EPA Office of Pollution Prevention and Toxics
Chemical Control Division, New Chemicals Notice Management Branch
STATUS REPORT: TSCA BIOTECHNOLOGY SUBMISSIONS

STATUS REPORT for FISCAL YEARS 87-98:

EXECUTIVE SUMMARY

CONTAINED APPLICATIONS	35 STRAINS
ENVIRONMENTAL INTRODUCTIONS	30 STRAINS*
NOTICES OF COMMENCEMENT RECEIVED	30 STRAINS
WITHDRAWN	8 STRAINS

*Note: 16 strains tested at multiple sites over multiple years.

Fiscal Year 87

Submission	Chronology of Events	Major Issues
BioTechnica International, Inc. (BTI)		
o P87-0568 through P87-0570 o Rhizobium meliloti engineered for yield enhancement in alfalfa o Notice of Receipt 52 FR 5333 (February 20, 1987)	o Feb.'87 - Submitted o Mar.'88 - 5(e) Consent Order issued o Apr.'88 - Inoculated alfalfa planted in a field test in Pepin County, Wisconsin o Aug.'88 - BTI requested modifications to the protocols o Sept.'88 - Field test terminated	o Environmental use o Development of field protocols o Detection at field site using antibiotic resistance
International Minerals and Chemical Co. (IMC)		
o P87-0693 o Escherichia coli engineered to contain human gene for insulin-like growth hormone o Notice of Receipt 52 FR 8962 (March 20, 1987)	o Feb.'87 - Submitted o May '87 - Review completed; Agency took no regulatory action o May 26, '87 - Agency received Notice of Commencement	o Used in a fermentation system to produce a growth hormone which was used as a component of the cell culture media

Submission	Chronology of Events	Major Issues
Company Name Confidential		
o P87-1030 o Bacillus subtilis engineered for enhanced production of the enzyme protease which is used in a commercial product (which is CBI) o Notice of Receipt 52 FR 23496 (June 22, 1987)	o May '87 - Submitted o July '87 - Review completed; Agency took no regulatory action o Aug.'87 - Agency received Notice of Commencement	o Used in fermentation system o Name and kind of product are confidential
Monsanto Agricultural Company		
o P87-1292 o Strain of Pseudomonas aureofaciens engineered to contain genes from Escherichia coli o Notice of Receipt 52 FR 24527 (July 1, 1987)	o June '87 - Submitted o Aug. '87 - Meeting of Biotechnology Science Advisory Committee o Oct. '87 - 5(e) Consent Order signed o Nov. '87 - Field test initiated in S.C. o Mar. '88 - Monsanto requested, and was granted, a 5(e) modification which allowed additional field tests of the PMN microorganism at the same site. o Aug. '88 - Monsanto requested, and was granted, a 5(e) modification of protocols	o Environmental use o Added genes provide a "marker" system to enhance capability for monitoring the microorganism under field conditions

Submission	Chronology of Events	Major Issues
Gist-Brocades		
o P87-1511 o Bacillus licheniformis engineered for enhanced production of an enzyme, hydrolase o Notice of Receipt 52 FR 30431 (August 14, 1987)	o July '87 - Submitted o Oct. '87 - Review completed. Agency took no regulatory action o Mar. 14,'87 - Agency received Notice of Commencement	o Used in fermentation system o Kind and name of product are confidential

Submission	Chronology of Events	Major Issues
BioTechnica Agriculture, Inc (BTA)		
o P88-1115 through P88-1122 o Eight strains of nitrogen-fixing Rhizobium meliloti genetically engineered to contain antibiotic resistance o Notice of Receipt 53 FR 15130 (April 27, 1988)	o March '88 - submitted o June '88 - Agency Risk Assessment sent to outside experts for review o August '88 - 5(e) Consent Order received EPA concurrence and was sent to BTA for signature; BTA held the 5(e) Consent Order for signature while revising the monitoring protocols o Jan.'89 - Five strains withdrawn from review, P88-1115, 1117, 1119, 1121, and 1122 o May 19, '89 - 5(e) Consent Order was signed and field test protocols approved for P88-1116, P88-1118, and P88-1120 o April 20, ‘90 - Field test for P88-1118 with P89-0280 & P90-0339 in Wisconsin o April 28, ‘92 - Field test for P88-1116 and P88-1118, with P89-280 and P92-0399 through P92-0403	o Environmental use o Proposed Pepin County, Wisconsin field test was to evaluate the competitiveness of the new strains and test different methods of application to alfalfa seeds

