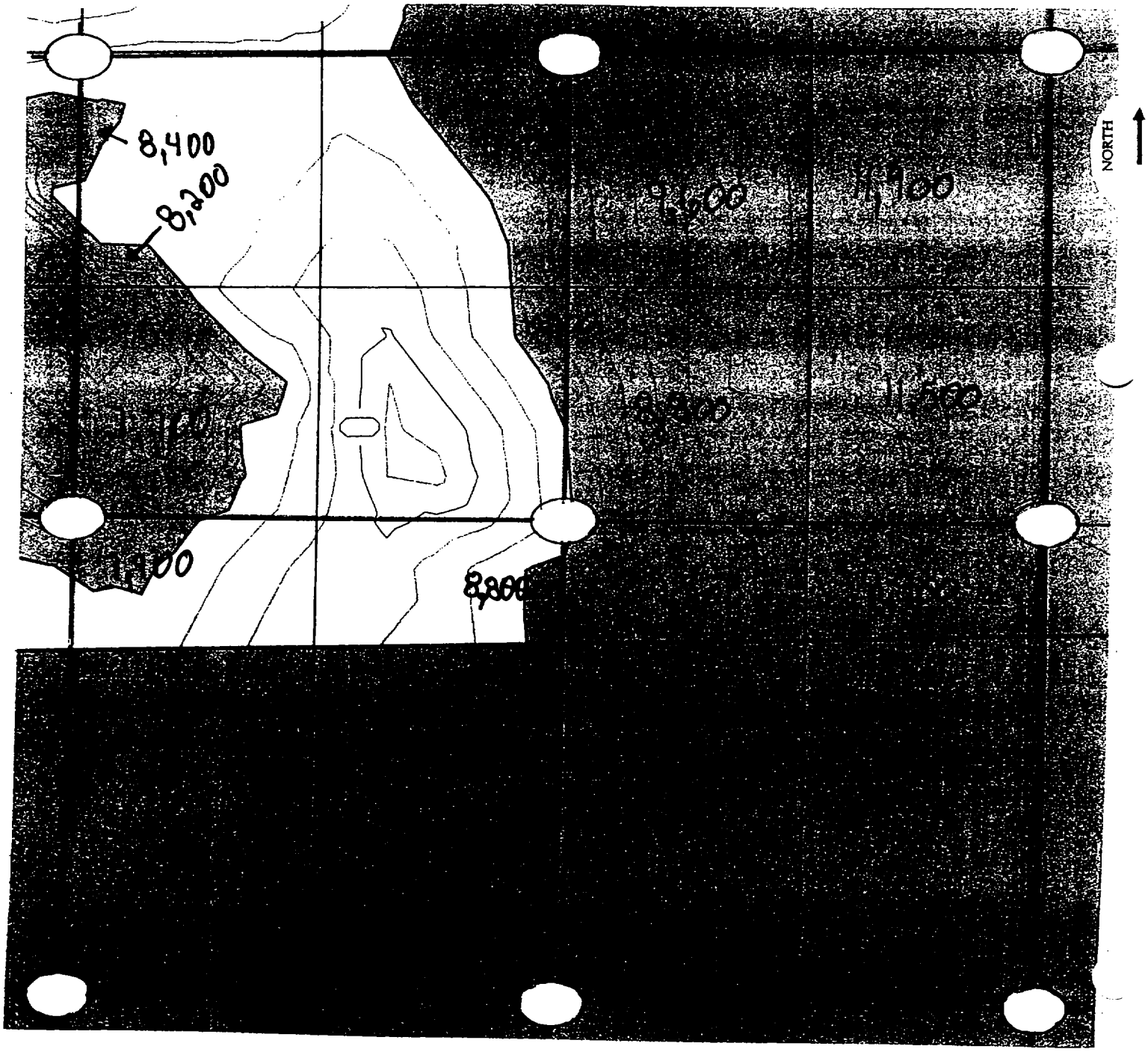
Project # 32193-XC Project Name Lakeshore East Sheet 3 of 3

Date 1/2/03, 1/3/03, 1/6/03 Technician Tim O'Brien / Jerry Krane

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 28 (1.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

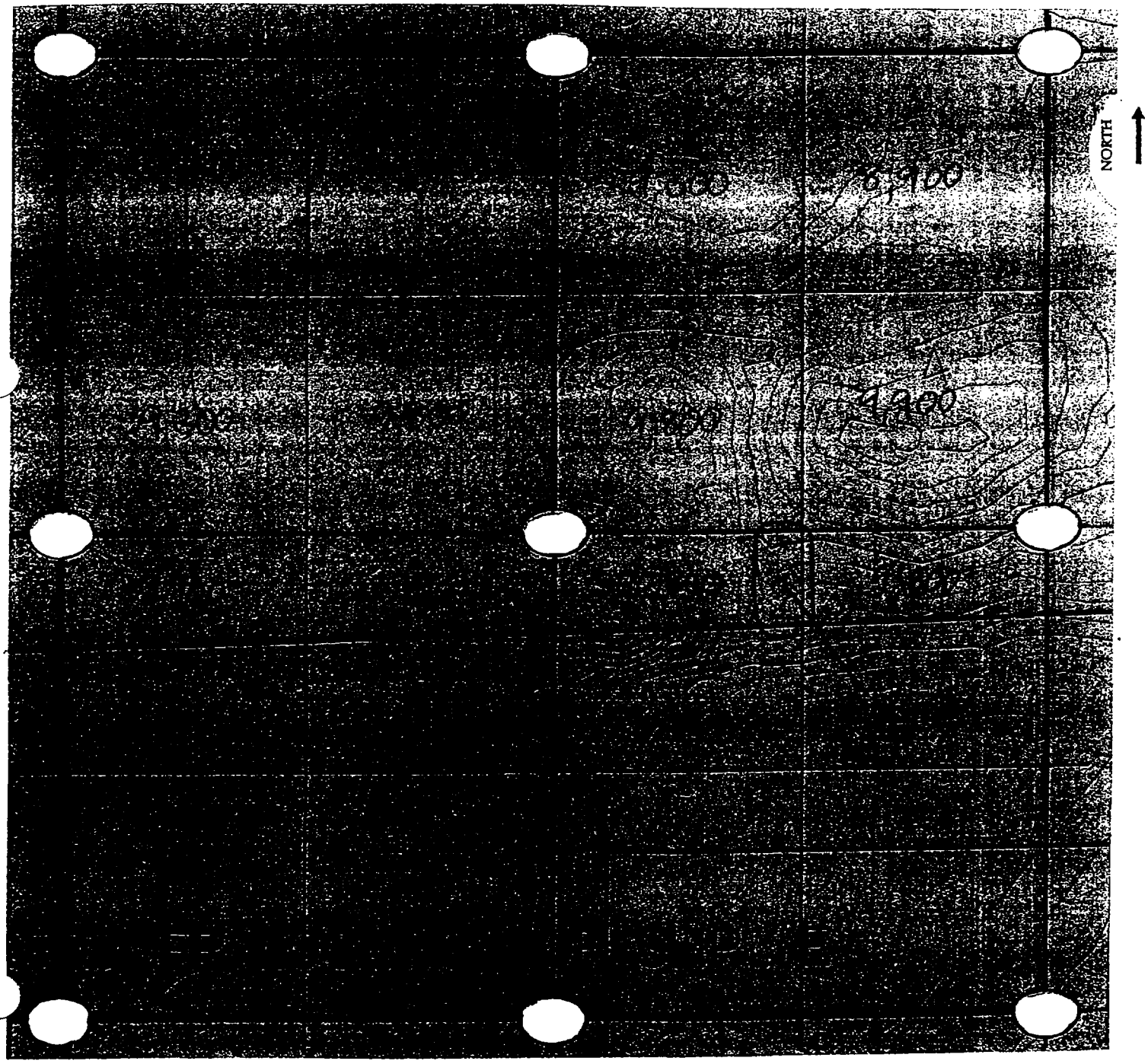
Project # 1-32193-XC Project Name Lakeshore East Sheet 1 of 3

Date 1/6/03 / 1/7/03 / 1/8/03 / 1/9/03 / 1/10/03 Technician J. Krane / L. Aschim / T. O'brien

Inst. Model 2221 Serial No. 132844

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 29 4.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

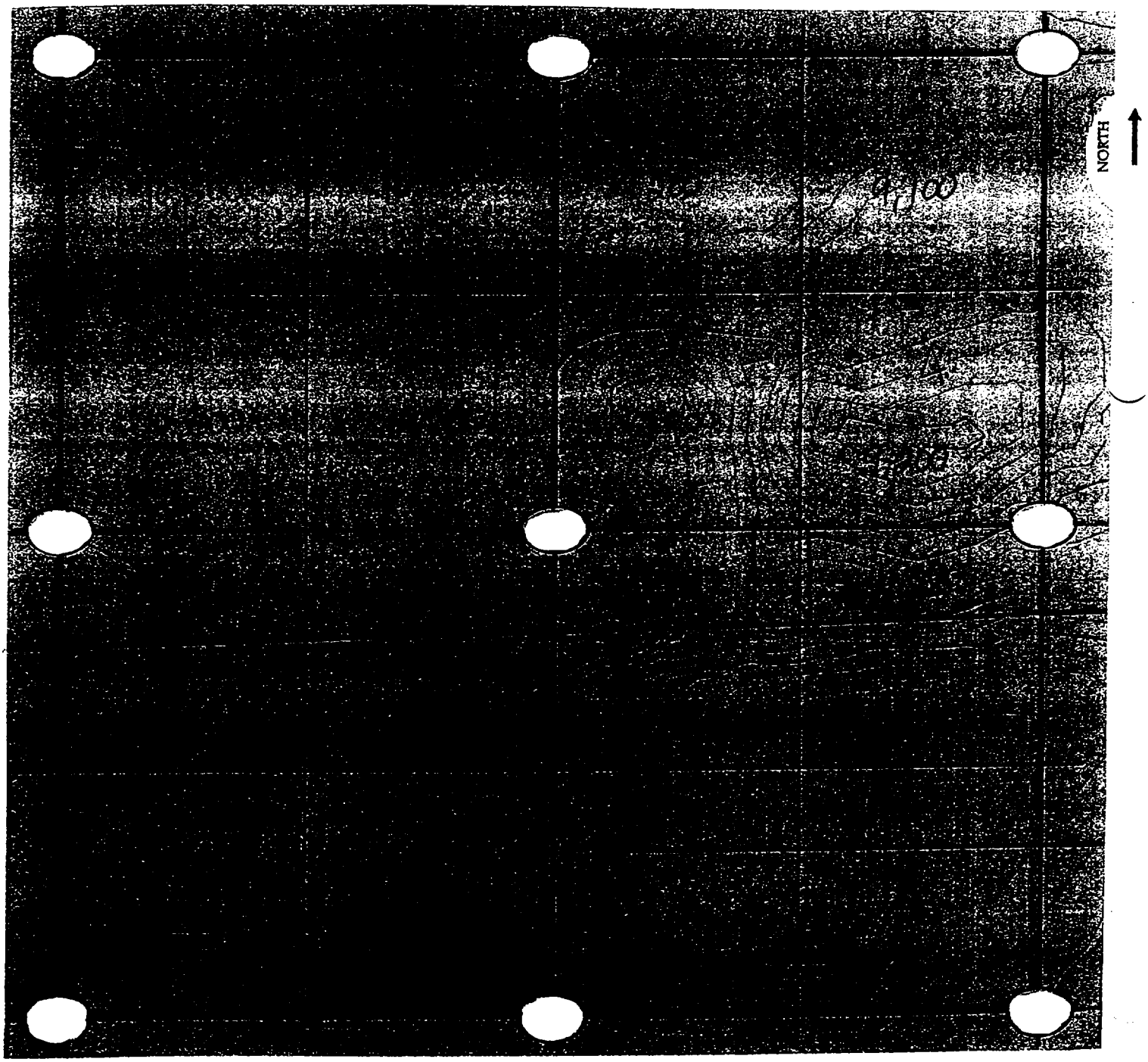
Project # 1-32193-XC Project Name Lakeshore East Sheet 2 of 3

Date 1/6/03 / 1/7/03 / 1/8/03 / 1/9/03 / 1/10/03 Technician J. Krane / L. Aschim / T. O'Brien

Inst. Model 2221 Serial No. 132544

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 29 3.0'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

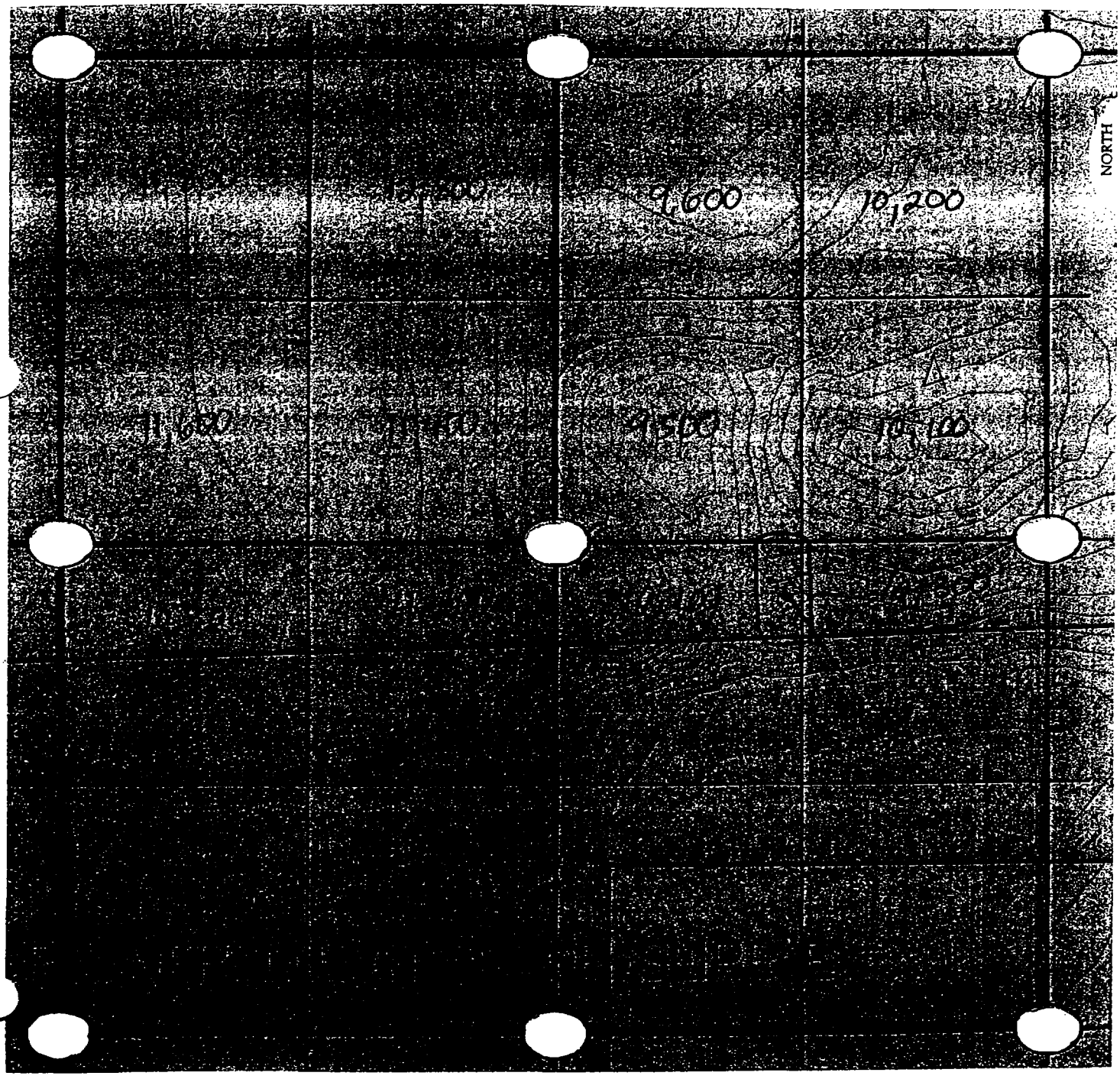
Project # 1-32193-XC Project Name Lakeshore East Sheet 3 of 3

Date 1/6/03 / 1/7/03 / 1/8/03 / 1/9/03 / 1/10/03 Technician S. Krane / L. Aschim / T. O'Brien

Inst. Model 2221 Serial No. 132844

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 29 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

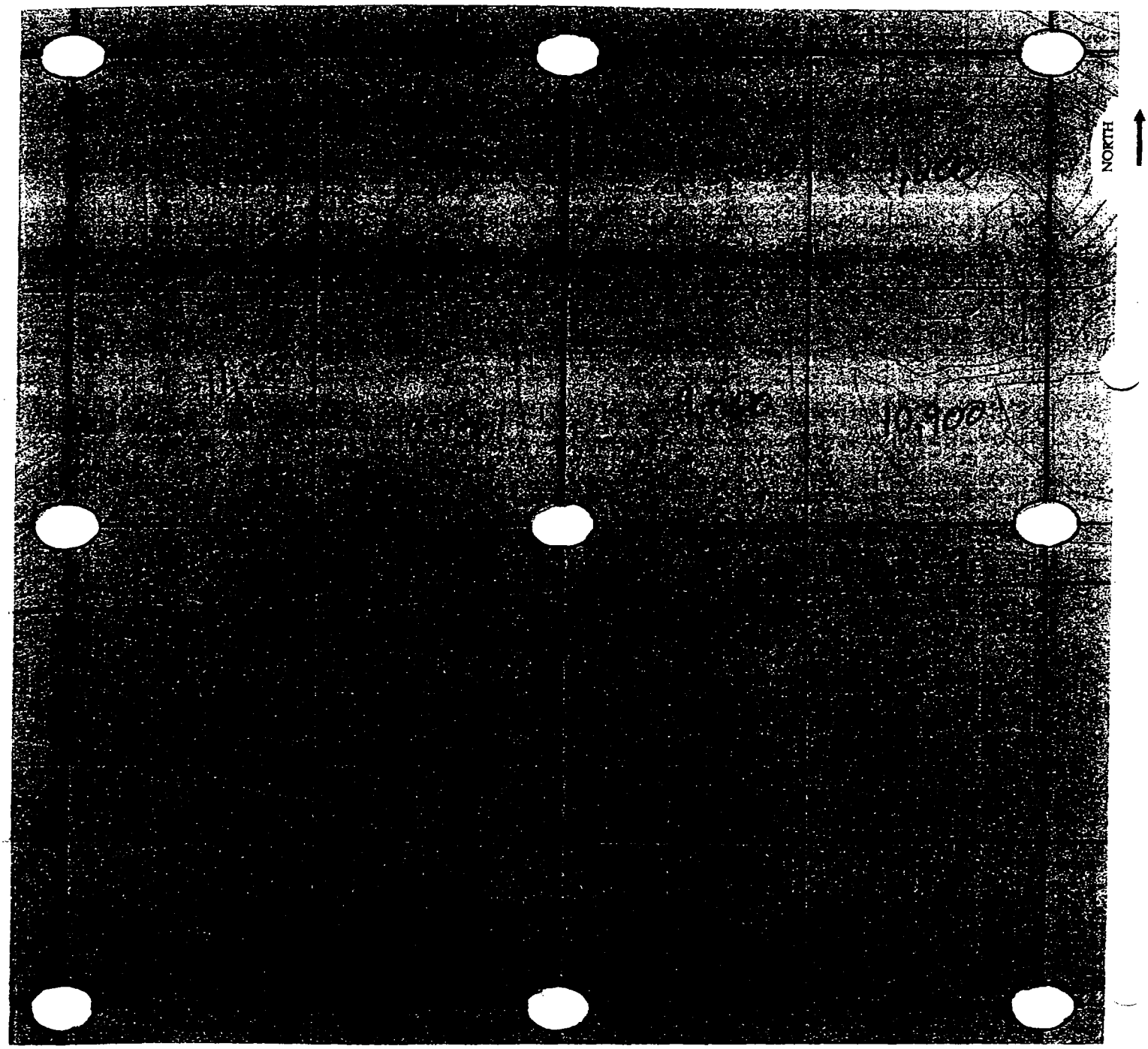
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 3

Date 1/10/03, 1/13/03, 1/14/03, 1/15/03 Technician J. Krane, L. Aschim, T. O'Brien

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 30 1½'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

