

Battelle

The Business of Innovation

October 29, 2004

Mr. Mike McCann
U.S. Nuclear Regulatory Commission
Region III
2443 Warrenville Road
Suite 210
Lisle, ILL 60532-4352

Dear Mr. McCann:

Subject: Submittal of Microshield Analysis supplement to the final package for the Final Status Survey Technical Basis Document of the Sanitary Sewer Line Beneath Lake Battelle and the Battelle Lake Dam

Battelle is submitting the attached two copies of the Microshield Analysis to NRC for review titled "Data Used for MicroShield Calculation of Dam Pipe Dose Rates" (created on 10/27/04) to support the already submitted to NRC package listed below:

- 1) ECC&E2 Closure Services "Technical Basis Document for Unrestricted Release of Sanitary Sewer Line Beneath Lake Battelle and the Lake Battelle Dam" October 2004

This data is submitted to address a concern by your staff, during the site inspection at Battelle's property at West Jefferson, Ohio the week of 10/18-22/04, that we also evaluate the potential external dose to the public if the pipe were removed from the Battelle Lake Dam in the future. If you have any questions or comments concerning this request please do not hesitate to call me at 614-424-4098.

Sincerely,



Joe Jacobsen
BCLDP Radiation Safety Officer

NOV 1 2004


Data Used for MicroShield Calculation of Dam Pipe Dose Rates

Data obtained from DD-05-01

			Radius	Density
		cm	cm	gm/cc
Pipe ID in inches	7.83	19.89	9.94	
Pipe Wall thickness in inches	0.98	2.49		
Pipe OD			12.43	
Pipe Material - Clay pounds/foot	25.00			2.13
Length of Concern feet	6.00	182.88		
Grout Density gm/cc				1.85
Assumed Grout Core			9.94	
ID Surface Area Sq Ft per foot	2.05			
Ave uCi : Max uCi Ratio	0.16			
Pipe ID surface area cm ² /cm length	62.48			

	uCi Ave for 240'				
	at 5600	Ave	Max uCi	Max uCi	Max uCi
Radionuclides	dpm/100cm ²	uCi/foot	per foot	per cm	per cm ²
Cs-137	7.60E+00	3.17E-02	1.93E-01	6.34E-03	1.02E-04
Co-60	2.00E-02	8.33E-05	5.09E-04	1.67E-05	2.67E-07
Eu-152	4.47E-01	1.86E-03	1.14E-02	3.73E-04	5.97E-06
Eu-154	4.20E-02	1.75E-04	1.07E-03	3.51E-05	5.61E-07
Am-241	5.07E-01	2.11E-03	1.29E-02	4.23E-04	6.77E-06
Sr-90	1.65E-01	6.88E-04	4.20E-03	1.38E-04	2.20E-06
Pu-238	1.00E-02	4.17E-05	2.54E-04	8.35E-06	1.34E-07
Pu-239	3.04E-01	1.27E-03	7.73E-03	2.54E-04	4.06E-06
Pu-241	2.72E+00	1.13E-02	6.91E-02	2.27E-03	3.63E-05
Total	1.18E+01	4.92E-02	3.00E-01	9.86E-03	1.58E-04

The resultant 1 meter and 30 centimeter dose rates are for the maximum contaminated 6 feet of pipe.

Calculation Performed By: Phillip A. Shultz, CHP:  Date: 10/27/2004

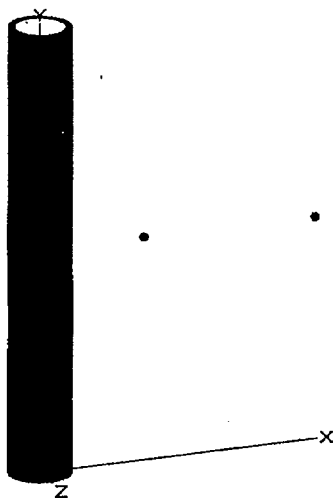
Calculation Reviewed By: Darin Ridgley:  Date: 10/27/2004

MicroShield v5.03 (5.03-00098)
Battelle

Page : 1
DOS File: Case1
Run Date: October 26, 2004
Run Time: 11:48:18 AM
Duration: 00:00:01