Submission	Chronology of Events	Major Issues
International Bio-Synthetics		
o P88-1153 o Strain of Bacillus, (alcalophilic strain), engineered for enhanced production of an enzyme, protease o Notice of Receipt 53 FR 15463 (April 29, 1988)	o April '88 - Submitted o July '88 - Review completed. Agency took no regulatory action o Nov. '88 - Agency received Notice of Commencement	o Used in fermentation system o Kind and name of product are confidential

Submission	Chronology of Events	Major Issues
BioTechnica Agriculture, Inc. (BTA)		
o P88-1275 through P88-1278 o Four strains of nitrogen-fixing Bradyrhizobium japonicum genetically engineered to contain antibiotic resistance o Notice of Receipt 53 FR 19030 (May 26, 1988) o No 1988 field test was conducted o P88-1275 and P88-1277 were field tested with P89-0340 and P89-0341 in Louisiana (1989) and Wisconsin (1990) o For additional information, see entry for BioTechnica Agriculture for P89-0340 and P89-0341 (FY 89), and Research Seeds, Inc., for P88-1275, P88-1277, P89-0340, and P89-0341	o May '88 - Submitted o July 14,'88 - Meeting of BSAC Subcommittee o Aug. '88 - suspension of review for Agency to develop 5(e) Consent Order and for BTA to conduct requested testing for soybean growth and background antibiotic resistance o Nov. '88 - Company informed Agency of plans to change site of field test from Pepin County, Wisc. and Henry County, Iowa to East Baton Rouge Parish, LA o Feb. '90 - Two of the four strains were withdrawn from further review (P88-1276 and 1278); remaining strains (P88-1275 and 1277) were field tested with P89-0340 and P89-0341 " Mar. 14, '94 - company requested modification to conduct small-scale field tests of P88-1275 & 1277 and P89-0340 and P89-0341, at two additional sites in Wisconsin " June 9, '94 - 5(e) Consent Order modification signed	o Environmental use o Field tests were to evaluate the competitiveness of the new strains and evaluate methods of application of the microorganisms to soybean seeds

Submission	Chronology of Events	Major Issues
Novo Biochemical Industries, Inc.		
o P89-0134 o Strain of Aspergillus oryzae engineered for enhanced production of a lipase enzyme o Notice of Receipt 53 FR 51136 (December 20, 1988)	o Nov. 30, '88 - Submitted o Feb.'89 - Review completed. Agency took no regulatory action o Nov. 4, 1992 - Notice of Commencement received	o Used in fermentation system o Lipase to be used primarily in detergent formulations for the removal of fat-containing stains
Enzyme Bio-Systems		
o P89-0227 o Strain of Bacillus subtilis engineered for enhanced production of an alpha amylase enzyme o Notice of Receipt 54 FR 1233 (January 12, 1989)	o Dec.'88 - Submitted o March '89 - Review completed. Agency took no regulatory action o April '89 - Agency received Notice of Commencement	o Used in fermentation system o Amylase to be used primarily in ethanol production

Submission	Chronology of Events	Major Issues
BioTechnica Agriculture, Inc (BTA)		
o P89-0280 o Strain of Rhizobium meliloti genetically engineered to contain antibiotic resistance and other genes to enhance nitrogen-fixing ability o Notice of Receipt 54 FR 6959 (February 15, 1989) o Field tests in Wisconsin (1989-1990) with P88-1116, P88-1118, and P88-1120 o Field tests in Wisconsin with P88-1118 and P90-0339, during 1990	o Jan. 23,'89 -Submitted o May 19,'89 - Consent Order signed o May 24,'89 - Field test initiated o Oct. 24,'89 - protocol modification o April 20,'90 - Consent Order modification allowed two additional tests with P88-1118 and P90-0339 o April 28, '92 - Field test of P89-0280 with P88-1116, P88-1118, and P92-0399 through P92-0403	o Environmental use o Dane County, Wisconsin test site