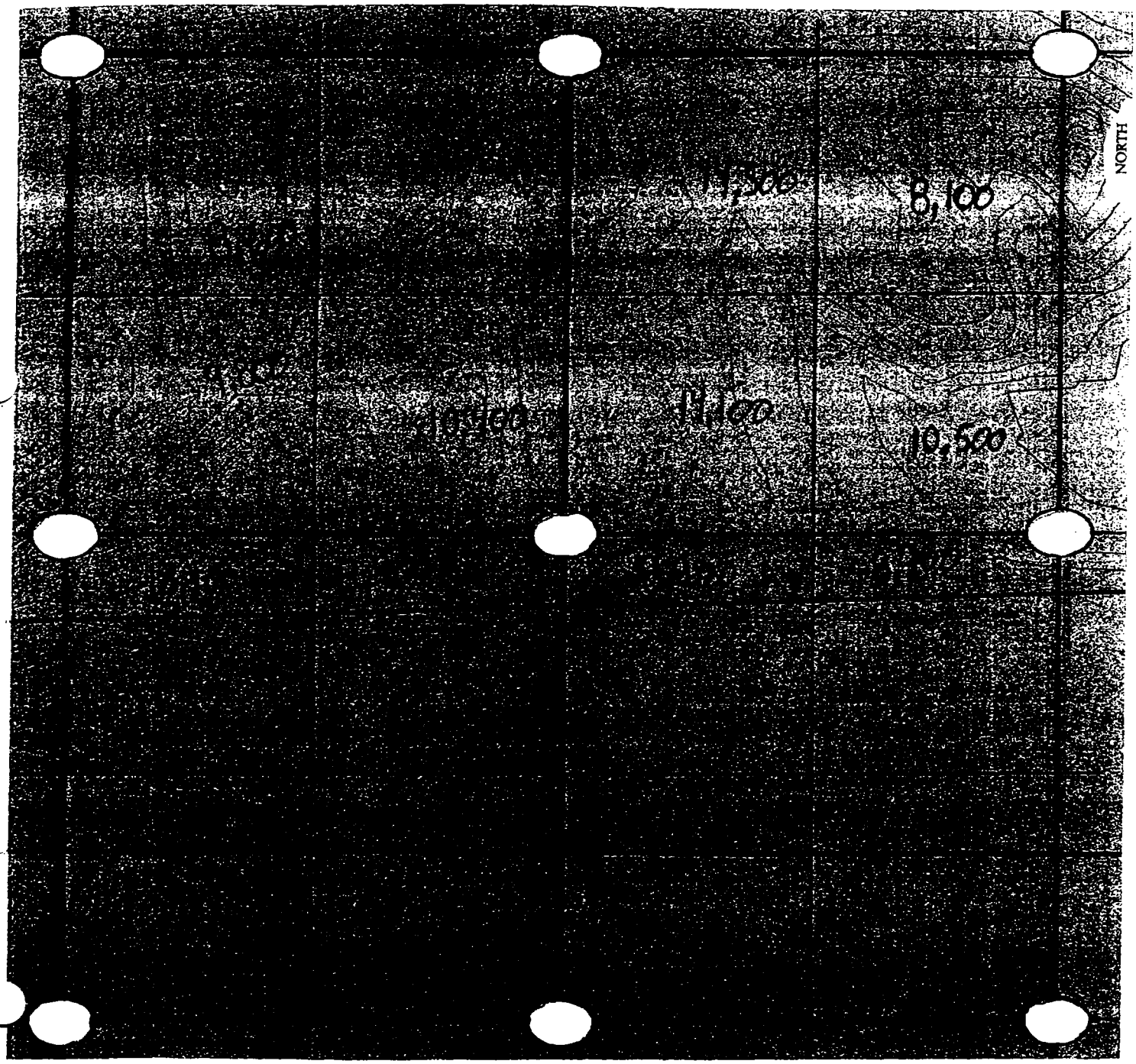
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 3

Date 1/10/03, 1/13/03, 1/14/03, 1/15/03 Technician J. Krane, L. Aschim, T. O'Brien

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 30 3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

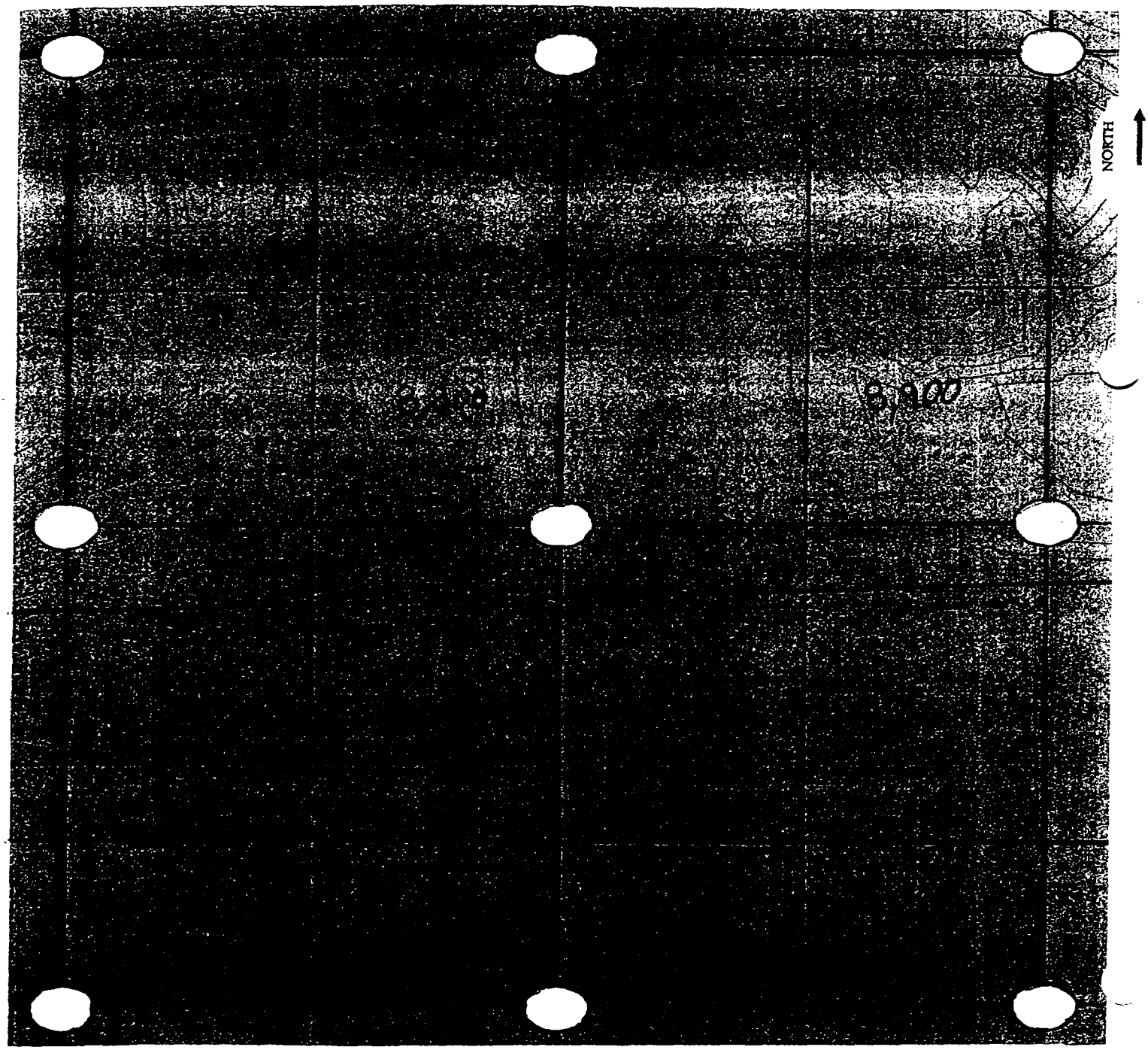
Project # 32193-xc Project Name Lakeshore East Sheet 3 of 3

Date 1/10/03, 1/13/03, 1/14/03, 1/15/03 Technician J. Krane, L. Aschim, T. O'Brien

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 30 4½'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

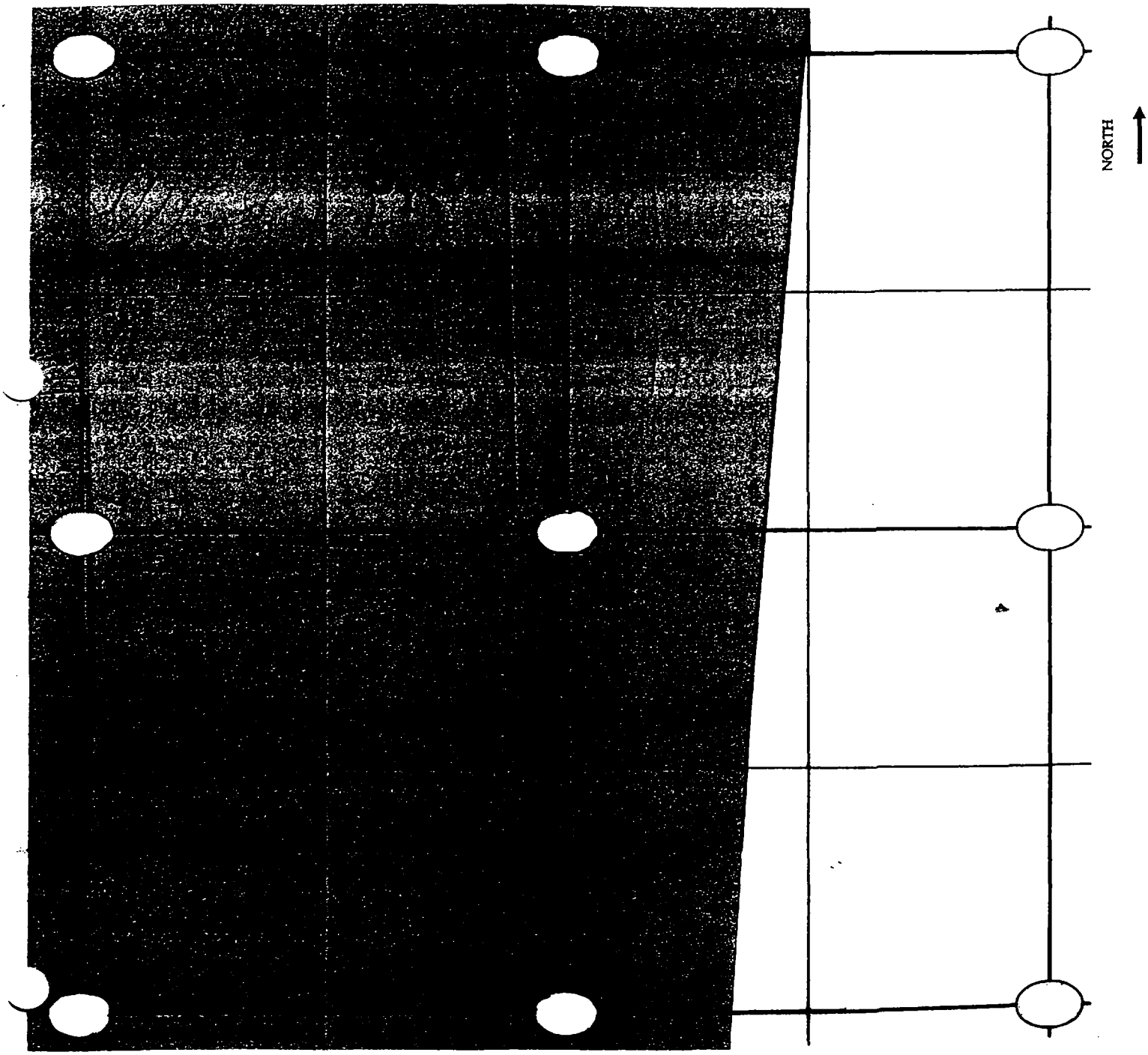
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 4

Date 1/15/03, 1/16/03, 1/17/03 Technician L. Aschim / J. Krane / T. O'Brien

Inst. Model Ludlum 2221 Serial No. 134542-168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 31 (6')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

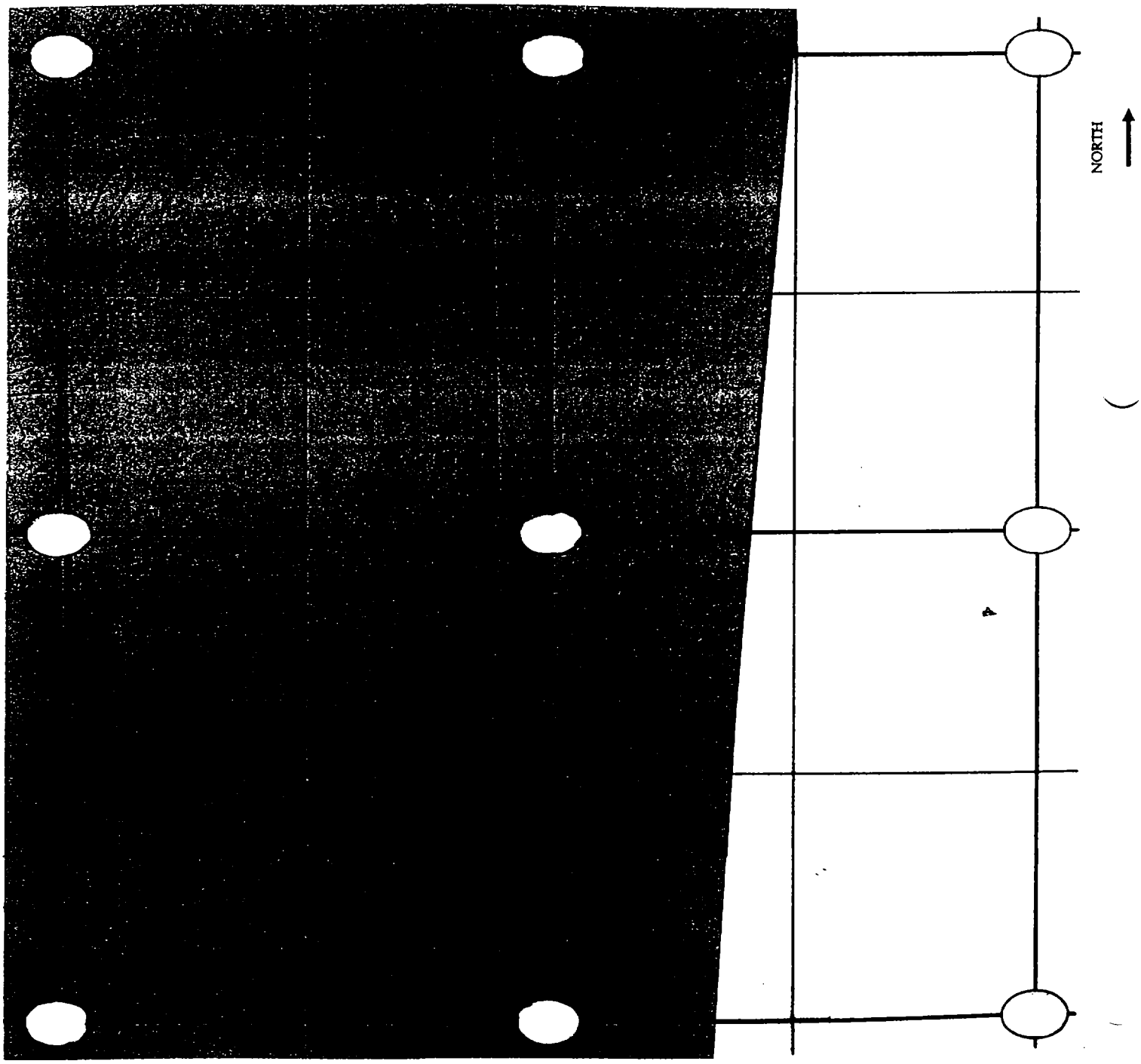
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 4

Date 1/15/03, 1/16/03, 1/17/03 Technician L. Aschim / J. Krane / T. O'Brien

Inst. Model Ludlum 2221 Serial No. 134542 - 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 31 (4.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

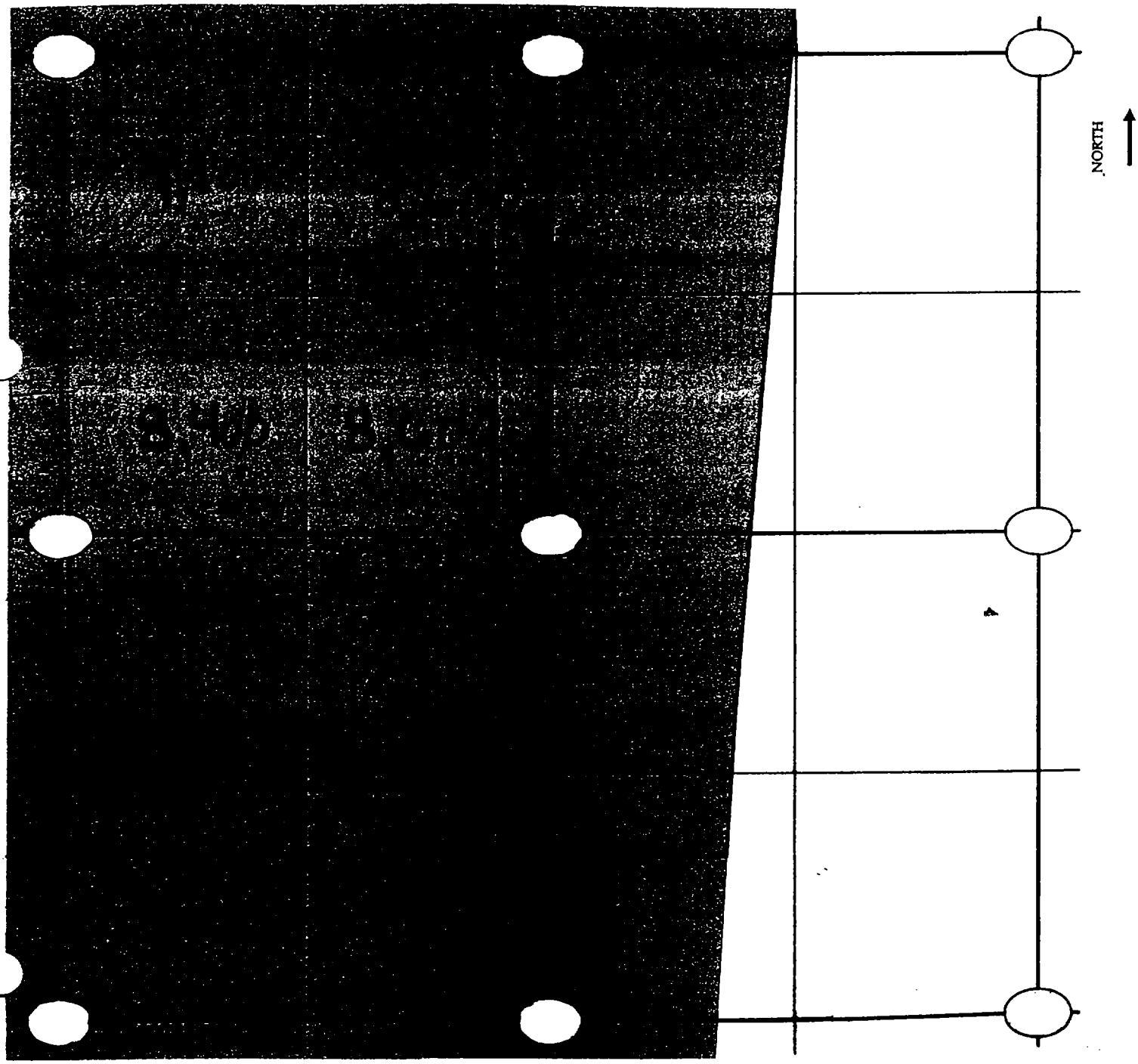
Project # 32193-xc Project Name Lakeshore East Sheet 3 of 4

Date 1/15/03; 1/16/03 Technician L. Aschim / J. Krane / T. O'Brien

Inst. Model Ludlum 2221 Serial No. 134542-168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 31 (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