File Ref: r/A
Date: 10/26/04
By: SHULTZ
Checked: Tidley on

Case Title: Dam Pipe
Description: Direct Radiation From Dam Pipe
Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions
Height 183.0 cm 6 ft 0.0 in
Radius 9.94 cm 3.9 in

Dose Points

	X	Y	Z
# 1	112.5 cm	91.5 cm	0 cm
	3 ft 8.3 in	3 ft 0.0 in	0.0 in
# 2	42.5 cm	91.5 cm	0 cm
	1 ft 4.7 in	3 ft 0.0 in	0.0 in

Shields

Shield Name	Dimension	Material	Density
Cyl. Core	9.94 cm ²	Concrete	1.85
Transition		Air	0.00122
Air Gap		Air	0.00122
Wall Clad	2.49 cm	Concrete	2.1

Source Input
Grouping Method : Standard Indices
Number of Groups : 25
Lower Energy Cutoff : 0.015
Photons < 0.015 : Excluded
Library : Grove

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Am-241	7.7376e-008 ✓	2.8629e+003	6.7700e-006	2.5049e-001
Ba-137m	1.1658e-006	4.3134e+004	1.0200e-004	3.7740e+000
Co-60	3.0516e-009	1.1291e+002	2.6700e-007	9.8790e-003
Cs-137	1.1658e-006	4.3134e+004	1.0200e-004	3.7740e+000
Eu-152	6.8233e-008	2.5246e+003	5.9700e-006	2.2089e-001
Eu-154	6.4118e-009	2.3724e+002	5.6100e-007	2.0757e-002
Pu-238	1.5315e-009	5.6666e+001	1.3400e-007	4.9580e-003
Pu-239	4.6403e-008	1.7169e+003	4.0600e-006	1.5022e-001
Pu-241	4.1488e-007	1.5351e+004	3.6300e-005	1.3431e+000
Sr-90	2.5144e-008	9.3034e+002	2.2000e-006	8.1400e-002
Y-90	2.5144e-008	9.3034e+002	2.2000e-006	8.1400e-002

Buildup
The material reference is : Wall Clad

Integration Parameters
Y Direction (axial) 20
Circumferential 20

Results - Dose Point # 1 - (112.5,91.5,0) cm

Page : 2
 DOS File: Casel
 Run Date: October 26, 2004
 Run Time: 11:48:18 AM
 Duration: 00:00:01

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm ² /sec		Exposure Rate mR/hr	
		No Buildup	With Buildup	No Buildup	With Buildup
0.03	2.612e+03	1.121e-07	1.719e-07	1.111e-09	1.704e-09
0.04	2.142e+03	4.073e-06	7.976e-06	1.801e-08	3.527e-08
0.05	3.858e+02	3.459e-06	8.431e-06	9.214e-09	2.246e-08
0.06	1.033e+03	2.072e-05	5.928e-05	4.115e-08	1.177e-07
0.1	8.146e+02	5.916e-05	2.055e-04	9.051e-08	3.144e-07
0.2	2.054e+02	4.355e-05	1.335e-04	7.686e-08	2.355e-07
0.3	6.826e+02	2.552e-04	6.787e-04	4.840e-07	1.287e-06
0.4	1.603e+02	8.926e-05	2.132e-04	1.739e-07	4.154e-07
0.5	1.475e+01	1.118e-05	2.467e-05	2.194e-08	4.842e-08
0.6	3.894e+04	3.792e-02	7.821e-02	7.401e-05	1.527e-04
0.8	5.420e+02	7.839e-04	1.467e-03	1.491e-06	2.790e-06
1.0	1.266e+03	2.486e-03	4.346e-03	4.583e-06	8.011e-06
1.5	7.911e+02	2.695e-03	4.198e-03	4.535e-06	7.063e-06
TOTALS:	4.959e+04	4.437e-02	8.955e-02	8.554e-05	1.730e-04