Submission	Chronology of Events	Major Issues
BioTechnica Agriculture, Inc. (BTA)		
o P89-0340 and P89-0341 o Two strains of Bradyrhizobium japonicum genetically engineered to contain antibiotic resistance and other genes to enhance nitrogen-fixing ability o Notice of Receipt 54 FR 7879 (February 23, 1989) o For additional information, see entry for BioTechnica Agriculture for P88-1275 through P88-1278 (FY 88), and Research Seeds, Inc, for P89-0340 and P89-0341 during FY 94	o Feb. 3, '89 - submitted as P89-0340/0341 and P88-1275/1277 o June 2, '89 - Agency review completed; 5(e) Consent Order signed and field test protocols approved o June 17, '89 - Field test initiated in East Baton Rouge Parish, LA o May 25, '90 - Consent Order modified to include new protocol for field test in Dane County (Sun Prairie) Wisconsin o May 30,'90 - Wisconsin field test initiated o June 25,'90 - Protocol modification allowed BTA to re-start the Wisconsin test " Feb. '91 - Project purchased from BTA by Research Seeds, Inc. " Mar. 14, '94 - Research Seeds, Inc. requested a modification to conduct additional small-scale field tests of P89-0340 and P89-0341, along with P88-1275 and P88-1277 at two additional sites in Wisconsin " June 9, '94 - 5(e) Consent Order modification signed	o Environmental use o Field test will evaluate soybean yield and strain competition

Submission	Chronology of Events	Major Issues
Novo Biochemical Industries, Inc.		
o P89-1071 o Strain of Bacillus licheniformis self-cloned by *r*DNA techniques for enhanced production of an enzyme, alpha amylase o Notice of Receipt 54 FR 39812 (September 28, 1989)	o Sept. 8 '89 - Submitted o Dec. 6 '89 - Review completed. Agency took no regulatory action o Jan. 24, 1991 - Notice of Commencement (NOC) received	o Used in fermentation system o Alpha amylase to be used in dishwashing and laundry detergent formulations for the breakdown of starch; also to be used in textile industry for desizing of textiles prior to dyeing

Submission	Chronology of Events	Major Issues
BioTechnica Agriculture, Inc. (BTA)		
o P90-0339 o Strain of Rhizobium meliloti engineered to contain antibiotic resistance and genes to enhance nitrogen fixation o Notice of Receipt 55 FR 6682 (February 26, 1990)	o Jan. 10 '90 - Submitted o April 20 '90 - Consent Order signed allowing field tests at two sites in Wisconsin with P88-1118 and P89-0280	o Environmental use o Dane County, Hampden Township, and Columbia County, Wisconsin, field test sites

Submission	Chronology of Events	Major Issues
Genencor International, Inc.		
o P91-1154 o Asporogenic strain of Bacillus subtilis modified to contain an antibiotic resistance gene from Staphylococcus aureus, and a lipase enzyme gene from a (confidential) intergeneric microorganism o Notice of Receipt 56 FR 32429 (July 16, 1991)	o June 21,'91 - Submitted o Sept. 3,'91 - Review completed. Agency took no regulatory action o Nov. 4, 1992 - Notice of Commencement (NOC) received	o Used in fermentation system o Used for enhanced production of a lipase enzyme which is added primarily to heavy duty detergents o Antibiotic resistance "marker" gene provides monitoring capability
Mycogen Corporation		
o Test Marketing Exemptions (TMEs) T91-0019 and T91-0020 o Pseudomonas fluorescens genetically modified to contain delta endotoxin from Bacillus thuringiensis (B.t.) variety kurstaki (for T91-0019) and variety san diego (for T91-0020) o Notice of Receipt 56 FR 26410, (June 7,1991) o For additional information, see entry for Mycogen Corporation, for P92-0244 through P92-0251 and P92-0545 through P92-0552 during FY 92 & 94	o May 22, '91 submitted o July 8, '91 - Notice of approval for limited production until March l, 1992 (56 FR 30923) o Nov.25, 1991 - Follow-up PMNs P92-0244 and 0248 received o February 27,1992 - TME extended until April 22,1992 (57 FR 6722) o May 15,1992 - TME extended until July 21,1992 (57 FR 20828) o July 28,1992 - TME extended until October 19,1992 (57 FR 33350) o October 26,1992 - TME extended until March l, 1993 (57 FR 48522)	o Used in fermentation system o The Pseudomonas fluorescens are killed, resulting in B.t. toxin crystals encapsulated by the dead P. fluorescens. The PMN microorganisms are therefore pesticide intermediates. The end use pesticides are used to control beetle and caterpillar pests