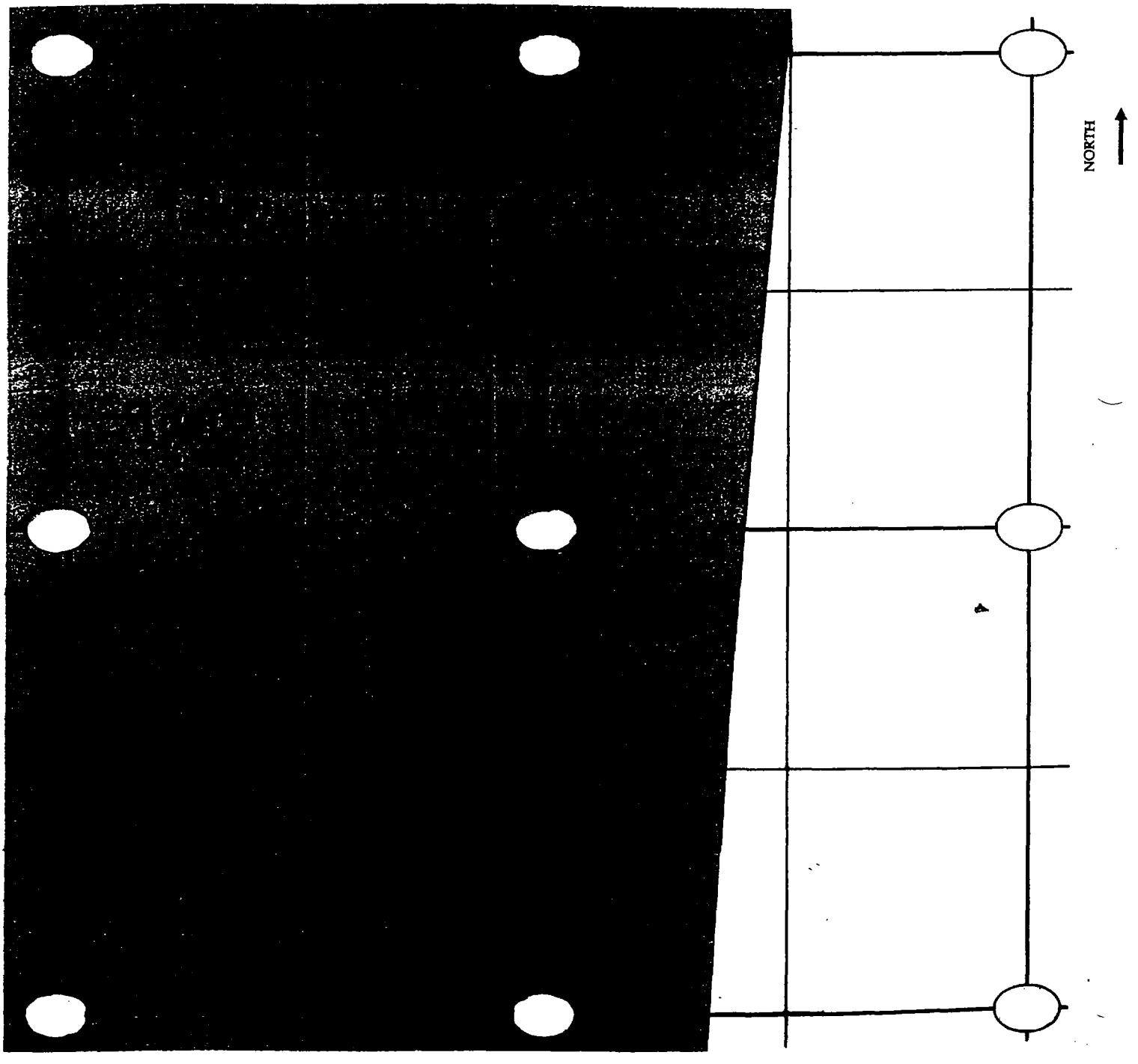
Project # 32193-xc Project Name Lakeshore East Sheet 4 of 4

Date 1/15/03, 1/16/03, 1/17/03 Technician L. Aschim / J. Krane / T. O'Brien

Inst. Model Ludlum 2221 Serial No. 134542 - 168143

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 3 / (1.5')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

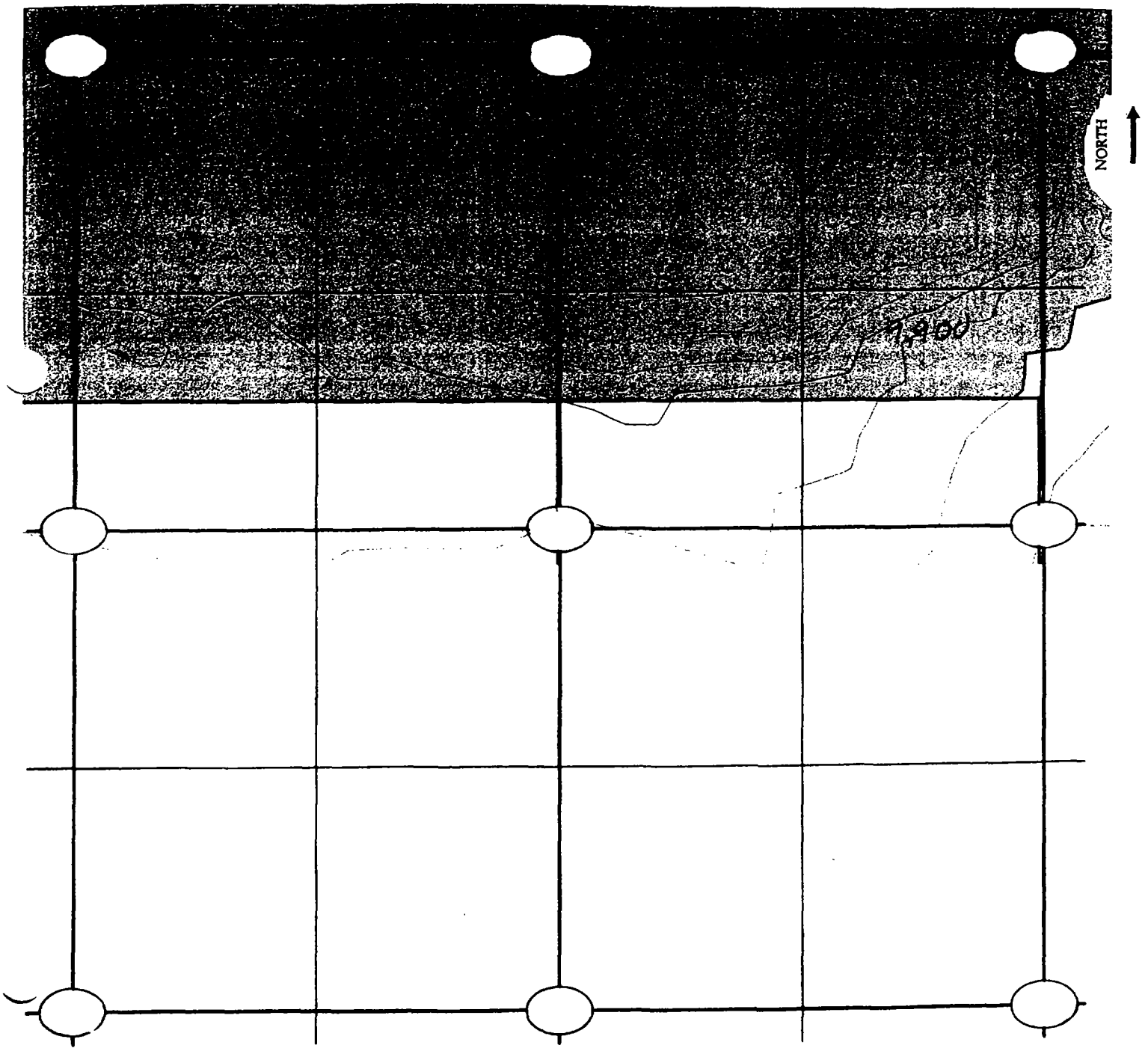
Project # 1-32193-xc Project Name Lakeshore East Sheet 1 of 3

Date 2/28/03 Technician Jerry Krause / Lindsay Atkinson / Tim O'Brien

Inst. Model 2221 Serial No. meter # 132844 probe # 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 33 4.0'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

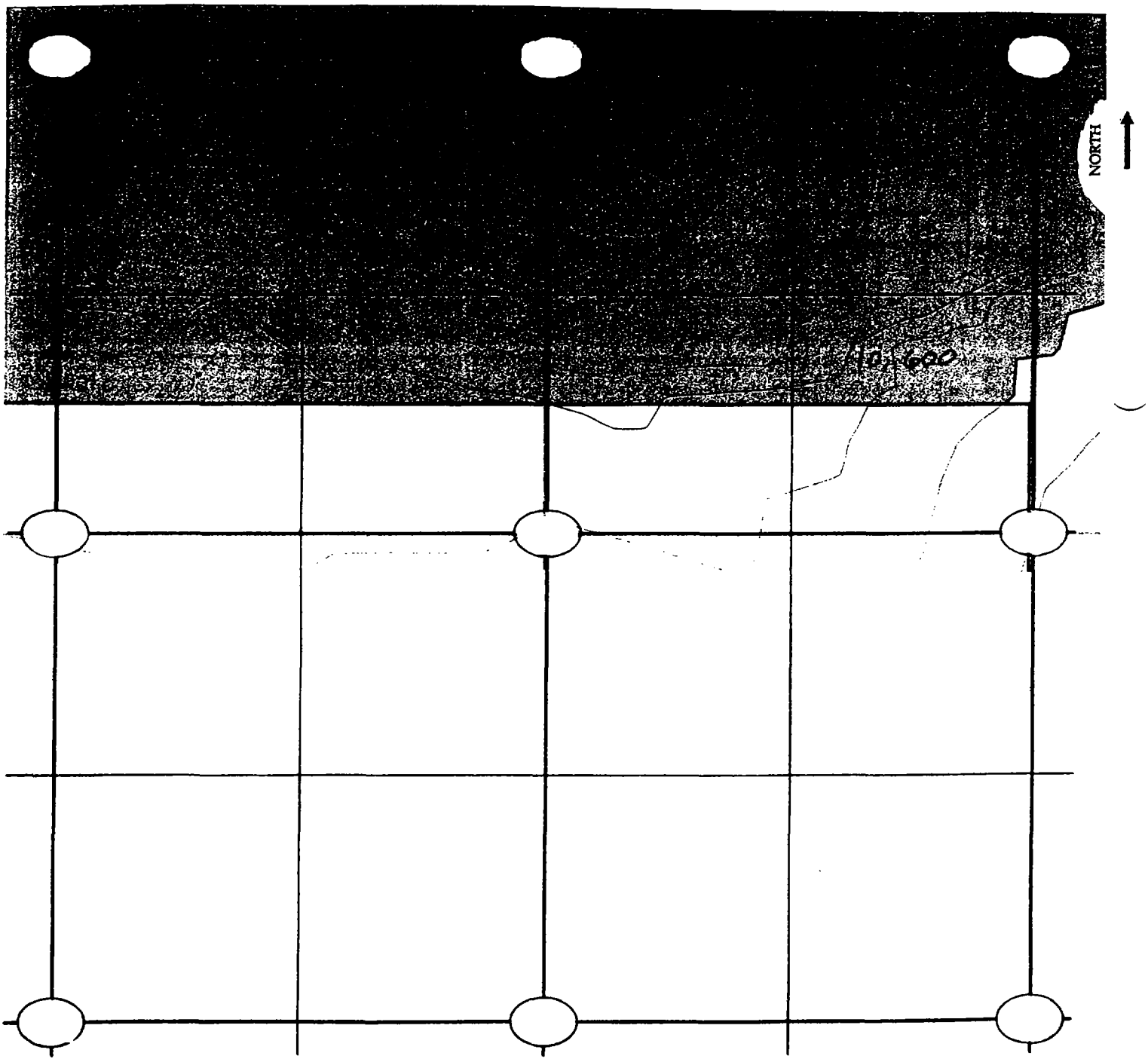
Project # 1-32193-XC Project Name Lakeshore East Sheet 2 of 3

Date 2/28/03 Technician Jerry Krane

Inst. Model 2221 Serial No. meter # 132844 probe # 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 33 3.0'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

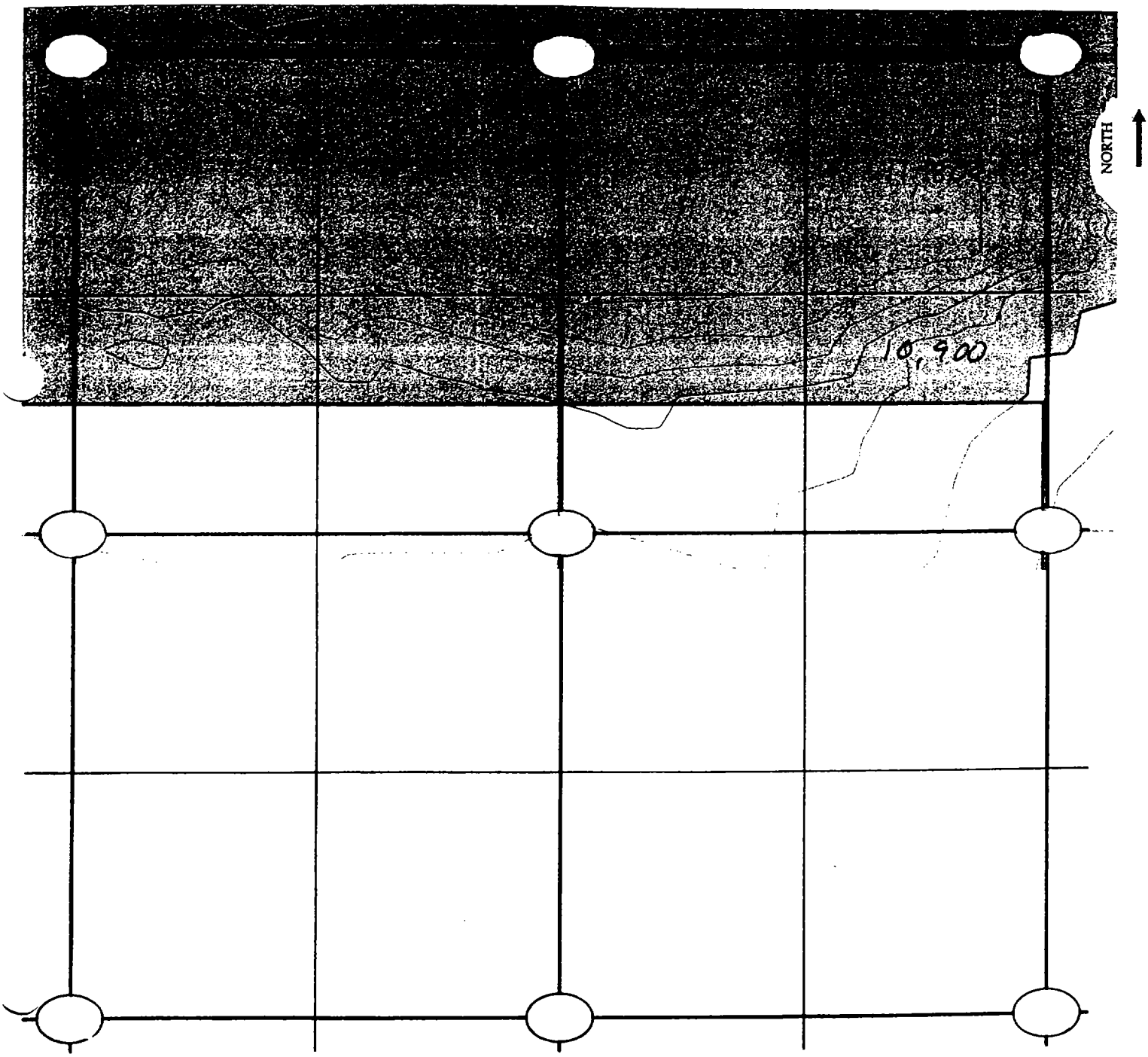
Project # 1-32193-XC Project Name Lakeshore East Sheet 3 of 3

Date 2/28/03 Technician Jerry Krause

Inst. Model 2221 Serial No. meter # 132844 probe # 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 33 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

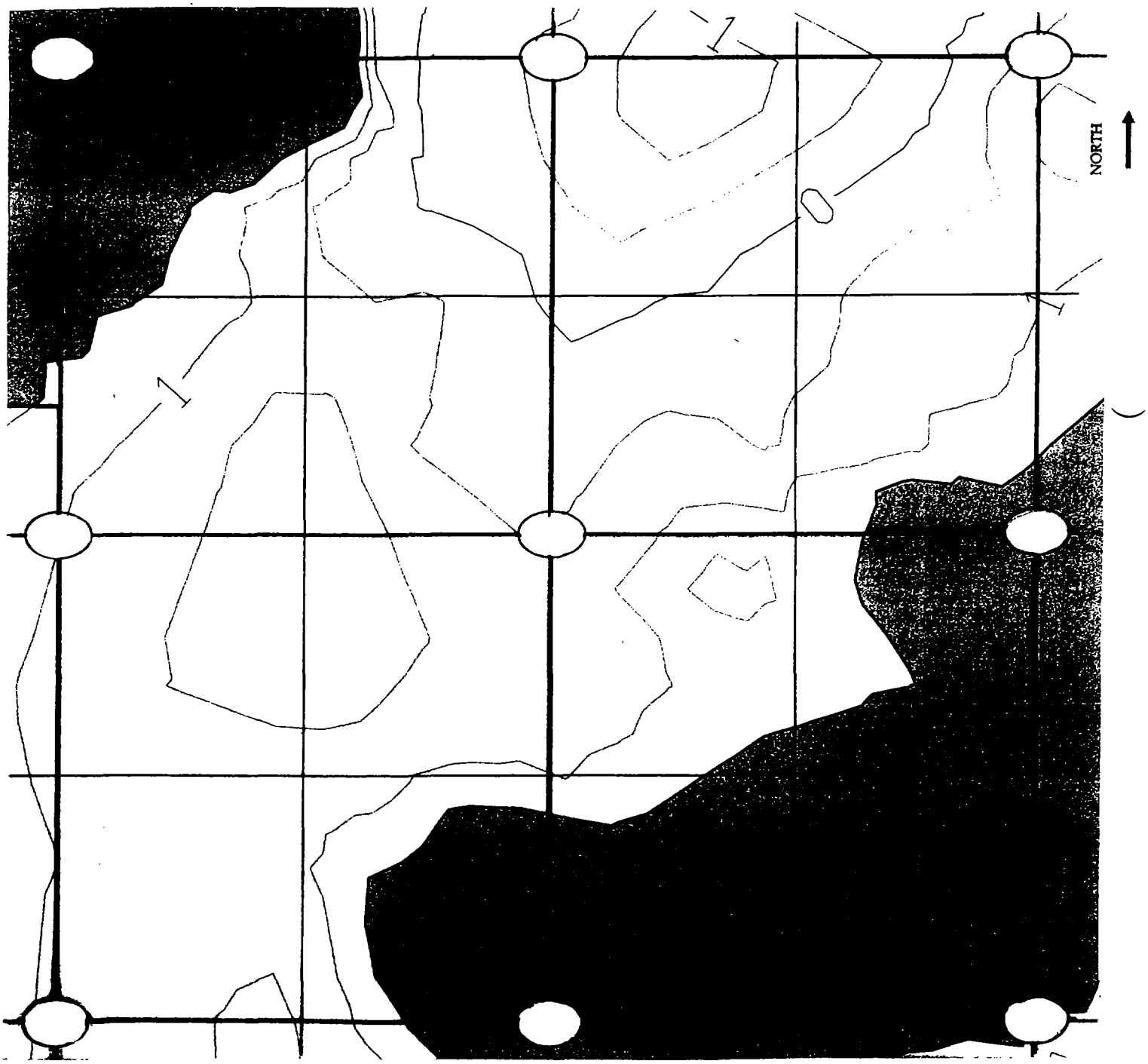
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 3

Date 12/02/02 Technician Jerry Krane

Inst. Model Ludlum 2221 Serial No. 127242-168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 34 (4½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