Results - Dose Point # 2 - (42.5,91.5,0) cm

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm ² /sec		Exposure Rate mR/hr	
		No Buildup	With Buildup	No Buildup	With Buildup
0.03	2.612e+03	3.146e-07	4.830e-07	3.118e-09	4.787e-09
0.04	2.142e+03	1.217e-05	2.401e-05	5.382e-08	1.062e-07
0.05	3.858e+02	1.100e-05	2.731e-05	2.929e-08	7.276e-08
0.06	1.033e+03	6.879e-05	2.032e-04	1.366e-07	4.036e-07
0.1	8.146e+02	2.108e-04	7.834e-04	3.225e-07	1.199e-06
0.2	2.054e+02	1.612e-04	5.348e-04	2.845e-07	9.439e-07
0.3	6.826e+02	9.599e-04	2.748e-03	1.821e-06	5.212e-06
0.4	1.603e+02	3.395e-04	8.674e-04	6.615e-07	1.690e-06
0.5	1.475e+01	4.287e-05	1.006e-04	8.416e-08	1.976e-07
0.6	3.894e+04	1.464e-01	3.199e-01	2.858e-04	6.244e-04
0.8	5.420e+02	3.059e-03	6.025e-03	5.819e-06	1.146e-05
1.0	1.266e+03	9.782e-03	1.792e-02	1.803e-05	3.303e-05
1.5	7.911e+02	1.076e-02	1.744e-02	1.810e-05	2.933e-05
TOTALS:	4.959e+04	1.718e-01	3.666e-01	3.312e-04	7.081e-04

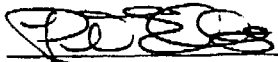
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Data obtained from DD-05-01

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ID Surface Area Sq Ft per foot	2.05			
Ave uCi : Max uCi Ratio	0.16			
Pipe ID surface area cm ² /cm length	62.48			

	uCi Ave for 240'				
	at 5600	Ave	Max uCi	Max uCi	Max uCi
Radionuclides	dpm/100cm ²	uCi/foot	per foot	per cm	per cm ²
Cs-137	7.60E+00	3.17E-02	1.93E-01	6.34E-03	1.02E-04
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Am-241	5.07E-01	2.11E-03	1.29E-02	4.23E-04	6.77E-06
Sr-90	1.65E-01	6.88E-04	4.20E-03	1.38E-04	2.20E-06
Pu-238	1.00E-02	4.17E-05	2.54E-04	8.35E-06	1.34E-07
Pu-239	3.04E-01	1.27E-03	7.73E-03	2.54E-04	4.06E-06
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Total	1.18E+01	4.92E-02	3.00E-01	9.86E-03	1.58E-04

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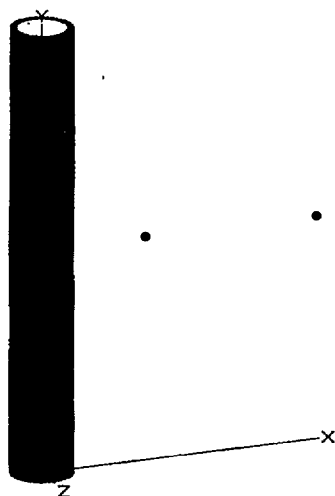
Calculation Reviewed By: Darin Ridgley:  Date: 10/27/2004

MicroShield v5.03 (5.03-00098)
Battelle

Page : 1
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File Ref: r/A
Date: 10/26/04
By: SHULTZ
Checked: Tedger on

Case Title: Dam Pipe
Description: Direct Radiation From Dam Pipe
Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions			
Height	183.0 cm	6 ft	0.0 in
Radius	9.94 cm		3.9 in

Dose Points			
	X	Y	Z
# 1	112.5 cm	91.5 cm	0 cm
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Photons < 0.015 : Excluded

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
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Eu-154	6.4118e-009	2.3724e+002	5.6100e-007	2.0757e-002
Pu-238	1.5315e-009	5.6666e+001	1.3400e-007	4.9580e-003
Pu-239	4.6403e-008	1.7169e+003	4.0600e-006	1.5022e-001
Pu-241	4.1488e-007	1.5351e+004	3.6300e-005	1.3431e+000
Sr-90	2.5144e-008	9.3034e+002	2.2000e-006	8.1400e-002
Y-90	2.5144e-008	9.3034e+002	2.2000e-006	8.1400e-002