Submission	Chronology of Events	Major Issues
Novo Nordisk Bioindustries, Inc.		
o P92-0050 o A sporulation deficient strain of Bacillus licheniformis modified to contain alpha-amylase enzyme from a strain of Bacillus stearothermaphilus, and antibiotic resistance genes o Notice of Receipt 56 FR 56216 (November 1, l991)	o Oct. 7, 1991 submitted o December 17, l991 - Review completed. Agency took no action o Aug. 27, 1992 - Notice of Commencement (NOC) received	o Used in fermentation system o Used for enhanced production of alpha- amylase enzyme which is used in the starch, detergent and textile industries

Submission	Chronology of Events	Major Issues
Mycogen Corporation		
o P92-0244 through P92-0251 and P92-0545 through P92-0552 o Sixteen strains of Pseudomonas fluorescens genetically modified to contain delta endotoxin from Bacillus thuringiensis (B.t.) variety kurstaki (P92-0244 thru 0247, and P92-0545 through 0548) and variety san diego (P92-0248 through P92-0251, and P92-0549 through P92-552) o Two of the P. fluorescens strains, P92-0244 and P92-0248, were the subject of TMEs T91-0019 and T91-0020 o Notice of Receipt 56 FR 65254 (December 15, 1991) o For additional information, see entry for Mycogen Corporation, for T91-0019 and T91-0020 in FY 91, P92-0244 through P92-0251 and P92-0545 through P92-0552 during FY 94	o Nov. 25, '91 submitted o Jan. 30'92 - Review period extended thru April 22, ‘92 (57 FR 6722 (Feb. 27, ‘92)) o April 20, '92 - Review period extended until July 21, ‘92 (57 FR 20828 (May l5, ‘92)) o July 20, '92 - Review period extended until October 19, l992 (57 FR 33350 (July 28, l992)) o October 15, '92 - Review period extended until March l, 1993 (57 FR 48522 (Oct. 26, 1992)) o May 5, ‘92 - Submission of cell kill protocol o May 18, ‘92 - Approval of cell kill protocol o Aug. 14, ‘92 - Submission of cell kill data o Oct. 27, ‘92 - Approval of cell kill data o April 27, ‘93 - C.O. effective o Oct. 5, ‘93 - Notice of Commencement received o Sept. ‘94 - Company requests approval for new contract manufacturer site, and process change o Feb. ‘95 - C.O. modification and Contract Manufacturer Order signed	o Used in a fermentation system o The Pseudomonas fluorescens are killed, resulting in B.t. toxin crystals encapsulated by the dead P. fluorescens. The PMN microorganisms are therefore pesticide intermediates. The end use pesticides control beetle and caterpillar pests

Submission	Chronology of Events	Major Issues
Research Seeds, Inc.		
o P92-0399 through 0403 o Five strains of Rhizobium meliloti genetically engineered to contain antibiotic resistance and other genes to enhance nitrogen-fixing ability o Propose field tests which will include P88- 1116, P88-1118 and P89-0280 o Notice of Receipt 57 FR 4754 (February 7, 1992) o For additional information, see Research Seeds, Inc., entries for P92-0399 through P92-0403 during FY 93, FY 94, FY 95, and FY 97, and University of Wisconsin/USEPA Office of Research & Development entry for FY95	o Project purchased from BioTechnica International, Inc. in 1991 o Jan. 14, '92 - Submitted o April 28, '92 - C.O. & Modification signed o July 13, '92 - C.O. Modification authorizing replanting at the Marshfield site in Wisconsin; original test plot flooded o Jan. '96 - Field trials terminated o September '97, Consent Order allowing limited commercialization of P92-0403 signed o Nov. 19, 1997 - Notice of Commencement (NOC) received for P92-0403	o Environmental use o Proposed field tests are to be conducted at four University of Wisconsin Research Stations o Proposed field tests are to test effectiveness of strains in nodulating alfalfa roots, and determine effects on yield " September '97 Consent Order allows commercialization of P92-0403 with a Significant New Use Notice when production volume reaches 500,000 pounds in any 12 month period