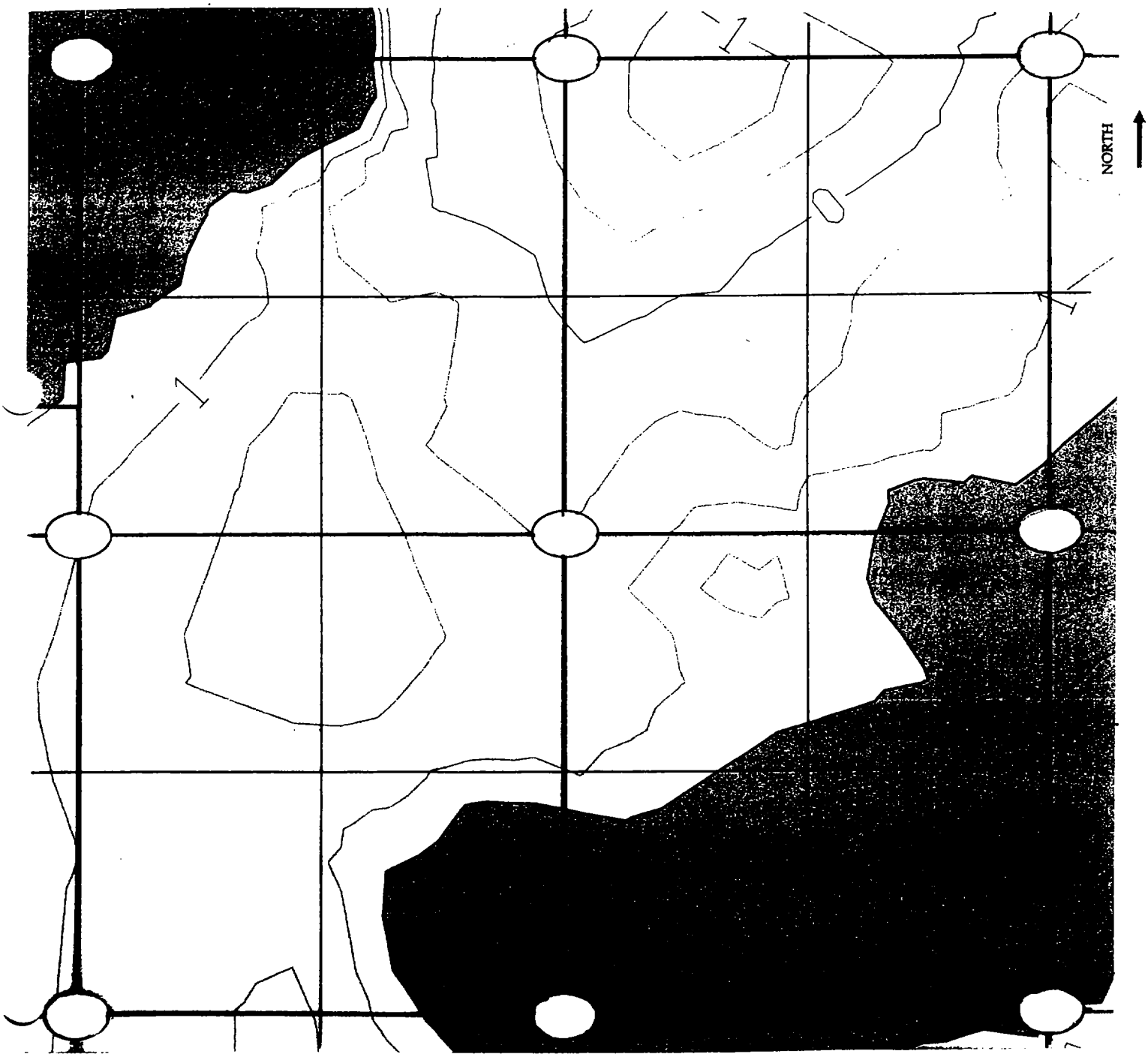
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 3

Date 12/02/02 Technician Jerry Krane

Inst. Model Ludlum 2221 Serial No. 127242-168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 34 (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

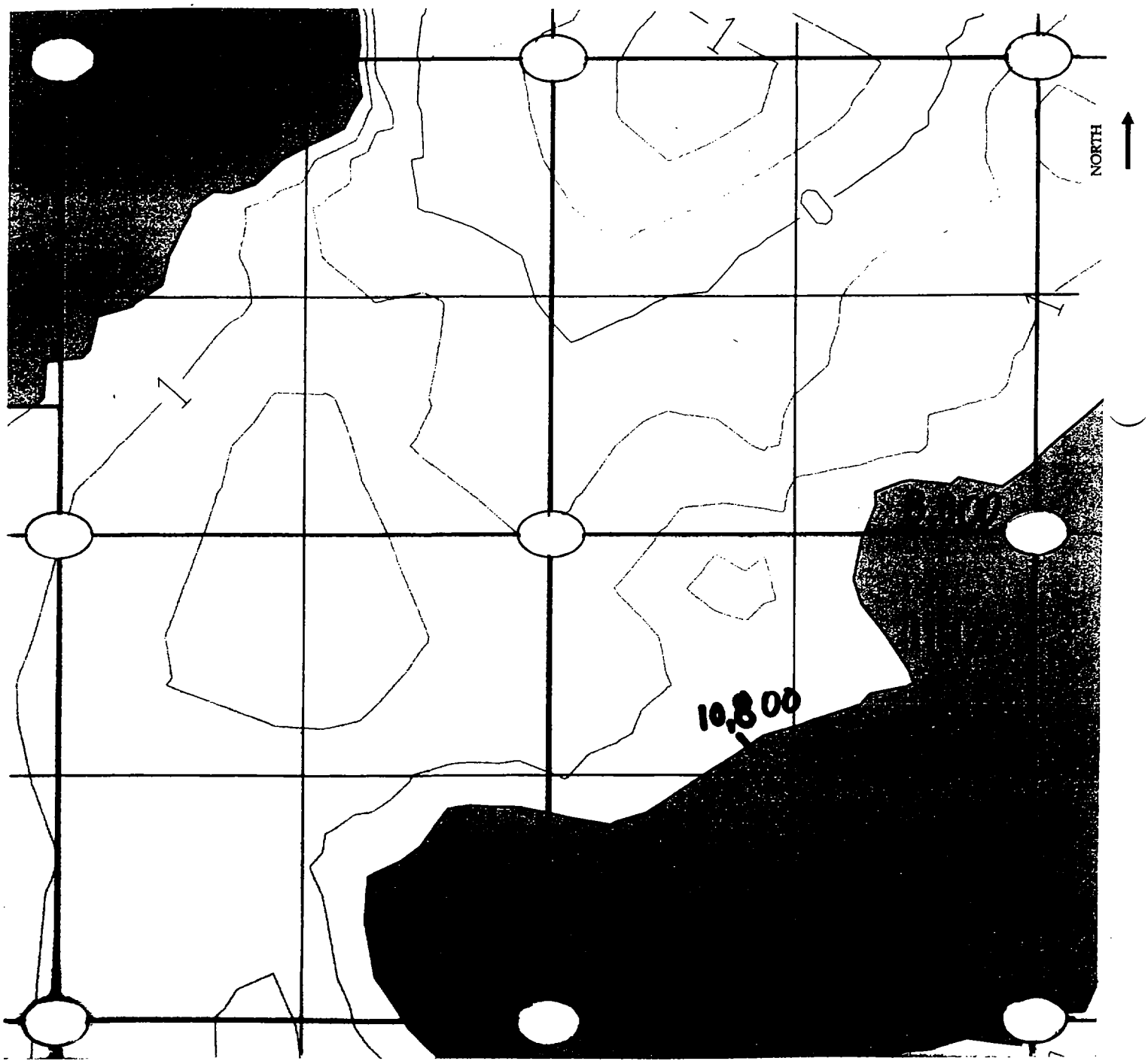
Project # 32193-xc Project Name Lakeshore East Sheet 3 of 3

Date 12/02/02 Technician Jerry Krane

Inst. Model Ludlum 2221 Serial No. 127242-168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 34 (1½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

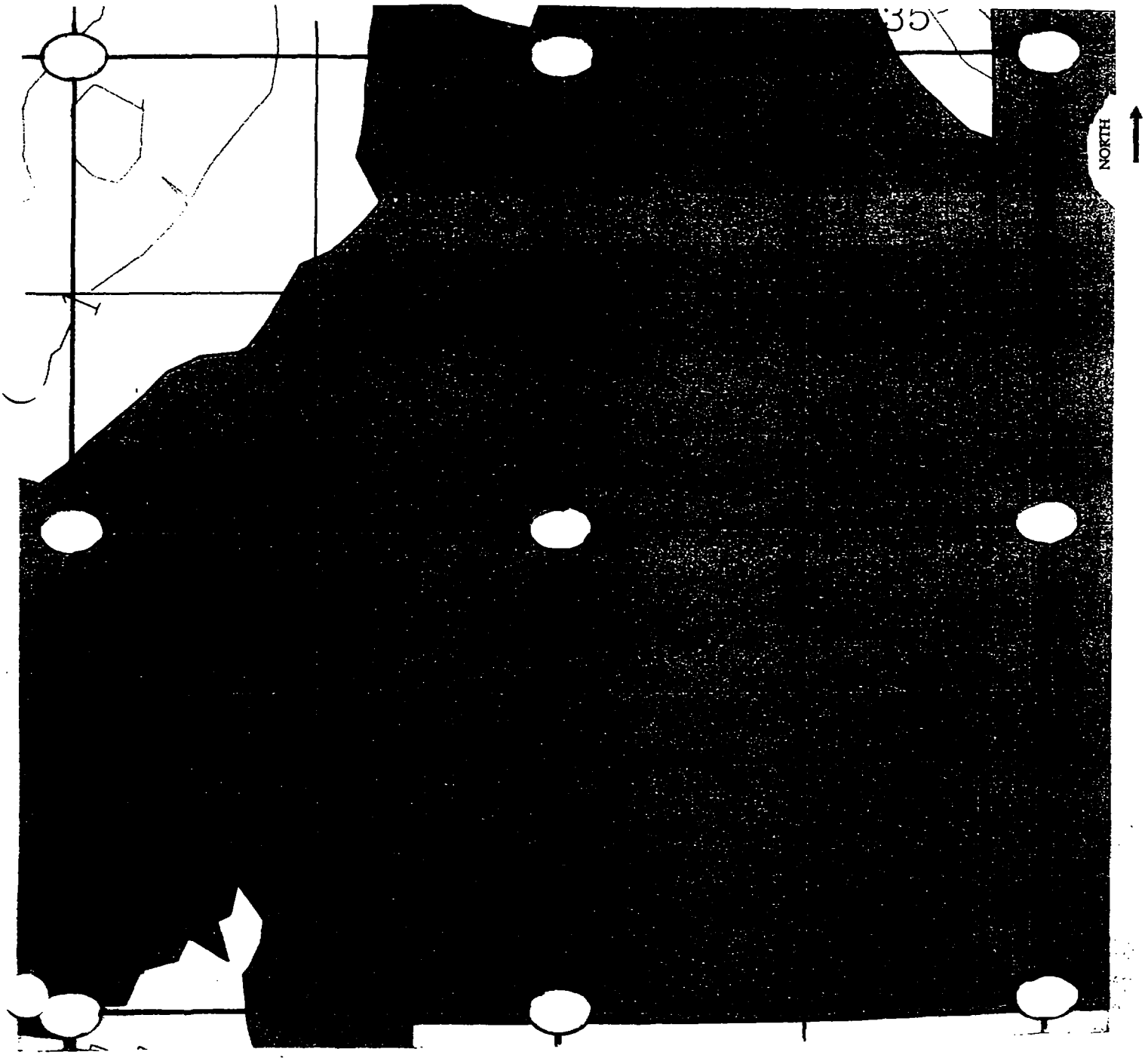
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 5

Date 12/13/02 - 12/19/02 Technician Lindsay Aschim / Jim O'Brien

Inst. Model Ludlum 2221 Serial No. 127242 / 168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 35 (7.5')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

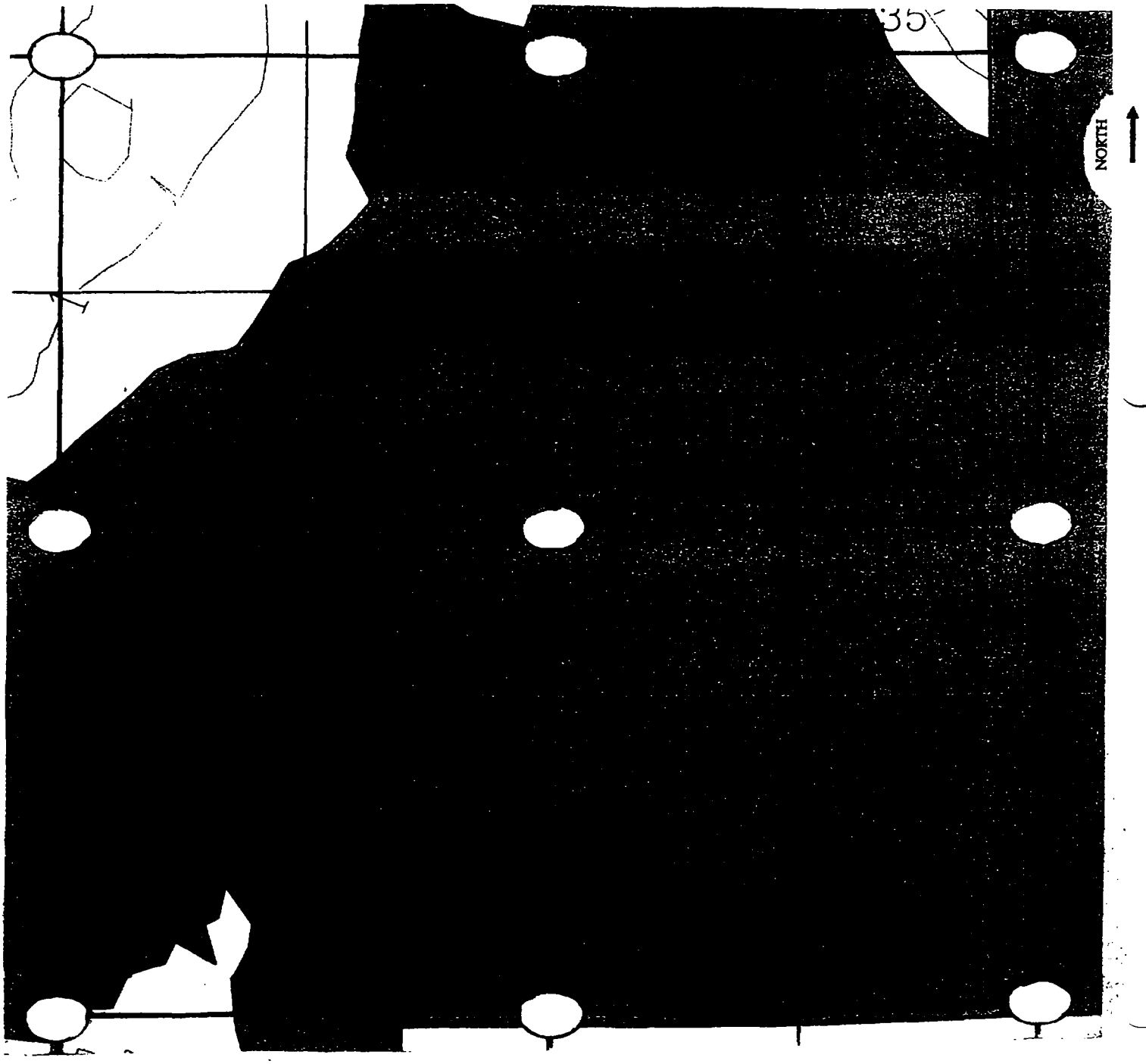
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 5

Date 12/13/02-12/19/02 Technician Lindsay Aschim/Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 127242/168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 35 (6')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

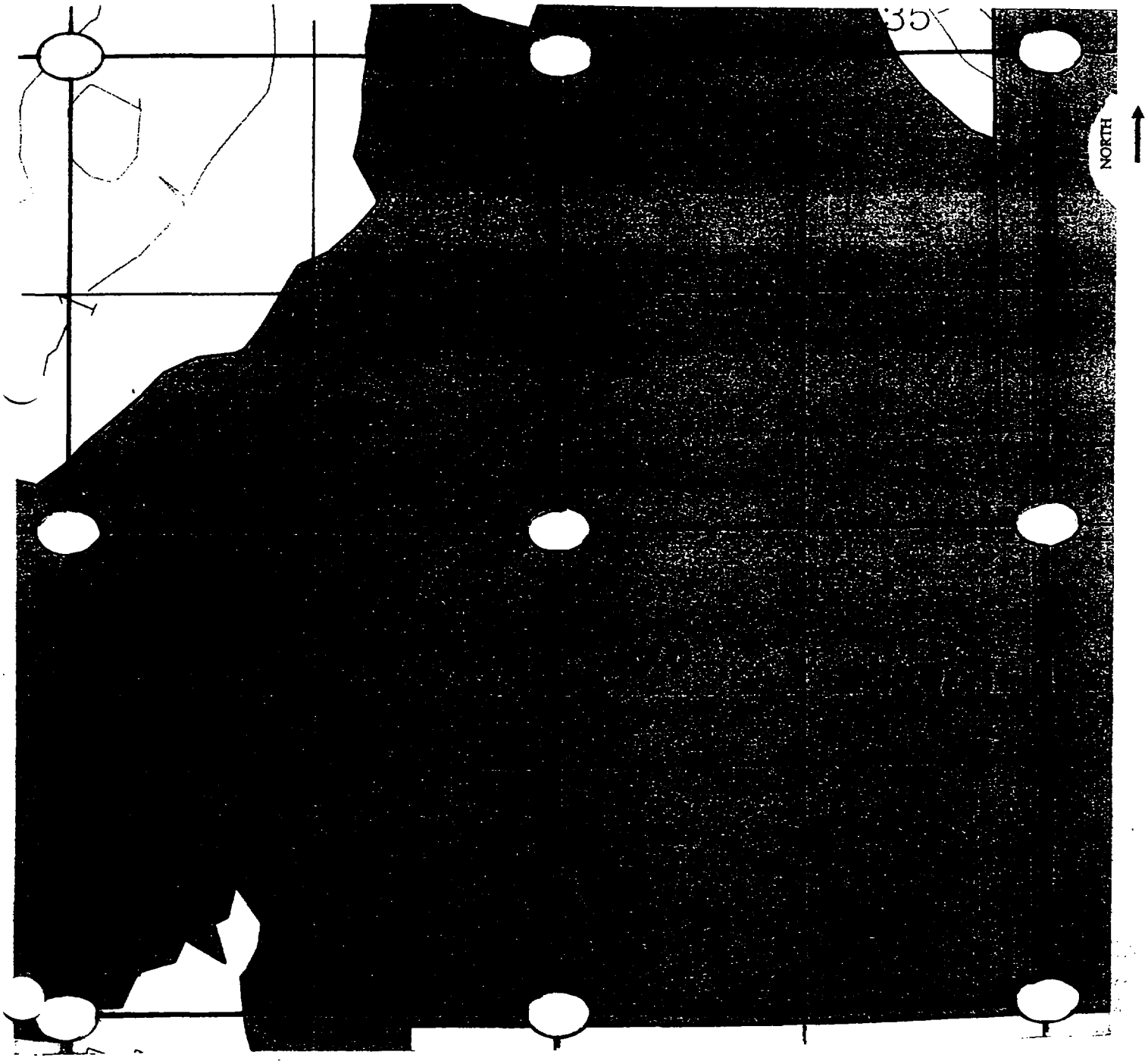
Project # 32193-xc Project Name Lakeshore East Sheet 3 of 5

Date 12/13/02 - 12/19/02 Technician Lindsay Aschim / Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 127242 / 168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 35 (4.5')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