Buildup
The material reference is : Wall Clad

Integration Parameters	
Y Direction (axial)	20
Circumferential	20

Results - Dose Point # 1 - (112.5,91.5,0) cm

Page : 2
 DOS File: Casel
 Run Date: October 26, 2004
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		No Buildup	With Buildup	No Buildup	With Buildup
0.03	2.612e+03	1.121e-07	1.719e-07	1.111e-09	1.704e-09
0.04	2.142e+03	4.073e-06	7.976e-06	1.801e-08	3.527e-08
0.05	3.858e+02	3.459e-06	8.431e-06	9.214e-09	2.246e-08
0.06	1.033e+03	2.072e-05	5.928e-05	4.115e-08	1.177e-07
0.1	8.146e+02	5.916e-05	2.055e-04	9.051e-08	3.144e-07
0.2	2.054e+02	4.355e-05	1.335e-04	7.686e-08	2.355e-07
0.3	6.826e+02	2.552e-04	6.787e-04	4.840e-07	1.287e-06
0.4	1.603e+02	8.926e-05	2.132e-04	1.739e-07	4.154e-07
0.5	1.475e+01	1.118e-05	2.467e-05	2.194e-08	4.842e-08
0.6	3.894e+04	3.792e-02	7.821e-02	7.401e-05	1.527e-04
0.8	5.420e+02	7.839e-04	1.467e-03	1.491e-06	2.790e-06
1.0	1.266e+03	2.486e-03	4.346e-03	4.583e-06	8.011e-06
1.5	7.911e+02	2.695e-03	4.198e-03	4.535e-06	7.063e-06
TOTALS:	4.959e+04	4.437e-02	8.955e-02	8.554e-05	1.730e-04

Results - Dose Point # 2 - (42.5,91.5,0) cm

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm ² /sec		Exposure Rate mR/hr	
		No Buildup	With Buildup	No Buildup	With Buildup
0.03	2.612e+03	3.146e-07	4.830e-07	3.118e-09	4.787e-09
0.04	2.142e+03	1.217e-05	2.401e-05	5.382e-08	1.062e-07
0.05	3.858e+02	1.100e-05	2.731e-05	2.929e-08	7.276e-08
0.06	1.033e+03	6.879e-05	2.032e-04	1.366e-07	4.036e-07
0.1	8.146e+02	2.108e-04	7.834e-04	3.225e-07	1.199e-06
0.2	2.054e+02	1.612e-04	5.348e-04	2.845e-07	9.439e-07
0.3	6.826e+02	9.599e-04	2.748e-03	1.821e-06	5.212e-06
0.4	1.603e+02	3.395e-04	8.674e-04	6.615e-07	1.690e-06
0.5	1.475e+01	4.287e-05	1.006e-04	8.416e-08	1.976e-07
0.6	3.894e+04	1.464e-01	3.199e-01	2.858e-04	6.244e-04
0.8	5.420e+02	3.059e-03	6.025e-03	5.819e-06	1.146e-05
1.0	1.266e+03	9.782e-03	1.792e-02	1.803e-05	3.303e-05
1.5	7.911e+02	1.076e-02	1.744e-02	1.810e-05	2.933e-05
TOTALS:	4.959e+04	1.718e-01	3.666e-01	3.312e-04	7.081e-04

**BATTELLE COLUMBUS LABORATORIES
USNRC
EVENT REPORT**

**PART I
Initial Discovery/Notification**

1. Date/time the event was discovered: 10/1/04 11:00 AM

2. Date/time the event occurred, if different than the date of discovery: N/A

3. Describe the event: We have been experiencing noticeable cracks/fissures of some of our MSA brand MM2K Powered Air Purifying Respirators (PAPR) motor/blower assembly casings (Part #10022695). However, as evidenced by our in place personnel monitoring programs, we have not experienced an employee exposure associated with break through of the casings. Our original note of the circumstance was on August 25, 2004 during the re-use inspection process of the MSA MM2K PAPR by the Respiratory Protection Supervisor on site. We have field verified that our respirator cleaning and use processes are adequate and in line with the manufacturer recommendations. We again experienced a similar crack/fissures issue with a different order of MSA MM2K PAPR motor/blower assemblies by a different vendor ordering from a different lot number in early September 2004. We have discontinued use of the MSA MM2K PAPR on site in mid September as a result of the issues we have had and have supplied MSA with several of the cracked/fissured MM2K PAPR motor/blower assembly casings for testing at their facility in Pennsylvania. MSA is evaluating the matter and working on a solution for the identified issue.