Submission	Chronology of Events	Major Issues
Novo Nordisk Bioindustries, Inc.		
o P92-0605 o A sporulation deficient strain of Bacillus genetically modified to contain genes to enhance production of subtilisin enzyme o Notice of Receipt 57 FR 10017 (March 23, 1992)	o Feb. 28, '92 - Date submitted o April 28, 1992 - Review completed. Agency took no regulatory action o June 16, 1992 - Notice of Commencement (NOC) received	o Used in a fermentation system for enhanced production of subtilisin protease enzymes which are used in detergents

Submission	Chronology of Events	Major Issues
	No new biotechnology PMNs were reviewed; however reviews were conducted on requests for Consent Order Modifications	
Research Seeds, Inc.		
o P92-0399 through 0403 o Five strains of Rhizobium meliloti genetically engineered to contain antibiotic resistance and other genes to enhance nitrogen-fixing ability o For additional information, see Research Seeds, Inc., entries for P92-0399 through P92-0403 during FY 92, FY 94, FY 95, and FY 97, and University of Wisconsin/USEPA Office of Research & Development entry for FY95	o Project purchased from BioTechnica International, Inc., in 1991 o Mar. 12. '93 - Receipt of request to conduct additional field tests in 1993 o May 19, '93 - Agency received a request to test market limited quantities of Rhizobium meliloti, RMBPC-2 (P92-0403) o June 18, '93 - C.O. Modification approved, allowing additional field tests for '93 growing season at five sites in Wisconsin, Minnesota, and Missouri o Jan. '96 - Field trials in Wisconsin, Minnesota, and Missouri terminated. o September '97, Consent Order allowing limited commercialization of P92-0403 signed o Nov. 19, 1997 - Notice of Commencement (NOC) received for P92-0403	o Environmental use o Proposed field tests are to test effectiveness of strains in nodulating alfalfa roots, and effects on yield o Test marketing large scale field trials for RMBPC-2 (P92-0403) " September '97 Consent Order allows commercialization of P92-0403 with a Significant New Use Notice when production volume reaches 500,000 pounds in any 12 month period

Submission	Chronology of Events	Major Issues
Research Seeds, Inc.		
o P88-1275, P88-1277, P89-0340, and P89-0341 o Strains of nitrogen-fixing Bradyrhizobium japonicum genetically engineered to contain antibiotic resistance o For additional background information, see entries for BioTechnica Agriculture, Inc., for P88-1275 through P88-1278 during FY 88 and P89-0340 and P89-0341 during FY 89	o Project purchased from BioTechnica International, Inc., in 1991 o Mar. 14, '94 - Research Seeds requested a Modification to field test P88-1275 & P88-1277 along with P89-0340 and P89-0341 at two additional sites in Wisconsin o June 9, '94 - 5(e) C.O. Modification signed o Dec. '94 - Field trials terminated	o Environmental use o Field tests were to evaluate the effectiveness of the strains in nodulating soybean roots, and effects on yield
Mycogen Corporation		
o P92-0244 through P92-0251 and P92-0545 through P92-0552 o Strains of Pseudomonas fluorescens genetically modified to contain delta endotoxin from Bacillus thuringiensis o For additional information, see entry for Mycogen Corporation for P92-0244 through P92-0251 and P92-0545 through P92-0552 during FY 92	o Oct. 5, 1993 - Notice of Commencement (NOC) received o Sept. '94 - Company requests approval for new contract manufacturer site, and process change o Feb. '95 - C.O. Modification and Contract Manufacturer Order signed	o Used in a fermentation system o The Pseudomonas fluorescens are killed, resulting in B.t. toxin crystals encapsulated by the dead P. fluorescens. The PMN microorganisms are therefore pesticide intermediates. The end use pesticides control beetle and caterpillar pests