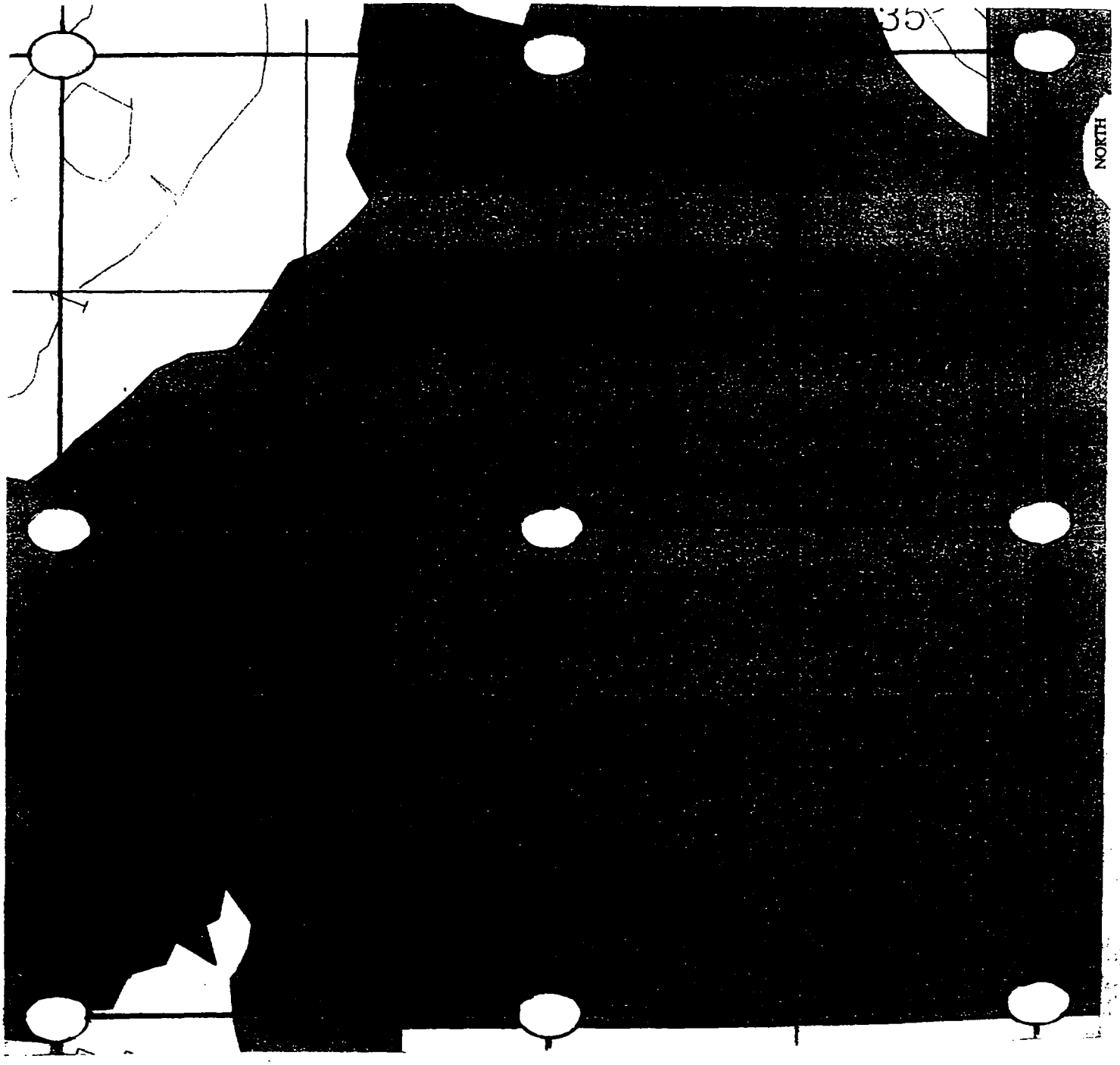
Project # 32193-xc Project Name Lakeshore East Sheet 4 of 5

Date 12/13/02 - 12/19/02 Technician Lindsay Aschim / Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 127242 / 168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 35 (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

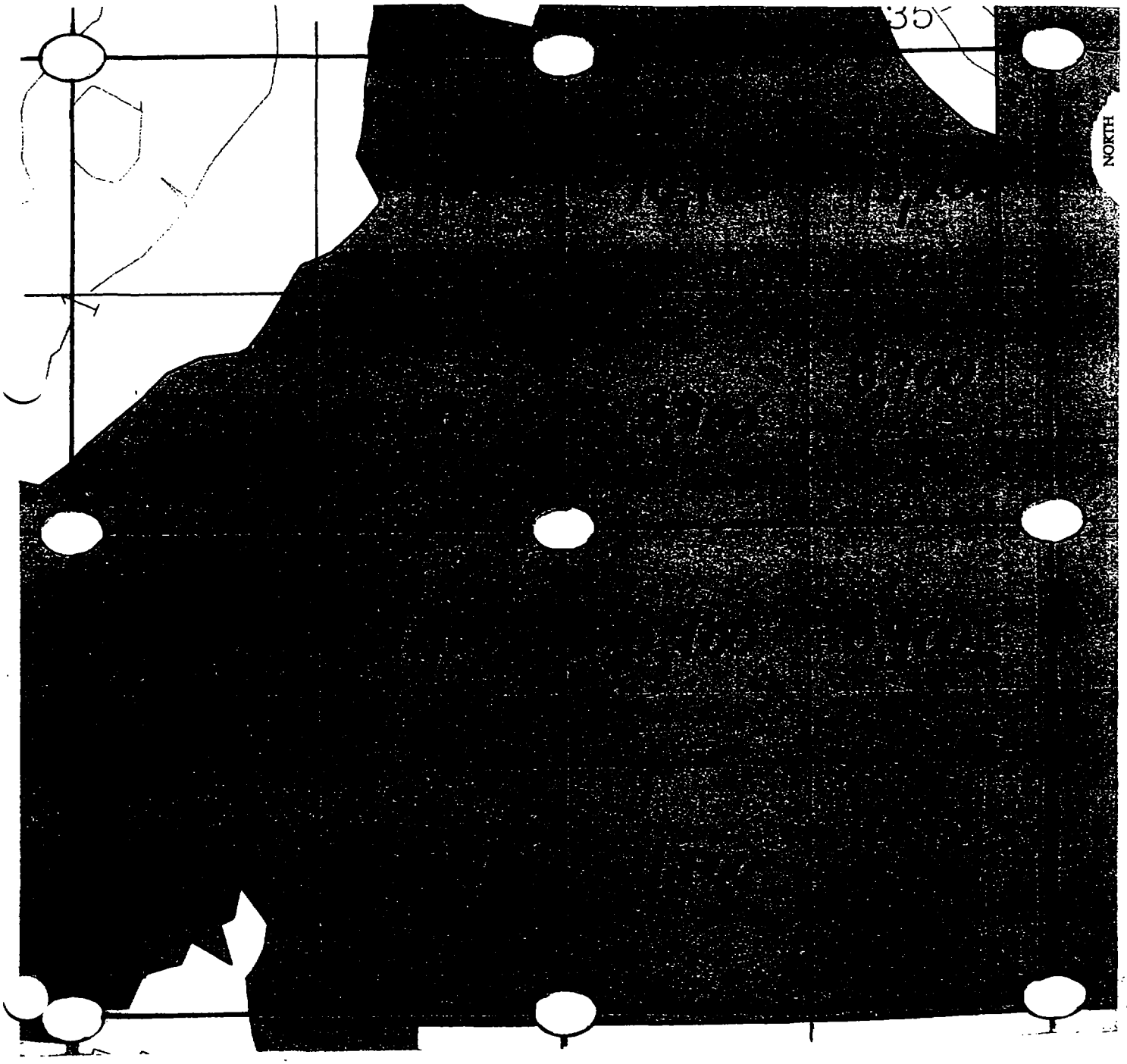
Project # 32193-xc Project Name Lakeshore East Sheet 5 of 5

Date 12/13/02 - 12/19/02 Technician Lindsay Aschim / Tim O'Brien

Inst. Model Ludlum 2221 Serial No. 127242/168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 35 (1.5')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

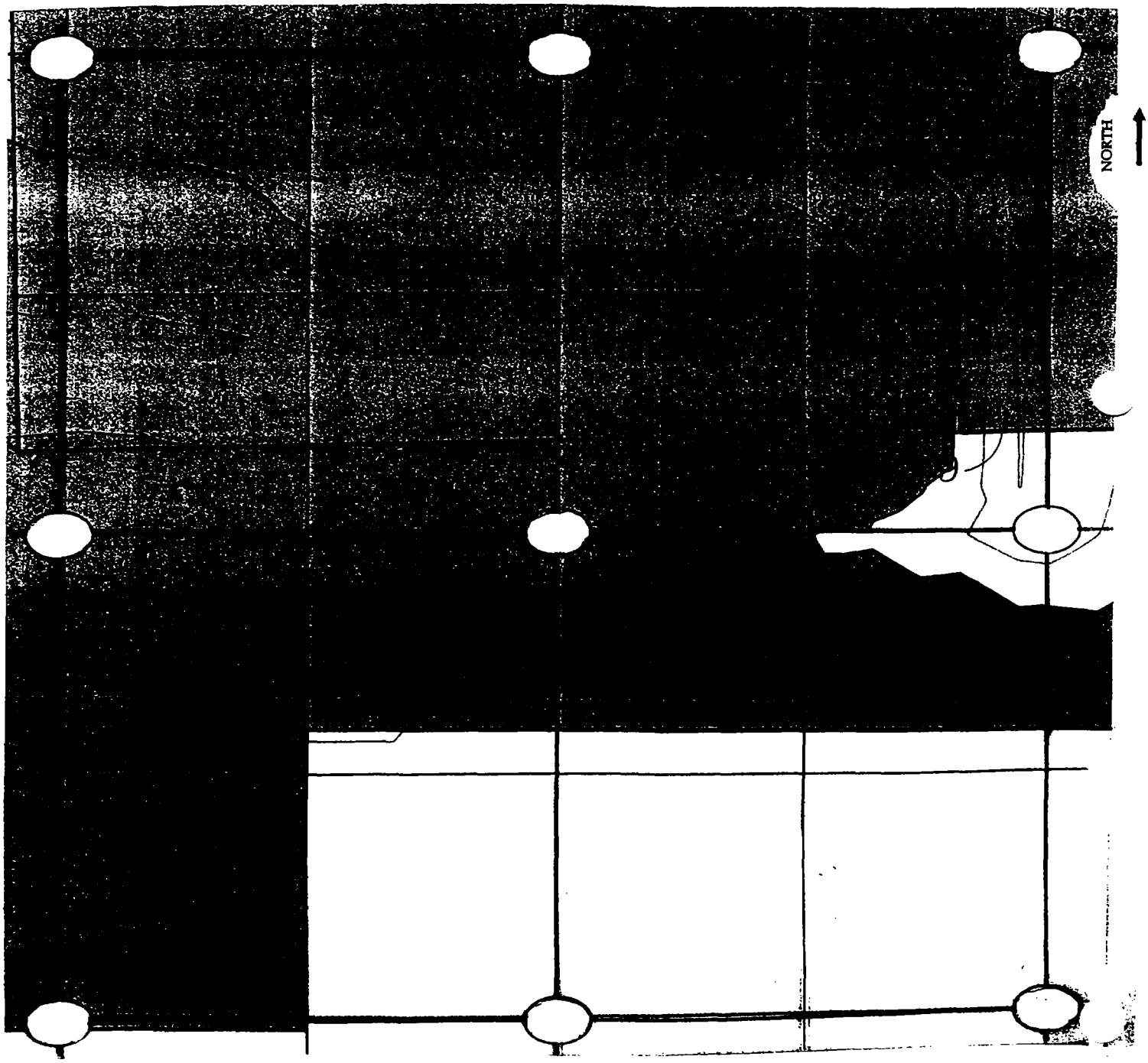
Project # 32193-XC Project Name Lakeshore East Sheet 1 of 3

Date 12/19/02 + 2/27/03 Technician L. Aschim, J. Krane, T. O'Brien

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 36 (4½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

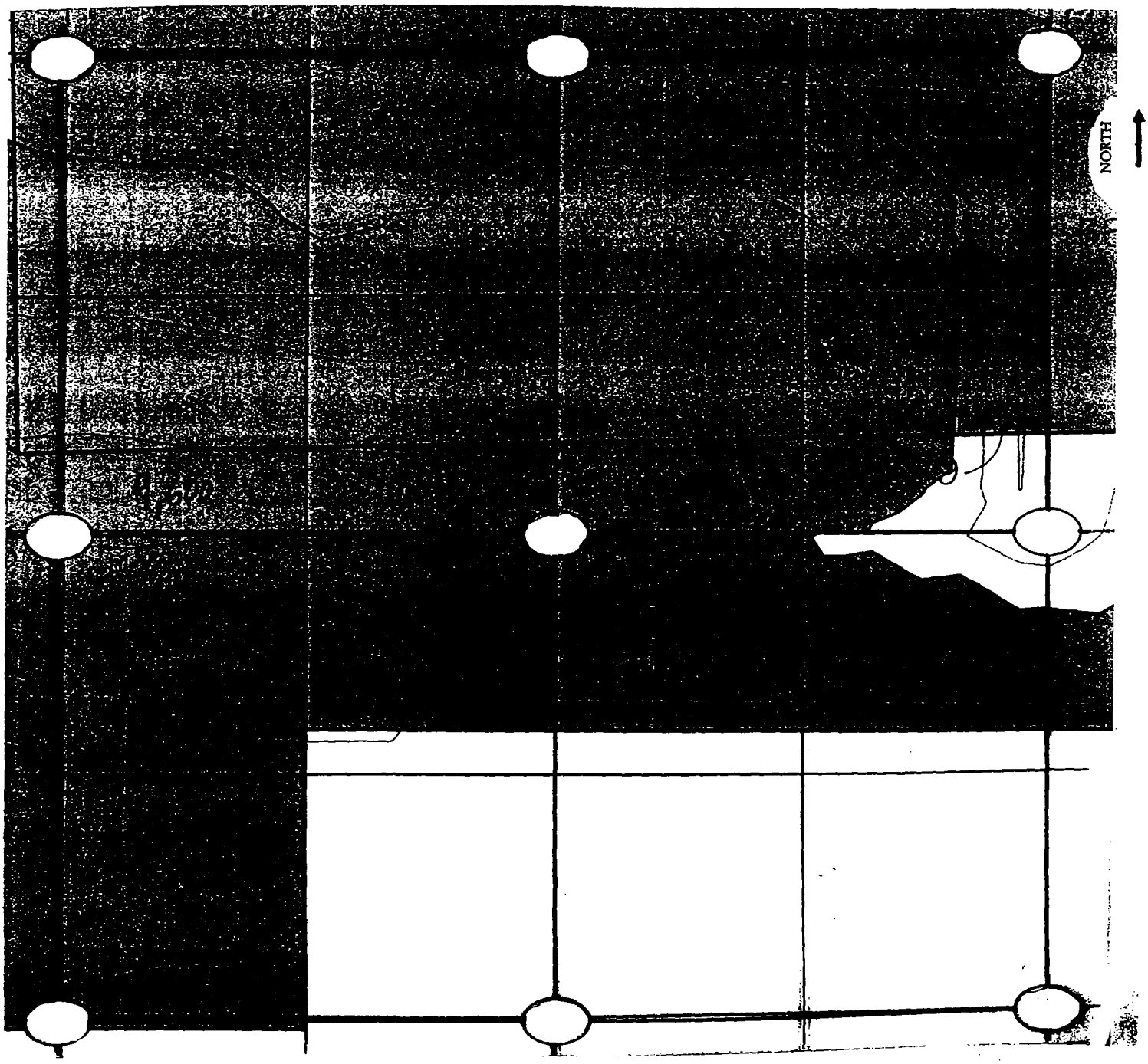
Project # 32193-XC Project Name Lakeshore East Sheet 2 of 3

Date 12/19/02 + 2/27/03 Technician L. Aschim, J. Krane, T O'Brien

Inst. Model Ludlum 2221 Serial No. 132844 / 168149

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 36 (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

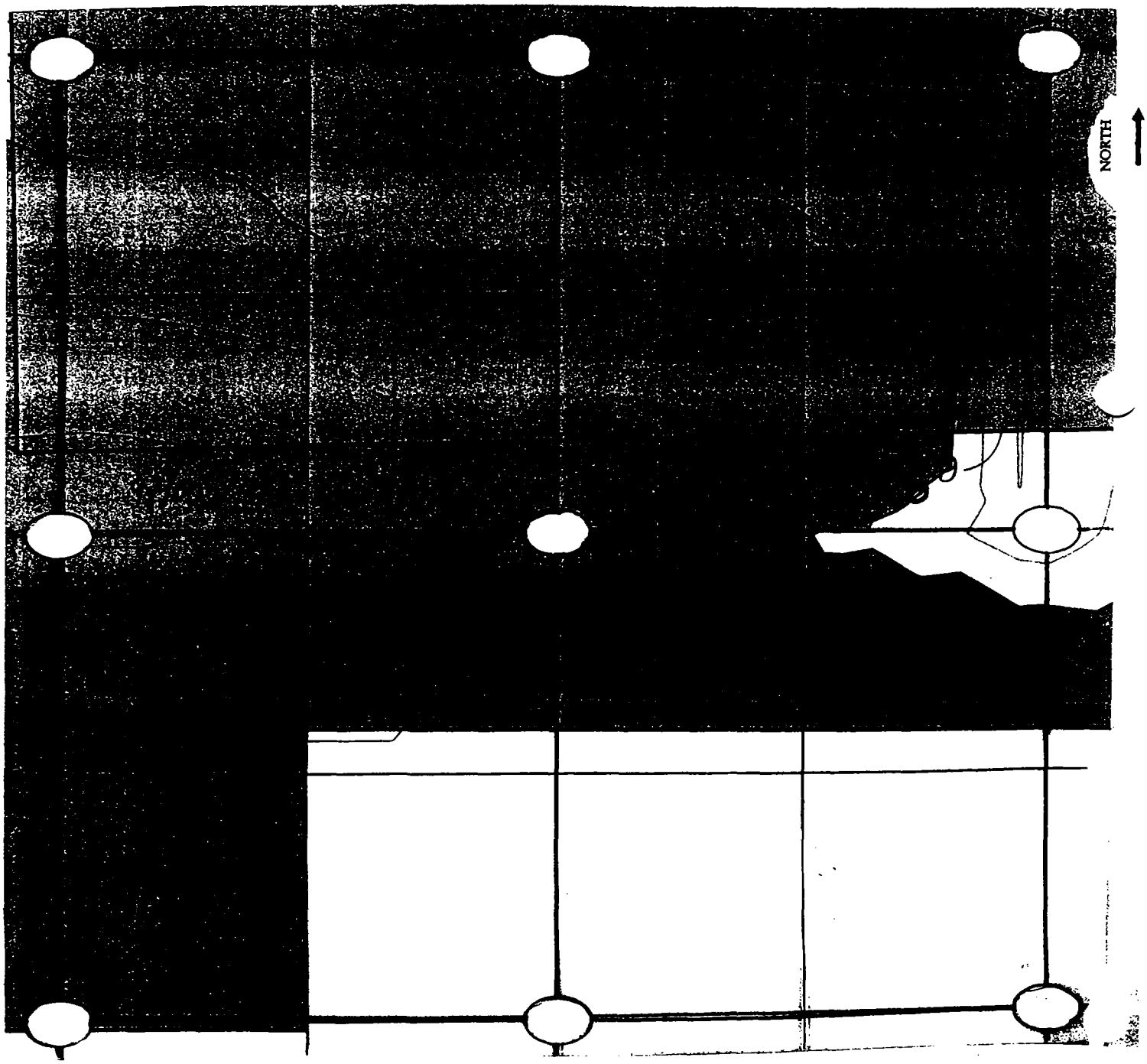
Project # 32193-xc Project Name Lakeshore East Sheet 3 of 3

Date 12/19/02 + 2/27/03 Technician L. Aschim, J. Krane, T O'Brien

Inst. Model Ludlum 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 36 (1½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