4. Under what regulation is this notification being made: 10CFR21

5. What is the period of time allowed for initial notification?
- | | |
|---|---|
| <input type="checkbox"/> Immediate | <input type="checkbox"/> Within 15 days |
| <input type="checkbox"/> Within 2 hours | <input type="checkbox"/> Within 30 days |
| <input type="checkbox"/> Within 4 hours | <input type="checkbox"/> Within 45 days |
| <input type="checkbox"/> Within 24 hours | <input type="checkbox"/> Within 60 days |
| <input checked="" type="checkbox"/> Within 2 days | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Within 5 days | |

6. Describe the emergency classification of this event.
- General
 - Site/Area
 - Alert
 - Unusual Event
 - None

7. Type of initial notification made.
- Telephone Mailgram X Facsimile Letter
- For other than immediate, 2 hour, 4 hour, and 24 hour notifications:

PART I
Initial Discovery/Notification

8. NRC Section notified: **USNRC Operations Center**

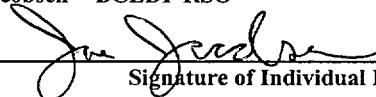
9. Individual's name to which the notification was made: **John MacKinnon**

10. Time/date notification was made: **10/4/04 1750 hrs.**

11. Exact content of notification: **Battelle, operating under US NRC License SNM-7 at West Jefferson, Ohio, is notifying NRC of a potential equipment defect as provided from the manufacturer concerning the MSA Model MM2K PAPR motor/blower assembly (Part # 10022695). After limited field use at its West Jefferson, Ohio site, noticeable cracks/fissures developed on some of the motor/blower casings. The manufacturer of the equipment, MSA, has been notified of the problem and several of the cracked/fissure units have been returned to MSA for testing in early September. Battelle discontinued use of the MSA Model MM2K PAPR in mid September as a result of the observed equipment cracks/fissures at its West Jefferson, Ohio site.**

12. Was any other agency or individual contacted as a result of this event? Yes No; If yes, who was contacted?
Pete Greenwalt- DOE Columbus Closure Project Manager

13. Initial notification made by: **Joe Jacobsen- BCLDP RSO**



Signature of Individual Making Notification

Joe Jacobsen- BCLDP RSO

Acknowledged (RSO)

**BATTELLE COLUMBUS LABORATORIES
USNRC
EVENT REPORT**

**PART II
Event Evaluation**

**1. Describe what conditions existed at the facility at the time of the event:
Routine radiological facility decommissioning operations.**

**2. Describe any facilities alarms or equipment that indicated the event:
None**

3. Radiological conditions involved with the event: N/A

- Overexposure of licensee personnel
- Overexposure of a member of the general public, a minor, or a prenatal exposure
- Release of radioactive materials to the environment
- License condition
- Loss or theft of radioactive materials
- Dose limits in restricted or unrestricted areas exceeded
- Receipt or transportation of radioactive materials
- Equipment failure
- Fires, toxic gasses, etc. that prevent radiological responses
- Contamination events
- Unplanned medical treatment of a contaminated individual at an offsite facility
- Sealed source leak tests
- Special nuclear material
- EPA limits

**3. Describe, in detail, including the isotopes, quantities, and physical and chemical forms, radiation levels, radioactive material concentrations, causes of elevated levels of exposure rates, dose or concentrations, of the event:
This section is not applicable to this event as it is an informational reporting for a 10CFR21 potential equipment defect issue only.**

PART II
Event Evaluation

7. If overexposures of facility personnel or members of the general public are involved, including prenatal over exposure, complete Part III of this form. N/A

**BATTELLE COLUMBUS LABORATORIES
USNRC
EVENT REPORT**

**PART III
Exposure Data**

SECTION 2.