Submission	Chronology of Events	Major Issues
Research Seeds, Inc.		
o P92-0399 through 0403 o Five strains of Rhizobium meliloti genetically engineered to contain antibiotic resistance and other genes to enhance nitrogen-fixing ability o For additional background and follow-up information, see entries for Research Seeds, Inc., for P92-0399 through P92-0403 during FY 92, FY 93, FY 95, and FY 97, and University of Wisconsin/USEPA Office of Research & Development entry for FY95	o Project purchased from BioTechnica International, Inc., in 1991 o May 19, '93 - Agency received a request to test market limited quantities of Rhizobium meliloti RMBPC-2 (P92-0403) o Nov. 22, '93 - C.O. Modification for test market field trials signed; field trials not initiated. o Feb. 16, 94 - Agency received a request to change locations of the test marketing sites for RMBPC-2 (P92-0403) " Apr. '94 - C.O. Modification signed authorizing change of test market sites; initiated in Neb., and North & South Dakota o May 31, '94 - Agency received a request for commercialization of RMBPC-2 (P92-0403) o September '97, Consent Order allowing limited commercialization of P92-0403 signed o Nov. 19, 1997 - Notice of Commencement (NOC) received for P92-0403	o Environmental use o Proposed field tests are to test effectiveness of strains in nodulating alfalfa roots, and effects on yield o September '97 Consent Order allows commercialization of P92-0403 with a Significant New Use Notice when production volume reaches 500,000 pounds in any 12 month period

Submission	Chronology of Events	Major Issues
Novo Nordisk Biochemical Industries, Inc.		
o P94-1475 o Strain of Aspergillus oryzae modified to contain the gene coding for cellulase o Notice of Receipt 59 FR 40577 (August 9, '94)	o May 5, '94 - Submitted o Aug. 2, '94 - Review completed. Agency took no regulatory action o Oct. 6, 1994 - Notice of Commencement (NOC) received	o Used in a fermentation system o Cellulase to be used primarily in detergents; other potential (CBI) industrial uses exist
Solvay Enzymes, Inc.		
o P94-1540 and P94-1541 o Strain of Bacillus licheniformis modified to contain the gene coding for xylanase (P94-1540) o Strain of Bacillus licheniformis modified to contain the gene for pullulanase (P94-1541) o Notice of Receipt 59 FR 40583 (August 9, '94)	o May 19, '94 - Submitted o Aug. 16, '94 - Review completed. Agency took no regulatory action. o Nov. 27, 1996 - Notice of Commencement (NOC) received for P94-1541	o Used in a fermentation system o Xylanase to be used in the pulp and paper industry (delignification and deinking) o Pullulanase to be used in the ethanol industry.

Submission	Chronology of Events	Major Issues
Genencor International, Inc		
o P94-1558 o Strain of E. coli K-12 modified to contain the gene coding for a desired indigo production pathway o Notice of Receipt 59 FR 40583 (August 9, '94)	o May 23, '94 - Submitted o Aug. 20, '94 - Review period suspended for review of additional information submitted by company o Aug. 23, '94 - Review completed. Agency took no regulatory action	o Used in a fermentation system o Indigo used to dye cotton for denim fabrics
Research Seeds, Inc.		
o P92-0399 through 0403 o Five strains of Rhizobium meliloti genetically engineered to contain antibiotic resistance and other genes to enhance nitrogen-fixing ability o For additional background information, see Research Seeds, Inc., entries for P92-0399 through P92-0403 during FY 92, FY 93, FY 95, and FY 97	o Oct. '94 - Test Market field trials initiated in California for RMBPC-2 (P92-0403) o Jan. '95 - Biotechnology Science Advisory Committee meeting held on commercialization request for RMBPC-2 (P92-0403) o September '97, Consent Order allowing limited commercialization of P92-0403 signed o Nov. 19, 1997 - Notice of Commencement (NOC) received for P92-0403	o Environmental use o Proposed field tests are to test effectiveness of strains in nodulating alfalfa roots, and effects on yield " September '97 Consent Order allows commercialization of P92-0403 with a Significant New Use Notice when production volume reaches 500,000 pounds in any 12 month period