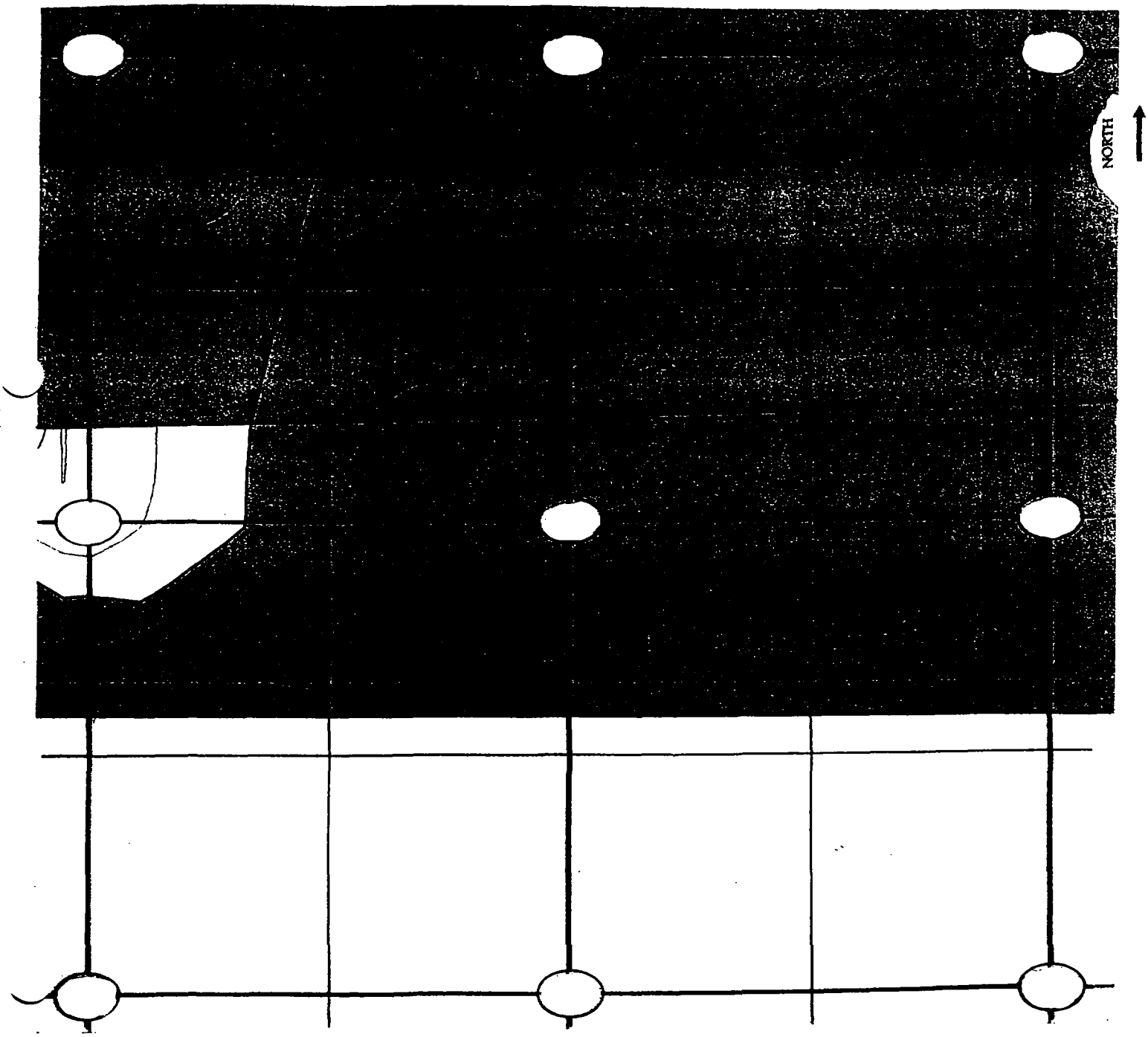
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 2

Date 12/19; 12/20; 12/23/2002 Technician Lindsay Aschim

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 37-3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

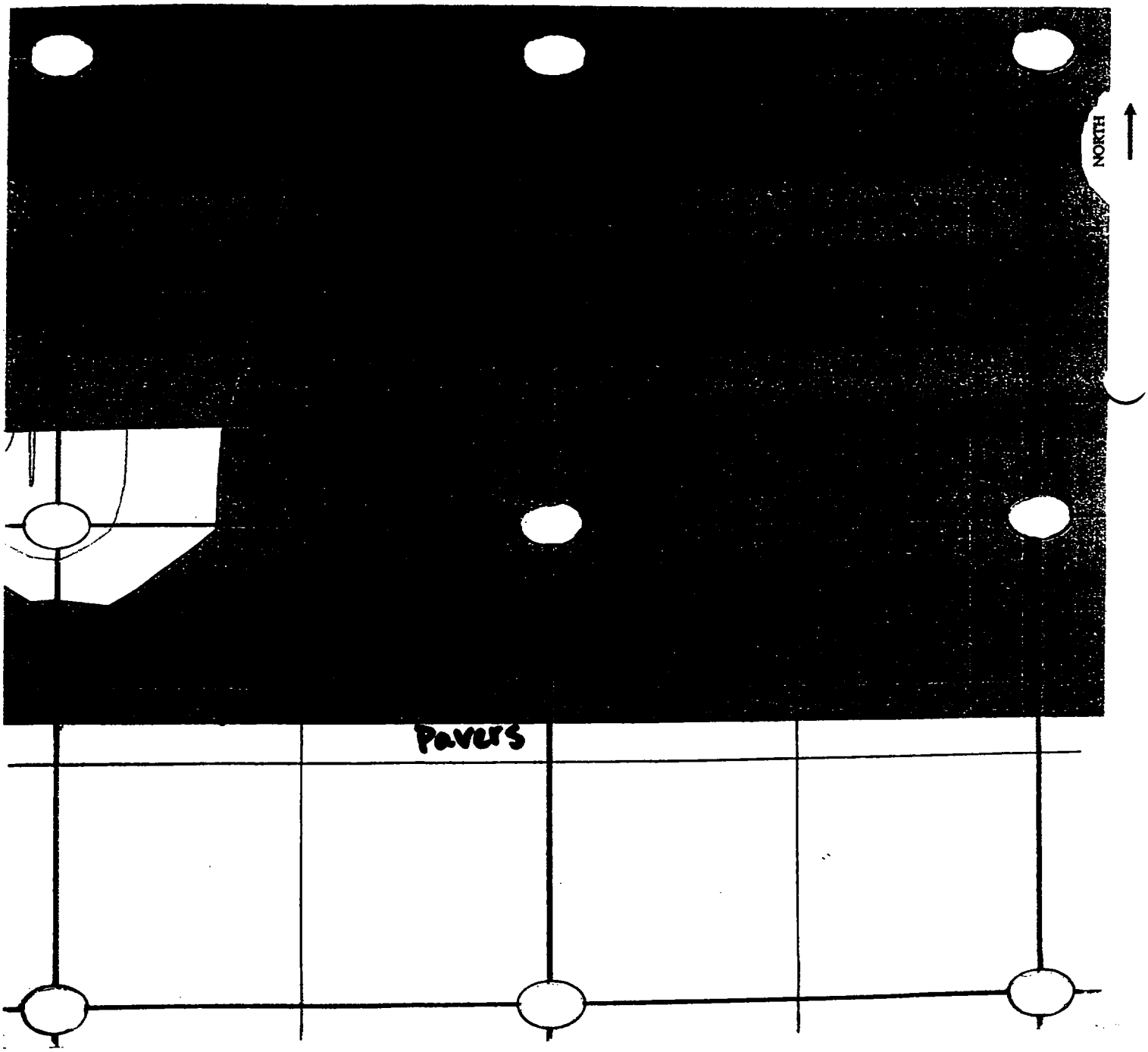
Project # 32193-xc Project Name Lakeshore East Sheet 2 of 2

Date 12/19/02 ; 12/23/2002 Technician Lindsay Aschim

Inst. Model Ludlum 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 37 - 1.5'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

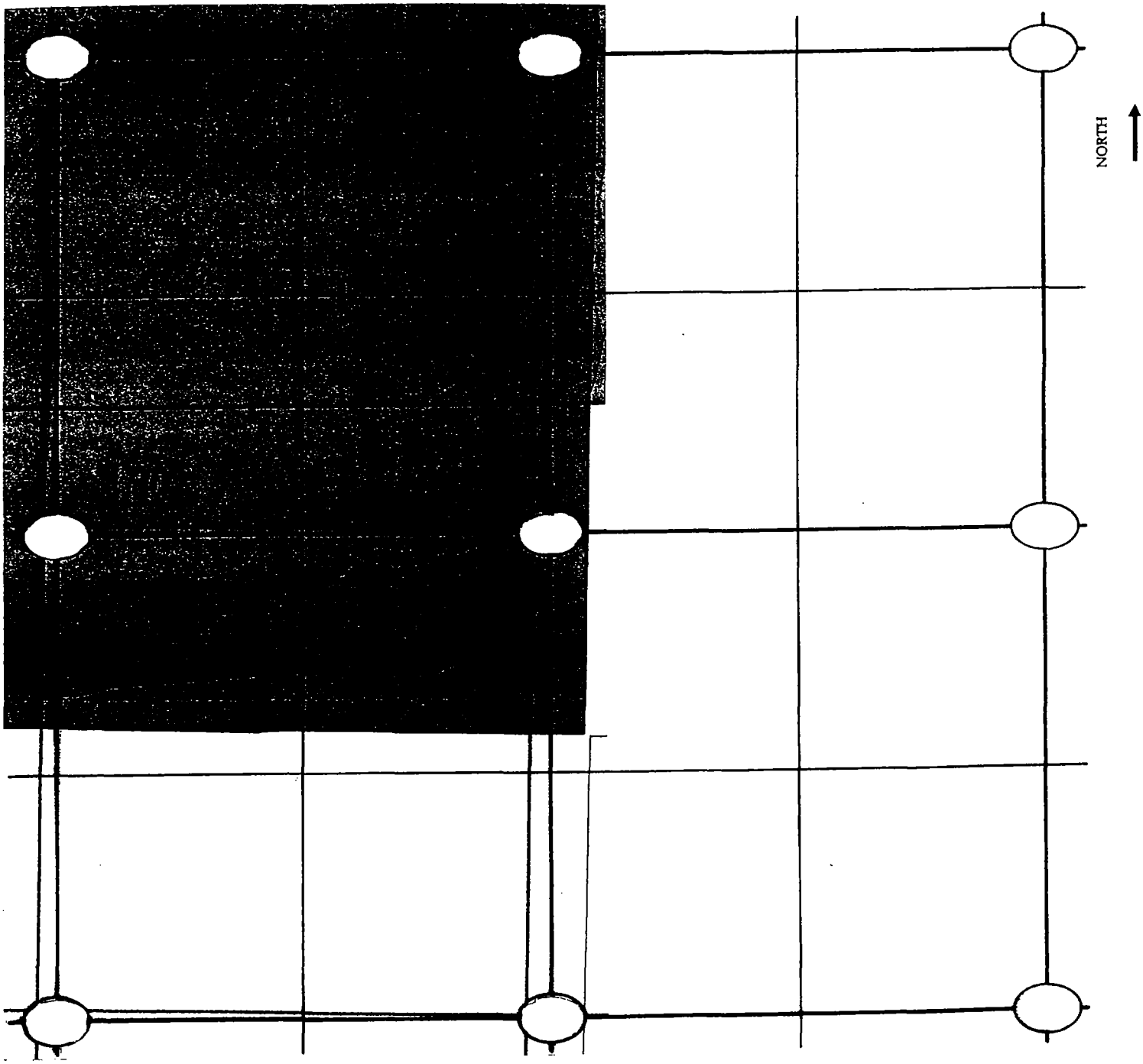
Project # 32193xc Project Name Lakeshore East Sheet 1 of 3

Date 12/20/02, 12/23/02, 12/26/02 Technician Lindsay Aschim

Inst. Model 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 38 ~~(4.0)~~ (4.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

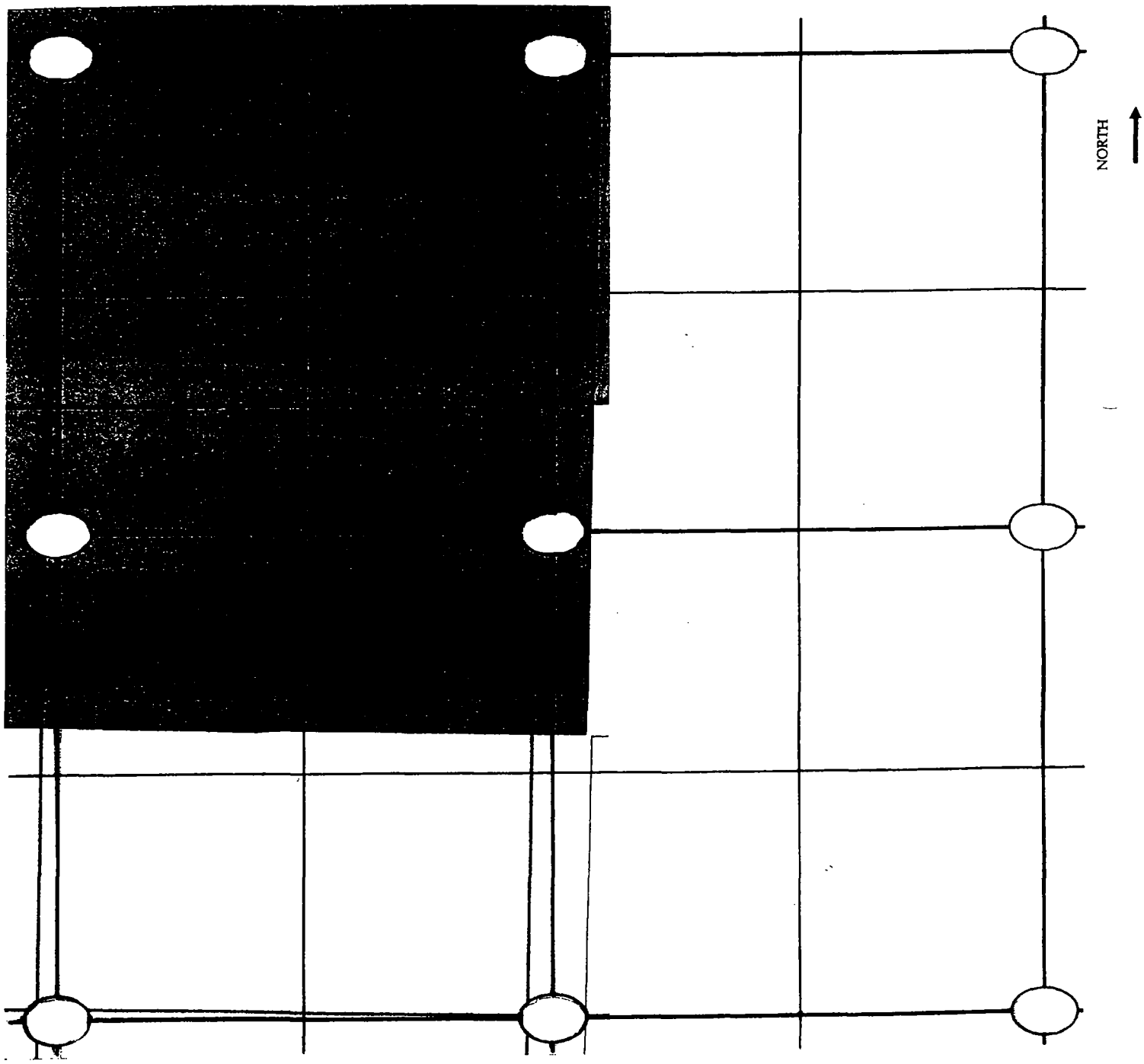
Project # 32193xc Project Name Lakeshore East Sheet 2 of 3

Date 12/20/02, 12/23/02, 12/26/02 Technician L. Aschim

Inst. Model 2221 Serial No. 132844 / 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 38 (3.0)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

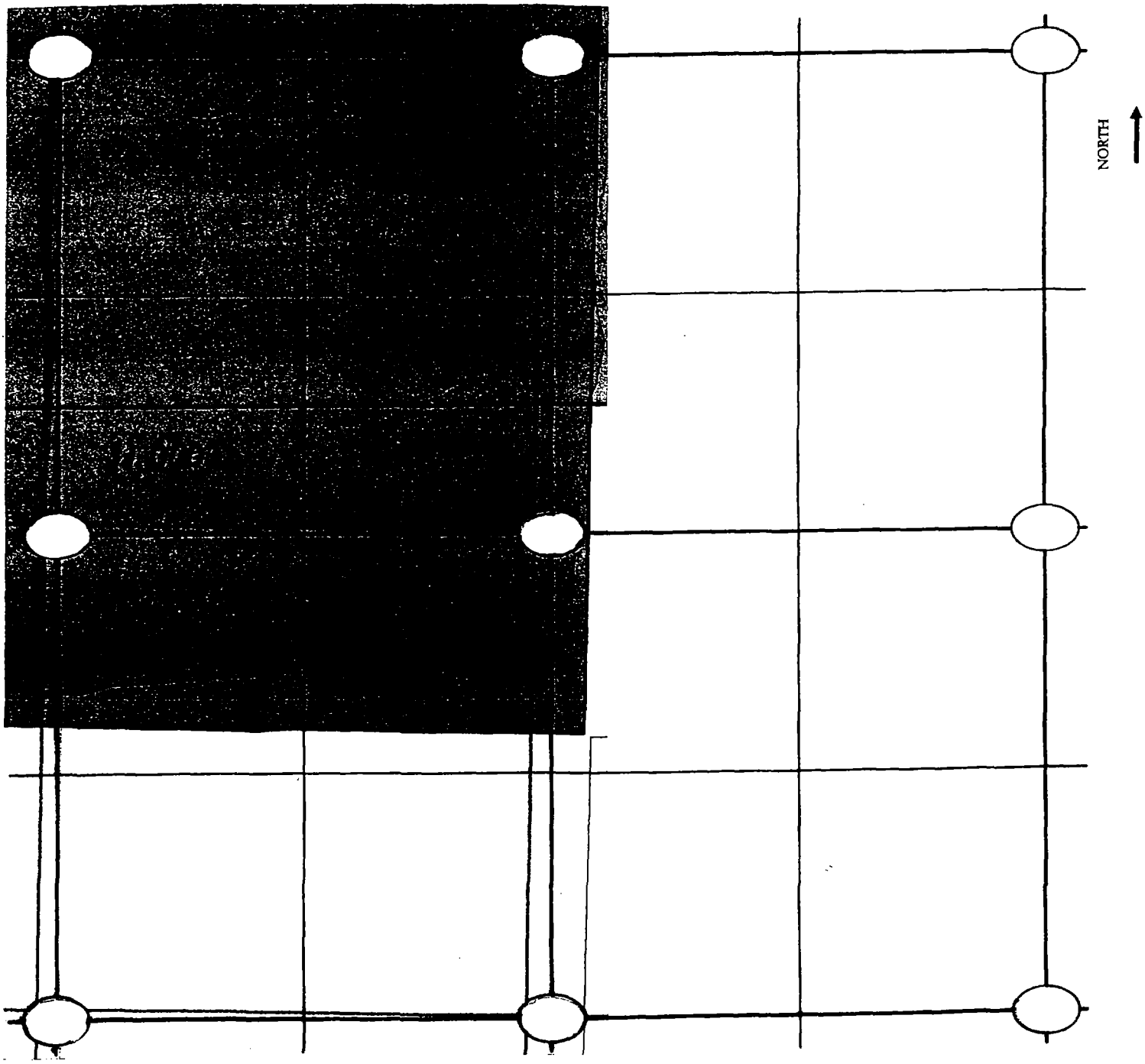
Project # 32193xc Project Name Lakeshore East Sheet 3 of 3

Date 12/20/02, 12/23/02, 12/26/02 Technician L. Aschim

Inst. Model 2221 Serial No. 132844/168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 38 (1.5)