Summary of supplemental actions taken associated with exposures:

None

PART IV
Final Event Summary

6. Date this report sent 10/31-04

7. Report sent to: 1) US NRC, Document Control Desk, Washington, D.C. 20555
2) Administrator, USNRC, Region III, 2443 Warren Road, Suite 201, Lisle, ILL 60532-4352

8. Copies of this report sent to:

1. Mike McCann- Region III NRC-Senior Health Physicist
2. BCLDP RSO File
3. Pete Greenwalt-DOE Site Manager-Columbus Closure Project
4. Scott Zoller- Closure Services Site RSO
5. Pat Weaver- Battelle BCLDP Oversight Manager
6. BSTI RSO File
6. _____
7. _____
8. _____
9. _____
10. _____

Report Preparer:


Joe Jacobsen- BCLDP RSO

Date: 10/29/04

Report Approval:


Pat Weaver- BMI BCLDP Project Manager

Date: 10/29/04

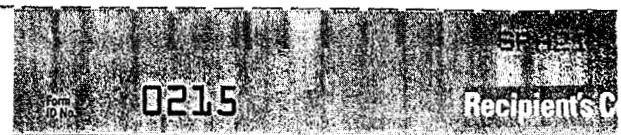
Align top of FedEx

158
200

FedEx US Airbill
Express

FedEx Tracking Number

8489 6963 8324



NO POUCH NEEDED.
See back for peel and stick application instructions.

RECIPIENT: PEEL HERE

1 From This portion can be removed for Recipient's records.

Date 10/29/04 FedEx Tracking Number 848969638324

Sender's Name Joe-Jacobsen Phone 514 879-6941

Company ECC & E2 CLOSURE SRVCS LLC

Address 1425 PLAIN CITY--GEORGEVILLE

City WEST JEFFERSON State OH ZIP 43162

2 Your Internal Billing Reference *Budille - Doc.*

3 To Recipient's Name *Mike McCann - Administrator* Phone

Company *U.S. N.A.C. Royal III*

Recipient's Address *2773 W. Van Buren*

Address *Suite 210 Quad 201*

City *Lisle* State *IL* ZIP *60532-4352*



4a Express Package Service Packages up to 1!

FedEx Priority Overnight Next business morning* FedEx Standard Overnight Next business afternoon* FedEx First Overnight Earliest next business morning delivery to select location.
 FedEx 2Day Second business day* FedEx Express Saver Third business day*
FedEx Envelope rate not available. Minimum charge: One-pound rate

4b Express Freight Service Packages over 15

FedEx 1Day Freight* Next business day** FedEx 2Day Freight Second business day** FedEx 3Day Freight Third business day**
* Call for Confirmation.

5 Packaging Declared value in

FedEx Envelope* FedEx Pak* Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak FedEx Box FedEx Tube C

6 Special Handling Inquire FedEx address in Section 3

SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes HOLD Weekday at FedEx Location Not available for FedEx First Overnight to select locations HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations

Does this shipment contain dangerous goods? (One box must be checked)
 No Yes. As per attached Shipper's Declaration Yes Shipper's Declaration not required Dry Ice Dry Ice, 9, UN 1845 x Cargo Aircraft Only
Dangerous goods (including Dry Ice) cannot be shipped in FedEx packaging.

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below.

Sender Acct. No. in Section 1 will be billed. Recipient Third Party Credit Card Cash/Ct

Total Packages	Total Weight	Total Charge

*Our liability is limited to \$100 unless you declare a higher value. See the FedEx Service Guide for details.

8 Sign to Authorize Delivery Without a Signature

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims. Questions? Visit our Web site at fedex.com or call 1.800.GoFedEx.1.800.463.3339. SRS Rev. Date 11/03 • Part #152719 • ©1994-2003 FedEx • PRINTED IN U.S.A.

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The **III**
PRIORITY OVERNIGHT

FedEx emp: 247039 29OCT04

TRK# 8489 6963 8324 FORM 0215

MON
Deliver By:
01NOV04
A2

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