Submission	Chronology of Events	Major Issues
Genencor International, Inc.		
o P95-0419 o Strain of Escherichia Coli K-12 organism modified to contain naphthalene dioxygenase gene cluster from Pseudomonas putida. o Notice of Receipt 52 FR __	o Dec. '94 - Date submitted. o Jan. 26, '95 - Agency review completed; no regulatory action	o Used in fermentation system for manufacture of Indigo dye (same use as P94-1558)
University of Wisconsin/USEPA Office of Research and Development		
o P88-1118 and P92-0403 o Strains of Rhizobium meliloti genetically engineered to contain antibiotic resistance and other genes to enhance nitrogen-fixing ability	o Jan. 17, '95 - request received to modify Consent Order to allow use of P88-1118 and P92-0403 in conjunction with transgenic alfalfa plants at 2 sites in Oregon and Wisconsin o May 4, '95 - Consent Order modification became effective	o Environmental use o The purpose of these field trials is to determine the effect of transgenic alfalfa plants on the nitrogen-fixing symbiosis with Rhizobium meliloti and soil microbiology. o University of Wisconsin granted permit for the use of transgenic alfalfa plants by USDA Animal and Plant Health Inspection Service. o Research Seeds, Inc., the manufacturer of Rhizobium meliloti strains P88-1118 and P92-0403, is not involved in the conduct of these field trials

Submission	Chronology of Events	Major Issues
International TLB Research Institute		
" P95-0459 " Four strains of S. jingyangensis are added to Streptomyces and support a GN02 dinitrogen-fixer. " Notice of Receipt 52 FR __	" 12/94 - Date submitted " 1/26/95 - Submission was declared incomplete	" Environmental use " Used as a microbial fertilizer " Submission was declared incomplete because: the identities of the four intergeneric microorganisms were not well addressed; the recipient organism is a species that is not recognized by the bacteriological community; and the intended production volume and concentration of organisms in application granules were not specified
Mycogen Corporation		
" P95-1028 " Submitted with P95-1029 " Related to P92-0244 through P92-0251 and P92-0545 through P92-0552 " Intergeneric Pseudomonas fluorescens, modified to contain genes for expression of the delta endotoxin of Bacillus thuringiensis which encodes for the production of toxins selective to lepidoptera " Notice of Receipt 52 FR __	" March 30, '95 - Date submitted " July 5, '95 - Agency review completed. Decision was to hold the company to: their processing scenario, cell kill protocol, and to require monitoring of releases at the scrubber " July '95 - Consent Order effective o March 22, 1996 - Notice of Commencement (NOC) received	" The PMN microorganism is a pesticide intermediate. TSCA has jurisdiction over the living microorganism (intermediate). The final killed product is regulated under FIFRA as a pesticide active ingredient .

Submission	Chronology of Events	Major Issues
Mycogen Corporation P95-1028 (continued)		" Consent Order requires that containment protocols included with the PMN submission be followed Monitoring of releases will be required; testing will be required only if the scrubber is determined to be ineffective or the company wishes to reduce containment criteria
Mycogen Corporation " P95-1029 " Submitted with P95-1028 " Intergeneric Pseudomonas fluorescens, modified to contain genes for expression of the delta endotoxin of Bacillus thuringiensis which encodes for the production of toxins selective to lepidoptera " Notice of Receipt 52 FR __	" March 30, '95 - Date submitted " Jan. '96 - PMN withdrawn	