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

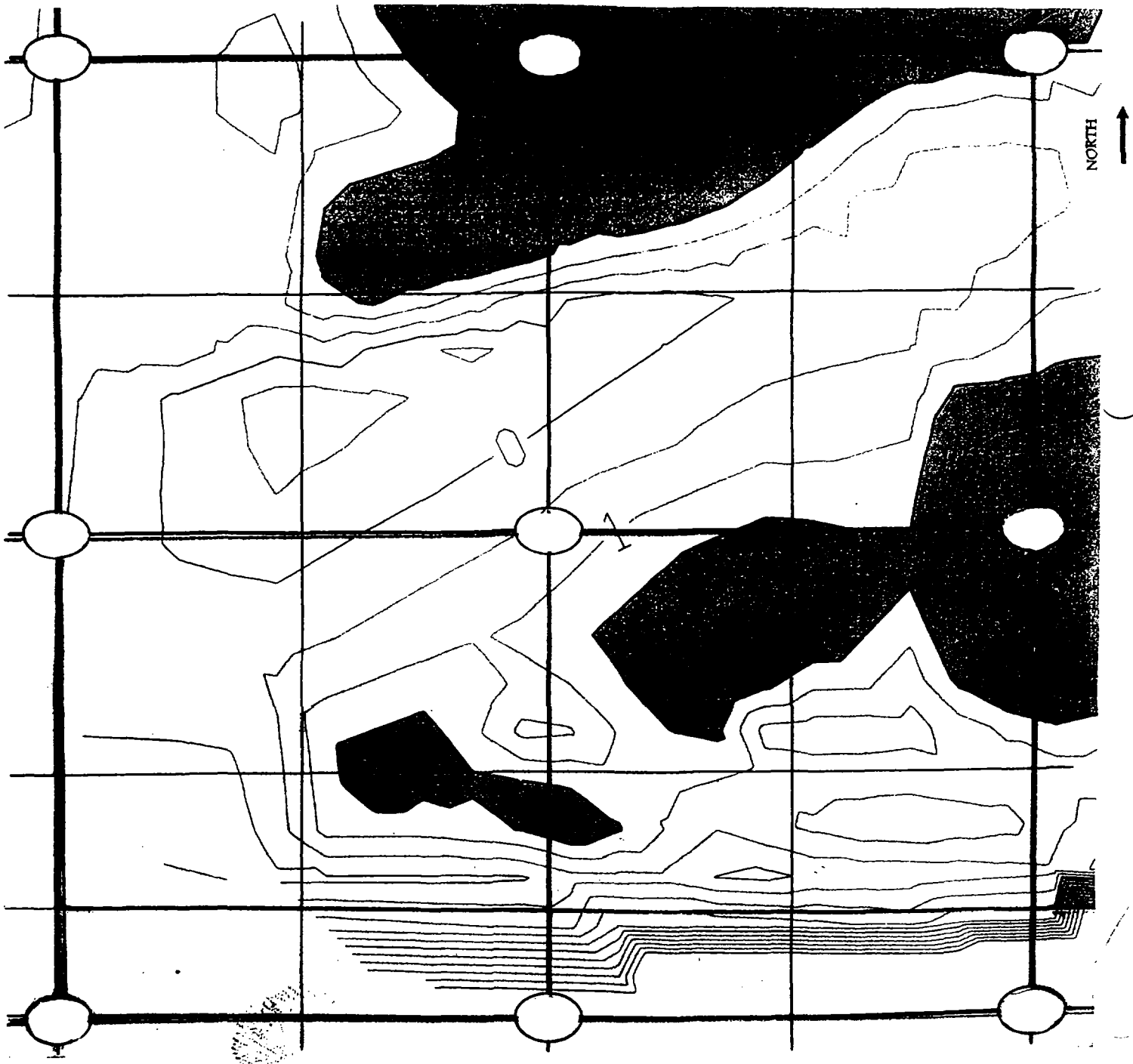
Project # 32193-XC Project Name Lakeshore East Sheet 1 of 2

Date 11/26/02 Technician Jerry Krause

Inst. Model 2221 Serial No. meter # 132844 probe # 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 39 3'

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

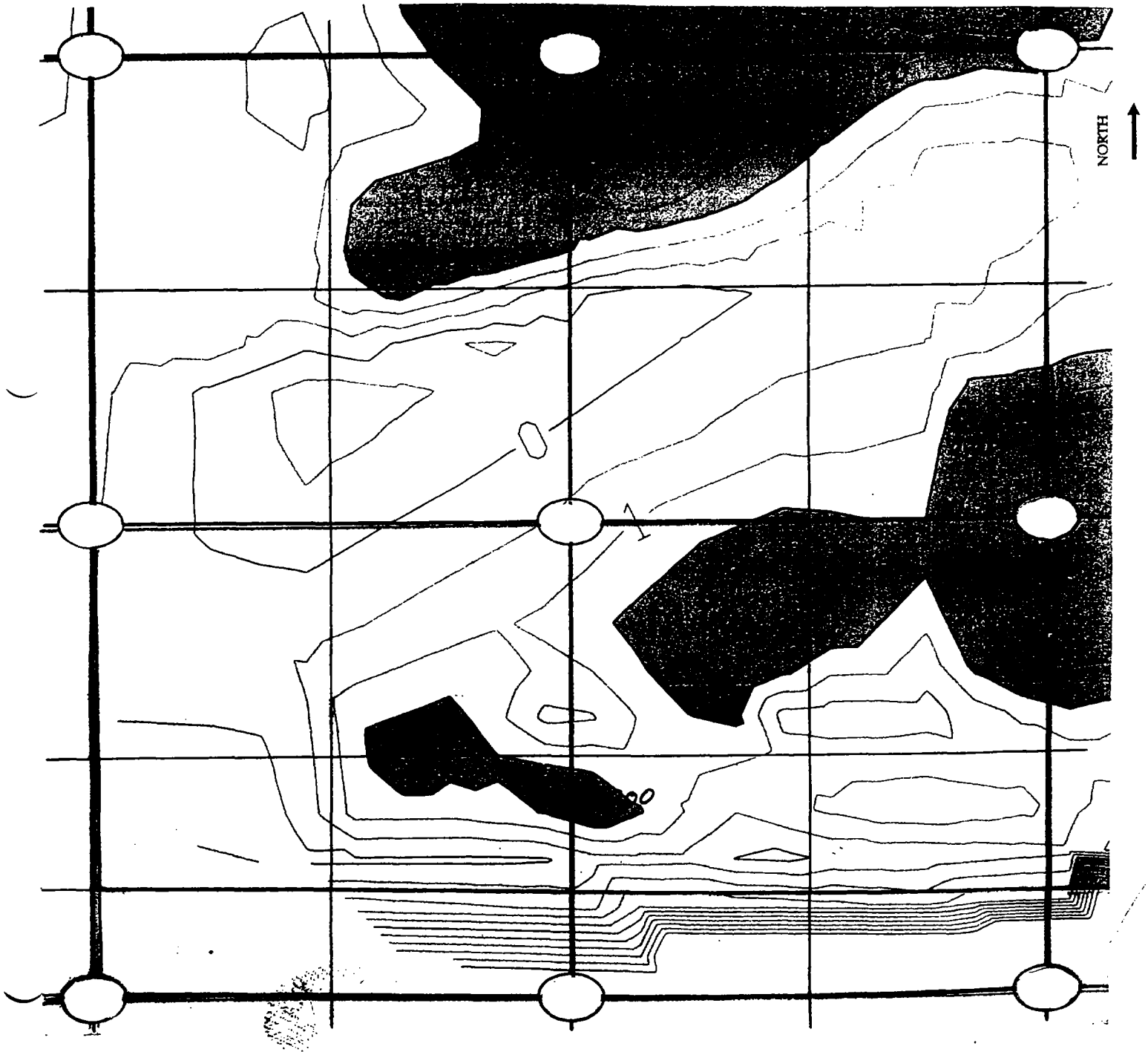
Project # 32193 - XC Project Name Lakeshore East Sheet 2 of 2

Date 11/26/02 Technician Jerry Krane

Inst. Model 2221 Serial No. meter # 132844 probe # 168148

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 39 1 1/2

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



STS Consultants, Ltd.

RADIATION SURVEY FORM – GRADING

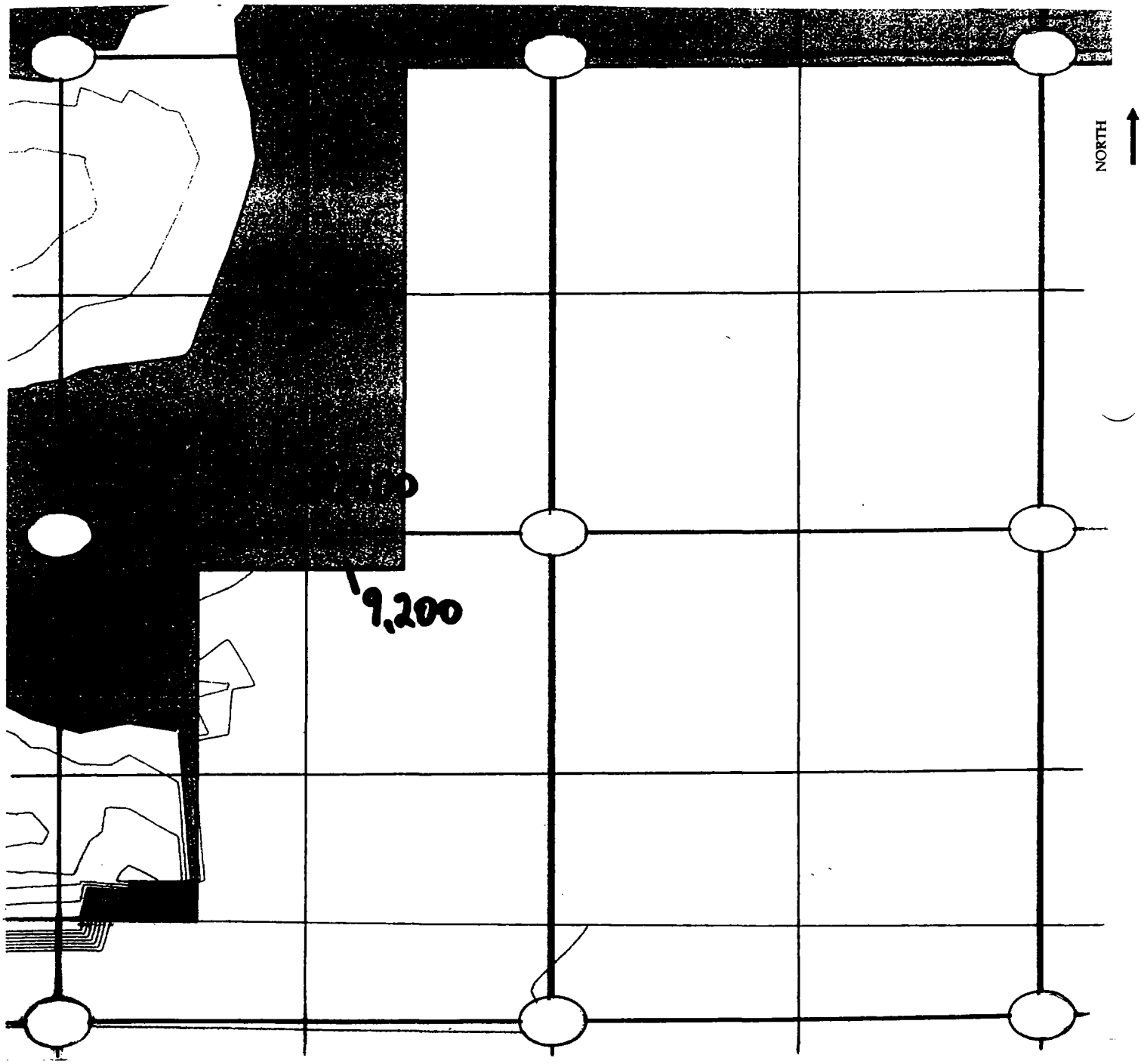
Project # 32193-xc Project Name Lakeshore East Sheet 1 of 2

Date 11/26/02 Technician Jerry Krane

Inst. Model Ludlum 2221 Serial No. 127242 - 168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 40 (3')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



RADIATION SURVEY FORM – GRADING

STS Consultants, Ltd.

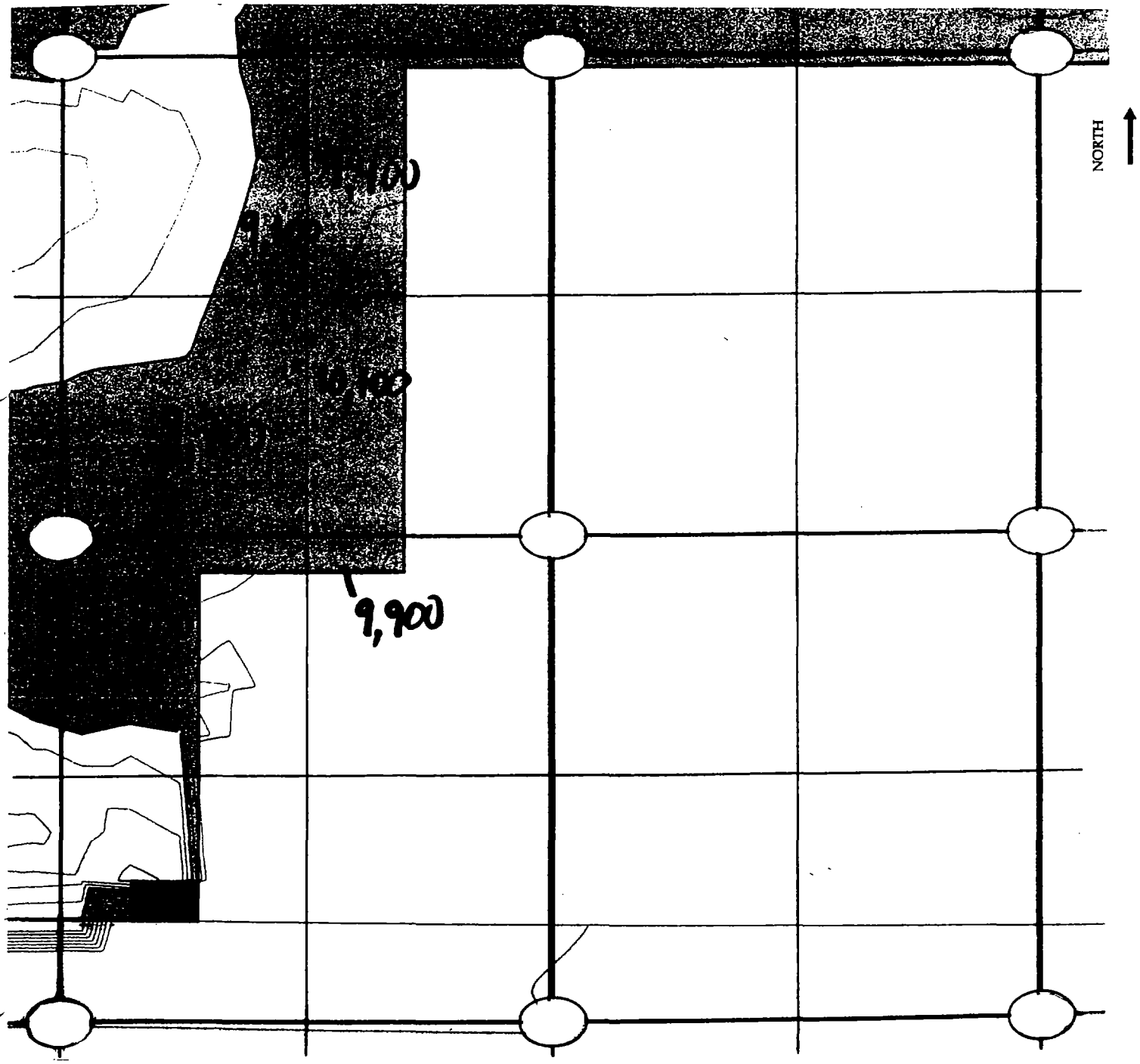
Project # 32193-XC Project Name Lakeshore East Sheet 2 of 2

Date 11/26/02 Technician Jerry Krane

Inst. Model Ludlum 2221 Serial No. 127242-168144

Inst. Calibrated (Y/N)? Yes Location ID/Lift Elevation 40 (1½')

Write the area coordinates in the large circles. Indicate boundaries of grading/excavation with a heavy line. Survey areas in accordance with Section 5.7 of SOP-210. Within each grid record the maximum cpm. If detected, shade areas of elevated gamma readings (> twice background) and record max cpm.



APPENDIX L

Equipment Release Survey Results

RADIATION SURVEY FORM

Lakeshore East Project

SURVEY REFERENCE #: 001

DATE OF SURVEY: 10/29/02

NAME OF SURVEYOR: G. Huber / T. O'Brien

SURVEY METER IDENTIFICATION: Mfg: Ludlum

Background Reading: 0.02 mR/hr Model: 14C

Serial: 95059

INSTRUMENT ID: Mfg: Ludlum

Background Reading: 0.3 cpm Model: 2200 (scaler) / 43-10 (alpha)

Efficiency: 35.7 % Serial: 102220 / PR 113195

MDA: 8.71 dpm

Description (attached sketch if needed) (Area, equipment, vehicle, materials, etc.)	Item #	Gross mR/hr	Gross cpm	dpm per 100 sq. cm
D&G Drilling Equipment				
used in G-15 Excavation				
left tires		.02	1	1.96
right tires		.02	0	0
auger bits		.02	1	1.96
auger bits		.02	1	1.96

RADIATION SURVEY FORM

Lakeshore East Project

SURVEY REFERENCE #: 002

DATE OF SURVEY: 3/31/02

NAME OF SURVEYOR: Jerry Krane / G. Huber

SURVEY METER IDENTIFICATION: Mfg: Ludlum

Background Reading: 0.02 mR/hr

Model: 14C

Serial: 114750

INSTRUMENT ID: Mfg: Ludlum

Background Reading: 0.4 cpm

Model: 2200 (scaler) / 43-10 (alpha)

Efficiency: 35.7%

Serial: 102770 / PR 113195

MDA: 8.71 dpm

Description (attached sketch if needed) (Area, equipment, vehicle, materials, etc.)	Item #	Gross mR/hr	Gross cpm	dpm per 100 sq. cm
Gas Pipe (4 sections)				
removed out of 90/sc				
Exclusion zone				
	1	0.02	2	4.48
	2	0.02	1	1.68
	3	0.02	0	0
	4	0.02	1	1.68

RADIATION SURVEY FORM

Lakeshore East Project

SURVEY REFERENCE #: 003

DATE OF SURVEY: 4/10/03

NAME OF SURVEYOR: Joel Alrutler

SURVEY METER IDENTIFICATION: Mfg: Ludlum

Background Reading: 0.02 mR/hr

Model: 114350

Serial: 14C

INSTRUMENT ID: Mfg: Ludlum

Background Reading: 0.4 cpm

Model: 2200 (scaler) / 43-10 (alpha)

Efficiency: .557 %

Serial: 102770/ PR113195-

MDA: 8.71 dpm

Description (attached sketch if needed) (Area, equipment, vehicle, materials, etc.)	Item #	Gross mR/hr	Gross cpm	dpm per 100 sq. cm
Rudron Backhoe (to be released for unrestricted use)				
left tread		.02	1	1.68
right tread		.02	0	0
bucket		.02	1	1.68
Rudron Front End loader				
left side		.02	0	0
right side		.02	0	0
bucket		.02	1	1.68

RADIATION SURVEY FORM

Lakeshore East Project

SURVEY REFERENCE #: 004

DATE OF SURVEY: 4/15/03

NAME OF SURVEYOR: Jerry Krenc

SURVEY METER IDENTIFICATION: Mfg: Ludlum

Background Reading: 0.02 mR/hr

Model: N/A

Serial: N/A

Gm meter on loan from Ken McGee in West Chicago (ProSource Technologies)

INSTRUMENT ID: Mfg: Ludlum

Background Reading: 0.4 cpm

Model: 2200 (scaler) / 43-10 (alpha)

Efficiency: .357%

Serial: 102770 / PR 113195

MDA: 8.71 dpm

Description (attached sketch if needed) (Area, equipment, vehicle, materials, etc.)	Item #	Gross mR/hr	Gross cpm	dpm per 100 sq. cm
B-dcon backhoe which was				
moved to equipment yard				
in West Chicago w/o				
authorization. Note: wipes				
obtained after small part				
of visible contamination was				
decontaminated				
left track		.02	1	1.68
right track		.02	0	0
outside bucket		.02	1	1.68
inside bucket		.02	2	4.48
* Survey results per Jerry Krenc				
form filled out by S. Huber				
wipes analyzed in DAKE				
field lab @ Lakeshore East				

APPENDIX M

Film Badge Results

STAN A HUBER CON INC
ATTN STAN HUBER
200 N CEDAR ROAD
NEW LENOX IL 60451

LANDAUER®

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (708)755-7000 Facsimile: (708)755-7016
www.landauerinc.com

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RADIATION DOSIMETRY REPORT

ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
67627	NL1	0232220050	11/22/02	11/18/02	4	1 OF 1

PARTICIPANT NUMBER	NAME (ID NUMBER, BIRTH DATE, SEX)	DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW			QUARTERLY ACCUMULATED DOSE EQUIVALENT (MREM)			YEAR TO DATE DOSE EQUIVALENT (MREM)			LIFETIME DOSE EQUIVALENT (MREM)			RECORDS FOR YEAR	INCEPTION DATE (MM/YY)
					DEEP DDE	EYE LDE	SHALLOW SDE	DEEP DDE	EYE LDE	SHALLOW SDE	DEEP DDE	EYE LDE	SHALLOW SDE	DEEP DDE	EYE LDE	SHALLOW SDE		
[redacted]																		
00NL1	CONTROL	P	CNTRL		M	M	M										14	10/78
[redacted]																		
00135	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	2	2	3	9	12/00
[redacted]																		
00137	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	5	4	5	8	12/00
[redacted]																		
00139	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	18	20	22	10	12/00
[redacted]																		
00144	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	10	10/01
[redacted]																		
00146	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	10	10/01
[redacted]																		
00148	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	10	10/01
[redacted]																		
00150	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	10	10/01
[redacted]																		

M: MINIMAL REPORTING SERVICE OF 1 MREM

QUALITY CONTROL RELEASE: DEM 1 - PR 7613 - RPT130 - N1 - 32250

Accredited by the National Institute of Standards and Technology through NVLAP*

STAN A HUBER CON INC
ATTN STAN HUBER
200 N CEDAR ROAD

NEW LENOX IL
60451

LANDAUER, INC. 2 SCIENCE ROAD GLENWOOD, ILLINOIS 60425 – 1586

Telephone: (800) 323 – 8830
Facsimile: (708) 755 – 7016

IMPORTANT: WHEN REQUESTING ANY CHANGES, ADDITIONS, OR DELETIONS, PLEASE MAKE THEM ON THIS FORM.
CHANGES TO BE EFFECTIVE FOR YOUR NEXT WEAR DATE
MUST REACH THE GLENWOOD OFFICE NO LATER THAN 10/07/2002
PLEASE DO NOT DUPLICATE CHANGES REQUESTED DURING PRECEDING 20 DAYS.
DO NOT RETURN CHANGE REQUESTS WITH YOUR DOSIMETERS SINCE THIS DELAYS HANDLING.

