General Characteristics		
1	**Abstract of Model Capabilities**	BNLGPM is an emergency response computer program applied to the 60 MW (t) High Flux Beam Reactor (HFBR) to provide a real-time projection of the downwind dose rates from noble gases and radioiodines released from the HFBR 100-meter stack. BNLGPM is a steady-state Gaussian straight line model. Dose rates are determined by calculating the release concentration of Xe-133 equivalent for the mixture of released noble gases and I-131 equivalent for the mixture of released radioiodines. BNLGPM receives hard-wired inputs of meteorological data and stack radiation monitor readings.
2	**Sponsor and/or Developing Organization**	Brookhaven National Laboratory (BNL)
3	**Last Custodian/ Point of Contact**	Dr. Paul Michael BNL Building 318 P.O. Box 5000 Upton, NY 11973-5000 PHN: 516/344-2264
4	**Life-Cycle**	BNLGPM was developed to provide assessments of real-time consequences from the HFBR in response to requirements identified in DOE Orders 5480.30 and 5500.3A. It has undergone little refinement over the years due to its narrow application.
5	**Model Description Summary**	BNLGPM is a site-specific emergency response computer program developed by Brookhaven National Laboratory (BNL) for the 60 MW (t) HFBR to provide a real-time projection of the downwind dose rates from noble gases and radioiodines released from the HFBR 100-meter stack. BNLGPM provides real-time emergency response displays of the stack monitor and meteorological data. The plume model is a steady-state Gaussian straight line variety which is used to address transport and dispersion. Dose calculations are limited to estimating the dose from noble gases and radioiodines. Dose rates are determined by calculating the release concentration of Xe-133 equivalent for the mixture of released noble gases and I-131 equivalent for the mixture of released radioiodines.
6	**Application Limitation**	BNLGPM is only applicable to the HBFR and provides consequence estimates of radioiodines and noble gases.
7	**Strengths/ Limitations**	**Strengths:** Ease of user and application. **Limitations:** Limited application domain. Limited portability to other locations due to the hard-wiring of the stack effluent and meteorological models.
9	**Input Data/Parameter Requirements**	Wind speed Wind direction Temperature Pasquill-Gifford-Turner stability class Stack effluent noble gas and radiodine abundances
10	**Output Summary**	Relevant meteorological parameters Location of ground maximum X/Q values and isopleths of 50%, 10%, 1%, 0.5%, and 0.1%, superimposed on BNL topography dose rate at the maximally exposed offsite individual
11	**Applications**	Real-time consequence assessment of BNL's HBFR radionuclide emissions.
12	**User-Friendliness**	Very easy to run and use.
13	**Hardware-Software Interface Constraints/ Requirements**	The Emergency Response Terminals (ERT's) for the Stack Monitoring Facility are specially programmed PC's, either Gateway 2000 clones or IBM PS/2's. The machines run the IBM OS/2 2.0 operating system. Meteorological data reported to a data logger and sent to a VAX system.
14	**Operational Parameters**	Display screens of past and present plume meteorological and dispersion data. Source plume and source data lists.
16	**Runtime Characteristics**	Runs take only a few seconds to execute.

Specific Characteristics		
Part A: Source Term Submodel Type		
A1	**Source Term Algorithm?**	_✔_YES __NO
A3	**For Radiological Consequence Assessment Models**	**Gaseous releases: _✔_ noble gases _✔_ iodines __ other non-reactive gases (Xe-133 and I-131 equivalents)** **Aerosol releases:** **Chemistry __ Isotopic exchange __ Physical properties capability**
Part B: Dispersion Submodel Type		
B1	**Gaussian**	**_✔_Straight-line plume __Segmented plume __ Statistical plume __ Statistical puff**
Part C: Transport Submodel Type		
C2	**Deterministic**	Yes
C4	**Frame of Reference**	**_✔_ Eulerian __ Lagrangian __ Hybrid __ Eulerian-Lagrangian**
Part D: Fire Submodel Type (Not Applicable)		
Part E: Energetic Events Submodel Type (Not Applicable)		
Part F: Health Consequence Submodel Type (Not Applicable)		
Part G: Effects and Countermeasures Submodel Type (No Information Provided.)		
Part H: Physical Features of Model		
H2	**Release Elevation**	**__ ground __ roof _✔_ stack**
H7	**Cloud Buoyancy**	**_✔_ neutral [passive] __ dense [negative] __ plume rise [positive]**
Part I: Model Input Requirements		
I1	**Radio(chemical) and Weapon Release Parameters**	**Release rate: _✔_ Continuous __ Time dependent __ Instantaneous** **Release container characteristics: __ vapor temperature __ tank diameter __ tank height __ tank temperature __ tank pressure __ nozzle diameter __ pipe length** **Jet release: __ initial size __ shape __ concentration profile at end of jet affected zone** **Release dimensions: _✔_ point __ line __ area** **Release elevation: __ ground __ roof _✔_ stack**
I2	**Meteorological Parameters**	**Wind speed and wind direction: _✔_single point __ single tower/multiple point __ multiple towers** **Temperature: __ single point __ single tower/multiple point __ multiple towers** **Dew point temperature: __ single point __ single tower/multiple point** **__ multiple towers** **Precipitation: __ single point __ single tower/multiple point __ multiple towers** **Turbulence typing parameters: _✔_ temperature difference __ sigma theta __ sigma phi __ Monin-Obukhov length __ roughness length __ cloud cover __ incoming solar radiation __ user-specified** **Four dimensional meteorological fields from prognostic model:**

Part J: Model Output Capabilities		
J4	**Tabular at Fixed Downwind Locations**	Location of ground maximum X/Q values and isopleths of 50%, 10%, 1%, 0.5%, and 0.1%, superimposed on BNL topography Dose rate at the maximally exposed offsite individual
Part K: Model Usage Considerations (No Information Provided.)		