Submission	Chronology of Events	Major Issues
University of Tennessee		
" P95-1601 " Pseudomonas fluorescens strain HK44 with an intrageneric naphthalene degradation gene and intergeneric bioluminescent reporter gene " Notice of Receipt 52 FR __	" June 28, '95 - Date submitted " July 27, '95 - Placed into Standard Review to examine the risks to human health and the environment associated with R&D releases of the microorganism " Aug. '95 - received additional data " Oct. '95 - Division Director's decision to approve field trial and issue a Consent Order " March '96 - Consent Order effective " Field trial initiated in October '96	" Environmental use for *in situ* bioremediation of polycyclic aromatic hydrocarbons (PAH) in soil " Field trial to be conducted jointly with US Dept. of Energy (DOE) Office of Health and Envr. Research " Planned tests to take place in soil lysimeters at the DOE's Oak Ridge Natl. Laboratory in Oak Ridge, TN " Concerns for human pathogenicity of the PMN microorganism were dropped since the *P. fluorescens* microorganisms are not expected to survive at body temperature (above 37° C) " USDA Animal Plant and Health Inspection Services (APHIS) determined that the PMN microorganism is not a plant pathogen " Consent Order requires contaminated equipment, soils, and liquids to be treated to a level of no detectable cells prior to disposal

Submission	Chronology of Events	Major Issues
" P95-1601 - *continued*		" Consent Order limiting use of the PMN microorganism to R&D applications will remain in effect until information is submitted addressing: transfer rate of antibiotic resistance markers; production or increased persistence of toxic metabolites; and animal & plant pathogenicity

Submission	Chronology of Events	Major Issues
	No new biotechnology submissions were received; review of Research Seeds commercialization request was completed	
Research Seeds, Inc.		
" P92-0399 through 0403 " For additional background information, see Research Seeds, Inc., entries for P92-0399 through P92-0403 during FY 92, FY 93, FY 94 and FY 95	o September '97, Consent Order allowing limited commercialization of P92-0403 signed o Nov. 19, 1997 - Notice of Commencement (NOC) received for P92-0403	" Consent Order allows commercialization of P92-0403 with a Significant New Use Notice when production volume reaches 500,000 pounds in any 12 month period

Submission	Chronology of Events	Major Issues
Company Name Confidential		
" R98-0001 through 0003 " First TSCA Experimental Release Applications (TERAs) received under final regulations (40 C.F.R. Part 725) " 3 strains of Bradyrhizobium japonicum engineered to enhance competitiveness and/or nitrogen fixation in soybean plants " Notice of Receipt 52 FR __	" March 2, '98 - Submitted " May 6, '98 - Approved " May '98 - Field trials initiated	" Environmental Use " Field trials to be conducted at 8 small scale sites in Ohio and Wisconsin " Proposed field trials are to test competitiveness and nitrogen fixation abilities on soybeans " Antibiotic resistance "marker" genes provide monitoring capabilities
Novo Nordisk BioChem North America, Inc.		
" J98-0001 o First Microbial Commercial Activity Notice (MCAN) received under final regulations (40 C.F.R. Part 725) " Bacillus amyloliquefaciens engineered for commercial biosynthesis of an alpha-amylase enzyme, to be used in the detergent industry " Notice of Receipt, 52 FR __	" March 16, '98 - Submitted " June 15, '98 -Review completed. Agency took no regulatory action	" Used in a fermentation system for the commercial biosynthesis of an alpha-amylase enzyme in the detergents industry

Submission	Chronology of Events	Major Issues
Novo Nordisk BioChem North America, Inc.		
" J98-0002 " Bacillus lentus engineered for commercial biosynthesis of a subtilisin protease enzyme, to be used in the detergent industry " Notice of Receipt, 52 FR __	" March 16, '98 - Submitted " June 15, '98 -Review completed. Agency took no regulatory action	" Used in a fermentation system for the commercial biosynthesis of a subtilisin protease enzyme in the detergents industry
Diversa Corporation		
" J98-0003 " Pseudomonas flourescens engineered for the commercial biosynthesis of an enzyme for secondary oil recovery operations. " Notice of Receipt, 52 FR __	" July 9, '98 - Submitted	
The National Explosives Waste Technology & Evaluation Center (NEWTEC) and the Oak Ridge National Laboratory		
" R98-0004 and 0005 " Two strains of Pseudomonas putida, which have been modified to emit detectable light in the presence of trinitrotoluene (TNT)	" July 21, '98 - Submitted	