STANDARD HOLDERS	SPECIAL HOLDERS
0	0

* Holder included.

PLACE "D" IN DELETE

USE REVERSE SIDE FOR ADDITIONS AND OTHER CHANGES

ACCT. NO.	SERIES	EXPOSURE PERIOD	BADGE DATE
67627	NL1	1 MONTH M	10-01-02

SERIES NAME
NL1

SERVICE CHANGE ORDER
Issued

S1825203998 18

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR
			00NL1	P1	CONTROL		0186930D		
			00134	P1 ✓	VISITOR Glenn Huber	[redacted]	0186931D	M	[redacted] ✓
			00135	P1 ✓	VISITOR Tim O'Brien SAHLI	[redacted]	0186932D	M	[redacted] ✓
			00136	P1 ✓	VISITOR Jerry Krane	[redacted]	0186933D	M	[redacted] ✓
			00137	P1 ✓	VISITOR Lindsey Ascher	[redacted]	0186934D	F	[redacted] ✓

S1825203998 67627 NL1 18

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR
			00138	P1 ✓	VISITOR John Anderson	[redacted]	0186935D	M	[redacted] ✓
			00139	P1 ✓	VISITOR Rich Berggreen	[redacted]	0186936D	M	[redacted] ✓
			00140	P1 ✓	VISITOR Charles Brown	[redacted]	0186937D	M	[redacted] ✓
			00141	P1 ✓	VISITOR Steve Kurnder	[redacted]	0186938D	M	[redacted]
			00144	P1	VISITOR D+G Drilling 1 day 10/29/02		0186939D		✓
			00145	P1 ✓	VISITOR Odell Morgan Budron		0186940D		✓
			00146	P1	VISITOR Jim Propek		0186941D		[redacted]
			00147	P1 ✓	VISITOR Greg Patterson	[redacted]	0186942D	M	[redacted] ✓
			00148	P1 ✓	VISITOR Ray Booker	[redacted]	0186943D	M	[redacted] ✓
			00149	P1 ✓	VISITOR Roger Petty Enumeration	[redacted]	0186944D	M	[redacted] ✓
			00150	P1 ✓	VISITOR William Concepcion	[redacted]	0186945D	M	[redacted] ✓
			00151	P1 ✓	VISITOR Antoine Harvey	[redacted]	0186946D	M	[redacted] ✓

STAN A HUBER CON INC
ATTN STAN HUBER
200 N CEDAR ROAD
NEW LENOX IL 60451

LANDAUER®

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (708)755-7000 Facsimile: (708)755-7016
www.landauerinc.com

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RADIATION DOSIMETRY REPORT

ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
67627	NL1	0234510142	12/17/02	12/11/02	4	1 OF 1

PARTICIPANT NUMBER	NAME / ID NUMBER	BIRTH DATE	SEX	DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW: DEEP DDE	EYE LDE	SHALLOW SDE	QUARTERLY ACCUMULATED DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	YEAR TO DATE DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	LIFETIME DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	RECORDS FOR YEAR	INCEPTION DATE (MM/YY)
[redacted]																				
00140	VISITOR			P	WHBODY	*P	18	18	18	18	18	18	18	18	18	18	18	18	10	12/00
[redacted]																				
00NL1	CONTROL			P	CNTRL		M	M	M										15	10/78
[redacted]																				
00135	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	2	2	3	10	12/00
[redacted]																				
00137	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	5	4	5	9	12/00
[redacted]																				
00139	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	18	20	22	11	12/00
[redacted]																				
00144	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	11	10/01
[redacted]																				
00146	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	11	10/01
[redacted]																				
00148	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	11	10/01
[redacted]																				
00150	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	11	10/01
[redacted]																				

M: MINIMAL REPORTING SERVICE OF 1 MREM

QUALITY CONTROL RELEASE: JS

1 - PR 7628 - RPT130 - N1 - 34542

* - NO CONTROL SUBTRACTED

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17

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200 N CEDAR ROAD

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60451

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Telephone: (800) 323–8830
Facsimile: (708) 755–7016

IMPORTANT: WHEN REQUESTING ANY CHANGES, ADDITIONS, OR DELETIONS, PLEASE MAKE THEM ON THIS FORM.
CHANGES TO BE EFFECTIVE FOR YOUR NEXT WEAR DATE
MUST REACH THE GLENWOOD OFFICE NO LATER THAN 11/06/2002
PLEASE DO NOT DUPLICATE CHANGES REQUESTED DURING PRECEDING 28 DAYS.
DO NOT RETURN CHANGE REQUESTS WITH YOUR DOSIMETERS SINCE THIS DELAYS HANDLING.

STANDARD HOLDERS	SPECIAL HOLDERS
0	0

* Holder included.

PLACE "D" IN DELETE

USE REVERSE SIDE FOR ADDITIONS AND OTHER CHANGES

ACCT. NO.	SERIES	EXPOSURE PERIOD	BADGE DATE
67627	NL1	1 MONTH M	11-01-02

SERIES NAME
NL1

SERVICE CHANGE ORDER

Issued S7128303977 01 Returned

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR	
			00NL1	P1	CONTROL		1049775D			
			00134	P1	VISITOR Glenn Huber	✓	1049776D			✓
			00135	P1	VISITOR Tim O Brien SAHCI	✓	1049777D			
			00136	P1	VISITOR Jerry Krane	✓	1049778D			
			00137	P1	VISITOR Lindsey Aschim	✓	1049779D			

S7128303977 67627 NL1 01

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR	
			00138	P1	VISITOR John Anderson	✓	1049780D			
			00139	P1	VISITOR Rich Berggreen	✓	1049781D			
			00140	P1	VISITOR Charles Brown	✓	1049782D			lost
			00141	P1	VISITOR Steve Kornder	✓	1049783D			✓
			00144	P1	VISITOR Eric Reuscher	[redacted]	1049784D	M	[redacted]	✓
			00145	P1	VISITOR Odell Morgan	✓	1049785D			
			00146	P1	VISITOR Jim Propek Budron	✓	1049786D			
			00147	P1	VISITOR Greg Patterson	✓	1049787D			
			00148	P1	VISITOR Ray Booker	✓	1049788D			
			00149	P1	VISITOR Roger Petty Envirocon	✓	1049789D			
			00150	P1	VISITOR William Concepcion	✓	1049790D			
			00151	P1	VISITOR Antoine Harvey	✓	1049791D			

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RADIATION DOSIMETRY REPORT

ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
67627	NL1	0301030005	01/14/03	01/10/03	2	1 OF 1

PARTICIPANT NUMBER	NAME / ID NUMBER	BIRTH DATE	SEX	DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW: DEEP DDE	EYE LDE	SHALLOW SDE	QUARTERLY ACCUMULATED DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	YEAR TO DATE DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	LIFETIME DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	RECORDS FOR YEAR	INCEPTION DATE (MM/YY)
[redacted]																				
00NL1	CONTROL			P	CNTRL		M	M	M										17	10/78
[redacted]																				
00135	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	2	2	3	11	12/00
[redacted]																				
00138	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	1	10	12/00
[redacted]																				
00140	VISITOR			P	WHBODY		M	M	M	18	18	18	18	18	18	18	18	18	11	12/00
[redacted]																				
00144	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	12	10/01
[redacted]																				
00148	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	12	10/01
[redacted]																				
00148	VISITOR			P	WHBODY	P	M	1	1	M	1	1	M	1	1	M	1	1	12	10/01
[redacted]																				
00150	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	12	10/01
[redacted]																				

M: MINIMAL REPORTING SERVICE OF 1 MREM

QUALITY CONTROL RELEASE: IYF 1 - PR 7645 - RPT130 - N1 - 01005

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December

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DO NOT RETURN CHANGE REQUESTS WITH YOUR DOSIMETERS SINCE THIS DELAYS HANDLING.

STANDARD HOLDERS	SPECIAL HOLDERS
0	0

* Holder Included.

PLACE "D" IN DELETE

USE REVERSE SIDE FOR ADDITIONS AND OTHER CHANGES

ACCT. NO.	SERIES	EXPOSURE PERIOD	BADGE DATE
67627	NL1	1 MONTH M	12-01-02

SERIES NAME
NL1

SERVICE CHANGE ORDER

Issued

S7131108541 01

Return

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR	
			00NL1	P1	CONTROL		1759516D			+
			00134	P1	VISITOR Glenn Huber ✓		1759517D			✓
			00135	P1	VISITOR Tim O'Brien ✓		1759518D			✓
			00136	P1	VISITOR Jerry Krese ✓		1759519D			✓
			00137	P1	VISITOR Lindsey Aschim ✓		1759520D			lost

S7131108541 67627 NL1 01

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR	
			00138	P1	VISITOR John Anderson ✓		1759521D			
			00139	P1	VISITOR Rich Bergsreen ✓		1759522D			✓
			00140	P1	VISITOR Charles Brown ✓		1759523D			✓
			00141	P1	VISITOR Steve Kornder ✓		1759524D			✓
			00144	P1	VISITOR Eric Reuscher ✓		1759525D			✓
			00145	P1	VISITOR Odell Morgan ✓		1759526D			✓
			00146	P1	VISITOR Jim Prupek ✓		1759527D			✓
			00147	P1	VISITOR Greg Pattersen ✓		1759528D			✓
			00148	P1	VISITOR Roy Booker ✓		1759529D			✓
			00149	P1	VISITOR Roger Petty ✓		1759530D			✓
			00150	P1	VISITOR William Concepcion ✓		1759531D			✓
			00151	P1	VISITOR Antoine Hervey ✓		1759532D			✓

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RADIATION DOSIMETRY REPORT

ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
67827	NL1	0304860153	02/24/03	02/17/03	5	1 OF 1

PARTICIPANT NUMBER	NAME / ID NUMBER / BIRTH DATE / SEX	DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW: DEEP DDE	EYE LDE	SHALLOW SDE	QUARTERLY ACCUMULATED DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	YEAR TO DATE DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	LIFETIME DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	RECORDS FOR YEAR	INCEPTION DATE (MM/YY)
[redacted]					01/01/03	01/31/03		[redacted]			[redacted]							
00NL1	CONTROL	P	CNTRL		M	M	M										1	10/78
[redacted]																		
00135	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	2	2	3	1	12/00
[redacted]																		
00137	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	5	4	5	1	12/00
[redacted]																		
00139	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	18	20	22	1	12/00
[redacted]																		
00144	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	1	10/01
[redacted]																		
00147	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	1	10/01
[redacted]																		
00149	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	13	13	13	1	10/01
00150	VISITOR	P	CHEST											M	M	M	1	10/01
[redacted]			NOTE		UNUSED													
00151	VISITOR	P	CHEST											M	M	M	1	10/01
			NOTE		UNUSED													

M: MINIMAL REPORTING SERVICE OF 1 MREM

QUALITY CONTROL RELEASE: IYF 1 - PR 7674 - RPT130 - N1 - 04853

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Facsimile: (708) 755-7018

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CHANGES TO BE EFFECTIVE FOR YOUR NEXT WEAR DATE
MUST REACH THE GLENWOOD OFFICE NO LATER THAN 01/07/2003
PLEASE DO NOT DUPLICATE CHANGES REQUESTED DURING PRECEDING 28 DAYS.
DO NOT RETURN CHANGE REQUESTS WITH YOUR DOSIMETERS SINCE THIS DELAYS HANDLING.

STANDARD HOLDERS	SPECIAL HOLDERS
0	0

PLACE "D" IN DELETE

USE REVERSE SIDE FOR ADDITIONS AND OTHER CHANGES

* Holder Included.

ACCT. NO.	SERIES	EXPOSURE PERIOD	BADGE DATE
67627	NL1	1 MONTH M	01-01-03

SERIES NAME
NL1

SERVICE CHANGE ORDER

issued

S7134503600 01

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR
			00NL1	P1	CONTROL		27246500		
			00134	P1	VISITOR Glenn Huber ✓		27246510		
			00135	P1	VISITOR Tim OBrien ✓		27246520		
			00136	P1	VISITOR Jerry Kraus ✓		27246530		
			00137	P1	VISITOR Lindsy Aschen ✓		27246540		

S7134503600 67627 NL1 01

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR
			00138	P1	VISITOR John Anderson ✓		27246550		
			00139	P1	VISITOR Rich Berggreen ✓		27246560		
			00140	P1	VISITOR Jeremiah Chase ✓		27246570		
			00141	P1	VISITOR Steve Korander ✓		27246580		
			00144	P1	VISITOR Eric Reuscher ✓		27246590		
			00145	P1	VISITOR Odell Morgan ✓		27246600		
			00146	P1	VISITOR Jim Prupek ✓		27246610		
			00147	P1	VISITOR Greg Patterson ✓		27246620		
			00148	P1	VISITOR Ray Becker ✓		27246630		
			00149	P1	VISITOR Armando Ruiz Budrun ✓		27246640		
			00150	P1	VISITOR		27246650		
			00151	P1	VISITOR		27246660		

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RADIATION DOSIMETRY REPORT

ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
67627	NL1	0308540034	04/01/03	03/26/03	4	1 OF 1

PARTICIPANT NUMBER	NAME: ID NUMBER	NAME: BIRTH DATE	NAME: SEX	DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW: DEEP DDE	EYE LDE	SHALLOW SDE	QUARTERLY ACCUMULATED DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	YEAR TO DATE DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	LIFETIME DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	RECORDS FOR YEAR	INCEPTION DATE (MM/YY)
[redacted]																				
00NL1	CONTROL			P	CNTRL		M	M	M										2	10/78
[redacted]																				
00135	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	2	2	3	2	12/00
[redacted]																				
00137	VISITOR			P	WHBODY	P	6	6	6	6	6	6	6	6	6	11	10	11	2	12/00
[redacted]																				
00139	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	18	20	22	2	12/00
[redacted]																				
00141	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	2	12/00
[redacted]																				
00145	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	1	10/01
[redacted]																				
00147	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	2	10/01
[redacted]																				
00149	VISITOR			P	WHBODY		M	M	M	M	M	M	M	M	M	13	13	13	2	10/01
[redacted]																				
00151	VISITOR			P	CHEST NOTE		UNUSED									M	M	M	2	10/01

M: MINIMAL REPORTING SERVICE OF 1 MREM

QUALITY CONTROL RELEASE: IYF 1 - PR 7700 - RPT130 - N1 - 08534

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DO NOT RETURN CHANGE REQUESTS WITH YOUR DOSIMETERS SINCE THIS DELAYS HANDLING.

STANDARD HOLDERS	SPECIAL HOLDERS
0	0

* Holder included.

ACCT. NO.	SERIES	EXPOSURE PERIOD	BADGE DATE
67627	NL1	1 MONTH M	02-01-03

SERIES NAME
NL1

SERVICE CHANGE ORDER

Issued

S7200809427 02 Rec'd

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR	
			00NL1	P1	CONTROL		3501337D			
			00134	P1	VISITOR Glenn Huber ✓		3501338D			✓
			00135	P1	VISITOR Tim O'Brien ✓		3501339D			✓
			00136	P1	VISITOR Jerry Kroese ✓		3501340D			✓
			00137	P1	VISITOR Lindsey Aschin ✓		3501341D			✓

S7200809427 67627 NL1 02

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES	ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR	
			00138	P1	VISITOR John Anderson ✓		3501342D			✓
			00139	P1	VISITOR Rich Berggreen ✓		3501343D			✓
			00140	P1	VISITOR		3501344D			
			00141	P1	VISITOR Steve Kender ✓		3501345D			✓
			00144	P1	VISITOR Eric Reuscher ✓		3501346D			✓
			00145	P1	VISITOR Odell Morgan ✓		3501347D			✓
			00146	P1	VISITOR Jim Propeck ✓		3501348D			✓
			00147	P1	VISITOR Greg Patterson ✓		3501349D			✓
			00148	P1	VISITOR Joe Yedrick ✓		3501350D			✓
			00149	P1	VISITOR Armando Ruiz ✓		3501351D			✓
			00150	P1	VISITOR		3501352D			
			00151	P1	VISITOR		3501353D			

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RADIATION DOSIMETRY REPORT

ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
67627	NL1	0310830251	04/24/03	04/18/03	4	1 OF 1

PARTICIPANT NUMBER	NAME / ID NUMBER / BIRTH DATE / SEX	DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW: DEEP DDE	EYE LDE	SHALLOW SDE	QUARTERLY ACCUMULATED DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	YEAR TO DATE DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	LIFETIME DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	RECORDS FOR YEAR	INCEPTION DATE (MM/YY)
00NL1	CONTROL	P	CNTRL		M	M	M										4	10/78
00135	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	2	2	3	3	12/00
00137	VISITOR	P	WHBODY		M	M	M	6	6	6	6	6	6	11	10	11	3	12/00
00139	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	18	20	22	3	12/00
00141	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	3	12/00
00147	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	M	M	M	3	10/01
00149	VISITOR	P	WHBODY		M	M	M	M	M	M	M	M	M	13	13	13	3	10/01
00151	VISITOR	P	CHEST NOTE		UNUSED									M	M	M	3	10/01

M: MINIMAL REPORTING SERVICE OF 1 MREM

QUALITY CONTROL RELEASE: DRB 1 - PR 7717 - RPT130 - N1 - 10851

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NEW LENOX IL 60451

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PLEASE DO NOT DUPLICATE CHANGES REQUESTED DURING PRECEDING 20 DAYS.
DO NOT RETURN CHANGE REQUESTS WITH YOUR DOSIMETERS SINCE THIS DELAYS HANDLING.

* Holder included.

STANDARD HOLDERS	SPECIAL HOLDERS
0	0

ACCT. NO.	SERIES	EXPOSURE PERIOD	BADGE DATE
67627	NL1	1 MONTH M	03-01-03

SERIES NAME
NL1

SERVICE CHANGE ORDER

Issued

S3404103953 34

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES		ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO DAY YEAR
			00NL1	P1	CONTROL			4213461D		
			00134	P1	VISITOR	Glenn Huber ✓		4213462D		
			00135	P1	VISITOR	Tim O'Brien ✓		4213463D		
			00136	P1	VISITOR	Jerry Krone ✓		4213464D		
			00137	P1	VISITOR	Lindsey Aschin ✓		4213465D		

S3404103953 67627 NL1 34

DELETE (D)	CHANGE SERIES FROM	TO	PARTICIPANT NUMBER	BADGE TYPE	NAME – MAXIMUM OF 34 LETTERS & SPACES		ID NUMBER	SERIAL NUMBER	SEX	BIRTH DATE MO. DAY YEAR
			00138	P1	VISITOR	John Andrews		4213466D		
			00139	P1	VISITOR	Rick Berggren ✓		4213467D		
			00140	P1	VISITOR			4213468D		
			00141	P1	VISITOR	Steve Kornder ✓		4213469D		
			00144	P1	VISITOR	Eric Reuscher ✓		4213470D		
			00145	P1	VISITOR	Odell Morgan ✓		4213471D		
			00146	P1	VISITOR	Jim Aropeck ✓		4213472D		
			00147	P1	VISITOR	Greg Patterson ✓		4213473D		
			00148	P1	VISITOR	Joe Yedrouk ✓		4213474D		
			00149	P1	VISITOR	Armando Ruiz ✓		4213475D		
			00150	P1	VISITOR			4213476D		
			00151	P1	VISITOR			4213477D		

APPENDIX N

Shipping Manifests